5. テクニカル・ノート

オキナワ道路整備計画準備調査

テクニカル・ノート

JICA 調査団は、サンタクルス県公共事業・土地整備局(SOPOT)と技術的な協議を実施し、添付の事項について確認した。なお、各事項については、日本での解析、外務省及び JICA との協議を経て最終的に決定される。

サンタクルス　2016 年 5 月 18 日

カルロス　ソーサ	中村友彦
局長	業務主任
サンタクルス県公共事業・土地整備局	JICA 準備調査団

添　付

1. 本テクニカル・ノートでの合意事項

本テクニカル・ノートでの合意事項は、道路舗装構造の検討方針及びボリビア側負担事項の内、現状の EIA ライセンスの取得手続き状況を反映した EIA ライセンス及び樹木の伐採・抜根許可の取得手続きのスケジュールについてである。

2014 年 8 月 29 日に署名、合意したテクニカル・ノートの内容の内、本テクニカル・ノートで更新した内容以外は有効である。

2. 道路舗装構造の検討方針

道路構造は設計交通荷重に耐えうるコンクリート層、下層路盤、構築路床から構成されるが、これらの厚さの複数の代替案を検討し、経済的な案を提案する。また、アスファルト舗装についても検討し、コンクリート舗装と比較して経済的な案を提案する。

3. ボリビア側負担事項

・EIA ライセンス及び伐採・抜根許可書の取得

ボリビア側は、Okinawa1~Okinawa3 間道路の EIA カテゴリーが「2」と決定された事を受け、抜根・伐採計画及び EIA レポートを作成し、EIA ライセンスを 2017 年 5 月 31 日までに取得する。

付属文書：2014 年 8 月 29 日に署名したテクニカル・ノート

Estudio Preparatorio para el Proyecto de Pavimentación de la Carretera Okinawa I,II,III

Memorando Técnico

La Misión de JICA mantuvo conversaciones técnicas con distintas autoridades de Bolivia tales como la Secretaría de Obras Públicas y Ordenamiento Territorial del Gobierno Autónomo Departamental de Santa Cruz (SOPOT), Servicio De Caminos (SEDCAM), Administradora Boliviana de Caminos (ABC), la Alcaldía de Santa Cruz de la Sierra y la Alcaldía de Okinawa, y confirmó los ítems descritos en el Documento Adjunto. Con respecto a cada uno de dichos ítems, se definirá después de hacer análisis de los resultados del Estudio Preparatorio y mantener conversaciones con la Cancillería del Japón y JICA.

Santa Cruz, 29 de agosto de 2014

Ing. Carlos Hugo SOSA ARREAZA
Secretario de Obras Públicas y Ordenamiento Territorial del Gobierno Autónomo Departamental de Santa Cruz

Ing. Tomohiko NAKAMURA
Jefe de los consultores
Misión del Estudio Preparatorio de JICA

Documento Adjunto

1. Contenido del Proyecto

- Pavimentación de la Carretera Okinawa (Tramo de unos 35 km de distancia desde la Intersección de Okinawa 1 hasta la de Okinawa 3) .
- Mejoramiento de Cunetas、Alcantarillas transversales y alcantarillas a las cuales fluye finalmente el agua de dichas cunetas de la mencionada Carretera
- Mejoramiento de las aceras de las comunidades habitadas, ubicadas sobre dicha Carretera (Okinawa2、San Miguel、alrededores de la Intersección de Okinawa 3)
- Señalizaciones horizontales y verticales de todo el trayecto de dicha Carretera (línea eje, etc.)
- Mejoramiento de 5 intersecciones sobre dicha Carretera (Okinawa1、Okinawa2、San Miguel、Zona Franca～Okinawa2,3、Okinawa3)
- Mejoramiento de otras intersecciones y de rampa de acceso desde la entrada de construcciones hasta dicha Carretera
- Reconstrucción del Puente

2. Normativa de estructura geométrica de camino

- Normativa de AASHTO
- Velocidad de diseño : 80km／hora
- Pendiente(bombeo) transversal vial estándar : 2 %

3. Normativa de diseño estructural para pavimentación de camino

- tipo de pavimentación : pavimentación de concreto asfáltico o de hormigón
- vida útil diseñada : 10 años en caso de la pavimentación de concreto asfáltico, 20 años en caso de la pavimentación de hormigón
- método de diseño (Normativa aplicable) : AASHTO GUIDE FOR Design of Pavement Structures (AASHTO 1993)、"Analisis de teoría elástica de multi-estrato" (Japan Road Association)

4. Perfil normal vial

・En la mayor parte del trayecto de la Carretera

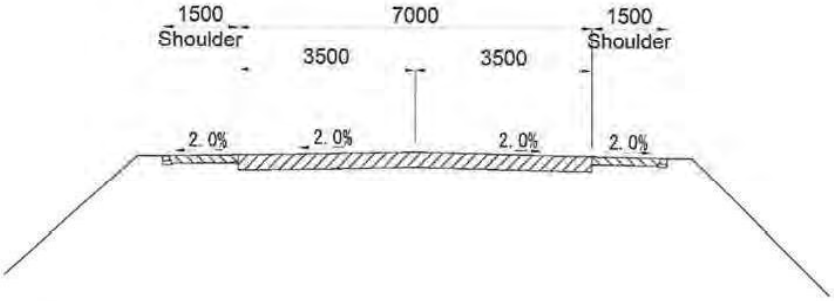


Figura 4-1 Perfil transversal normal vial en la mayor parte del trayecto de la Carretera

・Áreas habitadas

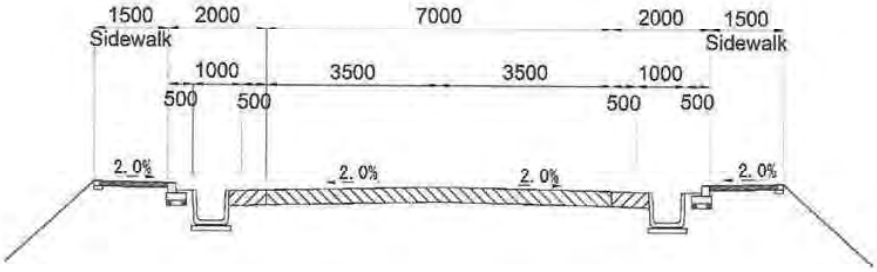


Figura 4-2 Perfil transversal normal vial en las áreas habitadas

5. Mejoramiento de canal de drenaje

Como se menciona en la Figura 5-1, las instalaciones de drenaje existentes ubicadas desde Okinawa 1 hasta el Puente, en un tramo de unos 9.7 km de distancia, están conectadas con la hidrovía existente, pasando por las alcantarillas ubicadas a lo largo de la Ruta 10.

Las instalaciones de drenaje desde dicho puente hasta Okinawa 3, en un tramo de unos 25.4 km de distancia, están conectadas con el río Pailón sobre el cual está construido dicho puente.

Para mantener la estructura vial en buen estado, se necesitará elevar la cota de la rasante del camino en tramos donde se inunda la carretera. Por lo tanto, se

instalarán alcantarillas transversales para no cambiar el drenaje de agua en momento de inundaciones.
El plan definitivo se definirá en consideración al resultado del estudio de campo que se llevará a cabo en el próximo mes de diciembre, en la época de lluvias.

Figura 5-1 Ríos・hidrovías en los alrededores de la carretera Okinawa y tramos inundados de dicha carretera

6. Mejoramiento de intersecciones y caminos de acceso

Abajo se mencionan propuestas para mejorar cada intersección.

・Intersección de Okinawa 1

La Misión mantuvo conversaciones con ABC sobre el alcance de obras (Ver el Anexo-1)

Figura 6-1 Propuesta para el mejoramiento de la Intersecciόn de Okinawa 1

・Intersección de Okinawa 2

Figur6-2 Propuesta para el mejoramiento de la Intersección Okinawa2

・Intersección de Okinawa2 y 3～Zona Franca

Con respecto al alcance de obras, la Misión mantuvo conversaciones con ingenieros encargados de diseño de SEDCAM. (Ver el Anexo-2)

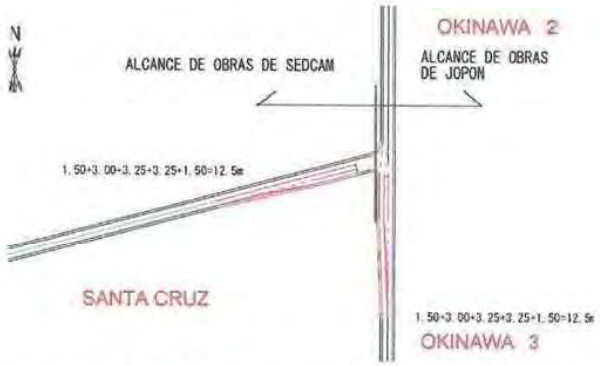


Figura 6-3 Propuesta para el mejoramiento de la Intersección de Okinawa2,3～Zona Franca

・Intersección de San Miguel

Figura 6-4 Propuesta para el mejoramiento de la Intersección de San Miguel

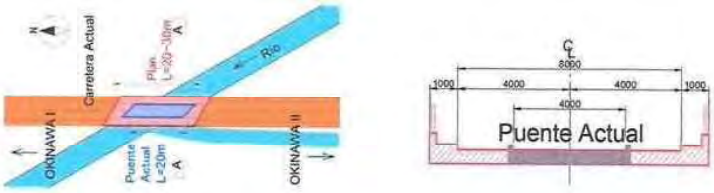
・Intersección de Okinawa 3

Con respecto al alcance de obras, la Misión mantuvo conversaciones con ingenieros encargados de diseño de SEDCAM. (Ver el Anexo-3)

Figura 6-5 Propuesta para el mejoramiento de la Intersección de Okinawa 3

7. Reconstrucción del puente

7-1 Plano de ubicación del puente a ser reconstruido

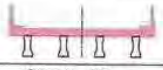
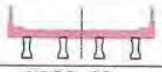


Plano　　Sección

Figura 7-1 Plano de ubicación del puente a ser reconstruido

7-2 Tipo de puente y longitud de luz

Tabla 7-1　Examen comparativo de tipo de puente

Número de luces	2 luces	1 luz	
Tipo de puente	Puente de viga I Hormigón Armado	Puente de viga I Pretensado	Puente mixto
Sección			
Longitud de puente 30m	2@15=30 m	1@30=30 m	1@30=30 m
Facilidad de ejecución	Las obras serán complicadas debido a que se necesitará estancar el río para la construcción de pilas.	Será facil hacer obras por no tener necesidad de estancar el río.	Será facil hacer obras por no tener necesidad de estancar el río.
Mantenimiento	Se necesitará poco mantenimiento por ser de hormigón.	Se necesitará poco mantenimiento por ser pretensado.	Se requiere con frecuencia el mantenimiento por ser de acero.
Plazo de obras	Se necesitará bastante tiempo para construir pilas.	No se necesitan pilas. Es posible ejecutar obras en corto tiempo .	No se necesitan pilas. Es posible ejecutar obras en corto tiempo .Sin embargo, se necesita tiempo de transporte debido a ser fabricadas en algún tercer país.
Proporción de costo de construcción	1.0	1.0	1.4
prioridad	2	1(recomendable)	3

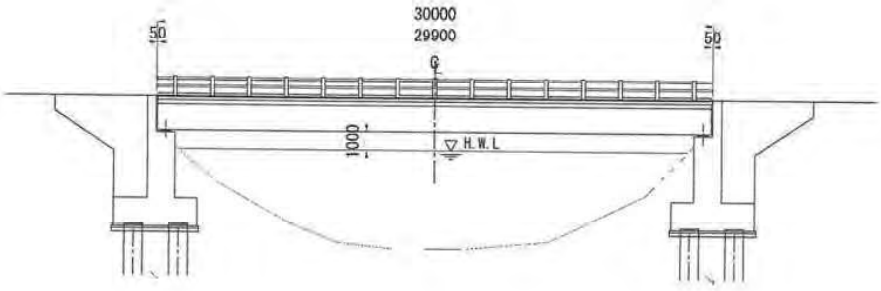


Figura 7-2 Elevación lateral y transversal del puente

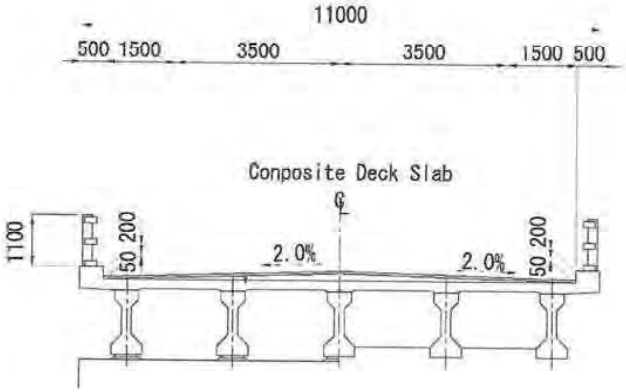


Figura 7-3 Sección transversal del puente

7-3 Normativa de diseño de puente

Método de diseño(base aplicable): Se aplicará la normativa del Japón.

Carga viva: carga viva B (equivalente a 125% de HS20-44)

Carga en momento de sismo:

Carga viva en momento de sismo : Se utilizará el coeficiente sísmico diseñada Kh=0.1.

8. Medidas de seguridad

Se asegurará la seguridad de peatones en las áreas habitadas debido a que se mejore la carretera y eleve la velocidad de vehículos. Como se menciona en la Figura. 4-2, se asegurará la seguridad de peatones a través de elevarse el nivel de superficie de

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carretera e instalarse cunetas a ambos lados de la carretera. Además, en las intersecciones se examinará a instalar pasos peatonales e instalarán marcas viales como "paso peatonal", "máxima velocidad 20km/h" y "sonorizadores".

9. Responsabilidades a ser asumidas por la parte boliviana

9-1 Consideraciones socio-ambientales

・Obtención de licencia ambiental de EIA

La parte boliviana quedó acordado con el siguiente cronograma de obtención de licencia ambiental de EIA para la Carretera Okinawa I～III.

Tabla 9-1 Cronograma de obtención de la licencia ambiental de EIA

※1 : Existe previsto presentar la Ficha ambiental entre finales de octubre y primeros de noviembre
※2 : En caso de no haber re-solicitud, se adelantará la fecha de elaboración del informe EIA
※3 : PASA = plan de seguimiento ambiental
: MM (PMM) = Plan de mitigación ambiental

・Plan de monitoreo ambiental

La parte boliviana quedó acordado con el siguiente plan de monitoreo ambiental.

Tabla 9-2 Propuesta del plan de monitoreo ambiental

Items ambientales	Items	lugar	Frecuencia arriba : antes de obras medio : durante obras abajo : despúes de obras	Entidad responsable
【antes】【durante】【despues】				
aire	$PM_{2.5}$, PM_{10}, CO, O_3, NOx, SOx, polvo,, olor Dirección de viento, velocidad de viento	Punto inicial (área urbana) , punto intermedio (entre Okinawa1 y 2) , punto intermedio (okinawa2) , punto intermedio (okinawa2～3 ㎞) , punto final (área urbana)	1 vez(antes de EIA) 1 vez／cada 3 meses 1 vez／cada 6 meses	Constructora o SOPOT
ruidos・vibraciones	Nivel de ruidos・vibraciones	Zona habitada (okinawa1,2,3,san miguel) , área escolar(okinawa2), área agrícola (entre Okinawa 1y2, entre 2 y 3)	1 vez(antes de EIA) 1 vez ／cada 3 meses 1 vez／cada 6 meses	Constructora o SOPOT
Calidad de agua	pH, SS, COD, DO, aceites, conductividad, turbiedad, olor, color	pozo(uno o dos・cerca de la carretera)	1 vez(antes de EIA) 1 vez ／cada 3 meses 1 vez／cada 6 meses	Constructora o SOPOT
biosfera	Fauna y flora	Okinawa1～3 (dentro del Derecho de vía)	1 vez(antes de EIA) 1 vez ／cada 3 meses 1 vez／cada 6 meses	Constructora o SOPOT

・Con respecto al monitoreo ambiental previo

La parte boliviana, de acuerdo con el plan de monitoreo ambiental previo arriba descrito, acordó con la ejecución de monitoreo ambiental previo como parte de responsabilidades a ser asumidas por el país receptor del Proyecto. La parte boliviana informará a la parte japonesa el resultado de dicho monitoreo.

・Obtención de permiso de desmonte y poda de árboles

La parte boliviana acordó con la obtenciíon de permiso de desmonte y corte de árboles que hay entre Okinawa 1 ～Okinawa 3, de acuerdo con el cronograma de desmonte y corte de árboles.

Tabla 9-3 Cronograma de obtención de permiso de desmonte y corte de árboles.

(※1 PASA=plan de seguimiento ambiental
MM (PMM)=plan de mitigación ambiental

9-2 Traslado de instalaciones (tuberías de agua, postes de energía eléctrica, etc.) y de casetas de vigilancia

La parte boliviana, con base al plano esquemático de mejoramiento de dicha Carretera y plano de ubicación de instalaciones como tuberías de agua, postes de energía eléctrica y casetas de vigilancia que se adjuntarán al Borrador del Informe Final, que se presentará en marzo de 2015, terminará de desplazar las instalacioes necesarias antes de la convocatoria de precalificación de constructoras (posiblemente en octubre de 2015).

9-3 Disposición del campamento provisional para obras y de botadero de residuos

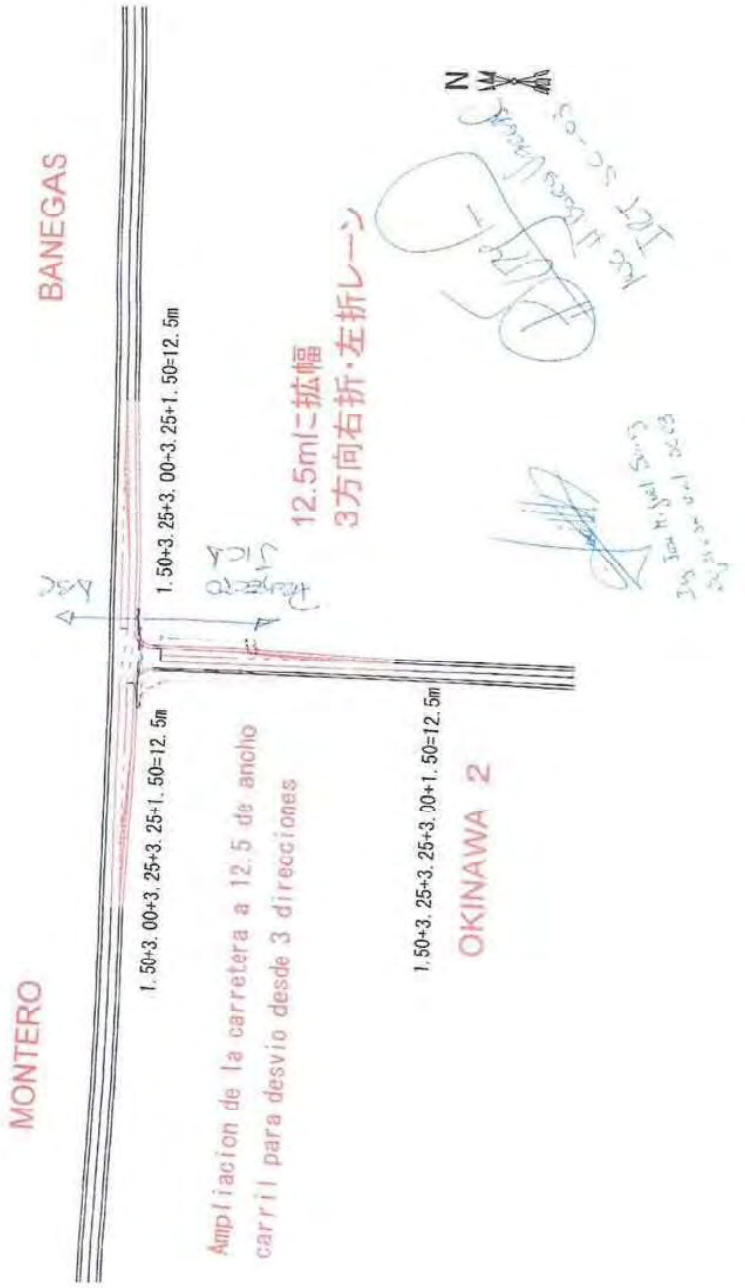
La parte boliviana, consultando con los consultores y constructoras a la hora del inicio de obras, dispondrá de un patio o área provisional para colocar materiales y equipos, construir plantas y campamento. La extensión de dicho patio será de varias hectáreas a definirse. Además, asegurará un botadero de residuos sólidos cerca del sitio de obras. La Alcaldía de Okinawa asegurará un

patio provisional (1 hectárea) para obras cerca de Okinawa 2. Y, está de acuerdo con el uso de botadero ubicado a unos 14 km al norte de Okinawa 1.

9-4 Impulso de mejoramiento de los caminos en sus contornos

La parte boliviana, con el fin de lograr más eficacia del mejoramiento de la Carretera Okinawa, impulsará a distintas ejecutoras, del Proyecto de pavimentación de la carretera entre Santa Cruz y Okinawa3 (Proyecto de la Gobernación de Santa Cruz y de la Alcaldía de Santa Cruz de la Sierra)、Mejoramento de la Ruta 10 entre Okinawa1～Los Troncos (Proyecto de ABC)、y Construcción del Puente Banegas (Proyecto de ABC) , para que terminen dichos Proyectos antes de finales del año 2017.

Anexo-1 Conversaciones sobre la interseccion Okinawa1



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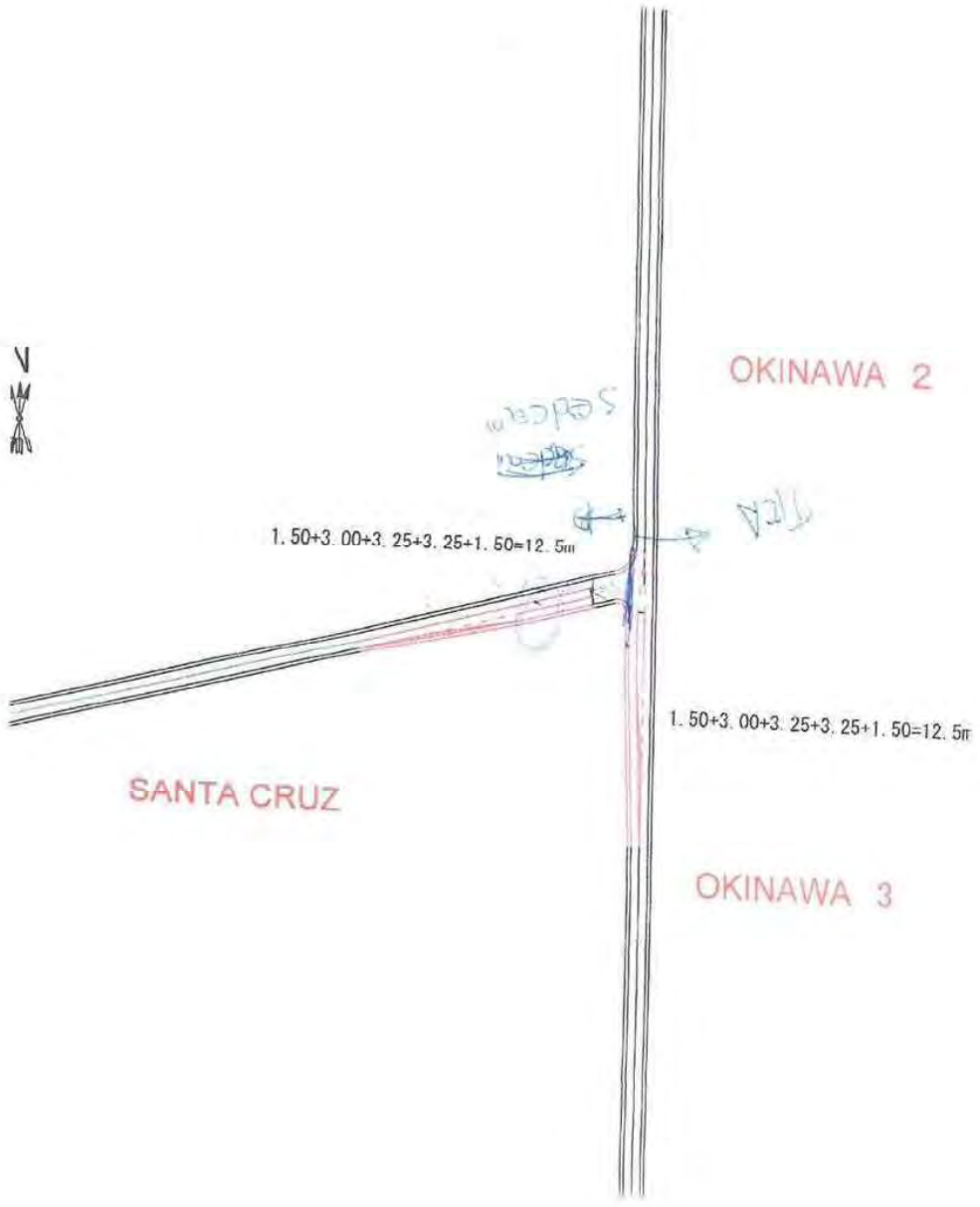
Anexo-2 Conversacion sobre la intersseccion Zona Franca～Okinawa2,3



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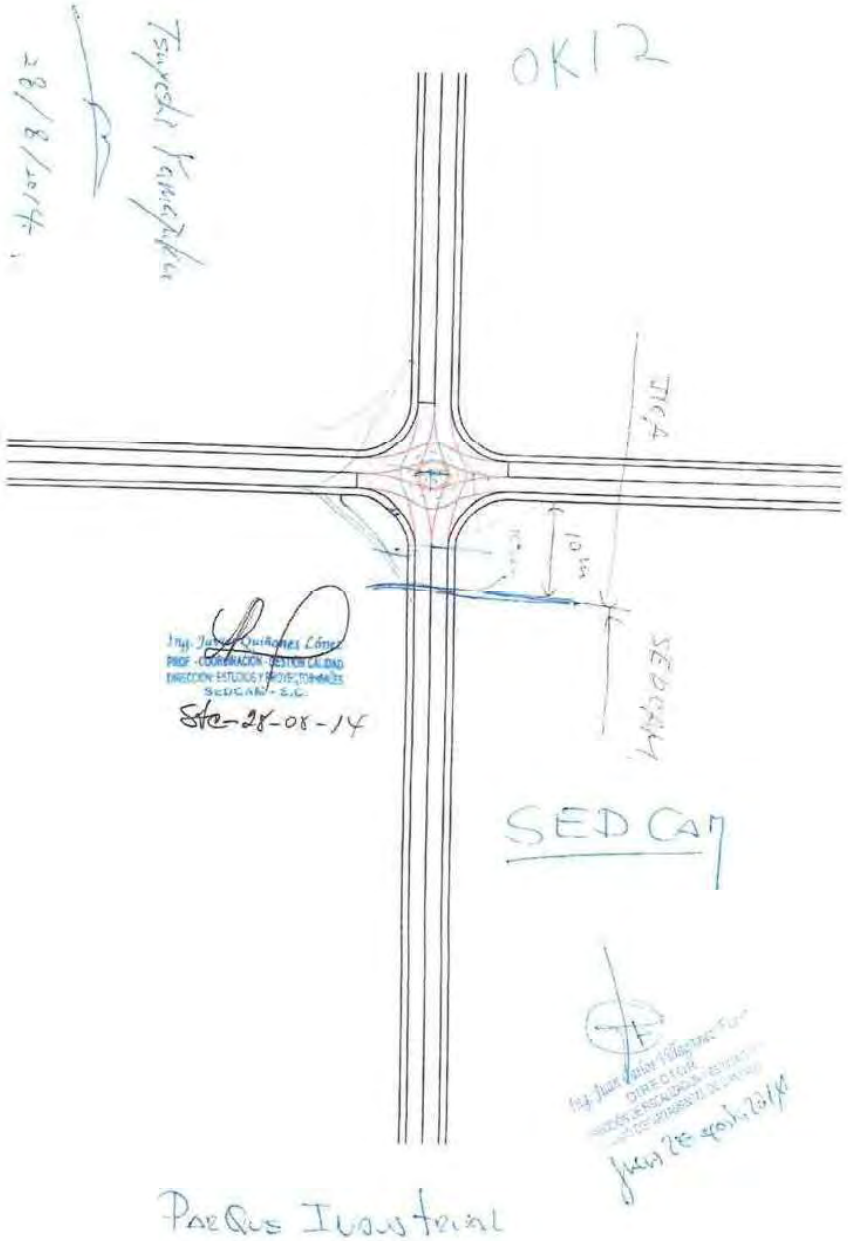
Anexo-3 Conversacion sobre la intersseccion de Okinawa3



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Estudio Preparatorio para el Proyecto de Pavimentación de la Carretera Okinawa I,II,III

Memorando Técnico

La Misión de JICA mantuvo conversaciones técnicas con la Secretaría de Obras Públicas y Ordenamiento Territorial del Gobierno Autónomo Departamental de Santa Cruz (SOPOT) y confirmó los ítems descritos en el Documento Adjunto. Con respecto a cada uno de dichos ítems, se definirá después de hacer análisis y mantener conversaciones con la Cancillería del Japón y JICA.

Santa Cruz, 18 de mayo de 2016

Ing. Carlos Hugo SOSA A.
Secretario de Obras Públicas y Ordenamiento Territorial del Gobierno Autónomo Departamental de Santa Cruz

Ing. Tomohiko NAKAMURA
Jefe de los consultores
Misión del Estudio Preparatorio de JICA

Documento Adjunto

1. **Ïtems acordados en el presente Memorando Técnico**

   Los ítems acordados en el presente Memorando Técnico, dentro de los lineamientos del análisis de la estructura de pavimentación de las carreteras y las responsabilidades a asumirse por la parte boliviana: los trámites para conseguir Licencia Ambiental y el permiso de ABT para corte y desmonte de árboles.

   Dentro del contenido del Memorando Técnico, firmado el día 29 de agosto de 2014, los ítems son vigentes salvo el contenido renovado en el presente Memorando Técnico.

2. **Líneamientos para el análisis de la estructura de pavimentación de carretera**

   La estructura de carretera se compondrá de capa de hormigón que pueda resistir a la carga de tráfico diseñada , subbase y plataforma (o subrasante) a construirse. Sin embargo, se analizarán distintas opciones del espesor y se propondrá una opcion económica. También, se analizará la pavimentación asfáltica y se propondrá una opción económica en comparación con la pavimentación de hormigón.

3. **Responsabilidades a asumirse por la parte boliviana**

   ・Obtención dela Licencia Ambiental y el permiso de tala y desmonte

   Debido a que se ha definido la categoría "2" para la Carretera Okinawa1~Okinawa3, la parte boliviana elaborará un informe del EEIA y plan de tala y desmonte de árboles , y obtendrá la Licencia Ambiental antes del día 31 de mayo de 2017.

Documento Anexo : Memorando Técnico firmado el día 29 de agosto de 2014

Estudio Preparatorio para el Proyecto de Pavimentación de la Carretera Okinawa I,II,III

Memorando Técnico

La Misión de JICA mantuvo conversaciones técnicas con distintas autoridades de Bolivia tales como la Secretaría de Obras Públicas y Ordenamiento Territorial del Gobierno Autónomo Departamental de Santa Cruz (SOPOT), Servicio De Caminos (SEDCAM), Administradora Boliviana de Caminos (ABC), la Alcaldía de Santa Cruz de la Sierra y la Alcaldía de Okinawa, y confirmó los ítems descritos en el Documento Adjunto. Con respecto a cada uno de dichos ítems, se definirá después de hacer análisis de los resultados del Estudio Preparatorio y mantener conversaciones con la Cancillería del Japón y JICA.

Santa Cruz, 29 de agosto de 2014

Ing. Carlos Hugo SOSA ARREAZA
Secretario de Obras Públicas y Ordenamiento Territorial del Gobierno Autónomo Departamental de Santa Cruz

Ing. Tomohiko NAKAMURA
Jefe de los consultores
Misión del Estudio Preparatorio de JICA

Documento Adjunto

1. **Contenido del Proyecto**
   - Pavimentación de la Carretera Okinawa (Tramo de unos 35 km de distancia desde la Intersección de Okinawa 1 hasta la de Okinawa 3) .
   - Mejoramiento de Cunetas、Alcantarillas transversales y alcantarillas a las cuales fluye finalmente el agua de dichas cunetas de la mencionada Carretera
   - Mejoramiento de las aceras de las comunidades habitadas, ubicadas sobre dicha Carretera (Okinawa2、San Miguel、alrededores de la Intersección de Okinawa 3)
   - Señalizaciones horizontales y verticales de todo el trayecto de dicha Carretera (línea eje, etc.)
   - Mejoramiento de 5 intersecciones sobre dicha Carretera (Okinawa1、Okinawa2、San Miguel、Zona Franca~Okinawa2,3、Okinawa3)
   - Mejoramiento de otras intersecciones y de rampa de acceso desde la entrada de construcciones hasta dicha Carretera
   - Reconstrucción del Puente

2. **Normativa de estructura geométrica de camino**
   - Normativa de AASHTO
   - Velocidad de diseño : 80km／hora
   - Pendiente(bombeo) transversal vial estándar : 2 %

3. **Normativa de diseño estructural para pavimentación de camino**
   - tipo de pavimentación : pavimentación de concreto asfáltico o de hormigón
   - vida útil diseñada : 10 años en caso de la pavimentación de concreto asfáltico, 20 años en caso de la pavimentación de hormigón
   - método de diseño (Normativa aplicable) : AASHTO GUIDE FOR Design of Pavement Structures (AASHTO 1993)、"Analisis de teoría elástica de multi-estrato" (Japan Road Association)

4. **Perfil normal vial**

· En la mayor parte del trayecto de la Carretera

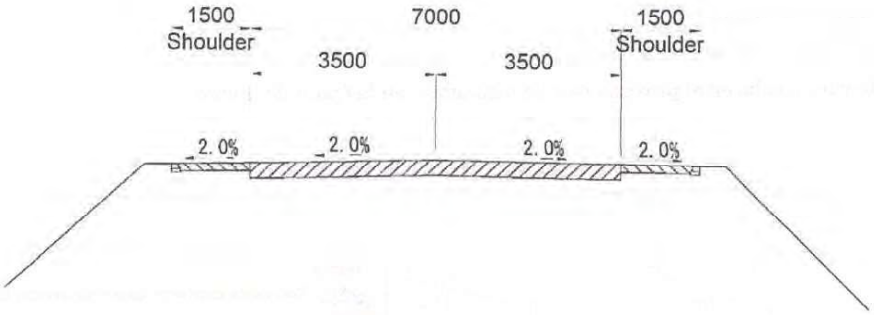


Figura 4-1 Perfil transversal normal vial en la mayor parte del trayecto de la Carretera

· Áreas habitadas

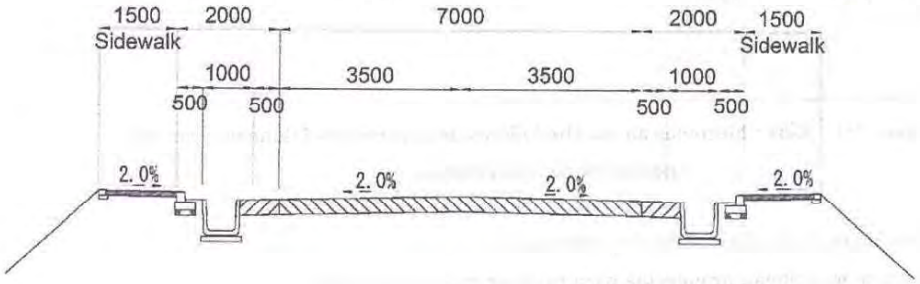


Figura 4-2 Perfil transversal normal vial en las áreas habitadas

5. **Mejoramiento de canal de drenaje**

Como se menciona en la Figura 5-1, las instalaciones de drenaje existentes ubicadas desde Okinawa 1 hasta el Puente, en un tramo de unos 9.7 km de distancia, están conectadas con la hidrovía existente, pasando por las alcantarillas ubicadas a lo largo de la Ruta 10.

Las instalaciones de drenaje desde dicho puente hasta Okinawa 3, en un tramo de unos 25.4 km de distancia, están conectadas con el río Pailón sobre el cual está construido dicho puente.

Para mantener la estructura vial en buen estado, se necesitará elevar la cota de la rasante del camino en tramos donde se inunda la carretera. Por lo tanto, se

instalarán alcantarillas transversales para no cambiar el drenaje de agua en momento de inundaciones.

El plan definitivo se definirá en consideración al resultado del estudio de campo que se llevará a cabo en el próximo mes de diciembre, en la época de lluvias.

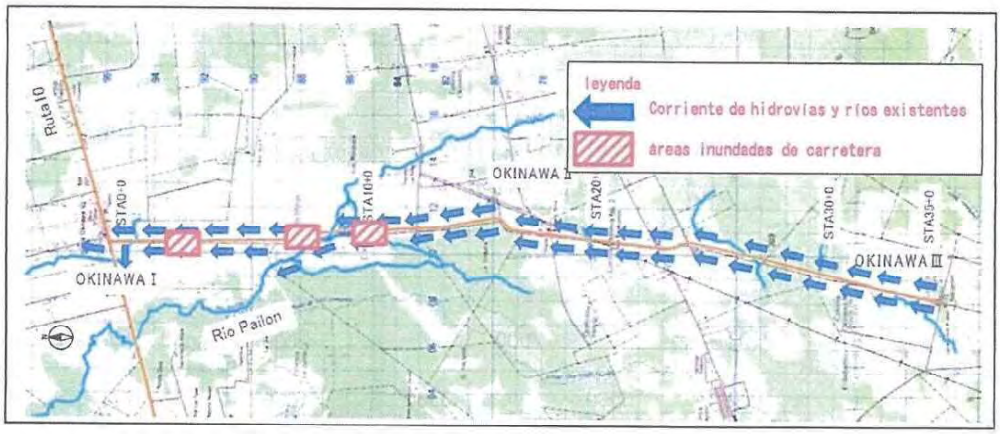


Figura 5-1 Ríos・hidrovías en los alrededores de la carretera Okinawa y tramos inundados de dicha carretera

6. Mejoramiento de intersecciones y caminos de acceso

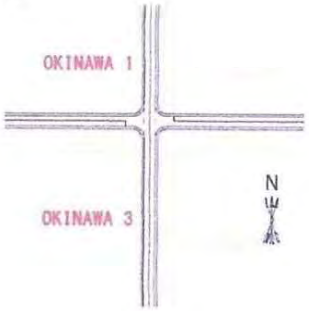
Abajo se mencionan propuestas para mejorar cada intersección.

・Intersección de Okinawa 1

La Misión mantuvo conversaciones con ABC sobre el alcance de obras (Ver el Anexo-1)

Figura 6-1 Propuesta para el mejoramiento de la Intersecciόn de Okinawa 1

・Intersección de Okinawa 2



Figur6-2 Propuesta para el mejoramiento de la Intersección Okinawa2

・Intersección de Okinawa2 y 3～Zona Franca

Con respecto al alcance de obras, la Misión mantuvo conversaciones con ingenieros encargados de diseño de SEDCAM. (Ver el Anexo-2)

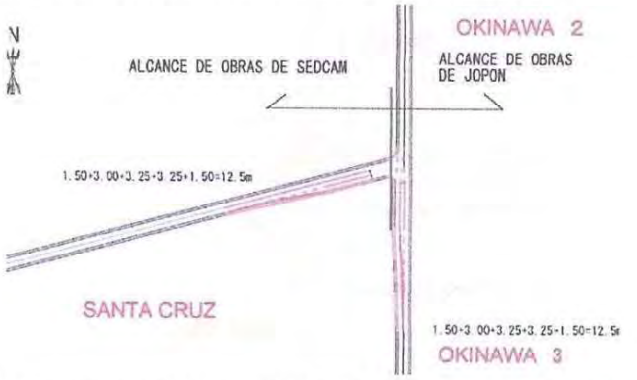


Figura 6-3 Propuesta para el mejoramiento de la Intersección de Okinawa2,3～Zona Franca

・Intersección de San Miguel

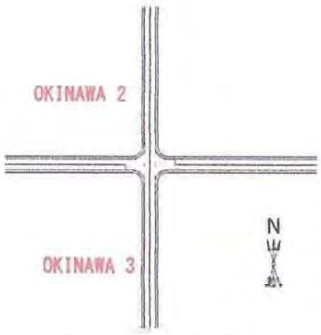


Figura 6-4 Propuesta para el mejoramiento de la Intersección de San Miguel

・Intersección de Okinawa 3

Con respecto al alcance de obras, la Misión mantuvo conversaciones con ingenieros encargados de diseño de SEDCAM. (Ver el Anexo-3)

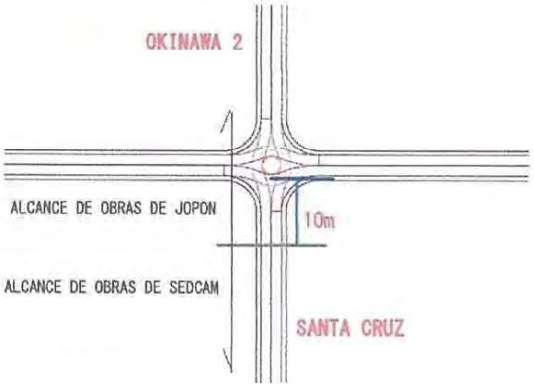


Figura 6-5 Propuesta para el mejoramiento de la Intersección de Okinawa 3

7. Reconstrucción del puente

7-1 Plano de ubicación del puente a ser reconstruido

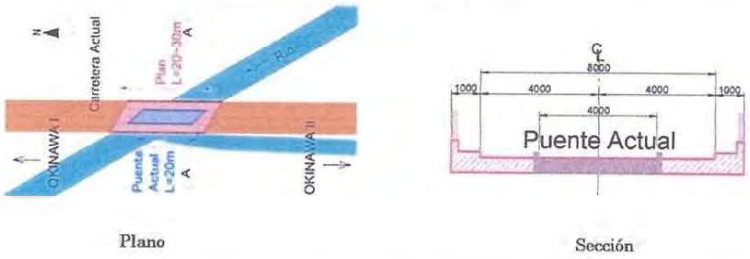
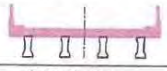
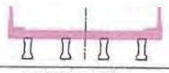
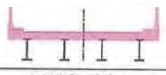


Figura 7-1 Plano de ubicación del puente a ser reconstruido

7-2 Tipo de puente y longitud de luz

Tabla 7-1 Examen comparativo de tipo de puente

Número de luces	2 luces	1 luz	
Tipo de puente	Puente de viga I Hormigón Armado	Puente de viga I Pretensado	Puente mixto
Sección			
Longitud de puente 30m	2@15=30 m	1@30=30 m	1@30=30 m
Facilidad de ejecución	Las obras serán complicadas debido a que se necesitará estancar el río para la construcción de pilas.	Será facil hacer obras por no tener necesidad de estancar el río.	Será facil hacer obras por no tener necesidad de estancar el río.
Mantenimiento	Se necesitará poco mantenimiento por ser de hormigón.	Se necesitará poco mantenimiento por ser pretensado.	Se requiere con frecuencia el mantenimiento por ser de acero.
Plazo de obras	Se necesitará bastante tiempo para construir pilas.	No se necesitan pilas. Es posible ejecutar obras en corto tiempo .	No se necesitan pilas. Es posible ejecutar obras en corto tiempo .Sin embargo, se necesita tiempo de transporte debido a ser fabricadas en algún tercer país.
Proporción de costo de construcción	1.0	1.0	1.4
prioridad	2	1(recomendable)	3

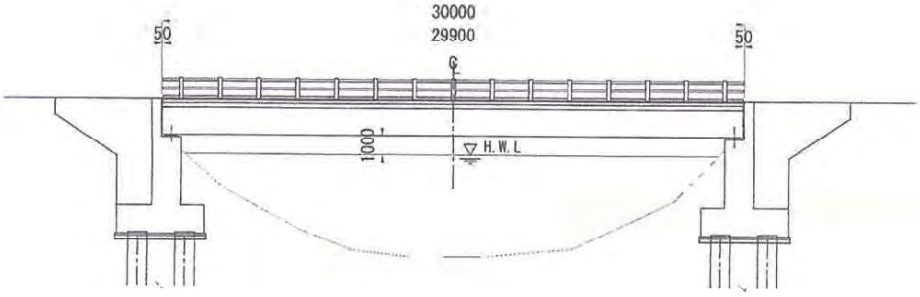


Figura 7-2 Elevación lateral y transversal del puente

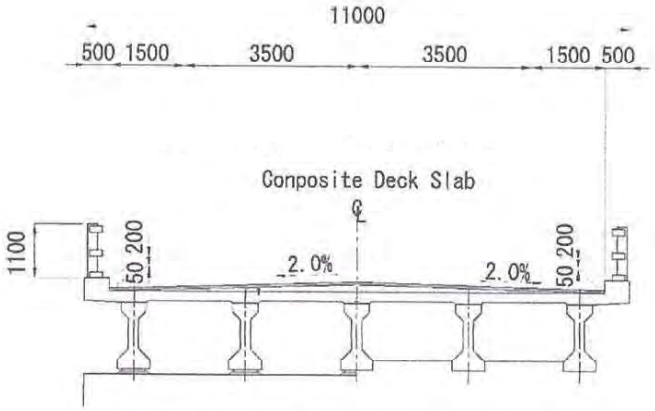


Figura 7-3 Sección transversal del puente

7-3 Normativa de diseño de puente

Método de diseño(base aplicable): Se aplicará la normativa del Japón.

Carga viva: carga viva B (equivalente a 125% de HS20-44)

Carga en momento de sismo:

Carga viva en momento de sismo : Se utilizará el coeficiente sísmico diseñada Kh=0.1.

8. Medidas de seguridad

Se asegurará la seguridad de peatones en las áreas habitadas debido a que se mejore la carretera y eleve la velocidad de vehículos. Como se menciona en la Figura. 4-2, se asegurará la seguridad de peatones a través de elevarse el nivel de superficie de

carretera e instalarse cunetas a ambos lados de la carretera. Además, en las intersecciones se examinará a instalar pasos peatonales e instalarán marcas viales como "paso peatonal", "máxima velocidad 20km/h" y "sonorizadores".

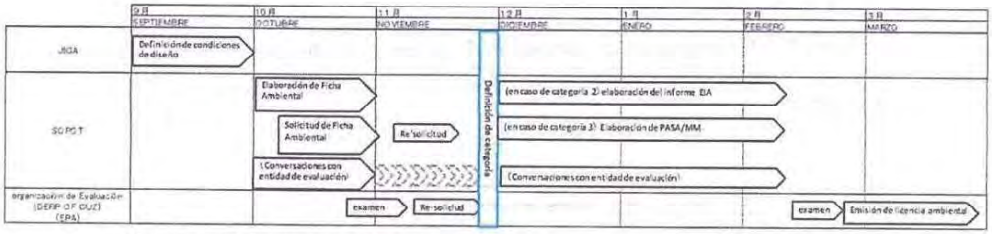
9. Responsabilidades a ser asumidas por la parte boliviana

9-1 Consideraciones socio-ambientales

・Obtención de licencia ambiental de EIA

La parte boliviana quedó acordado con el siguiente cronograma de obtención de licencia ambiental de EIA para la Carretera Okinawa I～III.

Tabla 9-1 Cronograma de obtención de la licencia ambiental de EIA



※1 : Está previsto presentar la ficha ambiental entre finales de octubre y primeros de noviembre
※2 : En caso de no haber re-solicitud, se adelantará la fecha de elaboración del informe EIA
※3 : PASA = plan de seguimiento ambiental
: MM (PMM) = Plan de mitigación ambiental

・Plan de monitoreo ambiental

La parte boliviana quedó acordado con el siguiente plan de monitoreo ambiental.

Tabla 9-2 Propuesta del plan de monitoreo ambiental

Items ambientales	Items	lugar	Frecuencia arriba : antes de obras medio : durante obras abajo : despoés de obras	Entidad responsable
【antes】【durante 】【después】				
aire	$PM_{2.5}$, PM_{10}, CO, O_2, NOx, SOx, polvo,. olor Dirección de viento, velocidad de viento	Punto inicial (área urbana) , punto intermedio (entre Okinawa1 y 2) , punto intermedio (okinawa2) , punto intermedio (okinawa2～3 ㎞) , punto final (área urbana)	1 vez(antes de EIA) 1 vez／cada 3 meses 1 vez／cada 6 meses	Constructora o SOPOT
ruidos・vibraciones	Nivel de ruidos・vibraciones	Zona habitada (okinawa1,2,3,san miguel) , área escolar(okinawa2), área agricola (entre Okinawa 1y2, entre 2 y 3)	1 vez(antes de EIA) 1 vez ／cada 3 meses 1 vez／cada 6 meses	Constructora o SOPOT
Calidad de agua	pH, SS, COD, DO, aceites, conductividad, turbiedad, olor, color	pozo(uno o dos・cerca de la carretera)	1 vez(antes de EIA) 1 vez ／cada 3 meses 1 vez／cada 6 meses	Constructora o SOPOT
biósfera	Fauna y flora	Okinawa1～3 (dentro del Derecho de via)	1 vez(antes de EIA) 1 vez ／cada 3 meses 1 vez／cada 6 meses	Constructora o SOPOT

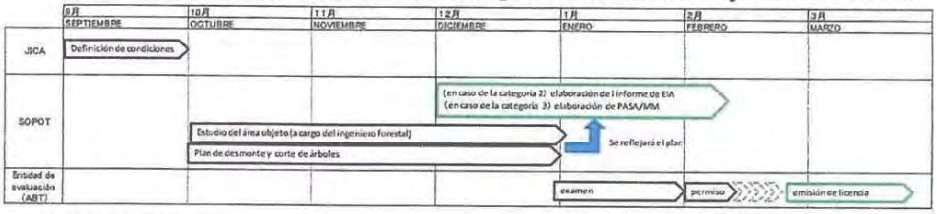
・Con respecto al monitoreo ambiental previo

La parte boliviana, de acuerdo con el plan de monitoreo ambiental previo arriba descrito, acordó con la ejecución de monitoreo ambiental previo como parte de responsabilidades a ser asumidas por el país receptor del Proyecto. La parte boliviana informará a la parte japonesa el resultado de dicho monitoreo.

・Obtención de permiso de desmonte y poda de árboles

La parte boliviana acordó con la obtenciíon de permiso de desmonte y corte de árboles que hay entre Okinawa 1 ～Okinawa 3, de acuerdo con el cronograma de desmonte y corte de árboles.

Tabla 9-3 Cronograma de obtención de permiso de desmonte y corte de árboles.



※1 : PASA=plan de seguimiento ambiental
MM (PMA)=plan de mitigación ambiental

9-2 Traslado de instalaciones (tuberías de agua, postes de energía eléctrica, etc.) y de casetas de vigilancia

La parte boliviana, con base al plano esquemático de mejoramiento de dicha Carretera y plano de ubicación de instalaciones como tuberías de agua, postes de energía eléctrica y casetas de vigilancia que se adjuntarán al Borrador del Informe Final, que se presentará en marzo de 2015, terminará de desplazar las instalacioes necesarias antes de la convocatoria de precalificación de constructoras (posiblemente en octubre de 2015).

9-3 Disposición del campamento provisional para obras y de botadero de residuos

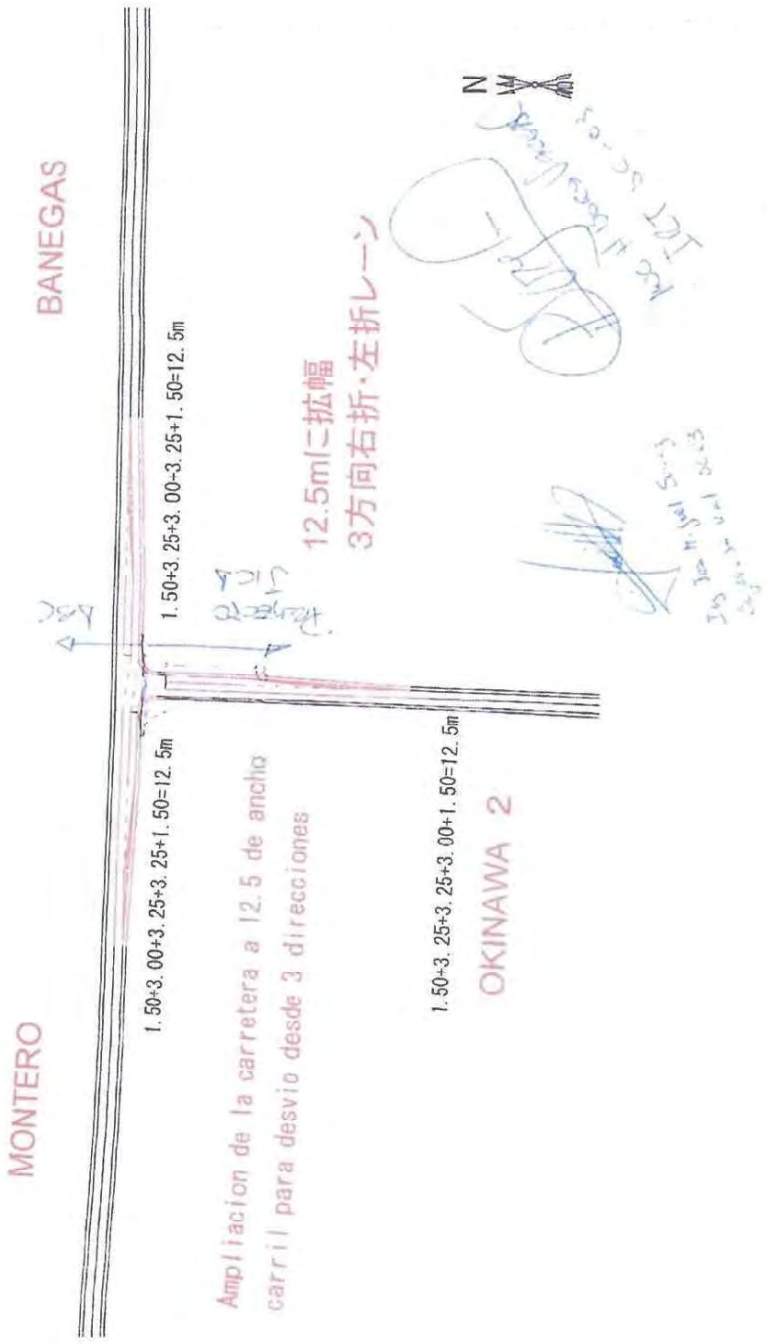
La parte boliviana, consultando con los consultores y constructoras a la hora del inicio de obras, dispondrá de un patio o área provisional para colocar materiales y equipos, construir plantas y campamento. La extensión de dicho patio será de varias hectáreas a definirse. Además, asegurará un botadero de residuos sólidos cerca del sitio de obras. La Alcaldía de Okinawa asegurará un

patio provisional (1 hectárea) para obras cerca de Okinawa 2. Y, está de acuerdo con el uso de botadero ubicado a unos 14 km al norte de Okinawa 1.

9-4 Impulso de mejoramiento de los caminos en sus contornos

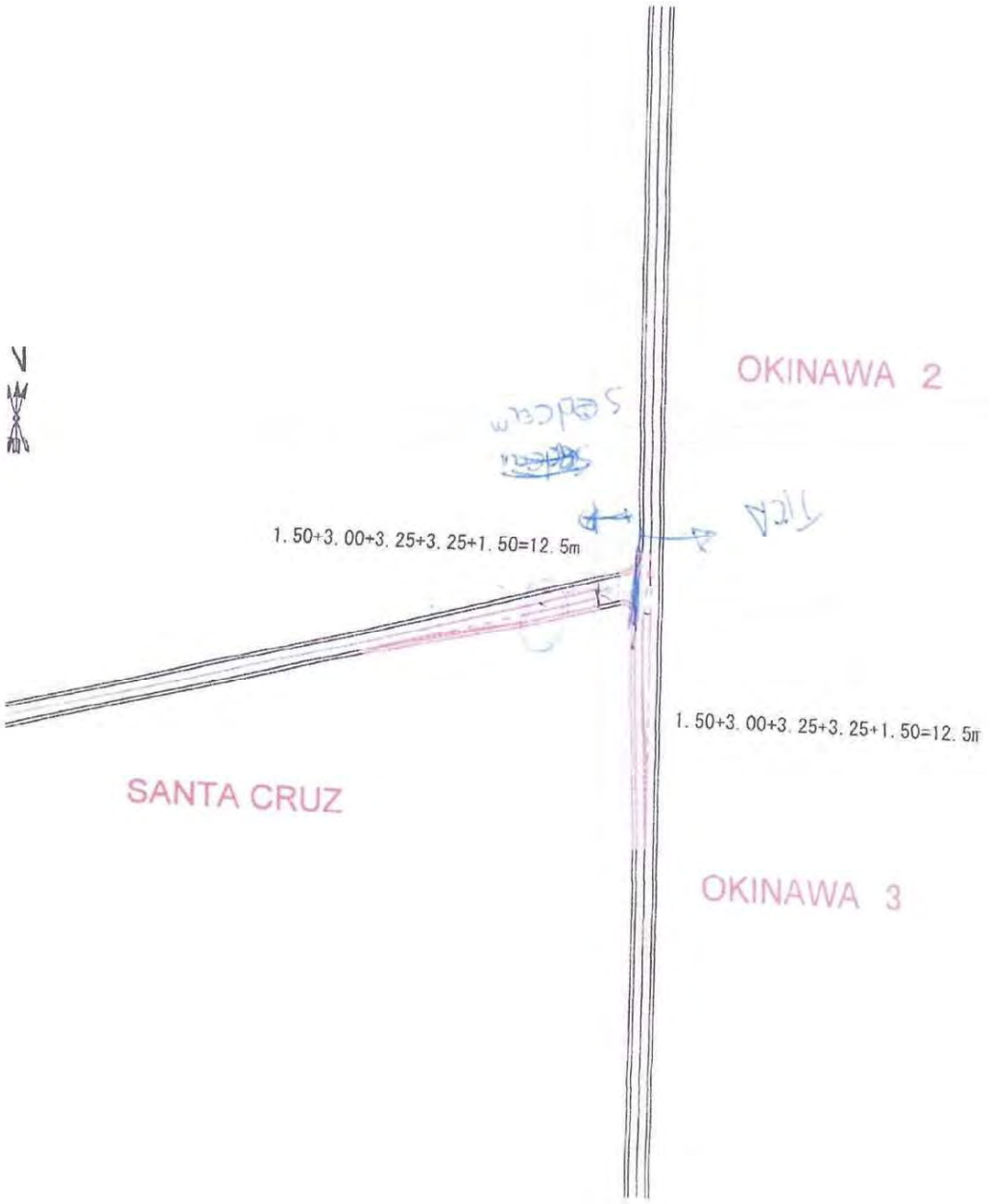
La parte boliviana, con el fin de lograr más eficacia del mejoramiento de la Carretera Okinawa, impulsará a distintas ejecutoras, del Proyecto de pavimentación de la carretera entre Santa Cruz y Okinawa3 (Proyecto de la Gobernación de Santa Cruz y de la Alcaldía de Santa Cruz de la Sierra)、Mejoramento de la Ruta 10 entre Okinawa1～Los Troncos (Proyecto de ABC)、y Construcción del Puente Banegas (Proyecto de ABC) , para que terminen dichos Proyectos antes de finales del año 2017.

Anexo-1 Conversaciones sobre la interseccion Okinawa1



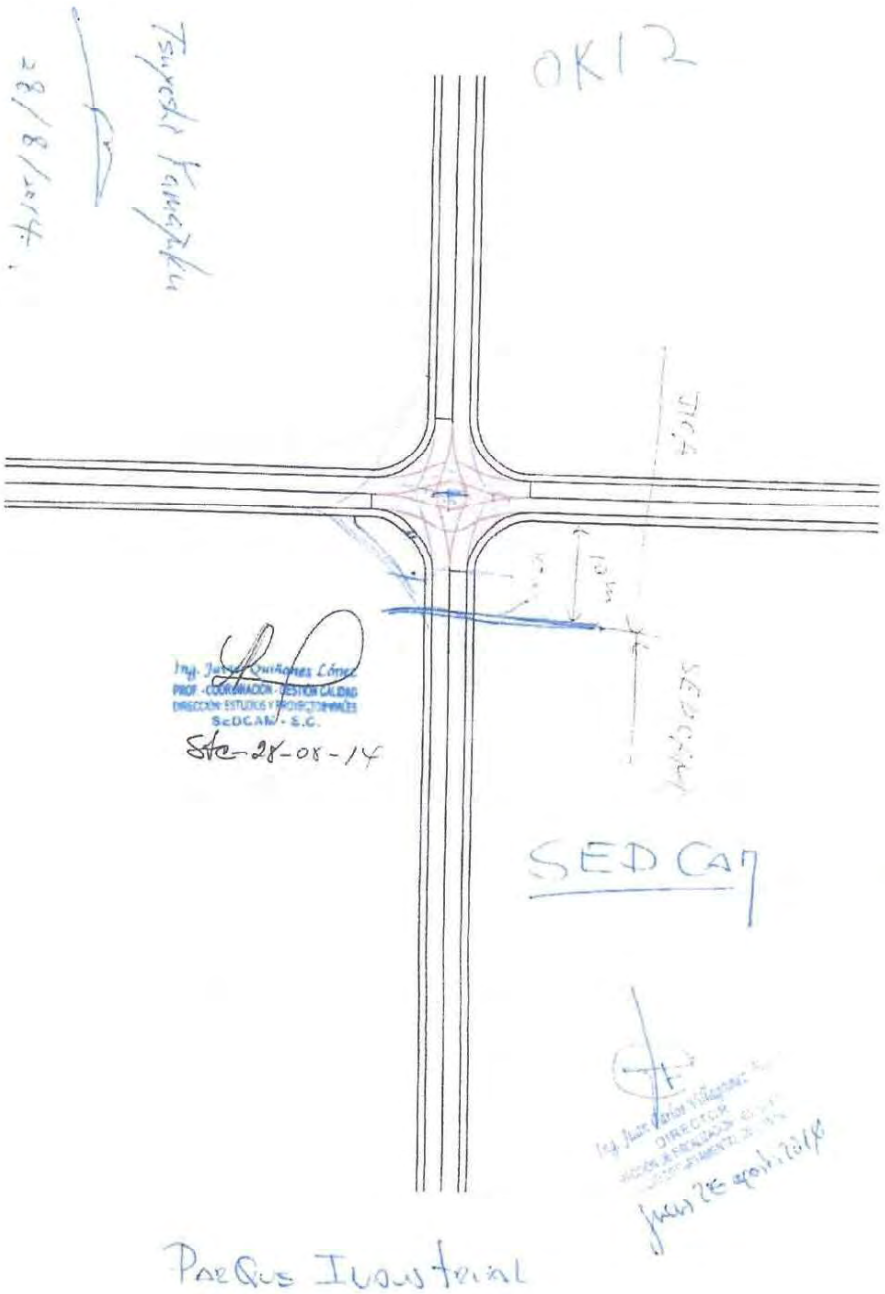
12

Anexo-2 Conversacion sobre la intersseccion Zona Franca～Okinawa2,3



13

Anexo-3 Conversacion sobre la intersseccion de Okinawa3



6. 環境社会配慮【EI(EIA)裁定書】

EI 裁定書（DIA）（仮訳）

070202/06/DIA/No7059/18.

国家環境管轄機関は証明する：

環境法 1333 号を遵守し、且つ、環境・生物の多様性、環境予防・管理規定（RPCA）の評価手続きに基づき　、カルロス・ウーゴ・ソサ・アレアサが代理人となるサンタクルス県自治政府は、環境申請書 7059/15 及び「オキナワ I-II-III 道路建設」の EIA-解析調査を提出した。同プロジェクトはサンタクルス県ワルネス郡オキナワ市をサイトとしている。環境の視点から判断して最低限の必要条件を満たしており、よって同プロジェクトの実施を許可する。

EI 裁定書(DIA)は、環境予防・管理規定に定めている点検・監視・管理手続きを実施するために、承認済み EIA 調査、特に、防止・緩和プログラム（PPM）及び適用・環境フォローアップ計画（PASA）と共に構成されている。

上記の計画及び EIA 調査に記載されていることを確実に遂行しない場合には、上記法律 1333 号及びその規定（大統領令 24176）及び関連法規に基づいて制裁が適用される。

しかるべき目的のために認証する。

環境・気候変動局長

環境・生物の多様性・気候変動・森林管理

及び開発次官室

マリア・クリスチーナ・アレジャノ・デ・フランク

環境・水資源省次官

環境・生物の多様性・気候変動・森林管理

環境・水資源省

シンサ・ビビアナ・シルバ・マツラナ

ラパス、２０１８年1月２９日

DECLARATORIA DE IMPACTO AMBIENTAL (DIA)
070202/06/DIA/Nº 7059/18.

LA AUTORIDAD AMBIENTAL COMPETENTE NACIONAL

CERTIFICA:

Que, dando cumplimiento al artículo 25° de la Ley Nº 1333 del Medio Ambiente, y con ajustes al Procedimiento de Evaluación de Impacto Ambiental del Reglamento de Prevención y Control Ambiental (RPCA), el **Gobierno Autónomo Departamental de Santa Cruz,** legalmente representado por el **Ing. Carlos Hugo Sosa Arreaza**, ha presentado la Ficha Ambiental Nº 7059/15 y el correspondiente Estudio de Evaluación de Impacto Ambiental – Analítico Específico del proyecto **"CONSTRUCCIÓN CARRETERA OKINAWA I - II - III"**, el mismo se encuentra ubicado en el municipio de Okinawa I, provincia Warnes del departamento de Santa Cruz, habiéndose cumplido con los requisitos mínimos desde el punto de vista ambiental, por lo cual queda autorizada la implementación del proyecto.

La presente Declaratoria de Impacto Ambiental (DIA) se constituye conjuntamente el Estudio de Evaluación de Impacto Ambiental aprobado, en particular con el Programa de Prevención y Mitigación (PPM) y el Plan de Aplicación y Seguimiento Ambiental (PASA), en referencia para la realización de los Procedimientos de inspección, vigilancia y control, establecidos en el Reglamento de Prevención y Control Ambiental.

En caso de no darse estricto cumplimiento a lo previsto en los planes anteriormente mencionados y el Estudio de Evaluación de Impacto Ambiental, se aplicarán las sanciones previstas en la Ley Nº 1333 sus Reglamentos (Decreto Supremo 24176) y demás disposiciones conexas.

Es cuanto certifico para los fines consiguientes.

Lic. María Cristina Arellano de Frank
DIRECTORA GENERAL DE MEDIO
AMBIENTE Y CAMBIOS CLIMATICOS
VMABCCGDF - MMAyA

Cynthia Viviana Silva Maturana
VICEMINISTRA DE MEDIO AMBIENTE,
BIODIVERSIDAD,CAMBIOS CLIMATICOS Y
DE GESTIÓN Y DESARROLLO FORESTAL
MMAyA

La Paz, 29 de enero de 2018.

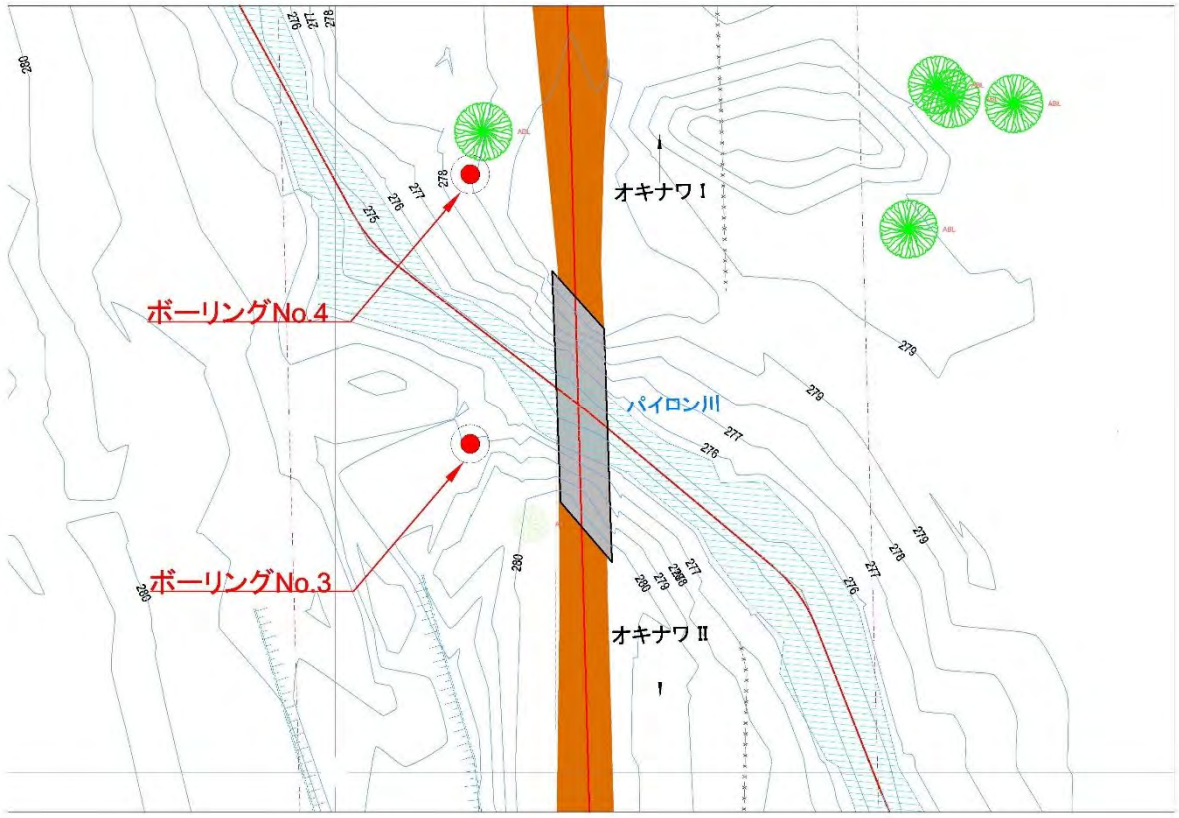
収 集 資 料 リ ス ト

調査名:ボリビア国_オキナワ道路整備計画準備調査

番号	資 料 の 名 称	形 態 図書・ビデオ 地図・写真等	オリジナル／ コピー	発 行 機 関	発行年
1	気象観測データ(2007 年～2014 年)	EXCEL	コピー	ボリビア農業技術センター（Centro Tecnológico Agropecuario en Bolivia（CETABOL)）	-
2	PACAY 及び PAILAS における河川観測データ（水位・気温）（2010 年～2014 年）	EXCEL	コピー	SEARPI (Servicio de Encauzamiento de Aguas y Regularización del Río Piraí)	2014 年
3	オキナワ移住地 I における降雨データ（1977 年～2013 年）	EXCEL	コピー	SENAMHI (Servicio Nacional de Meteorología e Hidrología)	2014 年
4	BALANCE HIDRICO SUPERFICIAL DE BOLIVIA	PDF	コピー	環境・水資源省	1992 年
5	INSTITUTO NACIONAL DE ESTADÍSTICA 2011	図書	コピー	国立統計研究所 (INSTITUTO NACIONAL DE ESTADÍSTICA)	2012 年
6	環境法 1333 号	PDF	コピー	ボリビア国	1992 年
7	LIBRO ROJO FLORA AMENAZADA	PDF	コピー	環境・水資源省	2012 年
8	LIBROJO COMPLETO	PDF	コピー	環境・水資源省	2009 年
9	森林法	PDF	コピー	ボリビア国	2001 年
10	サンタクルス県道路地図	PDF	コピー	サンタクルス県	2017 年　他
11	NUEVOS MANUALES ABC	PDF	コピー	ABC	2008 年

8. 技術資料

8-1 SPT 試験実施位置図



技術資料　SPT 試験結果（P3）

FIELD REGISTER				OFF-SITE REGISTER																
Scale	Depth (m)	Geotechnical Profile	Visual Description of the Material	Soil Classif. System USCS & AASHTO	Strength of Soils Parameters: Friction Angle (°)	Strength of Soils Parameters: Cohesion (kg/cm²)	Soil Density γd (tn/m3)	Effective Pressure (kg/cm2)	Correction Factor CF	Number of Blows: 15 cm Iniciales	Number of Blows: 30 cm Finales	Penetration Resistance Index: N g 60-depth	Penetration Resistance Index: Ng corr.-pressure	Penetration Resistance Index: Ng corr.-blows	Penetration Resistance Index: Ngcale	Depth (m)	Penetration Resistance Chart Number of Blows Vs Depth	Allowable Stress (Kg/cm²)
	0.00																	
1.00	1.30		Clay with medium to high plasticity, in weak in-situ condition, with soft consistency, in saturated state and of dark brown coloration with reddish patinas. Alluvial Fan Geological Interpretation	CL A-7-6 (14)	1	0.370	1.680	0.185	1.000	2	5	5	5.00	5	5	1.10		0.65
2.00	2.60		Clay with low plasticity, in weak in-situ condition, with soft consistency, in saturated state and of dark brown coloration with brown patinas. Alluvial Fan Geological Interpretation	CL A-6 (8)	2	0.340	1.700	0.354	1.349	2	5	5	6.74	7	6	2.10		0.69
3.00	3.10		Silt with very fine sand mixtures, in weak in-situ condition, with soft consistency, in saturated state and of dark brown coloration. Alluvial Fan Geological Interpretation	ML A-4 (7)	10	0.130	1.800	0.529	1.214	2	6	6	7.29	7	7	3.10		0.99
4.00	N.F.		Silty sand with no plasticity, in firm in-situ condition, with medium compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-2-4 (0)	28	0.000	1.900	0.619	1.162	6	13	13	15.11	15	14	4.10		1.85
5.00	4.90							0.707	1.118	6	12	12	13.41	13	12	5.10		1.20
6.00	6.50		Clay with low plasticity, in weak to firm in-situ condition, with soft to medium consistency, in saturated state and of brown coloration with brown patinas. Alluvial Fan Geological Interpretation	CL A-4 (8)	2	0.360	1.780	0.785	1.083	5	8	8	8.66	9	8	6.10		0.88
7.00	8.30		Silt with very fine sand mixtures, in weak to partially firm in-situ condition, with soft to medium consistency, in saturated state and of light brown coloration with brown patinas. Alluvial Fan Geological Interpretation	ML A-4 (4)	13	0.150	1.840	0.867	1.050	2	4	4	4.20	4	4	7.10		1.05
8.00								0.942	1.022	3	9	9	9.20	9	8	8.00		1.11
9.00	9.40		Silty sand with no plasticity, in firm in-situ condition, with medium compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-2-4 (0)	29	0.000	1.940	1.043	0.988	12	16	16	15.81	15	14	9.10		1.52
10.00	10.50		Silt with very fine sand mixtures, in partially firm in-situ condition, with soft to medium consistency, in saturated state and of light brown coloration with brown patinas. Alluvial Fan Geological Interpretation	ML A-4 (8)	14	0.170	1.860	1.122	0.963	4	9	9	8.67	9	8	10.00		1.38
11.00	12.10		Clay with medium plasticity, in firm in-situ condition, with medium consistency, in saturated state and of dark brown coloration with brown patinas. Alluvial Fan Geological Interpretation	CL A-6 (13)	2	0.390	1.880	1.218	0.936	6	13	13	12.17	12	11	11.10		1.48
12.00								1.306	0.912	5	17	17	15.51	15	14	12.10		1.51
13.00	13.50		Silty sand with no plasticity, in firm in-situ condition, with medium to dense compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-4 (1)	30	0.000	1.960	1.393	0.891	10	49	49	43.66	29	26	13.00		2.65
14.00	15.20		Clay with high plasticity, in firm in-situ condition, with medium consistency, in saturated state and of reddish brown coloration with light brown patinas. Alluvial Fan Geological Interpretation	CH A-7-6 (20)	3	0.460	1.880	1.485	0.870	8	18	18	15.65	15	14	14.00		1.89
15.00								1.573	0.850	5	19	19	16.16	16	14	15.00		1.93
16.00	16.60		Clay with low plasticity, firm in-situ condition, with medium consistency, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	CL A-6 (7)	4	0.420	1.880	1.661	0.832	6	20	20	16.64	16	14	16.00		2.00
17.00	18.50		Clay with low plasticity, firm in-situ condition, with medium consistency, in saturated state and of dark brown coloration. Alluvial Fan Geological Interpretation	CL A-6 (10)	4	0.420	1.880	1.766	0.812	3	11	11	8.93	9	8	17.20		1.50
18.00								1.837	0.799	4	15	15	11.98	12	11	18.00		1.53
19.00	19.80		Clay with medium to high plasticity, firm in-situ condition, with medium consistency, in saturated state and of light brown coloration with brown patinas. Alluvial Fan Geological Interpretation	CL A-7-6 (16)	4	0.420	1.880	1.925	0.783	5	20	20	15.66	15	14	19.00		1.56
20.00	20.60		Clay with medium to high plasticity, firm in-situ condition, with medium consistency, in saturated state and of light gray coloration with dark brown patinas. Alluvial Fan Geological Interpretation	CL A-7-6 (17)	4	0.490	1.900	2.022	0.766	6	18	17	13.03	13	12	20.10		1.73
21.00	22.20		Clay with low plasticity, firm in-situ condition, with medium consistency, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	CL A-4 (8)	4	0.490	1.900	2.103	0.753	5	17	16	12.05	12	11	21.00		1.76
22.00								2.193	0.739	6	21	20	14.79	15	13	22.00		1.80
23.00	23.40		Clay with medium to high plasticity, firm in-situ condition, with very compacted to heavy consistency, in saturated state and of dark brown coloration. Alluvial Fan Geological Interpretation	CL A-7-6 (18)	4	0.490	1.900	2.283	0.726	9	41	40	29.04	22	20	23.00		2.50
24.00	25.60		Silt with very fine sand mixtures, in firm to consolidated in-situ condition, with very compacted to heavy consistency, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	ML A-4 (8)	20	0.230	1.940	2.375	0.712	Penetro 30 cm con 38						24.00		R
25.00								2.469	0.699	20	56	55	38.48	27	24	25.00		3.94
26.00	26.80		Silt with very fine sand mixtures, in consolidated in-situ condition, with heavy consistency, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	ML A-4 (7)	20	0.230	1.940	2.563	0.687	Penetro 15 cm con 25						26.00		R
27.00								2.659	0.675	Penetro 15 cm con 20						27.00		R
28.00	28.20		Silty sand with no plasticity, in consolidated to firm in-situ condition, with medium to dense compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-4 (1)	31	0.000	2.030	2.762	0.662	21	21	20	13.26	13	12	28.00		1.11
29.00	30.10		Clay with medium plasticity, firm in-situ condition, with medium consistency, in saturated state and of brown coloration. Alluvial Fan Geological Interpretation	CL A-6 (12)	6	0.490	1.900	2.855	0.651	6	13	12	7.83	8	7	29.00		2.33
30.00								2.954	0.640	7	16	15	9.61	10	9	30.10		2.38
END OF BOREHOLE																		

技術資料　SPT 試験結果（P4）

FIELD REGISTER				OFF-SITE REGISTER																
Scale	Depth (m)	Geotechnical Profile	Visual Description of the Material	Soil Classif. System USCS & AASHTO	Strength of Soils Parameters: Friction Angle (°)	Strength of Soils Parameters: Cohesion (kg/cm²)	Soil Density γd (tn/m3)	Effective Pressure (kg/cm2)	Correction Factor CF	Number of Blows: 15 cm Iniciales	Number of Blows: 30 cm Finales	Penetration Resistance Index: Ng 60-depth	Penetration Resistance Index: Ng corr.-pressure	Penetration Resistance Index: Ng corr.-blows	Penetration Resistance Index: Ngcale	Depth (m)	Penetration Resistance Chart Number of Blows Vs Depth	Allowable Stress (Kg/cm²)
	0.00																0 5 10 15 20 25 30	
1.00	1.50		Clay with medium to high plasticity, in weak in-situ condition, with soft consistency, in saturated state and of reddish coloration. Alluvial Fan Geological Interpretation	CL A-7-6 (17)	1	0.370	1.680	0.185	1.000	2	6	6	6.00	6	6	1.10		0.65
2.00	2.80		Clay with medium plasticity, in partially firm in-situ condition, with soft to medium consistency, in saturated state and of brown coloration with light gray patinas. Alluvial Fan Geological Interpretation	CL A-6 (10)	2	0.340	1.700	0.354	1.349	2	9	9	12.14	12	12	2.10		1.00
3.00	3.40		Clay with low plasticity, in weak in-situ condition, with soft consistency, in saturated state and of reddish brown coloration. Alluvial Fan Geological Interpretation	CL A-6 (9)	2	0.340	1.700	0.524	1.218	2	5	5	6.09	6	6	3.10		0.75
4.00	N.F.		Silty sand with no plasticity, in firm in-situ condition, with medium compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-2-4 (0)	28	0.000	1.900	0.638	1.152	10	27	27	31.11	23	21	4.10		2.88
5.00	5.00							0.728	1.108	8	33	33	36.56	26	23	5.10		2.96
6.00	7.00		Poorly graded sand with little fine-grained soils, in firm in-situ condition, with medium compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SP-SM A-2-4 (0)	28	0.000	1.890	0.817	1.069	10	36	36	38.50	27	24	6.10		2.94
7.00								0.905	1.035	8	18	18	18.63	17	15	7.10		1.82
8.00	8.90		Silt with no to low plasticity, in weak to firm in-situ condition, with soft to medium consistency, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	ML A-4 (5)	13	0.150	1.840	0.981	1.008	3	4	4	4.03	4	4	8.00		1.14
9.00								1.075	0.977	3	7	7	6.84	7	6	9.10		0.67
10.00	10.30		Silty sand with no plasticity, in loose in-situ condition, with low compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-2-4 (0)	29	0.000	1.940	1.160	0.952	4	8	8	7.62	8	7	10.00		0.76
11.00	11.40		Clay with medium plasticity, firm in-situ condition, with medium consistency, in saturated state and of dark brown coloration. Alluvial Fan Geological Interpretation	CL A-6 (11)	2	0.390	1.880	1.259	0.925	4	11	11	10.17	10	9	11.10		1.11
12.00	12.10		Clay with low plasticity, firm in-situ condition, with medium consistency, in saturated state and of light brown coloration with brown patinas. Alluvial Fan Geological Interpretation	CL A-6 (11)	2	0.390	1.880	1.347	0.902	4	16	16	14.44	14	13	12.10		1.53
13.00	14.20		Silty sand with no plasticity, in firm to consolidated in-situ condition, with medium to dense compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-2-4 (0)	30	0.000	1.960	1.433	0.881	15	45	45	39.67	27	25	13.00		2.59
14.00								1.529	0.860	Penetro 30 cm con 53						14.00		R
15.00	15.40		Silty sand with no plasticity, in consolidated in-situ condition, with dense compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-2-4 (0)	30	0.000	1.960	1.625	0.839	Penetro 15 cm con 24						15.00		R
16.00	16.50		Clay with high plasticity, firm in-situ condition, with medium consistency, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	CH A-7-5 (19)	3	0.460	1.880	1.716	0.821	7	21	21	17.24	16	15	16.00		1.99
17.00	18.20		Clay with medium to high plasticity, with the presence of isolated clasts in small percentage, in firm in-situ condition, with medium consistency, in saturated state and of dark brown coloration. Alluvial Fan Geological Interpretation	CL A-7-6 (17)	4	0.420	1.880	1.822	0.801	7	22	22	17.63	16	15	17.20		2.08
18.00								1.892	0.789	6	21	21	16.56	16	14	18.00		1.55
19.00	20.10		Clay with high plasticity, with the presence of isolated clasts in small percentage, in firm in-situ condition, with medium consistency, in saturated state and of light brown coloration with brown patinas. Alluvial Fan Geological Interpretation	CH A-7-6 (20)	4	0.490	1.900	1.982	0.773	8	22	22	17.01	16	14	19.00		1.71
20.00								2.081	0.757	9	28	27	20.43	18	16	20.10		1.75
21.00	21.50		Clay with medium to high plasticity, firm in-situ condition, with medium consistency, in saturated state and of dark brown coloration. Alluvial Fan Geological Interpretation	CL A-7-6 (16)	4	0.490	1.900	2.162	0.744	11	20	19	14.14	14	13	21.00		1.79
22.00	23.60		Clay with low plasticity, with the presence of isolated clasts in small percentage, in firm in-situ condition, with medium consistency, in saturated state and of brown coloration. Alluvial Fan Geological Interpretation	CL A-6 (11)	4	0.490	1.900	2.252	0.730	7	17	16	11.69	12	11	22.00		1.83
23.00								2.342	0.717	8	21	20	14.35	14	13	23.00		1.87
24.00	25.50		Silty sand with no plasticity, in firm to consolidated in-situ condition, with medium to dense compactness, in saturated state and of dark brown coloration. Alluvial Fan Geological Interpretation	SM A-2-4 (0)	30	0.000	2.000	2.436	0.704	12	40	39	27.47	21	19	24.00		1.80
25.00								2.536	0.691	20	55	54	37.30	26	24	25.00		2.27
26.00	26.60		Silty sand with no plasticity, in consolidated in-situ condition, with dense compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SM A-2-4 (0)	31	0.000	2.030	2.637	0.678	Penetro 30 cm con 55						26.00		R
27.00	27.20		Poorly graded sand with little fine-grained soils, in consolidated in-situ condition, with dense compactness, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	SP-SM A-2-4 (0)	31	0.000	2.020	2.740	0.665	Penetro 15 cm con 25						27.00		R
	27.60		Silty sand with no plasticity, in firm to consolidated in-situ condition, with medium to dense compactness, in saturated state and of light brown coloration. Fan Geological Interpretation	SM A-2-4 (0)	31	0.000	2.030											
28.00	28.70		Silt with no to low plasticity, in firm in-situ condition, with medium consistency, in saturated state and of light brown coloration with brown patinas. Alluvial Fan Geological Interpretation	ML A-4 (6)	20	0.230	1.940	2.839	0.653	20	16	15	9.81	10	9	28.00		4.42
29.00								2.933	0.642	6	13	12	7.72	8	7	29.00		4.54
30.00	30.10		Silt with no to low plasticity, in firm in-situ condition, with medium consistency, in saturated state and of light brown coloration. Alluvial Fan Geological Interpretation	ML A-4 (7)	20	0.230	1.940	3.037	0.630	7	17	16	10.10	10	9	30.10		4.67
END OF BOREHOLE																		

8-2 排水計算

(1) 降雨量データ

出典: 国立気象水文局（Servicio Nacional de Meteorología e Hidrología（SENAMHI））

期間: 1987~2013

1987年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	50.8	0.0	0.0	0.0	68.2	0.0	41.5	0.0	0.0	0.0	86.7	21.0	268.2
2	0.0	0.0	38.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.1
3	10.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.2
4	10.3	0.0	70.5	0.0	8.5	27.3	0.0	0.0	0.0	0.0	0.0	0.0	116.6
5	0.0	5.1	0.0	0.0	0.0	80.3	0.0	95.5	0.0	0.0	0.0	0.0	180.9
6	0.0	4.4	10.5	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.4
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.5	0.0	80.0	0.0	110.5
8	0.0	4.0	0.0	0.0	12.1	0.0	0.0	0.0	0.0	16.0	0.0	15.8	47.9
9	0.0	0.0	31.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.5
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
13	21.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.5	0.0	46.4
14	60.0	0.0	0.0	0.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	67.2
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	53.0	0.0	57.1
16	4.5	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.5
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.0	80.0
18	23.3	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	58.3
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	13.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.6
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.1	0.0	0.0	17.1
22	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	100.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.0	0.0	131.9
25	39.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.1	92.1
26	4.1	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	0.0	0.0	37.1
27	10.2	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	72.3	102.5
28	0.0	0.0	0.0	0.0	0.0	0.0	50.5	0.0	0.0	0.0	0.0	0.0	50.5
29	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	****	18.0	0.0	0.0	0.0	0.0	0.0	49.0	0.0	0.0	0.0	67.0
31	35.1	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	10.0	45.1
合計	**380.3**	**33.5**	**188.6**	**4.0**	**114.1**	**107.6**	**112.0**	**95.5**	**79.5**	**70.2**	**275.2**	**252.2**	**1712.7**
平均	**29.2**	**6.7**	**31.4**	**4.0**	**19.0**	**53.8**	**37.3**	**95.5**	**39.8**	**14.0**	**55.0**	**42.0**	**35.6**
最大	**100.9**	**15.0**	**70.5**	**4.0**	**68.2**	**80.3**	**50.5**	**95.5**	**49.0**	**20.0**	**86.7**	**80.0**	**100.9**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**13.0**	**5.0**	**6.0**	**1.0**	**6.0**	**2.0**	**3.0**	**1.0**	**2.0**	**5.0**	**5.0**	**6.0**	**55.0**

1988年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.8	0.0	0.0	43.8
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	52.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.2
6	53.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.3
7	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	7.2
8	0.0	0.0	0.0	15.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.3	27.6
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.9	2.3	0.0	0.0	18.2
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	30.5	10.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.3
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	6.9	0.0	0.0	0.0	0.0	20.1	0.0	0.0	0.0	27.0
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.6	0.0	0.0	16.6
16	0.0	38.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.1
17	0.0	20.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.2
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.1	0.0	41.1
19	0.0	0.0	0.0	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.8
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	1.9
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0
23	47.5	0.0	10.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.6
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	29.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.5
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5	44.5	0.0	70.0
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.0	0.0	27.0
30	0.0	****	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0
31	5.0	****	0.0	****	0.0	****	0.0	10.0	****	8.5	****	0.0	23.5
合計	**158.0**	**58.3**	**52.6**	**85.3**	**0.0**	**0.0**	**0.0**	**10.0**	**36.0**	**98.6**	**112.6**	**17.5**	**628.9**
平均	**39.5**	**29.2**	**13.2**	**14.2**	**0.0**	**0.0**	**0.0**	**10.0**	**18.0**	**16.4**	**37.5**	**8.8**	**20.8**
最大	**53.3**	**38.1**	**30.5**	**29.5**	**0.0**	**0.0**	**0.0**	**10.0**	**20.1**	**43.8**	**44.5**	**12.3**	**53.3**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**4.0**	**2.0**	**4.0**	**6.0**	**0.0**	**0.0**	**0.0**	**1.0**	**2.0**	**6.0**	**3.0**	**2.0**	**30.0**

1989年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.0
3	0.0	0.0	19.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.1
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
6	51.6	60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	111.6
7	0.0	19.0	23.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.5
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.4	0.0	46.4
9	0.0	0.0	13.5	15.1	0.0	0.0	22.5	0.0	0.0	0.0	0.0	0.0	51.1
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.5	0.0	10.2	43.7
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.1	20.1
13	0.0	42.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.2	62.4
14	10.3	0.0	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	30.1
15	50.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.2
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.5	62.5
18	0.0	0.0	0.0	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.6
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	88.6	0.0	0.0	0.0	0.0	88.6
21	51.2	0.0	0.0	0.0	0.0	0.0	0.0	39.3	0.0	6.5	4.5	0.0	101.5
22	0.0	21.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.9
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.9	0.0	0.0	0.0	0.0	63.9
24	10.0	0.0	0.0	0.0	0.0	27.3	0.0	13.5	0.0	0.0	0.0	99.5	150.3
25	0.0	0.0	13.8	44.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.3
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.2	0.0	15.2
27	0.0	0.0	0.0	0.0	0.0	0.0	9.5	25.5	0.0	0.0	0.0	0.0	35.0
28	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.5	28.3
29	0.0	****	0.0	11.5	0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	24.5
30	0.0	****	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
31	14.5	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	0.0	14.5
合計	**210.8**	**143.1**	**86.4**	**86.5**	**0.0**	**40.3**	**32.0**	**230.8**	**0.0**	**40.0**	**66.1**	**247.3**	**1183.3**
平均	**30.1**	**35.8**	**12.3**	**17.3**	**0.0**	**20.2**	**16.0**	**46.2**	**0.0**	**20.0**	**22.0**	**35.3**	**25.5**
最大	**51.6**	**60.0**	**23.5**	**44.5**	**0.0**	**27.3**	**22.5**	**88.6**	**0.0**	**33.5**	**46.4**	**99.5**	**99.5**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**7.0**	**4.0**	**7.0**	**5.0**	**0.0**	**2.0**	**2.0**	**5.0**	**0.0**	**2.0**	**3.0**	**7.0**	**44.0**

1990年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	0.0	20.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.2
2	0.0	10.0	6.5	0.0	0.0	53.1	0.0	0.0	0.0	0.0	0.0	0.0	69.6
3	88.5	0.0	4.5	0.0	20.3	0.0	0.0	0.0	0.0	6.0	0.0	0.0	119.3
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.2	7.2	48.4
5	0.0	0.0	0.0	0.0	0.0	30.8	0.0	0.0	0.0	0.0	0.0	0.0	30.8
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.8	0.0	0.0	0.0	23.8
7	27.4	43.0	0.0	0.0	40.3	0.0	0.0	0.0	0.0	0.0	0.0	12.1	122.8
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	100.3	0.0	0.0	0.0	0.0	0.0	8.4	0.0	0.0	0.0	0.0	0.0	108.7
10	10.1	23.3	0.0	14.5	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	67.9
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	0.0	0.0	6.1
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	31.5	7.5	0.0	0.0	17.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.2
16	0.0	0.0	0.0	71.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.5
17	90.9	0.0	46.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	137.7
18	0.0	6.1	0.0	0.0	0.0	0.0	0.0	23.0	0.0	83.5	0.0	0.0	112.6
19	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.1	27.3
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	0.0	14.5	0.0	0.0	0.0	0.0	8.3	0.0	0.0	0.0	62.5	0.0	85.3
22	0.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	18.9
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	4.9	0.0	17.3	0.0	0.0	0.0	0.0	0.0	0.0	22.2
25	0.0	10.0	82.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	92.4
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	7.0	0.0	0.0	8.0	13.2	0.0	0.0	30.5	58.7
28	0.0	0.0	0.0	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
29	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	****	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0
31	7.8	****	9.8	****	50.0	****	0.0	0.0	****	12.7	****	0.0	80.3
合計	**363.7**	**114.4**	**162.0**	**99.4**	**195.0**	**101.2**	**16.7**	**31.0**	**37.0**	**108.3**	**110.6**	**69.9**	**1409.2**
平均	**45.5**	**16.3**	**27.0**	**24.8**	**24.4**	**33.7**	**8.3**	**15.5**	**18.5**	**27.1**	**36.9**	**17.5**	**24.6**
最大	**100.3**	**43.0**	**82.4**	**71.5**	**50.0**	**53.1**	**8.4**	**23.0**	**23.8**	**83.5**	**62.5**	**30.5**	**100.3**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**8.0**	**7.0**	**6.0**	**4.0**	**8.0**	**3.0**	**2.0**	**2.0**	**2.0**	**4.0**	**3.0**	**4.0**	**53.0**

1991年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	1.0	****	5.2
2	25.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.0	****	30.7
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	****	3.4
5	0.0	0.0	0.0	60.0	0.0	0.0	0.0	0.0	11.5	0.0	0.0	****	71.5
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	****	13.0
7	18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	18.5
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
9	0.0	0.0	0.0	0.0	0.0	8.4	0.0	0.0	6.4	0.0	0.0	****	14.8
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	****	11.9
11	0.0	50.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	50.3
12	100.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	100.2
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
14	92.3	68.6	23.5	17.5	33.8	0.0	0.0	0.0	0.0	0.0	0.0	****	235.7
15	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	****	12.5
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
18	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.5	****	29.5
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	0.0
21	0.0	0.0	0.0	0.0	0.0	8.4	3.2	0.0	0.0	0.0	0.0	****	11.6
22	0.0	0.0	28.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	28.5
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.2	0.0	****	39.2
24	0.0	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	7.8
25	29.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	****	29.5
26	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	56.5	****	59.0
27	68.3	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.5	0.0	****	94.8
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	****	3.5
29	6.3	****	0.0	0.0	4.2	0.0	0.0	0.0	5.0	0.0	0.0	****	15.5
30	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.5	0.0	****	19.5
31	0.0	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	****	0.0
合計	**340.4**	**144.2**	**52.0**	**80.0**	**38.0**	**16.8**	**3.2**	**0.0**	**26.4**	**83.8**	**121.3**	****	**906.1**
平均	**48.6**	**24.0**	**26.0**	**26.7**	**19.0**	**8.4**	**3.2**	**0.0**	**6.6**	**16.8**	**17.3**	****	**19.7**
最大	**100.2**	**68.6**	**28.5**	**60.0**	**33.8**	**8.4**	**3.2**	**0.0**	**11.5**	**39.2**	**56.5**	****	**100.2**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	****	**0.0**
個数	**7.0**	**6.0**	**2.0**	**3.0**	**2.0**	**2.0**	**1.0**	**0.0**	**4.0**	**5.0**	**7.0**	****	**39.0**

1992年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	4.4	0.0	0.0	0.0	122.5	0.0	6.0	0.0	17.8	10.1	0.0	0.0	160.8
2	0.0	49.7	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.1
3	0.0	0.0	0.0	1.1	0.5	0.0	0.0	0.0	0.0	0.0	24.5	0.0	26.1
4	0.0	17.9	3.2	0.0	0.0	0.0	0.0	0.0	0.0	10.4	0.0	0.0	31.5
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.6	28.6
6	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
7	0.0	0.0	0.0	43.1	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.1
8	12.3	0.0	1.5	10.5	11.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	35.8
9	7.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	120.0	127.8
10	55.0	0.0	0.0	0.0	3.9	0.0	0.0	0.0	29.5	0.0	0.0	8.5	96.9
11	0.0	21.7	0.0	38.5	0.0	0.0	0.0	0.0	49.5	0.0	0.0	0.0	109.7
12	0.0	10.7	0.0	17.5	0.0	0.0	0.0	0.0	21.5	0.0	0.0	0.0	49.7
13	55.5	10.0	5.1	0.0	6.8	0.0	0.0	0.0	9.5	0.0	0.0	0.0	86.9
14	203.5	0.0	0.0	0.0	0.0	0.5	6.5	0.0	0.0	0.0	0.0	0.0	210.5
15	23.9	53.1	4.2	0.0	0.0	0.0	1.0	0.0	0.0	0.0	30.6	0.0	112.8
16	0.0	45.1	0.0	0.0	0.0	0.0	0.0	1.5	0.0	9.5	0.0	0.0	56.1
17	0.0	15.0	0.0	0.0	8.9	0.0	0.0	43.0	0.0	0.0	0.0	3.6	70.5
18	0.0	55.0	0.0	0.0	0.6	0.0	0.0	21.5	3.1	0.0	0.0	0.0	80.2
19	0.0	53.0	0.0	9.1	0.0	0.0	0.0	10.3	0.0	0.0	0.0	0.0	72.4
20	15.5	0.0	0.0	70.1	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	95.6
21	0.0	0.0	70.8	4.5	0.0	4.0	0.0	0.9	0.0	0.0	0.0	0.0	80.2
22	0.0	0.0	5.0	24.5	0.0	0.0	0.0	0.0	0.0	0.0	18.0	0.0	47.5
23	0.0	0.0	0.0	10.5	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	12.7
24	0.0	0.0	0.0	10.5	3.0	0.0	0.0	0.0	66.6	0.0	0.0	0.0	80.1
25	3.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	9.5	0.0	0.0	0.0	20.5
26	0.0	10.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0
27	0.0	0.0	75.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	75.4
28	0.0	0.0	16.0	1.0	16.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.6
29	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	19.8	16.7	0.0	40.5
30	0.0	****	0.0	0.0	0.0	10.3	0.0	0.0	77.5	0.0	0.0	0.0	87.8
31	0.0	****	0.0	****	11.9	****	0.0	0.2	****	0.0	****	80.3	92.4
合計	**380.1**	**341.7**	**183.3**	**248.9**	**209.6**	**16.5**	**13.5**	**87.4**	**284.5**	**49.8**	**92.0**	**241.0**	**2148.3**
平均	**42.2**	**31.1**	**20.4**	**19.2**	**15.0**	**2.8**	**4.5**	**12.5**	**31.6**	**12.4**	**18.4**	**48.2**	**21.5**
最大	**203.5**	**55.0**	**75.0**	**70.1**	**122.5**	**10.3**	**6.5**	**43.0**	**77.5**	**19.8**	**30.6**	**120.0**	**203.5**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**9.0**	**11.0**	**9.0**	**13.0**	**14.0**	**6.0**	**3.0**	**7.0**	**9.0**	**4.0**	**5.0**	**5.0**	**95.0**

1993年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.5	3.2	20.7
2	0.0	15.5	16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.0
3	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
4	24.6	0.0	4.8	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.1
5	0.0	10.0	0.0	6.6	0.0	0.0	14.4	0.0	0.0	0.0	20.0	0.0	51.0
6	15.2	120.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	6.2	0.0	145.9
7	32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	32.5
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.0	0.0	0.0	0.0	5.2
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	0.0	7.2
12	0.0	0.0	0.0	0.0	0.0	0.0	24.5	0.0	0.0	0.0	0.0	0.0	24.5
13	0.0	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5
14	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5
15	12.0	0.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.9
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	7.0	13.0
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.0	0.0	18.0
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	20.0	0.0	28.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.7
20	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	5.2	9.7
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.5	0.0	26.5	0.0	0.0	43.0
22	0.0	0.0	4.0	0.0	0.0	0.0	0.0	2.2	0.0	4.5	0.0	15.5	26.2
23	0.0	0.0	0.0	0.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5
24	7.1	0.0	8.8	0.0	7.5	0.0	0.0	0.0	13.5	0.0	34.0	0.0	70.9
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	8.0	22.0
28	0.0	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	6.5
29	0.0	****	0.0	0.0	0.0	0.0	10.5	0.0	5.1	0.0	0.0	0.0	15.6
30	0.0	****	0.0	0.0	0.0	0.0	0.0	13.6	0.0	0.0	0.0	0.0	13.6
31	0.0	****	6.8	****	0.0	****	0.0	0.0	****	0.0	****	0.0	6.8
合計	**110.9**	**156.0**	**69.6**	**13.3**	**29.9**	**0.0**	**60.4**	**37.5**	**19.4**	**31.0**	**122.9**	**38.9**	**689.8**
平均	**18.5**	**39.0**	**11.6**	**6.6**	**4.3**	**0.0**	**12.1**	**9.4**	**4.8**	**15.5**	**15.4**	**7.8**	**13.2**
最大	**32.0**	**120.0**	**28.7**	**6.7**	**7.5**	**0.0**	**24.5**	**16.5**	**13.5**	**26.5**	**34.0**	**15.5**	**120.0**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**6.0**	**4.0**	**6.0**	**2.0**	**7.0**	**0.0**	**5.0**	**4.0**	**4.0**	**2.0**	**8.0**	**5.0**	**53.0**

1994年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	20.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	49.0	0.0	0.0	73.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.2	32.2
5	0.0	41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	41.5
6	0.0	0.0	0.0	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	17.8
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	26.5	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.3
10	0.0	30.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.2
11	0.0	30.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.3
12	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	7.5	13.5
13	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
14	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	19.3
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	12.9	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.3	10.1	59.1
17	0.0	3.9	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0	16.4
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	14.4	0.0	0.0	0.0	0.0	100.2	0.0	0.0	0.0	0.0	0.0	0.0	114.6
20	12.0	0.0	12.9	0.0	0.0	100.1	0.0	0.0	0.0	0.0	0.0	0.0	125.0
21	19.5	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	40.0	65.6
22	0.0	32.5	0.0	0.0	0.0	0.0	42.0	0.0	0.0	2.5	0.0	0.0	77.0
23	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.1	0.0	0.0	10.1
25	12.4	0.0	0.1	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	14.6
26	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6
27	0.0	0.0	0.0	0.0	131.0	0.0	0.0	0.0	0.0	0.0	0.2	27.1	158.3
28	0.0	23.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.3	0.0	18.9	55.1
29	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	****	26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.0
31	4.9	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	0.0	4.9
合計	**117.6**	**180.9**	**50.8**	**15.1**	**137.1**	**202.4**	**42.0**	**0.0**	**15.0**	**75.4**	**40.5**	**142.3**	**1019.1**
平均	**13.1**	**18.1**	**10.2**	**5.0**	**68.5**	**67.5**	**42.0**	**0.0**	**15.0**	**15.1**	**13.5**	**17.8**	**26.0**
最大	**26.5**	**41.0**	**26.0**	**11.8**	**131.0**	**100.2**	**42.0**	**0.0**	**15.0**	**49.0**	**28.3**	**40.0**	**131.0**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**9.0**	**10.0**	**5.0**	**3.0**	**2.0**	**3.0**	**1.0**	**0.0**	**1.0**	**5.0**	**3.0**	**8.0**	**50.0**

1995年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4
5	2.9	0.0	0.0	0.0	9.5	0.0	1.0	0.0	0.0	0.0	10.5	0.0	23.9
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	23.0	24.5
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	3.1
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	25.6	0.0	0.0	0.0	0.0	0.0	0.0	13.0	0.0	0.0	0.0	38.6
11	0.0	55.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.5	0.0	77.8
12	0.0	15.0	22.9	0.0	0.0	0.0	1.0	0.0	0.0	10.3	0.0	0.0	49.2
13	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.5	0.0	20.5
17	0.0	10.1	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.6
18	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	5.0
19	0.0	0.0	5.5	0.0	0.0	0.0	0.0	0.0	5.7	0.0	0.0	0.0	11.2
20	0.0	0.0	0.0	35.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.5
21	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	7.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	15.5	16.0
23	24.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.1
24	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	0.0	13.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.2
28	0.0	0.0	14.5	0.0	0.0	0.0	0.0	0.0	41.1	0.0	0.0	2.5	58.1
29	64.1	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	64.1
30	0.0	****	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	3.8
31	0.0	****	9.5	****	0.0	****	0.0	0.0	****	0.0	****	0.0	9.5
合計	**101.1**	**147.5**	**69.5**	**35.5**	**14.9**	**1.5**	**10.8**	**0.0**	**59.8**	**10.8**	**58.0**	**44.1**	**553.5**
平均	**25.3**	**21.1**	**9.9**	**35.5**	**7.4**	**1.5**	**2.7**	**0.0**	**19.9**	**5.4**	**14.5**	**11.0**	**14.0**
最大	**64.1**	**55.3**	**22.9**	**35.5**	**9.5**	**1.5**	**5.0**	**0.0**	**41.1**	**10.3**	**22.5**	**23.0**	**64.1**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**4.0**	**7.0**	**7.0**	**1.0**	**2.0**	**1.0**	**4.0**	**0.0**	**3.0**	**2.0**	**4.0**	**4.0**	**39.0**

1996年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.0	0.0	18.0
3	0.0	29.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.5
4	72.5	7.0	0.0	0.0	0.0	0.0	0.0	0.0	104.1	0.0	0.0	0.0	183.6
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	0.0	0.0	7.9
6	0.0	11.0	0.0	0.0	0.0	0.0	0.0	7.5	0.0	0.0	0.0	0.0	18.5
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	54.2	57.8
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2	9.2
10	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	14.2	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.0	0.0	0.0	58.2
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	11.9	0.0	0.0	78.5	0.0	0.0	0.0	0.0	90.4
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	17.3	30.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.6
17	0.0	0.0	29.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9	0.0	39.8
18	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.9	0.0	0.0	35.9
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.8	0.0	0.0	0.0	26.3
23	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9	10.9
24	0.0	18.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.1
25	0.0	0.0	7.5	14.5	0.0	0.0	0.0	0.0	0.0	61.0	0.0	0.0	83.0
26	0.0	18.2	0.0	0.0	0.0	0.0	0.0	20.0	0.0	12.0	0.0	8.5	58.7
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	72.0	0.0	72.0
30	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0
31	0.0	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	0.0	0.0
合計	**110.1**	**91.8**	**37.4**	**37.9**	**56.2**	**0.0**	**0.0**	**106.0**	**123.5**	**152.8**	**99.9**	**101.8**	**917.4**
平均	**22.0**	**15.3**	**18.7**	**12.6**	**14.0**	**0.0**	**0.0**	**35.3**	**41.2**	**30.6**	**33.3**	**20.4**	**24.3**
最大	**72.5**	**29.5**	**29.9**	**17.3**	**30.3**	**0.0**	**0.0**	**78.5**	**104.1**	**61.0**	**72.0**	**54.2**	**104.1**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**5.0**	**6.0**	**2.0**	**3.0**	**4.0**	**0.0**	**0.0**	**3.0**	**3.0**	**5.0**	**3.0**	**5.0**	**39.0**

1997年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	30.0	0.0	0.0	0.0	0.0	4.5	****	0.0	0.0	0.0	0.0	12.9	47.4
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	0.0	0.0	0.0	0.0	7.5
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	21.8	0.0	0.0	0.0	21.3	0.0	0.0	0.0	0.0	0.0	0.0	43.1
6	0.0	0.0	0.0	0.0	0.0	42.3	0.0	0.0	0.0	67.5	2.4	0.0	112.2
7	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	8.4	13.7
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9
10	0.0	0.0	5.3	49.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.2
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	0.0	0.0	14.0
13	0.0	0.0	20.0	0.0	0.0	10.1	0.0	0.0	0.0	0.0	0.0	83.5	113.6
14	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	27.5	17.0	57.5	0.0	109.1
15	30.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.2
16	0.0	3.6	0.0	0.0	0.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0	10.8
17	1.2	0.0	0.0	0.0	0.0	10.3	0.0	0.0	0.0	0.0	0.0	0.0	11.5
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	42.0	3.3	0.0	106.1	0.0	0.0	0.0	60.0	0.0	0.0	0.0	0.0	211.4
20	0.0	0.0	0.0	2.5	0.0	0.0	0.0	12.0	14.0	0.0	0.0	0.0	28.5
21	0.0	0.0	0.0	0.0	20.3	0.0	0.0	0.0	1.0	0.0	0.0	0.0	21.3
22	0.0	0.0	0.0	0.0	16.4	0.0	5.3	0.0	0.0	0.0	0.0	0.0	21.7
23	0.0	0.0	20.4	0.0	9.5	0.0	7.2	0.0	0.0	24.0	0.0	7.8	68.9
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	10.0
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	0.0	20.0	0.0	8.9	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	35.9
27	0.0	0.0	18.5	0.0	0.0	9.4	0.0	0.0	0.0	0.0	6.1	0.0	34.0
28	0.0	0.0	0.0	0.0	0.0	12.5	0.0	0.0	0.0	0.0	7.8	0.0	20.3
29	0.0	****	0.0	0.0	0.0	1.0	0.0	0.0	4.6	0.0	0.0	0.0	5.6
30	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.0	0.0	52.0
31	42.0	****	0.0	****	0.0	****	7.1	0.0	****	0.0	****	0.0	49.1
合計	**154.3**	**48.7**	**65.5**	**167.4**	**46.2**	**132.7**	**19.6**	**79.5**	**47.1**	**122.5**	**139.8**	**112.6**	**1135.9**
平均	**25.7**	**12.2**	**13.1**	**41.8**	**15.4**	**12.1**	**6.5**	**26.5**	**11.8**	**30.6**	**20.0**	**28.2**	**20.3**
最大	**42.0**	**21.8**	**20.4**	**106.1**	**20.3**	**42.3**	**7.2**	**60.0**	**27.5**	**67.5**	**57.5**	**83.5**	**106.1**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**6.0**	**4.0**	**5.0**	**4.0**	**3.0**	**11.0**	**3.0**	**3.0**	**4.0**	**4.0**	**7.0**	**4.0**	**58.0**

1998年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0	3.4
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.1	20.1
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.8	0.0	0.0	0.0	0.0	10.8
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	2.7
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.5	25.5	32.6
7	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	23.3
8	0.0	0.0	0.0	11.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2
9	0.0	35.4	0.0	0.0	0.0	0.0	0.0	2.0	4.9	0.0	0.0	0.0	42.3
10	0.0	6.1	21.1	0.0	0.0	7.5	0.0	0.0	0.0	0.0	29.0	0.0	63.7
11	0.0	0.0	22.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.2
12	8.3	0.0	0.0	0.0	5.4	0.0	0.0	0.0	3.2	0.0	0.0	0.0	16.9
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.7	0.0	0.0	27.7
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2	0.0	0.0	11.2
15	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3
16	0.0	0.0	0.0	54.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.1	70.6
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	5.9	0.0	0.0	0.0	11.4
19	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	0.0	36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.0
22	38.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.8
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.1	0.0	0.0	0.0	0.0	14.1
24	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	63.1	0.0	65.6
25	0.0	0.0	30.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.1
26	0.0	36.5	0.0	0.0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.4
27	0.0	0.0	0.0	10.5	0.0	0.0	0.0	0.0	20.0	0.0	0.0	12.0	42.5
28	0.0	0.0	0.0	0.0	6.9	0.0	0.0	0.0	62.0	0.0	0.0	0.0	68.9
29	7.7	****	0.0	0.0	3.3	0.0	0.0	0.0	6.1	0.0	29.5	0.0	46.6
30	10.2	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.2
31	4.8	****	24.3	****	0.0	****	0.0	0.0	****	0.0	****	0.0	29.1
合計	**73.1**	**114.0**	**106.5**	**78.7**	**26.8**	**13.0**	**0.0**	**27.0**	**122.1**	**48.2**	**122.1**	**73.7**	**805.2**
平均	**12.2**	**28.5**	**17.8**	**19.7**	**5.4**	**6.5**	**0.0**	**6.8**	**17.4**	**12.0**	**30.5**	**18.4**	**15.9**
最大	**38.8**	**36.5**	**30.1**	**54.5**	**7.9**	**7.5**	**0.0**	**14.1**	**62.0**	**27.7**	**63.1**	**25.5**	**63.1**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**6.0**	**4.0**	**6.0**	**4.0**	**5.0**	**2.0**	**0.0**	**4.0**	**7.0**	**4.0**	**4.0**	**4.0**	**50.0**

1999年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	24.6
2	0.0	0.0	5.1	0.0	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0	18.1
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	46.1	0.0	0.0	0.0	8.2	0.0	0.0	0.0	0.0	0.0	0.0	41.1	95.4
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	77.0	0.0	75.2	0.0	152.2
9	9.1	0.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.1
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	77.9	79.1
12	20.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.3
13	20.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.2
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	14.5	34.5
15	0.0	0.0	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5
16	0.0	0.0	0.0	29.0	0.0	0.0	0.0	0.0	0.0	11.5	0.0	0.0	40.5
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	66.0	0.0	0.0	0.0	0.0	0.0	0.0	66.0
19	29.8	36.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.5	35.0	160.5
20	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.1	0.0	56.1
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	0.0	2.6	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7
28	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.5
29	0.0	****	23.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.8
30	36.9	****	0.0	0.0	0.0	0.0	0.0	0.0	10.1	0.0	0.0	0.0	47.0
31	0.0	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	0.0	0.0
合計	**175.1**	**51.5**	**81.4**	**29.0**	**8.3**	**66.0**	**13.0**	**0.0**	**107.1**	**11.5**	**190.8**	**188.5**	**922.2**
平均	**21.9**	**10.3**	**20.4**	**29.0**	**4.2**	**66.0**	**13.0**	**0.0**	**35.7**	**11.5**	**63.6**	**37.7**	**28.5**
最大	**46.1**	**36.2**	**40.0**	**29.0**	**8.2**	**66.0**	**13.0**	**0.0**	**77.0**	**11.5**	**75.2**	**77.9**	**77.9**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**8.0**	**5.0**	**4.0**	**1.0**	**2.0**	**1.0**	**1.0**	**0.0**	**3.0**	**1.0**	**3.0**	**5.0**	**34.0**

2000年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	0.0	17.5	0.0	0.0	3.6	0.0	0.0	0.0	0.0	21.1
2	0.0	0.0	7.7	0.0	0.0	0.0	3.0	0.0	14.0	0.0	0.0	0.0	24.7
3	0.0	30.2	0.0	0.0	7.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.8	46.8
5	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5
6	0.0	72.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	72.5
7	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.2	12.2
9	0.0	0.0	24.2	0.0	0.0	0.0	103.6	0.0	0.0	0.0	0.0	0.0	127.8
10	0.0	0.0	24.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.3
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	40.0
12	0.0	0.0	53.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.2
13	0.0	12.2	0.0	17.9	0.0	0.0	0.0	5.1	0.0	0.0	119.0	0.0	154.2
14	0.0	0.0	63.2	0.0	0.0	0.0	0.0	0.0	9.0	0.0	0.0	19.8	92.0
15	0.0	0.0	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3
16	0.0	0.0	0.0	0.0	0.0	12.2	0.0	0.0	0.0	0.0	0.0	0.0	12.2
17	0.0	0.0	0.0	26.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.7
18	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	3.8
21	0.0	110.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	110.2
22	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0
23	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0	44.6
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	20.0
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	20.0	0.0	0.0	7.3	0.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0	32.8
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.3	0.0	0.0	0.0	0.0	23.3
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	1.3
29	0.0	15.5	0.0	0.0	0.0	0.0	19.1	0.0	0.0	0.0	99.1	0.0	133.7
30	8.5	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
31	0.0	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	0.0	0.0
合計	**68.5**	**240.6**	**184.7**	**56.4**	**31.6**	**19.7**	**125.7**	**33.3**	**23.0**	**60.0**	**226.5**	**78.8**	**1148.8**
平均	**22.8**	**48.1**	**26.4**	**14.1**	**10.5**	**6.6**	**41.9**	**8.3**	**11.5**	**30.0**	**56.6**	**26.3**	**25.3**
最大	**40.0**	**110.2**	**63.2**	**26.7**	**17.5**	**12.2**	**103.6**	**23.3**	**14.0**	**40.0**	**119.0**	**46.8**	**119.0**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**3.0**	**5.0**	**7.0**	**4.0**	**3.0**	**3.0**	**3.0**	**4.0**	**2.0**	**2.0**	**4.0**	**3.0**	**43.0**

2001年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	0.0	0.0	11.9
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	7.5
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	10.9	0.0	0.0	0.0	0.0	7.5	0.0	0.0	6.7	0.0	0.0	25.1
6	0.0	0.0	0.0	45.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.3
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0
9	24.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.2
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.9	17.9
12	33.9	0.0	23.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.0
13	0.0	0.0	22.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3	0.0	0.0	29.3
14	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.1	40.1	106.2
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0	0.0	21.0
16	16.0	0.0	0.0	0.0	0.0	13.3	0.0	0.0	0.0	0.0	8.2	0.0	37.5
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	0.0	0.0	0.0	0.0	8.5
19	0.0	0.0	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.3
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	2.9
21	0.0	72.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	76.4
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5
24	0.0	0.0	0.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.0
25	0.0	0.0	0.0	0.0	58.4	0.0	0.0	0.0	76.9	0.0	0.0	0.0	135.3
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	0.0	13.0
27	0.0	12.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.1
28	0.0	20.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	22.7
29	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.5	0.0	28.5
30	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.9	28.9
31	4.8	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	3.5	8.3
合計	**98.9**	**116.1**	**93.4**	**120.3**	**68.9**	**13.3**	**7.5**	**8.5**	**76.9**	**28.8**	**133.3**	**101.4**	**867.3**
平均	**19.8**	**29.0**	**23.4**	**60.2**	**34.4**	**13.3**	**7.5**	**8.5**	**76.9**	**7.2**	**22.2**	**16.9**	**26.6**
最大	**33.9**	**72.9**	**42.3**	**75.0**	**58.4**	**13.3**	**7.5**	**8.5**	**76.9**	**11.9**	**60.1**	**40.1**	**76.9**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**5.0**	**4.0**	**4.0**	**2.0**	**2.0**	**1.0**	**1.0**	**1.0**	**1.0**	**4.0**	**6.0**	**6.0**	**37.0**

2002年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	16.8	0.0	25.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	76.6	119.1
2	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	29.9	33.4
3	0.0	29.7	0.0	0.0	0.0	0.0	10.5	0.0	0.0	0.0	15.8	5.5	61.5
4	0.0	4.9	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.5	6.6
5	16.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.9
6	0.0	0.0	0.0	0.0	0.0	17.1	0.0	0.0	0.0	0.0	0.0	0.0	17.1
7	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.0	0.0	0.0	0.0	71.1	77.0
8	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	8.8
9	0.0	0.0	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.0	45.7
10	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	9.2
11	0.0	0.0	0.0	2.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	3.1
12	0.0	0.2	30.3	13.9	0.0	0.0	0.0	0.0	3.0	0.0	0.0	17.5	64.9
13	0.0	0.0	0.0	22.5	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.4	23.1
14	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	10.0
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	7.2	8.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	4.7	9.7
17	0.0	0.5	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	4.8
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	0.0	49.1	9.5	0.0	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.1
20	0.0	0.0	0.0	0.0	6.5	0.0	0.0	10.3	0.0	0.0	0.0	70.6	87.4
21	0.0	49.9	1.0	0.0	0.0	0.0	0.0	3.3	0.0	0.4	2.2	0.0	56.8
22	0.0	0.0	0.0	0.0	0.0	0.0	9.5	0.1	0.0	0.0	0.0	0.0	9.6
23	0.0	4.9	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	9.0	15.9
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.5
25	0.0	0.0	0.0	16.9	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	17.4
26	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.7
28	0.0	2.5	0.0	0.0	0.0	0.0	0.0	23.1	0.0	0.0	7.6	0.0	33.2
29	0.0	****	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	5.8	5.0	12.0
30	0.0	****	0.0	1.2	20.1	0.0	0.0	0.0	0.0	2.8	5.0	0.0	29.1
31	27.7	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	1.5	29.2
合計	**65.9**	**144.2**	**83.7**	**61.2**	**36.1**	**24.1**	**24.2**	**37.5**	**4.0**	**9.0**	**36.9**	**355.5**	**882.3**
平均	**16.5**	**16.0**	**10.5**	**8.7**	**12.0**	**8.0**	**4.8**	**7.5**	**1.3**	**2.2**	**6.2**	**19.8**	**9.5**
最大	**27.7**	**49.9**	**30.3**	**22.5**	**20.1**	**17.1**	**10.5**	**23.1**	**3.0**	**5.0**	**15.8**	**76.6**	**76.6**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**4.0**	**9.0**	**8.0**	**7.0**	**3.0**	**3.0**	**5.0**	**5.0**	**3.0**	**4.0**	**6.0**	**18.0**	**75.0**

2003年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	5.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.7	5.4	16.2
2	5.7	11.0	0.0	6.9	0.0	0.0	0.0	0.0	0.0	3.4	0.0	2.1	29.1
3	5.3	0.0	108.7	16.0	0.0	5.5	0.0	0.0	0.0	3.8	0.0	6.2	145.5
4	0.0	0.0	0.0	8.9	0.0	0.8	0.0	0.0	0.0	0.0	0.0	21.6	31.3
5	0.6	1.7	0.0	2.1	0.0	0.0	0.0	0.0	0.0	108.8	0.0	9.5	122.7
6	0.4	3.9	4.4	0.0	0.0	0.0	0.0	14.6	0.0	0.0	0.0	3.7	27.0
7	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	2.4
8	0.0	0.2	7.5	0.0	0.0	0.0	5.1	0.0	34.6	0.0	0.0	0.0	47.4
9	0.0	0.3	8.5	42.5	0.0	0.0	0.0	0.0	0.9	8.3	0.0	1.7	62.2
10	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.7	45.2	0.1	48.2
11	97.5	1.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	107.5
12	28.1	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.2	0.0	50.7
13	13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.5
14	2.5	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	6.8
15	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
16	0.0	12.6	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	27.1
17	0.0	7.0	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	8.0
18	56.2	0.1	0.0	34.9	0.0	0.0	0.0	0.0	0.0	0.0	28.3	0.0	119.5
19	8.7	0.0	0.2	2.5	0.0	0.0	0.0	0.0	0.0	33.7	0.0	0.0	45.1
20	0.0	15.5	18.0	0.0	0.0	0.0	0.0	0.0	8.5	5.0	0.0	0.0	47.0
21	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.5
22	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.6	0.0	30.0	33.5
23	29.0	0.0	0.0	0.0	0.5	0.0	0.0	13.6	0.0	0.0	0.0	0.0	43.1
24	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.6
25	0.0	0.2	18.7	0.0	0.0	0.0	0.0	12.3	0.0	0.0	7.8	1.0	40.0
26	0.0	0.2	0.0	0.0	2.7	0.0	0.0	0.0	0.0	4.0	0.0	0.0	6.9
27	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.9
28	1.1	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.6	0.0	12.8	3.5	19.8
29	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	4.3
30	0.0	****	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.4	0.0	70.1
31	0.0	****	3.4	****	0.0	****	0.0	0.0	****	5.3	****	0.0	8.7
合計	**250.3**	**63.7**	**178.3**	**114.4**	**6.1**	**8.1**	**7.5**	**40.5**	**45.3**	**175.6**	**191.0**	**105.9**	**1186.7**
平均	**17.9**	**4.5**	**11.1**	**12.7**	**2.0**	**2.7**	**3.8**	**13.5**	**7.6**	**17.6**	**21.2**	**7.1**	**10.1**
最大	**97.5**	**15.5**	**108.7**	**42.5**	**2.9**	**5.5**	**5.1**	**14.6**	**34.6**	**108.8**	**68.4**	**30.0**	**108.8**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**14.0**	**14.0**	**16.0**	**9.0**	**3.0**	**3.0**	**2.0**	**3.0**	**6.0**	**10.0**	**9.0**	**15.0**	**104.0**

2004年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2	0.0	0.0	8.2
2	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	4.2
3	0.0	0.0	60.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	63.2
4	0.0	1.1	0.0	0.0	14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.6
5	3.0	37.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	44.6
6	0.0	0.4	0.0	0.4	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2
7	0.0	0.0	0.0	0.0	0.0	0.0	52.9	0.0	0.0	0.0	0.0	0.0	52.9
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	15.0
9	0.0	0.0	2.4	0.0	0.0	0.0	6.2	0.0	0.0	7.7	0.0	31.9	48.2
10	0.0	0.0	0.0	0.0	0.0	44.9	0.0	0.0	0.0	0.0	29.1	0.3	74.3
11	11.3	0.0	6.2	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	1.0	19.0
12	0.0	2.2	0.0	8.6	17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	28.3
13	1.9	3.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	39.5	0.0	11.9	57.1
14	4.0	0.0	16.6	2.1	0.0	0.0	0.0	0.0	0.0	1.3	0.0	1.1	25.1
15	0.0	0.4	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	14.0	27.5
16	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	17.9	2.4	21.4
17	0.0	0.0	8.3	3.6	0.0	0.0	0.0	0.0	0.0	69.8	13.8	0.0	95.5
18	0.0	144.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	144.6
19	37.4	0.1	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.8
20	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	2.8
21	9.9	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	12.1
22	0.2	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	1.8
23	0.0	0.0	0.0	4.9	0.0	4.7	0.0	0.0	0.0	44.5	0.0	0.0	54.1
24	0.0	0.0	0.0	0.0	1.7	1.0	0.0	0.0	0.0	45.2	0.0	0.0	47.9
25	0.0	0.0	0.0	0.0	22.1	6.6	0.0	0.0	0.0	1.3	2.0	0.0	32.0
26	0.0	0.0	0.0	0.0	4.8	26.5	0.0	0.0	0.0	5.6	0.0	0.0	36.9
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	10.2	0.0	12.5
28	2.2	0.0	0.0	0.0	0.0	0.0	53.5	0.0	64.1	0.0	0.0	0.0	119.8
29	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	5.1	12.7	22.5
30	0.0	****	2.0	0.0	0.0	0.0	0.0	0.0	****	0.0	0.0	25.8	27.8
31	0.0	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	0.0	0.0
合計	**71.8**	**189.1**	**104.0**	**26.1**	**64.5**	**88.0**	**112.6**	**0.0**	**67.8**	**226.5**	**89.1**	**120.4**	**1159.9**
平均	**8.0**	**23.6**	**10.4**	**3.3**	**10.8**	**11.0**	**37.5**	**0.0**	**33.9**	**20.6**	**11.1**	**9.3**	**16.3**
最大	**37.4**	**144.2**	**60.3**	**8.6**	**22.1**	**44.9**	**53.5**	**0.0**	**64.1**	**69.8**	**29.1**	**31.9**	**144.2**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**9.0**	**8.0**	**10.0**	**8.0**	**6.0**	**8.0**	**3.0**	**0.0**	**2.0**	**11.0**	**8.0**	**13.0**	**86.0**

2005年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.7	44.7
2	4.3	0.0	0.0	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0	3.2
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.6	0.0	42.6
6	0.0	0.7	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	57.1	59.0
7	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	3.5
9	0.0	52.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	54.7
10	24.8	6.7	0.0	0.0	0.0	0.0	0.0	0.0	7.5	0.0	82.2	2.6	123.8
11	1.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	10.5	0.0	13.0
12	0.0	0.0	0.0	23.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.5
13	5.8	0.0	44.3	0.0	0.0	44.5	0.0	0.0	0.0	0.0	0.1	1.0	95.7
14	0.6	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	18.2	0.0	0.0	19.3
15	7.6	0.0	0.0	0.0	23.1	0.0	0.0	0.0	0.0	2.0	0.0	0.0	32.7
16	0.0	0.0	0.0	0.0	9.4	0.0	12.2	0.0	0.0	8.2	3.2	0.0	33.0
17	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	24.6	0.0	2.5	28.9
18	0.0	0.0	0.0	0.0	0.5	0.0	5.5	0.0	0.0	0.0	0.2	0.0	6.2
19	0.0	0.0	3.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	15.7	1.0	20.4
20	0.0	0.0	0.0	0.0	30.9	1.3	0.0	0.0	0.0	0.0	0.0	0.3	32.5
21	0.0	0.0	1.4	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	6.1	0.3	0.0	0.0	2.0	0.0	0.0	0.0	0.0	8.4
24	0.0	0.0	0.0	4.4	0.0	0.0	0.0	0.0	58.0	0.0	17.0	38.0	117.4
25	20.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.1	27.5	0.0	0.7	52.6
26	0.0	3.2	0.0	0.0	0.0	6.9	0.0	0.0	0.0	0.0	0.0	0.2	10.3
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	4.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	4.0	0.0	4.7	13.5
29	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	0.0	2.6	14.5
30	0.0	****	5.0	0.0	0.0	0.0	0.0	31.5	9.8	0.0	0.0	0.0	46.3
31	8.9	****	0.0	****	0.0	****	0.0	36.2	****	0.0	****	40.1	85.2
合計	**73.2**	**67.9**	**53.7**	**43.3**	**69.3**	**56.1**	**17.7**	**69.7**	**75.9**	**103.1**	**171.5**	**195.5**	**996.9**
平均	**9.2**	**11.3**	**13.4**	**7.2**	**6.9**	**11.2**	**8.8**	**23.2**	**15.2**	**11.5**	**21.4**	**15.0**	**12.9**
最大	**24.8**	**52.0**	**44.3**	**23.5**	**30.9**	**44.5**	**12.2**	**36.2**	**58.0**	**27.5**	**82.2**	**57.1**	**82.2**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**8.0**	**6.0**	**4.0**	**6.0**	**10.0**	**5.0**	**2.0**	**3.0**	**5.0**	**9.0**	**8.0**	**13.0**	**79.0**

2006年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.5	0.0	0.0	0.0	15.4
2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
3	15.0	0.0	0.0	0.2	0.0	30.7	0.0	0.0	0.0	0.0	4.0	37.0	86.9
4	0.0	0.0	13.9	43.3	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	58.2
5	0.0	0.0	0.0	1.9	0.0	0.3	0.0	0.0	0.0	10.1	19.0	0.0	31.3
6	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
7	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	1.2
8	0.0	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	13.9
9	6.7	34.2	0.0	0.0	0.0	74.0	0.0	1.1	4.5	0.0	0.0	44.5	165.0
10	7.2	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.9
11	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	8.0
12	40.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.1
13	2.5	68.7	3.7	0.0	0.0	0.0	11.5	0.0	0.0	0.3	0.0	0.0	86.7
14	0.0	0.0	2.4	1.5	0.0	0.0	3.1	0.0	0.0	32.5	0.0	0.0	39.5
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	22.1	0.0	0.0	24.1
16	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
17	0.0	28.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.3
18	0.0	0.0	2.5	0.0	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.7
19	20.5	0.0	0.0	0.0	10.5	0.0	0.0	0.0	26.8	4.7	0.0	1.0	63.5
20	2.3	0.0	88.5	0.0	1.4	4.1	0.0	0.0	3.5	0.0	0.0	47.5	147.3
21	3.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	7.4
22	12.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.2
23	0.0	24.8	0.0	0.0	0.0	0.0	10.2	0.0	13.0	14.6	0.0	0.0	62.6
24	1.0	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	11.8
25	0.0	0.0	4.1	0.0	0.0	11.7	0.0	0.0	0.0	0.0	0.0	12.5	28.3
26	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
27	0.0	19.7	0.0	0.0	0.0	0.0	0.0	0.1	27.3	0.0	0.0	0.0	47.1
28	0.0	3.4	8.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	1.1	0.0	16.8
29	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	7.5
30	0.0	****	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8
31	0.0	****	1.5	****	0.0	****	0.0	0.0	****	20.2	****	0.0	21.7
合計	**122.0**	**201.2**	**134.0**	**46.9**	**20.1**	**124.0**	**24.8**	**1.2**	**90.9**	**108.5**	**24.1**	**157.2**	**1054.9**
平均	**9.4**	**22.4**	**10.3**	**11.7**	**6.7**	**15.5**	**8.3**	**0.6**	**11.4**	**13.6**	**8.0**	**17.5**	**11.3**
最大	**40.1**	**68.7**	**88.5**	**43.3**	**10.5**	**74.0**	**11.5**	**1.1**	**27.3**	**32.5**	**19.0**	**47.5**	**88.5**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**13.0**	**9.0**	**13.0**	**4.0**	**3.0**	**8.0**	**3.0**	**2.0**	**8.0**	**8.0**	**3.0**	**9.0**	**83.0**

2007年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	5.8
2	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0	18.5
3	8.2	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.5	0.0	45.0
4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.1	10.2
5	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	72.3	73.3
6	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.5	0.0	0.0	57.4
7	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	7.8	8.4	23.2
8	2.6	0.0	0.0	0.0	1.7	0.0	0.5	0.0	0.0	0.0	11.8	0.0	16.6
9	11.9	15.3	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.4
10	0.0	0.3	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	11.9
11	1.3	0.5	1.1	44.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	63.4
12	1.5	66.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	67.6
13	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	5.8	11.9
14	0.6	13.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	18.7
15	2.1	41.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.5	59.8
16	65.5	15.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.8
17	5.2	0.0	0.0	0.0	17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.7
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.5	0.0	14.5
20	15.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.0	21.8
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	7.1	0.0	0.5	62.1	0.0	13.5	0.0	0.0	0.0	0.0	0.0	83.2
23	0.0	0.0	0.0	3.7	0.0	0.0	31.5	0.0	0.0	0.0	25.0	0.0	60.2
24	45.5	0.0	0.0	0.0	0.0	0.0	19.1	0.0	0.0	0.0	0.0	0.0	64.6
25	4.4	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	15.5	0.0	0.0	24.4
26	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.9
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.2	44.2
28	63.1	4.1	35.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	102.7
29	7.3	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3
30	187.3	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	187.6
31	0.0	****	0.0	****	0.0	****	0.0	0.0	****	18.5	****	0.0	18.5
合計	**423.7**	**176.4**	**62.6**	**53.6**	**88.3**	**0.0**	**64.6**	**0.5**	**0.0**	**91.9**	**112.7**	**171.8**	**1246.1**
平均	**24.9**	**14.7**	**8.9**	**10.7**	**22.1**	**0.0**	**16.1**	**0.5**	**0.0**	**18.4**	**14.1**	**19.1**	**15.0**
最大	**187.3**	**66.1**	**35.5**	**44.5**	**62.1**	**0.0**	**31.5**	**0.5**	**0.0**	**55.5**	**32.5**	**72.3**	**187.3**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**17.0**	**12.0**	**7.0**	**5.0**	**4.0**	**0.0**	**4.0**	**1.0**	**0.0**	**5.0**	**8.0**	**9.0**	**72.0**

2008年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	1.9	3.6	0.0	69.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.0
2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.7	0.0	0.0	8.3	0.0	9.2
3	78.6	0.0	9.0	0.0	0.0	0.0	0.0	0.0	18.3	7.3	0.0	0.0	113.2
4	0.0	0.0	26.2	0.0	0.0	0.0	0.0	0.0	20.2	62.0	0.0	0.0	108.4
5	10.1	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0	0.0	15.2
6	0.0	0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	7.3	0.0	18.8
7	0.0	0.0	21.1	0.0	0.0	0.0	24.4	10.5	0.0	0.0	0.0	0.0	56.0
8	0.0	0.0	3.7	0.0	0.0	0.5	2.2	0.0	0.0	0.0	0.0	5.1	11.5
9	0.0	11.2	30.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.7	0.0	59.0
10	0.0	0.0	23.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.6	47.1
11	0.0	0.0	0.6	0.0	4.9	0.0	0.0	0.0	0.0	0.0	25.6	2.7	33.8
12	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8
13	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5
14	14.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.4
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	5.5	0.0	6.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.2
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	17.0
20	90.3	9.5	2.1	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	102.7
21	54.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	69.0
22	4.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	22.8	29.7
23	3.8	13.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	28.0
24	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	9.6	0.0	0.0	0.0	10.5
25	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	4.2
26	12.2	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	42.9
27	0.0	13.0	1.9	5.4	18.4	0.0	0.0	0.0	0.0	4.4	0.0	0.0	43.1
28	14.0	62.2	0.0	0.0	0.0	0.0	0.0	11.5	0.0	0.0	0.0	0.0	87.7
29	0.0	29.2	0.0	5.4	0.0	0.0	16.5	0.0	0.0	35.5	1.5	0.0	88.1
30	0.0	****	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.9
31	11.0	****	69.5	****	0.0	****	12.2	0.0	****	0.0	****	0.0	92.7
合計	**314.9**	**189.1**	**197.4**	**82.1**	**24.5**	**0.5**	**55.3**	**22.7**	**49.6**	**118.5**	**69.1**	**89.9**	**1213.6**
平均	**24.2**	**15.8**	**15.2**	**20.5**	**8.2**	**0.5**	**13.8**	**7.6**	**9.9**	**14.8**	**9.9**	**11.2**	**12.6**
最大	**90.3**	**62.2**	**69.5**	**69.5**	**18.4**	**0.5**	**24.4**	**11.5**	**20.2**	**62.0**	**25.6**	**23.6**	**90.3**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**13.0**	**12.0**	**13.0**	**4.0**	**3.0**	**1.0**	**4.0**	**3.0**	**5.0**	**8.0**	**7.0**	**8.0**	**81.0**

2009年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.7	0.0	0.0	0.0	3.0	32.7
2	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0	0.0	31.9
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	4.4	0.0	5.7	0.0	0.0	0.0	10.1
5	0.0	0.0	0.0	1.1	0.0	0.0	8.0	0.0	0.0	0.0	3.5	0.0	12.6
6	0.0	0.2	0.0	1.0	0.0	0.0	0.0	0.0	0.0	39.0	0.0	0.0	40.2
7	0.0	24.1	0.0	16.0	0.9	0.0	1.6	0.0	0.0	0.0	7.7	2.0	52.3
8	0.7	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	16.5	0.0	21.2
9	0.0	3.5	0.0	0.0	0.0	0.0	7.3	0.0	0.0	0.0	0.0	0.0	10.8
10	0.0	2.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5
11	0.0	103.1	11.5	0.0	0.0	0.0	6.9	0.0	0.0	17.2	0.0	5.3	144.0
12	0.0	0.0	0.5	0.0	13.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.7
13	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	15.3
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	2.5	9.0	5.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	17.8
18	39.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.3
19	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.9	0.0	0.0	24.4
20	0.0	0.0	17.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.3
21	0.0	0.3	0.0	0.0	0.0	0.0	3.0	6.6	0.0	0.0	0.0	0.0	9.9
22	0.0	0.0	0.5	0.0	0.0	0.0	32.8	0.0	20.0	0.0	0.0	0.0	53.3
23	0.0	13.0	0.0	0.0	0.0	10.2	4.3	0.0	0.0	0.0	0.0	4.0	31.5
24	0.0	0.0	0.7	12.1	0.0	31.4	0.0	0.0	0.0	9.5	0.0	0.0	53.7
25	58.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.1
26	0.0	0.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	50.5
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	68.0	0.0	0.0	79.0
28	9.3	0.0	0.0	0.0	52.4	0.0	0.0	0.0	0.0	0.0	5.0	0.0	66.7
29	0.0	****	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
30	0.0	****	0.1	0.0	0.0	****	0.0	0.0	0.0	0.0	55.5	7.0	62.6
31	0.0	****	41.5	****	0.0	****	0.0	0.0	****	0.0	****	0.0	41.5
合計	**148.9**	**159.2**	**120.6**	**30.2**	**67.7**	**45.6**	**68.3**	**37.6**	**40.6**	**158.9**	**88.2**	**31.8**	**997.6**
平均	**21.3**	**17.7**	**11.0**	**7.6**	**16.9**	**15.2**	**8.5**	**12.5**	**10.2**	**26.5**	**17.6**	**5.3**	**14.2**
最大	**58.1**	**103.1**	**41.5**	**16.0**	**52.4**	**31.4**	**32.8**	**29.7**	**20.0**	**68.0**	**55.5**	**10.5**	**103.1**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**7.0**	**9.0**	**11.0**	**4.0**	**4.0**	**3.0**	**8.0**	**3.0**	**4.0**	**6.0**	**5.0**	**6.0**	**70.0**

2010年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	7.0
2	84.9	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.5	0.0	0.0	89.2
3	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	4.3	0.0	10.6	0.0	0.0	0.0	0.0	0.0	0.0	12.6	0.0	27.5
6	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5
7	3.5	0.0	0.0	0.0	0.4	0.0	24.0	0.0	0.0	0.0	0.0	0.0	27.9
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	4.2	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	6.2
10	0.0	40.0	78.0	78.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	196.0
11	0.0	0.5	37.5	37.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.5
12	100.9	1.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	37.7	141.7
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0	6.7
14	0.0	20.0	1.6	1.6	0.0	0.0	11.0	0.0	0.0	0.0	0.0	0.0	34.2
15	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
16	0.0	5.5	0.0	0.0	0.0	0.0	12.5	0.0	0.0	0.0	0.0	0.0	18.0
17	5.5	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	47.5	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.5
20	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	2.0
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	65.0	0.0	0.0	0.0	0.0	0.0	25.0	0.0	0.0	90.0
23	0.0	0.0	65.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	10.2	0.0	79.1
24	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
25	0.0	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.8	35.3
26	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
27	0.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.2	0.0	130.2
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	40.0	41.8
29	0.0	****	1.0	0.0	0.0	0.0	0.0	12.9	6.0	6.2	0.0	0.0	26.1
30	0.0	****	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
31	0.0	****	0.0	****	****	****	0.0	0.0	****	0.0	****	0.0	0.0
合計	**249.8**	**132.6**	**183.6**	**199.2**	**11.3**	**0.0**	**51.6**	**12.9**	**14.5**	**31.7**	**121.0**	**103.5**	**1111.7**
平均	**35.7**	**11.0**	**30.6**	**28.5**	**2.3**	**0.0**	**10.3**	**12.9**	**4.8**	**10.6**	**24.2**	**34.5**	**18.7**
最大	**100.9**	**40.0**	**78.0**	**78.0**	**3.9**	**0.0**	**24.0**	**12.9**	**6.7**	**25.0**	**90.2**	**40.0**	**100.9**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**7.0**	**12.0**	**6.0**	**7.0**	**5.0**	**0.0**	**5.0**	**1.0**	**3.0**	**3.0**	**5.0**	**3.0**	**57.0**

2011年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	2.7
2	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	9.0
3	0.0	0.0	5.7	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.7
4	1.5	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	10.6
5	5.0	23.6	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	38.8	0.0	67.9
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	49.5	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	49.6
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.2	0.0	0.0	0.0	18.2
9	0.0	0.0	27.8	0.0	0.0	17.6	0.0	0.0	0.0	0.0	0.0	31.5	76.9
10	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2	0.0	11.7
11	0.0	15.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	0.0	0.0	22.8
12	12.0	0.0	0.0	2.5	0.0	8.5	2.7	0.0	0.0	0.0	0.0	31.5	57.2
13	3.5	3.5	8.5	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	35.5
14	60.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	23.5	0.0	0.0	83.7
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	17.0
16	60.7	0.0	0.0	0.0	0.0	0.0	8.6	0.0	0.0	0.0	0.0	0.5	69.8
17	0.0	5.4	0.0	0.0	0.0	0.0	0.0	0.0	14.4	0.0	0.0	0.0	19.8
18	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
19	0.0	13.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.4
20	0.0	8.5	0.0	0.0	0.0	0.0	26.2	0.0	0.0	0.0	0.0	0.0	34.7
21	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	4.7
22	0.0	35.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.5
23	0.0	30.5	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.6
24	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
25	1.3	5.2	0.0	0.0	17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.5
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	1.7
27	18.1	0.0	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.3
28	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3
29	0.0	****	0.0	0.0	0.0	5.2	2.3	0.0	0.0	60.2	0.0	0.0	67.7
30	0.0	****	0.0	****	0.0	****	3.5	0.0	0.0	0.0	0.0	0.0	3.5
31	0.0	****	****	****	****	****	12.9	0.0	****	0.0	****	0.0	12.9
合計	**166.1**	**195.0**	**65.7**	**19.7**	**17.0**	**31.4**	**56.2**	**1.7**	**32.6**	**117.4**	**52.2**	**86.5**	**841.5**
平均	**16.6**	**16.2**	**9.4**	**3.3**	**17.0**	**7.8**	**9.4**	**1.7**	**16.3**	**23.5**	**13.0**	**17.3**	**12.6**
最大	**60.7**	**49.5**	**27.8**	**13.0**	**17.0**	**17.6**	**26.2**	**1.7**	**18.2**	**60.2**	**38.8**	**31.5**	**60.7**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**10.0**	**12.0**	**7.0**	**6.0**	**1.0**	**4.0**	**6.0**	**1.0**	**2.0**	**5.0**	**4.0**	**5.0**	**63.0**

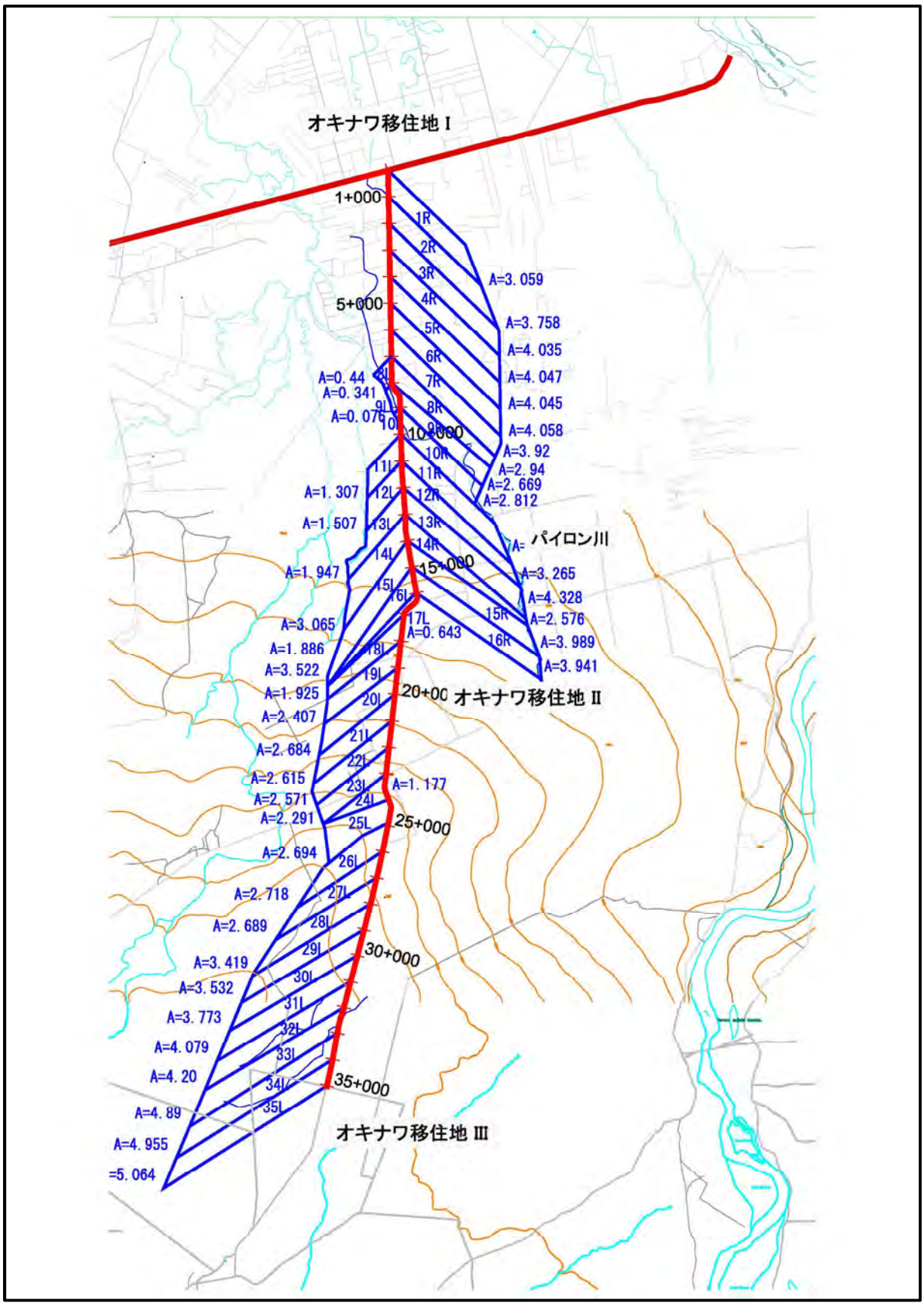
2012年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.0
2	0.0	0.5	5.3	0.0	0.0	0.0	0.0	0.0	0.0	25.9	0.0	0.0	31.7
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.3	0.0	0.0	0.0	35.0	0.0	0.0	0.0	0.0	0.0	0.0	35.3
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	12.5	0.0	0.0	0.0	0.0	3.6	3.6	0.0	0.0	0.0	23.5	0.0	43.2
7	0.0	0.0	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.5	67.5
8	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5
9	0.0	49.1	0.0	14.9	0.0	0.0	0.0	0.0	0.0	14.0	0.0	0.0	78.0
10	17.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0
11	30.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0
12	1.5	0.0	0.0	0.0	40.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.6
13	0.0	0.0	37.2	0.0	41.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.7
14	0.0	67.5	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.5
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	0.0	0.0	8.5
17	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.7
18	0.0	0.0	0.0	0.0	13.2	0.0	0.0	42.3	30.1	0.0	0.0	0.0	85.6
19	0.0	0.0	5.5	0.0	0.0	58.4	0.0	0.0	0.0	0.0	90.5	0.0	154.4
20	0.0	0.0	0.0	0.0	0.0	58.6	0.0	0.0	40.1	0.0	0.0	0.0	98.7
21	0.0	13.1	0.0	0.0	5.5	35.0	0.0	0.0	0.0	0.0	0.0	0.0	53.6
22	0.0	0.0	63.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.1
23	0.0	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.5	0.0	60.6
24	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5
25	64.5	3.0	6.5	34.0	0.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	120.0
26	0.0	64.2	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.2	89.6
27	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	1.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	12.5
30	0.0	****	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0
31	0.0	****	0.0	****	0.0	****	0.0	0.0	****	0.0	****	0.0	0.0
合計	**145.0**	**221.8**	**157.8**	**62.4**	**100.3**	**191.3**	**15.6**	**42.3**	**70.2**	**48.4**	**179.5**	**52.7**	**1287.3**
平均	**20.7**	**18.5**	**22.5**	**12.5**	**25.1**	**31.9**	**7.8**	**42.3**	**35.1**	**16.1**	**44.9**	**26.4**	**25.3**
最大	**64.5**	**67.5**	**63.1**	**34.0**	**41.5**	**58.6**	**12.0**	**42.3**	**40.1**	**25.9**	**90.5**	**39.5**	**90.5**
最小	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**7.0**	**12.0**	**7.0**	**5.0**	**4.0**	**6.0**	**2.0**	**1.0**	**2.0**	**3.0**	**4.0**	**2.0**	**55.0**

2013年

日付	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	合計
1	25.5	43.9	0.0	0.0	****	55.1	0.0	0.0	0.0	0.0	19.3	0.0	143.8
2	0.0	0.0	0.0	26.5	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.5
3	0.0	0.0	8.5	0.0	****	0.0	0.0	0.0	6.0	0.0	0.0	0.0	14.5
4	0.0	0.0	0.0	20.5	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.5
5	0.0	0.0	0.0	40.4	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.4
6	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	22.5	0.0	0.0	0.0	****	0.0	0.0	0.0	1.5	0.0	0.0	0.0	24.0
9	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	2.7	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7
11	0.0	28.5	0.0	0.0	****	1.5	0.0	0.0	0.0	0.0	0.0	0.0	30.0
12	0.0	0.0	0.0	32.5	****	0.0	0.0	0.0	5.7	0.0	0.0	13.3	51.5
13	0.0	1.5	39.6	0.0	****	0.0	0.0	0.0	5.3	0.0	0.0	14.2	60.6
14	0.0	0.0	0.0	24.5	****	0.0	0.0	0.0	0.0	6.5	9.3	0.0	40.3
15	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	13.2	13.2
17	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	30.1	0.0	0.0	30.1
18	0.0	0.0	0.0	0.0	****	12.2	0.0	0.0	0.0	12.2	0.0	0.0	24.4
19	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	4.2	0.0	4.2
20	0.0	8.5	0.0	0.0	****	0.0	14.6	0.0	0.0	0.0	11.4	16.5	51.0
21	0.0	0.0	0.0	0.0	****	4.5	0.0	0.0	0.0	0.0	0.0	0.0	4.5
22	0.0	0.0	0.0	0.0	****	8.0	0.0	0.0	0.0	38.2	0.0	20.2	66.4
23	0.0	0.0	11.2	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2
24	0.0	0.0	9.1	0.0	****	20.7	0.0	0.0	0.0	20.1	0.0	14.8	64.7
25	20.1	6.5	0.0	0.0	****	25.0	0.0	0.0	0.0	0.0	0.0	0.0	51.6
26	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	0.0	****	0.0	0.0	****	0.0	0.0	0.0	0.0	0.0	29.0	0.0	29.0
30	0.0	****	0.0	0.0	****	7.9	0.0	0.0	0.0	1.5	0.0	0.0	9.4
31	0.0	****	0.0	****	****	****	0.0	0.0	****	0.0	****	15.5	15.5
合計	**68.1**	**88.9**	**71.1**	**144.4**	****	**134.9**	**14.6**	**0.0**	**18.5**	**108.6**	**73.2**	**107.7**	**830.0**
平均	**22.7**	**17.8**	**14.2**	**28.9**	****	**16.9**	**14.6**	**0.0**	**4.6**	**18.1**	**14.6**	**15.4**	**16.8**
最大	**25.5**	**43.9**	**39.6**	**40.4**	****	**55.1**	**14.6**	**0.0**	**6.0**	**38.2**	**29.0**	**20.2**	**55.1**
最小	**0.0**	**0.0**	**0.0**	**0.0**	****	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
個数	**3.0**	**5.0**	**5.0**	**5.0**	****	**8.0**	**1.0**	**0.0**	**4.0**	**6.0**	**5.0**	**7.0**	**49.0**

(2) 流域面積


オキナワ移住地 I
1+000
5+000
10+000
15+000
20+00
25+000
30+000
35+000
オキナワ移住地 II
オキナワ移住地 III
パイロン川
1R
2R
3R
4R
5R
6R
7R
8R
9R
10R
11R
12R
13R
14R
15R
16R
A=3. 059
A=3. 758
A=4. 035
A=4. 047
A=4. 045
A=4. 058
A=3. 92
A=2. 94
A=2. 669
A=2. 812
A=3. 265
A=4. 328
A=2. 576
A=3. 989
A=3. 941
A=0. 44
A=0. 341
A=0. 076
A=1. 307
A=1. 507
A=1. 947
A=3. 065
A=1. 886
A=3. 522
A=1. 925
A=2. 407
A=2. 684
A=2. 615
A=2, 571
A=2. 291
A=2. 694
A=2. 718
A=2. 689
A=3. 419
A=3. 532
A=3. 773
A=4. 079
A=4. 20
A=4. 89
A=4. 955
=5. 064
A=0. 643
A=1. 177

(3) ガンベル法による降雨量計算

超過確率雨量計算
Gumbel Method (Exteam Value distribution)

(1) 順位 i	(2) 生起年	(2) 雨量 x (mm)	(3) 超過確率 F(x)	(4) x^2	(5) 極致変量 y
1	1992	203.5	0.96429	41,412.25	3.3142
2	2007	187.3	0.92857	35,081.29	2.6022
3	2004	144.2	0.89286	20,793.64	2.1775
4	1994	131	0.85714	17,161.00	1.8698
5	1993	120	0.82143	14,400.00	1.6260
6	2000	110.2	0.78571	12,144.04	1.4223
7	2003	108.8	0.75000	11,837.44	1.2459
8	1997	106.1	0.71429	11,257.21	1.0893
9	1996	104.1	0.67857	10,836.81	0.9473
10	2009	103.1	0.64286	10,629.61	0.8168
11	2010	100.9	0.60714	10,180.81	0.6952
12	1987	100.9	0.57143	10,180.81	0.5805
13	1990	100.3	0.53571	10,060.09	0.4713
14	1991	100.2	0.50000	10,040.04	0.3665
15	1989	99.5	0.46429	9,900.25	0.2649
16	2012	90.5	0.42857	8,190.25	0.1657
17	2008	90.3	0.39286	8,154.09	0.0680
18	2006	88.5	0.35714	7,832.25	-0.0292
19	2005	82.2	0.32143	6,756.84	-0.1266
20	1999	77.9	0.28571	6,068.41	-0.2254
21	2001	76.9	0.25000	5,913.61	-0.3266
22	2002	76.6	0.21429	5,867.56	-0.4321
23	1995	64.1	0.17857	4,108.81	-0.5439
24	1998	63.1	0.14286	3,981.61	-0.6657
25	2011	60.7	0.10714	3,684.49	-0.8036
26	2013	55.1	0.07143	3,036.01	-0.9704
27	1988	53.3	0.03571	2,840.89	-1.2037
	Total	2,699.3		302,350.11	
	平均 Σx/N=	99.97	Σx^2/N=	11198.152	
		$\overline{x}$		$\overline{x^2}$	

F(x)=1-j/(N+1)

Sx = $(\overline{x^2}-(\overline{x})^2)^{0.5}$ = 34.7009

N= 27 であるから、上表より

$\overline{y}$ = 0.5332 Sy = 1.1004

よって

1/a=Sx/Sy= 31.5348

$x_0 = \overline{x}-(1/a)*\overline{y}$ = 83.156

以上より確率雨量の基本式は

x=83.156+31.5348*y

確率年Tとyの関係は上表3.6に示されているので、これを上式に代入して以下のように確率雨量xが求まる。

T 回帰年	F(%)	$\overline{y}$	(1/a)*$\overline{y}$	x 確率雨量	
3	66.7	0.9027	28.467	112	
10	90	2.2504	70.965	154	
20	95	2.9702	93.665	177	
25	96	3.1985	100.865	184	
30	96.7	3.3843	106.723	190	
40	97.5	3.6763	115.930	199	
50	98	3.9019	123.047	**206**	⇐道路横断排水施設の確率雨量を50回帰年で求める。
100	99	4.6002	145.065	228	

標本数Nとy'、Syの数表

標本数 N	$\overline{y}$	Sy
20	0.5236	1.0628
21	0.5252	1.0696
22	0.5268	1.0754
23	0.5283	1.0811
24	0.5296	1.0864
25	0.5309	1.0915
26	0.5320	1.0961
27	0.5332	1.1004
28	0.5343	1.1047
29	0.5353	1.1086
30	0.5362	1.1124

Tに対する極値変量y

確率年 T	1/T= 1−F	極値変量 y
500	0.00200	6.21361
400	0.00250	5.99021
300	0.00333	5.70213
250	0.00400	5.51946
200	0.00500	5.29581
150	0.00667	5.00729
100	0.01000	4.60015
80	0.01250	4.37574
60	0.01667	4.08595
50	0.02000	3.90194
40	0.02500	3.67625
30	0.03333	3.38429
25	0.04000	3.19853
20	0.05000	2.97020
15	0.06667	2.67375
10	0.10000	2.25037
8	0.12500	2.01342
7	0.14286	1.86983
6	0.16667	1.70198
5	0.20000	1.49940
4	0.25000	1.24590
3	0.33333	0.90272
2	0.50000	0.36651

(4) 雨水流出量の計算

Sta.	左	右	流域面積	合計	流路長 (km) : L	標高(m)	標高差 (m)	勾配	流達速度 (km/hr) : W	算出到達時間 (hr) : Tc	仮定流達時間 (min)	流達時間 (min)	流達時間内降雨強度 (mm/h)	流出係数 : C	雨水流出量 (m3/s)	流下能力(m3/s)				確認
																新規カルバート	追加 DP800 本数	追加 DP800	合計	
1	0.48	3.06	3.06	3.06	5.54	274.49	2.88	0.0005	0.77	7.19	431	431	19.20	0.1	1.63	4.98		0.00	4.98	OK
2	2.417	3.758	3.758	23.863	10.84	276.00	6.00	0.0006	0.80	13.55	813	813	12.58	0.1	8.34	21.87		0.00	21.87	OK
3	2.109	4.035	4.035	20.105	9.91	277.12	4.88	0.0005	0.75	13.26	796	796	12.76	0.1	7.12	0.00	8	7.30	7.30	OK
4	1.772	4.047	4.047	16.07	8.98	277.37	4.63	0.0005	0.77	11.71	703	703	13.86	0.1	6.19	1.66	5	4.57	6.23	OK
5	1.37	4.045	4.045	12.023	8.08	277.42	4.58	0.0006	0.81	9.95	597	597	15.45	0.1	5.16	1.66	4	3.65	5.31	OK
6	1.141	4.058	4.058	7.978	7.20	277.78	4.22	0.0006	0.83	8.69	521	521	16.92	0.1	3.75	10.63		0.00	10.63	OK
7	0.849	3.92	3.92	3.92	6.36	278.70	3.30	0.0005	0.77	8.27	496	496	17.49	0.1	1.90	0.00	3	2.74	2.74	OK
8	0.44	2.94	3.38	19.001	5.57	279.04	2.96	0.0005	0.78	7.13	428	428	19.29	0.1	10.18	8.24	3	2.74	10.98	OK
9	0.341	2.669	3.01	99.201	18.15	279.63	35.37	0.0019	1.70	10.66	640	640	14.75	0.1	40.65	59.37		0.00	59.37	OK
10	0.076	2.812	2.888	12.611	17.29	280.37	34.63	0.0020	1.73	9.99	599	599	15.42	0.1	5.40	11.05		0.00	11.05	OK
11	1.307	3.644	4.951	9.723	16.31	280.96	34.05	0.0021	1.78	9.19	551	551	16.30	0.1	4.40	0.00	5	4.57	4.57	OK
12	1.507	3.265	4.772	4.772	15.33	281.63	33.38	0.0022	1.82	8.42	505	505	17.28	0.1	2.29	3.32		0.00	3.32	OK
13	1.947	4.328	6.275	44.261	14.36	282.81	32.19	0.0022	1.85	7.75	465	465	18.25	0.1	22.44	14.66	9	8.22	22.88	OK
14	3.065	2.576	5.641	37.986	13.41	284.28	30.72	0.0023	1.88	7.14	428	428	19.29	0.1	20.36	27.12		0.00	27.12	OK
15	3.522	3.989	7.511	32.345	12.45	284.91	30.09	0.0024	1.94	6.42	385	385	20.70	0.1	18.60	8.24	4	3.65	11.90	
16	1.886	3.941	5.827	24.834	11.54	287.80	27.20	0.0024	1.91	6.04	362	362	21.57	0.1	14.88	7.33	9	8.22	15.55	OK
17	0.643	9.424	0.643	19.007	10.64	290.00	25.00	0.0023	1.91	5.59	335	335	22.71	0.1	11.99	0.00	14	12.78	12.78	OK
18	1.925	3.258	1.925	18.364	9.71	291.81	23.19	0.0024	1.92	5.05	303	303	24.29	0.1	12.39	0.00	14	12.78	12.78	OK

(5) 道路排水施設サイズの計算

側溝および排水管の排水能力は、以下のマニングの流速等式より求められる通水量の８割を排水施設の可能通水量とした。

$$Qc = 0.8 \times V \times A$$

$$V = 1/n \times R^{(2/3)} \times I^{(1/2)}$$

ここで

Qc：排水施設の可能通水量（m3/sec）

V：流速（m/sec）

n : 粗度係数（コンクリート管 0.013、コンクリート側溝 0.015、石積側溝 0.025）

R：径深（m）, R = A/S

I：流路勾配

A ：排水施設の通水断面積（m2）

S ：潤辺（m）

#	サイズ	幅 (m)	高さ (m)	潤辺:S (m)	水深:h (m)	断面積:A (m2)	流速:v (m/s)	粗度 係数:n	勾配:I	径深:R (m)	通水量:Qc (m3/s)
PC1	DP800	直径 0.80		1.77	0.64	0.43	2.12	0.013	0.005	0.24	0.91
PC2	DP1000	直径 1.00		2.21	0.80	0.67	2.46	0.013	0.005	0.30	1.65
BC1	2.0×1.0	2.00	1.00	3.60	0.80	1.60	2.75	0.015	0.005	0.44	4.39
BC2	3.0×1.0	3.00	1.00	4.60	0.80	2.40	3.06	0.015	0.005	0.52	7.33
BC3	3.0×1.30	3.00	1.30	5.08	1.04	3.12	3.41	0.015	0.005	0.61	10.63
BC4	2*2.5×1.30	2.50	1.30	4.58	1.04	2.60	3.23	0.015	0.005	0.57	16.80
BC5	1.5×1.5	1.50	1.50	3.90	1.20	1.80	2.82	0.015	0.005	0.46	5.07
BC6	2*2.5×1.5	2.50	1.50	4.90	1.20	3.00	3.40	0.015	0.005	0.61	20.39

(6) 新規道路排水施設の延長及び通水量

測点	既設断面		新規断面		延長(m)		通水流量(m3/s)		
	Pipe	Box	Pipe	Box	Pipe	Box	Pipe	Box	合計
Sta. 0+016	1000		1000		18.24		1.66		
Sta. 0+025	1000		1000		18.24		1.66		4.98
Sta. 0+937	800		1000		20.06		1.66		
Sta. 1+121	1200			1.5×1.5		18.61		5.07	
Sta. 1+154		2*1.8×1.4		2*2.5×1.30		17.25		16.80	21.87
Sta. 3+200	1000		1000		17.62		1.66		1.66
Sta. 4+819	800		1000		19.41		1.66		1.66
Sta. 5+026		1.5×1.3		3.0×1.30		18.43		10.63	10.63
Sta. 7+010	800		800		15.94		0.91		
Sta. 7+972		1.6×1.2		3.0×1.0		18.09		7.33	8.24
Sta. 8+012	600		800		18.74		0.91		
Sta. 8+047		1.4×1.6		3.0×1.30		16.97		10.63	
Sta. 8+429		2.0×1.6		3.0×1.30		17.70		10.63	
Sta. 8+664		2*1.8×1.6		2*2.5×1.30		18.51		16.80	
Sta. 8+815		2*2.0×1.6		2*2.5×1.5		16.11		20.40	59.37
Sta. 9+132	1000			1.5×1.5		21.51		5.07	
Sta. 9+223	1500			1.5×1.5		20.83		5.07	
Sta. 9+330	600		800		17.26		0.91		11.05
Sta.11+742	1000		1000		17.82		1.66		
Sta.11+935	1000		1000		19.27		1.66		3.32
Sta.12+330	1200			3.0×1.0		16.88		7.33	
Sta.12+982	1200			3.0×1.0		17.88		7.33	14.66
Sta.13+035	800			2.0×1.0		18.95		4.39	
Sta.13+356	1000			2.0×1.0		19.81		4.39	
Sta.13+437	1000		1000		16.09		1.66		
Sta.13+630	1500			3.0×1.30		19.24		10.63	
Sta.13+782	1000		1000		18.27		1.66		
Sta.13+894	800			2.0×1.0		18.81		4.39	27.12
Sta.13+994	800		800		16.35		0.91		
Sta.14+200	800			3.0×1.0		17.54		7.33	8.24
Sta.15+261		1.6×1.0		3.0×1.0		15.68		7.33	7.33

8-3 流出解析（パイロン川、橋梁）

1) 雨量記録の整理

CETABOL 及び SENAMHI の雨量データを整理し、最終的に SENAMHI のデータを利用して、最大雨量を取り出し水文統計処理の準備を行った。

2) 超過確率の算定

対数正規分布法と Gumbel 法を使って確率雨量の算定を行った。結果を下記に示す。流量計算には、Gumbel 法を用いた。

表 2-2-14 確率日雨量

回帰年	確率日雨量（mm/日）	
	対数正規分布法	Gumbel 法
10	146	154
20	168	177
25	175	184
30	181	190
40	190	199
50	198	206
100	221	228

出典：調査団

3) 降雨確率年の算定

サンタクルス県の基準より降雨確率年の回帰年 100 年、確率日雨量 228mm/日を採用した。

4) 流域面積の算定

Instituto Geografico Militar (軍地理院)から入手した地形図から流域面積 30.5km2 を算出した。

5) 流出係数の設定

パイロン川流域周辺は耕地であることから、流出係数は建設省河川砂防基準（案）を参考に 0.45 を採用した。

6) 洪水到達時間の算定

パイロン川流域の標高と流路延長から洪水到達時間を算出した。この結果より洪水到達時間は、表 2-2-15 に示す複数の算定式による結果を比較し、110 分とした。

表 0-15 洪水到達時間

算出方法	等流流速法	土研式	角屋式	Kinematic Wave 式
洪水到達時間（分）	80	140	110	90

出典：調査団

7) 洪水到達時間内の平均雨量の算定

洪水到達時間 110 分の場合の平均降雨強度の計算結果を表 2-2-16 に示す。一般的で安全側の物部式で算出した値を採用した。

表 0-16 到達時間内平均降雨強度

	伊藤式	物部式
到達時間内平均降雨強度（mm/h）	38.2	52.8

出典：調査団

8) 高水位流量の算定

ラショナル式を使って解析洪水流量を算定した。

Qp = 1/3.6*fp*r*A = 201m3/s

Qp: 洪水ピークの流量（m3/s）

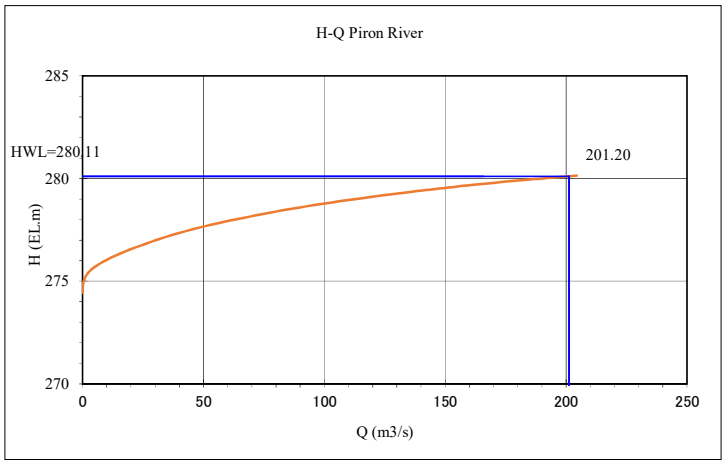
r: 洪水到達時間内平均降雨強度

fp: 流出係数

A: 流域面積（km2）

9) 高水位の算定

上記から得た回帰年 100 年における確率日雨量を用いて算出した流量 201m3/s を地形測量から得た河川断面から作成した水位水量曲線に当てはめると H=280.11 となった。



CBR試験結果　乾期

CAEM ISO 9001:2008 — EMPRESARIAL MULTIDISCIPLINARIO

REV: 00
REPORT: 210-14
DATE: 02/09/2014

Client: KATAHIRA & Engineers International. **Proyect:** Preparatory Study of the Okinawa I - II and III Road Paving Project
Location: Municipality of Okinawa I - II, 2º Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City

Nº POLL	Nº SAMPLES	Progresivas	HUMEDAD NATURAL Nat.	GRANULOMETRIA Grading				LIMITES DE ATTHERBERG Atterberg Limits			CLASIFICACION Clasification A.A.S.H.T.O.	CLASIFICACION ACION Clasificación S.U.S.C.	Proctor T- 180 MOD grs/cm3	HUMEDAD OPTIMA Opt.	% DE C.B.R. P/ 0.10"PENETRATION			OSERVACIONES
		Progressive	Moisture	4	10	40	200	L.L	L.P	I.P				Moisture	95%	100%		Observations
01	01	0+030	19.97%	100.00	99.57	98.60	88.79	26.54%	0.00%	N.P.	A-4 (8)	ML	1.835	15.79%	1.41	2.16		
02	01	1+000	21.90%	100.00	99.92	99.64	97.92	24.93%	0.00%	N.P.	A-4 (8)	ML	1.804	14.37%	0.74	1.43		
03	01	2+000	16.54%	100.00	99.69	98.51	85.11	20.45%	0.00%	N.P.	A-4 (8)	ML	1.920	12.43%	4.03	10.04		
04	01	3+000	18.04%	100.00	100.00	99.77	57.53	0.00%	0.00%	N.P.	A-4 (0)	ML	1.754	13.01%	7.01	13.07		
05	01	4+000	30.26%	100.00	99.95	99.67	97.56	24.48%	0.00%	N.P.	A-4 (8)	ML	1.804	14.37%	2.68	5.48		
06	01	5+000	20.24%	100.00	99.95	99.71	99.15	27.01%	0.00%	N.P.	A-4 (8)	ML	1.817	16.31%	1.36	2.49		
07	01	6+000	24.86%	100.00	100.00	99.95	97.22	0.00%	0.00%	N.P.	A-4 (0)	ML	1.843	12.41%	4.25	11.06		
08	01	7+000	19.35%	100.00	100.00	99.82	85.12	21.13%	0.00%	N.P.	A-4 (8)	ML	1.916	13.14%	7.40	12.32		
09	01	8+000	20.24%	100.00	99.95	99.71	99.15	22.34%	0.00%	N.P.	A-4 (8)	ML	1.832	14.44%	2.05	5.06		
10	01	9+100	22.51%	100.00	99.87	99.62	97.15	40.84%	21.74%	19.10%	A-7-6 (12)	CL	1.742	17.35%	0.86	1.34		
11	01	10+000	12.58%	100.00	100.00	99.67	97.48	49.95%	28.53%	21.41%	A-7-6 (15)	ML	1.726	16.34%	0.77	1.17		
12	01	11+000	12.74%	100.00	99.81	98.50	93.64	56.84%	24.49%	32.35%	A-7-6 (20)	CH	1.754	15.81%	0.59	1.72		
13	01	12+000	13.46%	100.00	100.00	99.53	96.91	61.75%	26.54%	35.21%	A-7-6 (20)	CH	1.698	20.27%	0.92	1.47		
14	01	13+000	7.94%	100.00	99.40	96.20	67.23	35.96%	16.09%	19.88%	A-6 (11)	CL	1.912	14.08%	1.52	2.40		
15	01	14+000	26.50%	100.00	99.92	99.64	97.25	49.93%	25.78%	24.15%	A-7-6 (16)	CL	1.625	22.65%	0.69	1.44		
16	01	15+000	17.21%	100.00	99.41	99.04	71.73	22.11%	11.24%	10.87%	A-6 (8)	CL	2.024	8.03%	2.41	5.22		
17	01	16+000	14.88%	100.00	100.00	99.56	62.69	20.44%	0.00%	N.P.	A-4 (6)	ML	2.060	9.43%	4.57	8.62		
18	01	17+000	13.61%	100.00	100.00	99.32	53.23	0.00%	0.00%	N.P.	A-4 (0)	ML	1.982	8.43%	11.79	26.30		
19	01	18+000	24.10%	100.00	100.00	99.70	93.88	41.22%	21.36%	19.86%	A-7-6 (13)	CL	1.828	15.91%	1.56	2.83		
20	01	19+000	13.17%	100.00	100.00	99.71	45.18	26.85%	0.00%	N.P.	A-4 (3)	SM	1.958	7.67%	8.57	18.73		
21	01	20+000	17.03%	100.00	99.95	98.45	60.63	0.00%	0.00%	N.P.	A-4 (0)	ML	2.057	9.46%	6.40	11.80		
22	01	21+000	18.25%	100.00	100.00	99.68	94.19	35.73%	17.64%	18.09%	A-6 (12)	CL	1.922	12.23%	1.61	3.19		
23	01	22+000	13.49%	100.00	99.95	99.50	61.64	20.04%	0.00%	N.P.	A-4 (6)	ML	2.058	9.31%	10.49	16.38		
24	01	23+000	14.52%	100.00	100.00	95.92	48.04	18.62%	0.00%	N.P.	A-4 (3)	SM	2.013	6.79%	15.07	24.26		
25	01	24+000	13.11%	100.00	100.00	99.58	64.56	18.12%	0.00%	N.P.	A-4 (6)	ML	2.061	9.36%	11.16	17.88		
26	01	25+000	13.01%	100.00	99.97	96.20	67.95	18.02%	0.00%	N.P.	A-4 (7)	ML	2.076	9.07%	9.35	13.09		
27	01	26+000	10.15%	100.00	100.00	99.32	48.04	0.00%	0.00%	N.P.	A-4 (0)	SM	2.046	8.27%	9.90	15.52		
28	01	27+000	20.02%	100.00	100.00	97.39	84.24	38.80%	20.44%	18.36%	A-6 (12)	CL	1.805	14.99%	1.08	2.43		
29	01	28+000	24.77%	100.00	100.00	99.03	96.98	46.79%	22.66%	24.20%	A-7-6 (16)	CL	1.786	15.82%	1.58	2.58		
30	01	29+000	20.11%	100.00	99.89	99.28	90.36	39.23%	18.45%	20.78%	A-6 (13)	CL	1.764	16.78%	1.77	2.74		
31	01	30+000	25.93%	100.00	99.98	98.56	94.51	44.85%	21.22%	23.63%	A-7-6 (15)	CL	1.844	14.77%	1.26	2.04		
32	01	31+000	15.50%	100.00	100.00	99.70	72.40	24.17%	12.18%	11.98%	A-6 (9)	CL	2.073	7.97%	3.33	5.87		
33	01	32+000	16.30%	100.00	100.00	100.00	72.41	25.22%	13.66%	11.55%	A-6 (9)	CL	2.036	9.28%	5.15	10.09		
34	01	33+000	21.14%	100.00	100.00	99.87	96.33	37.31%	18.84%	18.47%	A-6 (12)	CL	1.791	14.61%	1.46	2.08		
35	01	34+000	11.71%	100.00	100.00	98.24	35.50	0.00%	0.00%	N.P.	A-4 (0)	SM	1.864	7.15%	12.47	22.77		

CBR試験結果　雨期

CAEM CENTRO DE ASESORAMIENTO EMPRESARIAL MULTIDISCIPLINARIO ISO 9001:2008

SUMMARY CBR

REV: 00
REPORT: 308-14
DATE: 23/12/2014

Client: KATAHIRA & Engineers International.

Proyect: Preparatory Study of the Okinawa I - II and III Road Paving Project
Location: Municipality of Okinawa I - II, 2º Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City

Nº POLL	Nº SAMPLES	Progresivas / Progressive	HUMEDAD NATURAL Nat. / Moisture	GRANULOMETRIA Grading				LIMITES DE ATTHERBERG Atterberg Limits			CLASIFICACION Clasification A.A.S.H.T.O.	CLASIFICACION Clasificatio S.U.S.C.	Proctor T-180 MOD. grs/cm3	HUMEDAD OPTIMA Opt. / Moisture	% DE C.B.R. P/ 0.10"PENETRATION			OSERVACIONES / Observations
				4	10	40	200	L L	L P	I P					95%	100%		
01	01	3+100	8.50%	100.00	100.00	99.92	31.81	0.00%	0.00%	N.P.	A-2-4 (0)	SM	1.789	12.07%	10.71	14.75		Natural Land
02	01	6+100	9.50%	100.00	100.00	100.00	97.16	18.42%	0.00%	N.P.	A-4 (8)	ML	1.895	12.55%	6.19	8.08		Natural Land
03	01	9+100	9.61%	99.68	99.53	98.90	97.21	42.47%	21.84%	20.63%	A-7-6 (13)	CL	1.828	15.77%	1.10	1.44		Natural Land
04	01	12+000	10.11%	99.62	99.53	98.90	97.04	41.29%	21.09%	20.20%	A-7-6 (13)	CL	1.656	21.40%	0.88	1.24		Natural Land
05	01	15+100	10.80%	100.00	100.00	99.44	67.35	16.43%	0.00%	N.P.	A-4 (7)	ML	1.915	11.66%	10.51	16.81		Natural Land
06	01	18+100	10.61%	100.00	99.90	98.59	85.75	30.95%	16.25%	14.70%	A-6 (10)	CL	1.981	10.76%	1.18	1.42		Natural Land
07	01	21+100	11.60%	100.00	100.00	98.57	87.63	24.74%	13.82%	10.91%	A-6 (9)	CL	1.964	11.86%	4.68	6.11		Natural Land
08	01	24+100	11.60%	99.89	99.68	97.65	39.34	0.00%	0.00%	N.P.	A-4 (0)	SM	1.951	9.37%	18.17	24.56		Natural Land
09	01	27+100	12.60%	100.00	99.71	93.36	68.45	28.54%	15.46%	13.08%	A-6 (8)	CL	1.877	10.35%	0.99	1.33		Natural Land
10	01	30+100	13.51%	84.52	81.65	76.66	61.50	38.55%	20.21%	18.35%	A-6 (9)	CL	1.851	10.85%	0.92	1.20		Natural Land

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT RP 001/14 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International.*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2º Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP Nº: 01

TEST DATA

Progresive: 0+042 — Coordinated: X Coordinate 17°14'09.30"S; Y Coordinate 62°54'08.60"O

WATER TABLE: 1,70 m. — **WEIGHT HAMMER:** 8 Kg.

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hamm-er E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.20			Clayey silt with plasticity, dark brown coloration	0	2	--	--	--	--			
				20	50	50	2.50	1	2.50	68.80		
0.40				18	110	60	3.33	1	3.33	49.85	49.37	
	0.50			15	190	80	5.33	1	5.33	29.45		
0.60			Clayey silt with plasticity, dark brown coloration	1	30	30	30.00	1	30.00	4.26		
	0.70			3	80	50	16.67	1	16.67	8.22	8.42	
0.80				4	150	70	17.50	1	17.50	7.78		
1.00			Clayey silt with plasticity, dark brown coloration	4	60	60	15.00	1	15.00	9.25		
				7	140	80	11.43	1	11.43	12.54	11.52	
1.20	1.20			8	230	90	11.25	1	11.25	12.76		
1.40			Limo Sandy without plasticity, partially saturated state and clear brown color	3	60	60	20.00	1	20.00	6.70		
				4	130	70	17.50	1	17.50	7.78	7.70	
1.60	1.70			5	210	80	16.00	1	16.00	8.60		N.F.
1.80	N.F.		Limo Sandy without plasticity, partially saturated state and clear brown color									
				5	50	50	10.00	1	10.00	14.56		
2.00				9	120	70	7.78	1	7.78	19.30	16.93	
2.20	2.30											
2.40			Limo Sandy without plasticity, partially saturated state and clear brown color									
				4	40	40	10.00	1	10.00	14.56		
2.60				7	110	70	10.00	1	10.00	14.56	13.37	
2.80				7	200	90	12.86	1	12.86	10.99		
3.00	3.00											

OBSERVATIONS:
The presence of the Water Table at a depth of 1.70 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 23/08/2014
CLOSING DATE OF TEST: 23/08/2014
LABORATORY MANAGER

A-186

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 03/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International.*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2º Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP Nº: 02

TEST DATA

Progresive: 0+545 — Coordinated: X Coordinate 17°13'36.80"S; Y Coordinate 62°54'09.20"O

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hamm-er E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.20			Filled with Granular Base Layer Material Type	19	60	60	3.16	1	3.16	52.96		
				43	140	80	1.86	1	1.86	95.79	72.52	
0.40	0.20			24	200	60	2.50	1	2.50	68.80		
0.60			Limo, in-situ condition firm, medium bodied, partially dry and light gray coloring.	12	60	60	5.00	1	5.00	31.66		
				16	130	70	4.38	1	4.38	36.76	36.79	
0.80	0.70			18	200	70	3.89	1	3.89	41.95		
1.00			Limo, in-situ condition firm, medium bodied, partially dry and light gray coloring.	26	50	50	1.92	1	1.92	92.30		
				29	110	60	2.07	1	2.07	85.05	80.77	
1.20	1.00			19	160	50	2.63	1	2.63	64.96		
1.40			Clayey silt with plasticity condition in-situ firm, medium compact, partially dry and light gray color with reddish patinas.	5	40	40	8.00	1	8.00	18.70		
				11	100	60	5.45	1	5.45	28.72	21.44	
1.60	1.40			8	170	70	8.75	1	8.75	16.91		
1.80			Clayey silt with plasticity condition in situ firm, medium compact, partially dry and light brown coloring.	4	60	60	15.00	1	15.00	9.25		
				6	130	70	11.67	1	11.67	12.26	11.42	
2.00	1.90			8	220	90	11.25	1	11.25	12.76		
2.20			Clayey silt with plasticity condition in-situ firm, medium compact, partially dry and light brown coloring.	6	40	40	6.67	1	6.67	22.94		A.C.
				8	90	50	6.25	1	6.25	24.66	25.44	
2.40	2.10			11	150	60	5.45	1	5.45	28.72		
2.60	A.C.		Silty Sand with no plasticity condition in-situ firm, medium compact, saturated state and light brown coloring.	3	50	50	16.67	1	16.67	8.22		
				4	110	60	15.00	1	15.00	9.25	11.46	
2.80	2.50			8	180	70	8.75	1	8.75	16.91		
3.00			Clayey silt with plasticity condition in situ firm, medium bodied, partially saturated condition and light brown coloring.	5	60	60	12.00	1	12.00	11.87		
				5	130	70	14.00	1	14.00	9.99	10.81	
	3.00			6	210	80	13.33	1	13.33	10.55		

OBSERVACIONES:
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done. He hung evidenced waters of 2.10 m. to 2.50 m.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 23/08/2014
CLOSING DATE OF TEST: 23/08/2014
LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 03/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International.*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N °: 03

TEST DATA

Progresive: 1+045 — Coordinated: Coordenada X 17°13'53.00"S; Coordenada Y 62°54'08.70"O

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hamm-er E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
	0.10		Filled with Granular Base Layer Material Type	6	30	30	5.00	1	5.00	31.66	54.82	
				16	70	40	2.50	1	2.50	68.80		
0.20				15	110	40	2.67	1	2.67	64.01		
0.40			Limo, in-situ condition firm, medium dense consistency, partially dry and dark brown coloration.									
				5	30	30	6.00	1	6.00	25.81		
				10	60	30	3.00	1	3.00	56.10	56.75	
0.60	0.60			15	90	30	2.00	1	2.00	88.34		
0.80			Limo, in-situ condition firm, medium dense consistency, partially dry and dark brown coloration.									
				4	30	30	7.50	1	7.50	20.10		
				7	70	40	5.71	1	5.71	27.26	23.75	
1.00	1.00			7	115	45	6.43	1	6.43	23.89		
			Limo, in-situ condition firm, medium bodied, partially dry, dark brown with reddish patinas.	4	40	40	10.00	1	10.00	14.56		
1.20				5	90	50	10.00	1	10.00	14.56	14.56	
	1.30			4	130	40	10.00	1	10.00	14.56		
1.40												
			Silt situ condition firm, medium consistency, partially dry and dark brown with light brown patina.	2	40	40	20.00	1	20.00	6.70		
1.60				3	90	50	16.67	1	16.67	8.22	7.21	
1.80	1.80			3	150	60	20.00	1	20.00	6.70		
2.00												
			Limo, in-situ condition firm, medium bodied, partially dry and dark brown coloration.	3	50	50	16.67	1	16.67	8.22		
				4	100	50	12.50	1	12.50	11.34	10.48	
2.20	2.20			5	160	60	12.00	1	12.00	11.87		
2.40												
			Limo, in-situ condition firm, medium bodied, partially dry, dark brown with gray patinas.	5	60	60	12.00	1	12.00	11.87		
				4	120	60	15.00	1	15.00	9.25	9.78	
2.60	2.60			3	170	50	16.67	1	16.67	8.22		
2.80												
			Clayey silt with plasticity condition in-situ firm, medium bodied, partially saturated state and dark brown with gray patinas.	4	50	50	12.50	1	12.50	11.34		
				5	110	60	12.00	1	12.00	11.87	11.07	
3.00	3.00			5	180	70	14.00	1	14.00	9.99		

OBSERVACIONES:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 25/08/2014
CLOSING DATE OF TEST: 25/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 03/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International.*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N °: 04

TEST DATA

Progresive: 1+545 — Coordinated: Coordenada X 17°14'09.30"S; Coordenada Y 62°54'08.60"O

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hamm-er E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	8	30	30	3.75	1	3.75	43.69		
				11	60	30	2.73	1	2.73	62.41	69.25	
	0.10			17	90	30	1.76	1	1.76	101.63		
0.20			Limo, in-situ condition firm, medium dense consistency, partially dry and light gray coloring.	10	40	40	4.00	1	4.00	40.64		
0.40				23	80	40	1.74	1	1.74	103.31	82.42	
	0.40			23	120	40	1.74	1	1.74	103.31		
0.60												
			Sandy Silt, firm condition in-situ, on average compactness, partially dry and light brown coloring.	9	40	40	4.44	1	4.44	36.12		
0.80				21	90	50	2.38	1	2.38	72.67	67.92	
	0.90			16	120	30	1.88	1	1.88	94.96		
1.00												
			Limo, in-situ condition firm, medium bodied, partially dry and brown with gray patinas.	2	30	30	15.00	1	15.00	9.25		
1.20				3	70	40	13.33	1	13.33	10.55	9.34	
1.40	1.40			3	120	50	16.67	1	16.67	8.22		
1.60												
			Limo, in-situ condition firm, medium bodied, partially dry and dark brown coloration.	2	40	40	20.00	1	20.00	6.70		
1.80				2	80	40	20.00	1	20.00	6.70	6.35	
	1.90			3	150	70	23.33	1	23.33	5.64		
2.00												
			Limo, in-situ condition firm, medium bodied, partially dry and brown with reddish patinas.	2	40	40	20.00	1	20.00	6.70		
2.20				3	120	80	26.67	1	26.67	4.86	4.99	
2.40	2.40			3	230	110	36.67	1	36.67	3.40		
2.60												
			Limo Clay, in-situ condition firm, medium bodied, partially dry, dark brown with reddish patinas.	5	90	90	18.00	1	18.00	7.54		
2.80				6	190	100	16.67	1	16.67	8.22	9.13	
	2.90			9	300	110	12.22	1	12.22	11.63		
3.00												
			Limo Clay, in-situ condition firm, medium bodied, partially dry, dark brown with reddish patinas.	7	70	70	10.00	1	10.00	14.56		
				4	110	40	10.00	1	10.00	14.56	13.79	
	3.00			6	180	70	11.67	1	11.67	12.26		

OBSERVACIONES:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 23/08/2014
CLOSING DATE OF TEST: 23/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 05

TEST DATA

Progresive: 2+040 — Coordinated: X Coordinate 17°14'25.40"S; Y Coordinate 62°54'08.00"O

WATER TABLE: 1,30 m. — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	12	30	30	2.50	1	2.50	68.80		
				17	60	30	1.76	1	1.76	101.63	90.69	
	0.10			17	90	30	1.76	1	1.76	101.63		
020				14	40	40	2.86	1	2.86	59.25		
			Silty Sand with no plasticity condition in-situ firm, medium compact, partially dry and reddish brown coloration.	15	70	30	2.00	1	2.00	88.34	78.64	
040				15	100	30	2.00	1	2.00	88.34		
	0.50											
060												
			Sandy Silt, firm condition in-situ, on average compactness, partially dry and dark brown coloration.	6	40	40	6.67	1	6.67	22.94		
080				5	80	40	8.00	1	8.00	18.70	19.65	
	1.00			7	140	60	8.57	1	8.57	17.31		
100												
				8	80	80	10.00	1	10.00	14.56		
120			Limo Sandy, in-situ condition firm, medium compactness, partially saturated state and dark brown coloration.	7	170	90	12.86	1	12.86	10.99	11.26	N.F.
	1.30			6	270	100	16.67	1	16.67	8.22		
140	N.F.											
			Silty Sand with no plasticity condition in-situ firm, medium compact, saturated state and dark brown coloration.	4	80	80	20.00	1	20.00	6.70		
160				3	170	90	30.00	1	30.00	4.26	5.39	
	1.80			4	270	100	25.00	1	25.00	5.22		
180												
				6	70	70	11.67	1	11.67	12.26		
200			Sandy Silt, firm condition in-situ, on average compactness, partially dry and dark brown coloration.	7	160	90	12.86	1	12.86	10.99	10.49	
220	2.30			6	260	100	16.67	1	16.67	8.22		
240												
				5	80	80	16.00	1	16.00	8.60		
260			Limo Sandy, in-situ condition firm, medium compactness, saturated state and dark brown coloration.	7	180	100	14.29	1	14.29	9.77	9.64	
280	2.80			6	260	80	13.33	1	13.33	10.55		
			Limo Sandy, in-situ condition firm, medium compactness, saturated state and dark brown coloration.	5	70	70	14.00	1	14.00	9.99		
300				6	150	80	13.33	1	13.33	10.55	12.39	
	3.00			9	230	80	8.89	1	8.89	16.62		

OBSERVATIONS:

The presence of the Water Table at a depth of 1.30 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 23/08/2014
CLOSING DATE OF TEST: 23/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 06

TEST DATA

Progresive: 2+535 — Coordinated: X Coordinate 17°14'41.50"S; Y Coordinate 62°54'08.00"O

WATER TABLE: 1,20 m. — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	5	30	30	6.00	1	6.00	25.81		
				7	60	30	4.29	1	4.29	37.62	35.71	
	0.10			8	90	30	3.75	1	3.75	43.69		
020				6	40	40	6.67	1	6.67	22.94		
			Sandy Silt, firm condition in-situ, on average compactness, partially dry and dark brown coloration.	5	80	40	8.00	1	8.00	18.70	18.73	
040				3	110	30	10.00	1	10.00	14.56		
	0.50											
060				3	50	50	16.67	1	16.67	8.22		
			Clayey Silt, firm condition in-situ, on average compactness, partially dry, dark brown with reddish patinas.	4	110	60	15.00	1	15.00	9.25	9.91	
080	0.80			6	180	70	11.67	1	11.67	12.26		
100												
				5	40	40	8.00	1	8.00	18.70		
			Silty Sand with no plasticity condition in-situ firm, medium compact, partially saturated state and dark brown coloration.	4	80	40	10.00	1	10.00	14.56	19.31	N.F.
120	1.20			8	130	50	6.25	1	6.25	24.66		
140	N.F.											
			Silty Sand with no plasticity condition in-situ firm, medium compact, partially saturated state and dark brown coloration.	2	70	70	35.00	1	35.00	3.58		
160				4	160	90	22.50	1	22.50	5.87	4.89	
	1.70			4	260	100	25.00	1	25.00	5.22		
180												
				4	60	60	15.00	1	15.00	9.25		
200			Limo, in-situ condition firm, medium consistency, saturated state and dark brown coloration.	4	130	70	17.50	1	17.50	7.78	9.34	
220	2.30			7	220	90	12.86	1	12.86	10.99		
240												
				2	40	40	20.00	1	20.00	6.70		
260			Limo, in-situ condition firm, medium consistency, saturated state and dark brown coloration.	6	100	60	10.00	1	10.00	14.56	12.73	
280	2.80			8	170	70	8.75	1	8.75	16.91		
			Silty clay with plasticity condition in-situ firm, medium consistency, saturated state and dark brown coloration.	7	50	50	7.14	1	7.14	21.23		
300				9	110	60	6.67	1	6.67	22.94	21.16	
	3.00			9	180	70	7.78	1	7.78	19.30		

OBSERVATIONS:

The presence of the Water Table at a depth of 1.20 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 25/08/2014
CLOSING DATE OF TEST: 25/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)

NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*

PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*

UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 07

TEST DATA

Progresive: 3+030

Coordinated: X Coordinate 17°14'57.60"S; Y Coordinate 62°54'07.40"O

WATER TABLE: 1,80 m. **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	13	30	30	2.31	1	2.31	75.26	75.26	Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since it would be inconsistent data. This is because the test was conducted on an isolated haberce stone. Adopt CBR = 75.26%
	0.10			22	60	30	1.36	1	1.36	135.66		
				25	90	30	1.20	1	1.20	156.54		
			Limo, in-situ condition firm, medium dense consistency, partially dry and light gray coloring.	6	30	30	5.00	1	5.00	31.66	45.44	
				10	70	40	4.00	1	4.00	40.64		
	0.50			15	110	40	2.67	1	2.67	64.01		
			Limo Gritty no plasticity condition in-situ firm, medium compact, partially dry and dark brown coloration.	7	40	40	5.71	1	5.71	27.26	37.20	
				10	80	40	4.00	1	4.00	40.64		
	1.00			8	110	30	3.75	1	3.75	43.69		
			Limo, in-situ condition firm, medium bodied, partially saturated state and dark brown coloration.	5	50	50	10.00	1	10.00	14.56	10.70	
				5	120	70	14.00	1	14.00	9.99		
	1.50			5	210	90	18.00	1	18.00	7.54		
			Limo Gritty no plasticity condition in-situ firm, medium compact, partially dry and dark brown coloration.	4	60	60	15.00	1	15.00	9.25	9.21	N.F.
	1.80			5	140	80	16.00	1	16.00	8.60		
				7	240	100	14.29	1	14.29	9.77		
	N.F.											
			Silty clay with plasticity condition in-situ firm, medium consistency, saturated state and dark brown coloration.	7	90	90	12.86	1	12.86	10.99	12.77	
				8	180	90	11.25	1	11.25	12.76		
	2.30			10	280	100	10.00	1	10.00	14.56		
			Silty clay with plasticity condition in-situ firm, medium consistency, saturated state and dark brown with light brown patinas.	14	80	80	5.71	1	5.71	27.26	34.67	
				18	160	80	4.44	1	4.44	36.12		
				15	220	60	4.00	1	4.00	40.64		
	3.00											

OBSERVATIONS:

The presence of the Water Table at a depth of 1.80 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 25/08/2014

CLOSING DATE OF TEST: 25/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)

NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*

PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*

UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 08

TEST DATA

Progresive: 3+525

Coordinated: X Coordinate 17°15'13.80"S; Y Coordinate 62°54'07.30"O

WATER TABLE: 2,60 m. **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	20	30	30	1.50	1	1.50	121.92	117.40	Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since it would be inconsistent data. This is because the test was conducted on an isolated haberce stone. Adopt CBR = 75.26%
				20	60	30	1.50	1	1.50	121.92		
	0.10			18	90	30	1.67	1	1.67	108.35		
			Limo, in-situ condition firm, medium consistency to dense, dry and dark brown coloration.	5	30	30	6.00	1	6.00	25.81	25.33	
				6	70	40	6.67	1	6.67	22.94		
	0.60			7	110	40	5.71	1	5.71	27.26		
			Limo, in-situ condition firm, medium consistency to dense, dry and dark brown coloration.	6	40	40	6.67	1	6.67	22.94	31.91	
				6	80	40	6.67	1	6.67	22.94		
	1.00			9	110	30	3.33	1	3.33	49.85		
			Limo, in-situ condition firm, medium bodied, partially dry and dark brown coloration.	2	50	50	25.00	1	25.00	5.22	5.58	
				3	120	70	23.33	1	23.33	5.64		
				4	210	90	22.50	1	22.50	5.87		
	1.60											
			Limo, in-situ condition firm, medium bodied, partially saturated state and dark brown coloration.	5	60	60	12.00	1	12.00	11.87	12.59	
				8	140	80	10.00	1	10.00	14.56		
	2.10			8	240	100	12.50	1	12.50	11.34		
			Limo Sandy, in-situ condition firm, medium compactness, partially saturated state and dark brown coloration.	8	90	90	11.25	1	11.25	12.76	13.36	
				8	180	90	11.25	1	11.25	12.76		
	2.60			10	280	100	10.00	1	10.00	14.56		
	N.F.											
			Limo Sandy, in-situ condition firm, medium compactness, partially saturated state and dark brown coloration.	11	80	80	7.27	1	7.27	20.81	18.49	
				8	160	80	10.00	1	10.00	14.56		
				8	220	60	7.50	1	7.50	20.10		
	3.00											

OBSERVATIONS:

The presence of the Water Table at a depth of 2.60 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 26/08/2014

CLOSING DATE OF TEST: 26/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 09

TEST DATA

Progresive: 4+025
Coordinated: X Coordinate 17°15'30.00"S; Y Coordinate 62°54'06.90"O
WATER TABLE: 1,60 m. **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10			Limo, in-situ condition firm, medium bodied, dry and light brown coloring.	6	30	30	5.00	1	5.00	31.66		
				11	60	30	2.73	1	2.73	62.41	47.04	Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since it would be inconsistent data. This is because the test was conducted on an isolated haberoe stone. Adopt average CBR of the first two.
0.20	0.20			18	90	30	1.67	1	1.67	108.35		
			Limo Sandy, in-situ condition firm, medium consistency to dense, dry and light brown color	7	30	30	4.29	1	4.29	37.62		
0.40				13	60	30	2.31	1	2.31	75.26	62.71	
0.50	0.50			13	90	30	2.31	1	2.31	75.26		
0.60												
			Limo, in-situ condition firm, medium bodied, partially dry, dark brown with reddish patinas.	7	40	40	5.71	1	5.71	27.26		
0.80				6	80	40	6.67	1	6.67	22.94	24.95	
1.00	1.00			8	130	50	6.25	1	6.25	24.66		
1.20												
			Limo, in-situ condition firm, medium bodied, partially saturated state and dark brown coloration	5	50	50	10.00	1	10.00	14.56		
1.40				5	110	60	12.00	1	12.00	11.87	12.14	
1.50	1.50			5	180	70	14.00	1	14.00	9.99		N.F.
1.60	1.60											
	N.F.		Silty Sand, firm condition in-situ, on average compactness, saturated state and dark brown coloration	6	70	70	11.67	1	11.67	12.26		
1.80				6	150	80	13.33	1	13.33	10.55	9.84	
2.00	2.00			5	250	100	20.00	1	20.00	6.70		
2.20												
			Limo Sandy, in-situ condition firm, medium compactness, saturated state and dark brown coloration.	5	60	60	12.00	1	12.00	11.87		
2.40	2.40			4	130	70	17.50	1	17.50	7.78	9.81	
				7	230	100	14.29	1	14.29	9.77		
2.60												
			Clayey Silt, firm condition in-situ, medium consistency, saturated state and dark brown coloration	6	80	80	13.33	1	13.33	10.55		
2.80	2.80			6	170	90	15.00	1	15.00	9.25	9.86	
				7	270	100	14.29	1	14.29	9.77		
			Clayey Silt, firm condition in-situ, medium consistency, saturated state and brown with gray patinas	7	90	90	12.86	1	12.86	10.99		
3.00	3.00			8	190	100	12.50	1	12.50	11.34	12.85	
				11	290	100	9.09	1	9.09	16.21		

OBSERVATIONS:

The presence of the Water Table at a depth of 1.60 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 26/08/2014
CLOSING DATE OF TEST: 26/08/2014
LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 10

TEST DATA

Progresive: 4+520
Coordinated: X Coordinate 17°15'46.10"S; Y Coordinate 62°54'6.80"O
WATER TABLE: 1,60 m. **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10			Filled with Granular Base Layer Material Type	12	30	30	2.50	1	2.50	68.80		
				24	60	30	1.25	1	1.25	149.54	68.80	Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since it would be inconsistent data. This is because the test was conducted on an isolated haberoe stone. Adopt CBR = 68.80%
0.20	0.20			21	90	30	1.43	1	1.43	128.77		
			Limo Sandy, in-situ condition firm, medium consistency to dense, dry and dark brown coloration.	7	30	30	4.29	1	4.29	37.62		
0.40				10	60	30	3.00	1	3.00	56.10	47.86	
0.60	0.70			9	90	30	3.33	1	3.33	49.85		
0.80			Limo Sandy, in-situ condition firm, medium consistency to dense, dry and dark brown coloration.	3	40	40	13.33	1	13.33	10.55		
				5	100	60	12.00	1	12.00	11.87	10.56	
1.00	1.00			4	160	60	15.00	1	15.00	9.25		
1.20			Silt situ condition firm, medium consistency, partially saturated state and changes to dark brown with light brown patina.	3	80	80	26.67	1	26.67	4.86		
1.40				4	180	100	25.00	1	25.00	5.22	5.59	
1.50	1.50			6	300	120	20.00	1	20.00	6.70		N.F.
1.60	1.60											
	N.F.		Sandy Limo firm condition in-situ, on average compactness, saturated state and browning.	6	100	100	16.67	1	16.67	8.22		
1.80				7	200	100	14.29	1	14.29	9.77	10.31	
2.00	2.00			9	300	100	11.11	1	11.11	12.94		
2.20												
			Limo Clay, in-situ condition firm, medium consistency, saturated state and dark brown with gray patinas.	8	100	100	12.50	1	12.50	11.34		
2.40				8	200	100	12.50	1	12.50	11.34	12.96	
	2.50			11	300	100	9.09	1	9.09	16.21		
2.60												
			Limo Clay, in-situ condition firm, medium consistency, saturated state and dark brown with light brown patinas.									
2.80				7	80	80	11.43	1	11.43	12.54		
				8	160	80	10.00	1	10.00	14.56	13.35	
3.00	3.00			9	180	100	11.11	1	11.11	12.94		

OBSERVATIONS:

The presence of the Water Table at a depth of 1.60 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 26/08/2014
CLOSING DATE OF TEST: 26/08/2014
LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 11

TEST DATA

Progresive: 5+015 — Coordinated: X Coordinate 17°16'02.30"S; Y Coordinate 62°54'06.20"O

WATER TABLE: 2,10 m. — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10			Limo, in-situ condition firm, medium bodied, dry and light brown coloring.	4	30	30	7.50	1	7.50	20.10	31.90	Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since it would be inconsistent data. This is because the test was conducted on an isolated haberoe stone. Adopt average CBR of the first two.
0.20	0.20			8	60	30	3.75	1	3.75	43.69		
				18	90	30	1.67	1	1.67	108.35		
0.40			Organic silt, in-situ condition firm, medium bodied, dry and greenish coloration.	13	40	40	3.08	1	3.08	54.53	61.91	
0.60	0.60			12	70	30	2.50	1	2.50	68.80		
				11	100	30	2.73	1	2.73	62.41		
0.80	0.80		Organic clayey silt, firm-situ, medium bodied, dry and gray coloring condition.	3	40	40	13.33	1	13.33	10.55	15.24	
				6	90	50	8.33	1	8.33	17.86		
1.00				7	150	60	8.57	1	8.57	17.31		
1.20	1.30		Clayey silt, in-situ condition firm, medium bodied, partially dry, dark brown with light brown patinas.	4	50	50	12.50	1	12.50	11.34	10.19	
				4	110	60	15.00	1	15.00	9.25		
				5	180	70	14.00	1	14.00	9.99		
1.40	1.60		Clayey silt, in-situ condition firm, medium bodied, partially dry, dark brown with light brown patinas.	4	60	60	15.00	1	15.00	9.25	9.28	
				5	130	70	14.00	1	14.00	9.99		
1.60				5	210	80	16.00	1	16.00	8.60		
1.80			Limo Sandy, in-situ condition firm, medium compactness, saturated state and dark brown coloration.	7	100	100	14.29	1	14.29	9.77	9.30	N.F.
				8	220	120	15.00	1	15.00	9.25		
2.00	2.10			9	360	140	15.56	1	15.56	8.88		
2.20	N.F.		Limo Sandy, in-situ condition firm, medium compactness, saturated state and dark brown coloration.	8	100	100	12.50	1	12.50	11.34	12.41	
2.40	2.60			9	200	100	11.11	1	11.11	12.94		
				9	300	100	11.11	1	11.11	12.94		
2.80			Limo Clay, in-situ condition firm, medium consistency, saturated state and brown with gray patinas.	7	100	100	14.29	1	14.29	9.77	10.48	
				9	120	120	13.33	1	13.33	10.55		
3.00	3.00			11	260	140	12.73	1	12.73	11.12		

OBSERVATIONS:

The presence of the Water Table at a depth of 2.10 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 26/08/2014
CLOSING DATE OF TEST: 26/08/2014
LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 27/08/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 12

TEST DATA

Progresive: 5+515 — Coordinated: X Coordinate 17°16'18.50"S; Y Coordinate 62°54'6.10"O

WATER TABLE: 1,50 m. — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10			Filled with Granular Base Layer Material Type	12	30	30	2.50	1	2.50	68.80	68.80	Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since it would be inconsistent data. This is because the test was conducted on an isolated haberoe stone. Adopt CBR = 68.80%
0.20	0.10			22	60	30	1.36	1	1.36	135.66		
				22	90	30	1.36	1	1.36	135.66		
0.40			Limo, in-situ condition firm, compact consistency, dry and dark brown coloration	9	40	40	4.44	1	4.44	36.12	68.03	
0.60	0.60			17	80	40	2.35	1	2.35	73.64		
				11	110	30	2.73	1	2.73	62.41		
0.80			Limo, in-situ condition firm, partially saturated compact consistency, state and dark brown coloration	2	40	40	20.00	1	20.00	6.70	8.18	
1.00	1.00			4	100	60	15.00	1	15.00	9.25		
				5	180	80	16.00	1	16.00	8.60		
1.20			Limo, in-situ condition firm, medium bodied, partially saturated state and dark brown with gray patinas	5	60	60	12.00	1	12.00	11.87	11.79	N.F.
1.40	1.50			6	140	80	13.33	1	13.33	10.55		
				9	240	100	11.11	1	11.11	12.94		
1.60	N.F.		Silty Sand plasticity condition without strong in-situ, on average compactness, saturated state and dark brown coloration	6	100	100	16.67	1	16.67	8.22	10.33	
1.80				10	200	100	10.00	1	10.00	14.56		
2.00	2.10			6	300	100	16.67	1	16.67	8.22		
2.20			Silty Sand plasticity condition without strong in-situ, on average compactness, saturated state and dark brown coloration	3	80	80	26.67	1	26.67	4.86	4.50	
2.40				3	160	80	26.67	1	26.67	4.86		
	2.60			3	260	100	33.33	1	33.33	3.78		
2.80			Firm-situ, on average compactness, saturated state and dark brown coloration Sandy Limo condition	4	70	70	17.50	1	17.50	7.78	9.78	
				6	150	80	13.33	1	13.33	10.55		
3.00	3.00			7	170	90	12.86	1	12.86	10.99		

OBSERVATIONS:

The presence of the Water Table at a depth of 1.50 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 27/08/2014
CLOSING DATE OF TEST: 27/08/2014
LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 27/08/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 13

TEST DATA

Progresive: 6+010 — Coordinated: X Coordinate 17°16'34.60"S; Y Coordinate 62°54'05.50"O

WATER TABLE: 1,10 m. — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD				TEST RESULTS									
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Filled with Granular Base Layer Material Type	18	30	30	1.67	1	1.67	108.35	108.35	Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since it would be inconsistent data. This is because the test was conducted on an isolated haberos stone. Adopt average CBR of the first two
				18	60	30	1.67	1	1.67	108.35		
				22	90	30	1.36	1	1.36	135.66		
0.20												
0.40	0.50		Limo, in-situ condition firm, compact consistency, dry and dark brown coloration	7	40	40	5.71	1	5.71	27.26	32.87	
				11	90	50	4.55	1	4.55	35.22		
				9	130	40	4.44	1	4.44	36.12		
0.60												
0.80			Firm-situ, on average compactness, partially saturated state and dark brown coloration Sandy Limo condition	3	50	50	16.67	1	16.67	8.22	8.22	
				3	100	50	16.67	1	16.67	8.22		
1.00				3	150	50	16.67	1	16.67	8.22		
	1.10											
1.20	N.F.		Arena Limosa sin plasticidad de condición in-situ firme, de compacidad media, de estado saturado y de coloración marrón oscuro	5	70	70	14.00	1	14.00	9.99	10.02	
1.40	1.40			7	150	80	11.43	1	11.43	12.54		
				5	240	90	18.00	1	18.00	7.54		
1.60												
1.80			Clayey Silt, firm condition in-situ, medium consistency, saturated state and dark brown coloration	5	80	80	16.00	1	16.00	8.60	12.11	
				10	170	90	9.00	1	9.00	16.39		
2.00				8	270	100	12.50	1	12.50	11.34		
2.20	2.00											
2.40	2.40		Clayey Silt, firm condition in-situ, medium consistency, saturated state and dark brown coloration	6	60	60	10.00	1	10.00	14.56	12.69	
				6	140	80	13.33	1	13.33	10.55		
				9	240	100	11.11	1	11.11	12.94		
2.60												
2.80			Limo, in-situ condition firm, medium consistency, saturated state and dark brown coloration	8	90	90	11.25	1	11.25	12.76	13.96	
				10	190	100	10.00	1	10.00	14.56		
				10	200	100	10.00	1	10.00	14.56		
3.00	3.00											

N.F.

OBSERVATIONS:

The presence of the Water Table at a depth of 1.10 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 27/08/2014
CLOSING DATE OF TEST: 27/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 27/08/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 14

TEST DATA

Progresive: 6+510 — Coordinated: X Coordinate 17°16'50.80"S; Y Coordinate 62°54'05.50"O

WATER TABLE: ıot Applicabl — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD				TEST RESULTS									
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.15		Filled with Granular Base Layer Material Type	8	30	30	3.75	1	3.75	43.69	43.69	
				8	60	30	3.75	1	3.75	43.69		
				9	90	30	3.33	1	3.33	49.85		
0.20												
0.40			Silty Sand plasticity condition without strong in-situ, on average compactness of dry and dark brown coloration.	10	60	60	6.00	1	6.00	25.81	24.23	
				14	120	60	4.29	1	4.29	37.62		
0.60	0.60			4	180	60	15.00	1	15.00	9.25		
0.80												
			Firm-situ, on average compactness, partially saturated state and dark brown coloration Sandy Limo condition	7	60	60	8.57	1	8.57	17.31	16.56	
				8	120	60	7.50	1	7.50	20.10		
1.00				6	190	70	11.67	1	11.67	12.26		
	1.10											
1.20			Clay loam, in-situ condition firm, medium consistency, partially saturated state and changes to dark brown with reddish brown patina.	4	70	70	17.50	1	17.50	7.78	8.54	
1.40				6	160	90	15.00	1	15.00	9.25		
				5	240	80	16.00	1	16.00	8.60		
1.60	1.60											
1.80			Limo Clay, in-situ condition firm, medium consistency, saturated state and dark brown with light brown patinas.	5	80	80	16.00	1	16.00	8.60	6.24	
				4	170	90	22.50	1	22.50	5.87		
2.00				4	290	120	30.00	1	30.00	4.26		
2.20	2.10											
2.40			Limo Clay, in-situ condition firm, medium bodied, partially saturated state and dark brown with gray patinas.	3	50	50	16.67	1	16.67	8.22	8.86	
				5	130	80	16.00	1	16.00	8.60		
				7	230	100	14.29	1	14.29	9.77		
2.60	2.60											
2.80			Clay loam, in-situ condition firm, medium consistency, partially saturated state and changes to dark brown with light brown patina.	8	60	60	7.50	1	7.50	20.10	19.40	
				10	130	70	7.00	1	7.00	21.72		
				10	220	90	9.00	1	9.00	16.39		
3.00	3.00											

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 27/08/2014
CLOSING DATE OF TEST: 27/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)

NORMA ASTM-D-6951-03

REV: 00 | Date: 27/08/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*

PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*

UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 15

TEST DATA

Progresive: 7+000

Coordinated: X Coordinate 17°17'06.90"S; Y Coordinate 62°54'05.00"O

WATER TABLE: 2,10 m.

WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Filled with Granular Base Layer Material Type	14	30	30	2.14	1	2.14	81.77	79.60	
				13	60	30	2.31	1	2.31	75.26		
				14	90	30	2.14	1	2.14	81.77		
0.20												
0.40			Limo, in-situ condition firm, compact consistency, dry and dark brown coloration.	6	40	40	6.67	1	6.67	22.94	31.14	
				8	80	40	5.00	1	5.00	31.66		
0.60	0.60			12	130	50	4.17	1	4.17	38.83		
0.80			Sandy Limo firm condition in-situ, on average compactness, partially saturated state and dark brown coloration.	13	50	50	3.85	1	3.85	42.47	40.04	
				12	100	50	4.17	1	4.17	38.83		
1.00				12	150	50	4.17	1	4.17	38.83		
	1.10											
1.20			Silty Sand plasticity condition without strong in-situ, on average compactness, saturated state and dark brown coloration.	5	50	50	10.00	1	10.00	14.56	13.89	
1.40				6	110	60	10.00	1	10.00	14.56		
	1.50			7	190	80	11.43	1	11.43	12.54		
1.60												
1.80			Limo Clay, in-situ condition firm, medium consistency, saturated state and dark brown coloration.	9	90	90	10.00	1	10.00	14.56	16.21	
				11	190	100	9.09	1	9.09	16.21		
2.00				12	290	100	8.33	1	8.33	17.86		N.F.
	2.10											
2.20	N.F.		Limo Clay, in-situ condition firm, medium consistency, saturated state and dark brown coloration.	7	70	70	10.00	1	10.00	14.56	12.04	
				6	150	80	13.33	1	13.33	10.55		
	2.30			7	240	90	12.86	1	12.86	10.99		
2.40												
2.60												
2.80			Limo, in-situ condition firm, medium consistency, saturated state and dark brown coloration.	8	80	80	10.00	1	10.00	14.56	15.17	
				10	170	90	9.00	1	9.00	16.39		
3.00	3.00			8	170	80	10.00	1	10.00	14.56		

OBSERVATIONS:

The presence of the Water Table at a depth of 2.10 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 27/08/2014

CLOSING DATE OF TEST: 27/08/2014

LABORATORY MANAGER

ENSAYOS DE PENETRACION DINAMICA (DCP)

NORMA ASTM-D-6951-03

REV: 00 | FECHA: 27/08/2014 | REPORTE: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*

PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*

UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

SONDEO N°: 16

DATOS DE ENSAYO

Progresive: 7+500

COORDENADAS / Coordinated: Coordenada X 17°17'23.10"S; Coordenada Y 62°54'04.90"O

NIVEL FREATICO: No Aplica

LADO:

TIPO DE MATERIAL:

PESO DEL MARTILLO: 8 Kg.

REGISTRO DE CAMPO / RESULTADOS DE LOS ENSAYOS

ESCALA	PROF. (m)	PERFIL GEOTECNICO	DESCRIPCION VISUAL DEL MATERIAL	Nº de Golpes A	Penetración Acumulada (mm) B	Penetración Entre Lecturas (mm) C	Penetración Por Golpes (mm) D	Factor del Martillo E	Indice PDC (mm/Golpes) F	CBR % G	PROMEDIO CBR %	Observaciones
0.10	0.10		Filled with Granular Base Layer Material Type	17	30	30	1.76	1	1.76	101.63	101.63	Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since it would be inconsistent data. This is because the test was conducted on an isolated haberor stone. Adopt CBR = 101.63% and the second was adopted the average of 1 and 3
				25	60	30	1.20	1	1.20	156.54		
				27	90	30	1.11	1	1.11	170.63		
0.20												
0.40			Sandy Limo firm condition in-situ, on average compactness, partially dry and dark brown coloration.	13	40	40	3.08	1	3.08	54.53	68.97	
				25	80	40	1.60	1	1.60	113.42		
	0.50			19	120	40	2.11	1	2.11	83.41		
0.60												
0.80			Sandy Limo firm condition in-situ, on average compactness, partially saturated state and dark brown coloration.	9	50	50	5.56	1	5.56	28.13	33.48	
				15	110	60	4.00	1	4.00	40.64		
1.00				10	160	50	5.00	1	5.00	31.66		
	1.10											
1.20			Sandy Limo firm condition in-situ, on average compactness, partially saturated state and dark brown coloration.	7	80	80	11.43	1	11.43	12.54	9.50	
1.40				6	170	90	15.00	1	15.00	9.25		
	1.60			5	270	100	20.00	1	20.00	6.70		
1.60												
1.80			Limo Clay, in-situ condition firm, medium bodied, partially dry and gray coloring.	10	90	90	9.00	1	9.00	16.39	13.57	
				10	190	100	10.00	1	10.00	14.56		
2.00	2.00			7	290	100	14.29	1	14.29	9.77		
2.20			Limo Clay, in-situ condition firm, medium bodied, partially saturated condition and light brown coloring.	5	70	70	14.00	1	14.00	9.99	13.65	
				8	150	80	10.00	1	10.00	14.56		
2.40	2.40			10	240	90	9.00	1	9.00	16.39		
2.60												
2.80			Limo Clay, in-situ condition firm, medium bodied, partially saturated condition and light brown coloring.	13	100	100	7.69	1	7.69	19.54	20.67	
				13	200	100	7.69	1	7.69	19.54		
				15	300	100	6.67	1	6.67	22.94		
3.00	3.00		Limo Clay, in-situ condition firm, medium bodied, partially saturated state and browning.	10	70	70	7.00	1	7.00	21.72	25.42	
				13	150	80	6.15	1	6.15	25.09		
				15	230	80	5.33	1	5.33	29.45		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 27/08/2014

CLOSING DATE OF TEST: 27/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 27/08/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 17

TEST DATA

Progresive: 8+000 — Coordinated: X Coordinate 17°17'39.30"S; Y Coordinate 62°54'04.30"O

WATER TABLE: 1,40 m. — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Filled with Granular Base Layer Material Type	14	30	30	2.14	1	2.14	81.77	79.60	
				13	60	30	2.31	1	2.31	75.26		
				14	90	30	2.14	1	2.14	81.77		
0.20												
0.40	0.60		Clay, in-situ condition firm, compact consistency, dry and dark brown coloration.	6	40	40	6.67	1	6.67	22.94	31.14	
0.60				8	80	40	5.00	1	5.00	31.66		
				12	130	50	4.17	1	4.17	38.83		
0.80												
1.00	1.00		Sandy Limo firm condition in-situ, on average compactness, partially saturated state and dark brown coloration.	13	50	50	3.85	1	3.85	42.47	40.04	
				12	100	50	4.17	1	4.17	38.83		
1.20				12	150	50	4.17	1	4.17	38.83		
1.40	1.40		Sandy Limo firm condition in-situ, on average compactness, partially saturated state and dark brown coloration.	13	50	50	3.85	1	3.85	42.47	40.04	N.F.
				12	100	50	4.17	1	4.17	38.83		
1.60				12	150	50	4.17	1	4.17	38.83		
1.80	N.F.		Sandy Limo firm condition in-situ, on average compactness, saturated state and dark brown coloration.	5	50	50	10.00	1	10.00	14.56	13.89	
				6	110	60	10.00	1	10.00	14.56		
				7	190	80	11.43	1	11.43	12.54		
2.00												
2.20	2.40		Clay loam, in-situ condition firm, medium consistency, saturated state and gray color with light brown patina.	7	70	70	10.00	1	10.00	14.56	12.04	
				6	150	80	13.33	1	13.33	10.55		
2.40				7	240	90	12.86	1	12.86	10.99		
2.60												
2.80	2.80		Limo Clay, in-situ condition firm, medium consistency, saturated state and light brown coloring.	7	70	70	10.00	1	10.00	14.56	12.04	
				6	150	80	13.33	1	13.33	10.55		
3.00				7	240	90	12.86	1	12.86	10.99		
3.20	3.00		Clay, in-situ condition firm, medium consistency, saturated state, light brown with gray patinas.	8	80	80	10.00	1	10.00	14.56	15.17	
				10	170	90	9.00	1	9.00	16.39		
3.40				8	250	80	10.00	1	10.00	14.56		

OBSERVATIONS:

The presence of the Water Table at a depth of 1.40 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 27/08/2014
CLOSING DATE OF TEST: 27/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 18

TEST DATA

Progresive: 8+500 — Coordinated: X Coordinate 17°17'53.20"S; Y Coordinate 62°53'55.80"O

WATER TABLE: 1,00 m. — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.20		Limo, in-situ condition compact, dense consistency, dry and dark brown coloration.	9	30	30	3.33	1	3.33	49.85	64.76	
				10	60	30	3.00	1	3.00	56.10		
0.20				15	90	30	2.00	1	2.00	88.34		
0.40	0.50		Limo, in-situ condition firm, medium bodied, dry and dark brown coloration	5	40	40	8.00	1	8.00	18.70	22.48	
0.60				5	70	30	6.00	1	6.00	25.81		
				6	110	40	6.67	1	6.67	22.94		
0.80												
1.00	1.00		Clay loam, in-situ condition firm, medium consistency, partially saturated state and changes to dark brown with light brown patina.	3	40	40	13.33	1	13.33	10.55	13.23	
				4	80	40	10.00	1	10.00	14.56		N.F.
1.20				5	130	50	10.00	1	10.00	14.56		
1.40	N.F.		Sandy Limo firm condition in-situ, on average compactness, saturated state and dark brown coloration.	2	80	80	40.00	1	40.00	3.08	2.59	
	1.30			2	150	70	35.00	1	35.00	3.58		
1.60				1	250	100	100.00	1	100.00	1.10		
1.80	1.80		Limo Clay, of weak in-situ condition, soft consistency, saturated state and gray and brown coloring.	2	90	90	45.00	1	45.00	2.70	5.94	
				3	190	100	33.33	1	33.33	3.78		
2.00				8	290	100	12.50	1	12.50	11.34		
2.20	2.30		Clay, strong in-situ condition, medium consistency, saturated state and reddish coloration gray skate.	5	50	50	10.00	1	10.00	14.56	18.73	
				5	90	40	8.00	1	8.00	18.70		
2.40				6	130	40	6.67	1	6.67	22.94		
2.60												
2.80	3.00		Clay, firm-situ, medium consistency, saturated state and reddish coloration gray patinas condition	5	60	60	12.00	1	12.00	11.87	13.67	
				6	120	60	10.00	1	10.00	14.56		
3.00				8	200	80	10.00	1	10.00	14.56		
3.20												

OBSERVACIONES:

The presence of the Water Table at a depth of 1.00 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 28/08/2014
CLOSING DATE OF TEST: 28/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 19

TEST DATA

Progresive: 9+000 — **Coordinated:** X Coordinate 17°18'8.89"S; Y Coordinate 62°53'53.75"O

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD				TEST RESULTS									
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.15		Filled with Granular Base Layer Material Type	15	30	30	2.00	1	2.00	88.34	88.34	Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since it would be inconsistent data. This is because the test was conducted on an isolated haberce stone. Adopt CBR = 88.34%
				18	60	30	1.67	1	1.67	108.35		
				19	90	30	1.58	1	1.58	115.11		
0.20												
0.40	0.50		Clay in-situ condition dense, compact consistency, dry and gray coloring.	11	40	40	3.64	1	3.64	45.22	46.77	
				11	80	40	3.64	1	3.64	45.22		
0.60				12	120	40	3.33	1	3.33	49.85		
0.80	1.00		Alimo condition in-situ firm dense, medium bodied, dry and dark brown coloration.	4	30	30	7.50	1	7.50	20.10	26.34	
				8	70	40	5.00	1	5.00	31.66		
1.00				7	110	40	5.71	1	5.71	27.26		
1.20	1.40		Clay, in-situ condition firm, medium consistency, saturated state and dark brown coloration.	7	40	40	5.71	1	5.71	27.26	36.18	
				10	80	40	4.00	1	4.00	40.64		
1.40				10	120	40	4.00	1	4.00	40.64		
1.60	1.90		Limo, in-situ condition firm, medium bodied, partially dry and yellowish coloration.	11	50	50	4.55	1	4.55	35.22	39.85	
				10	90	40	4.00	1	4.00	40.64		
1.80				8	120	30	3.75	1	3.75	43.69		
2.00	2.40		Clay, in-situ condition firm, medium bodied, partially dry and light gray color with reddish patinas.	18	50	50	2.78	1	2.78	61.14	61.47	
2.20				14	90	40	2.86	1	2.86	59.25		
2.40				15	130	40	2.67	1	2.67	64.01		
2.60	2.80		Limo, in-situ condition firm, medium bodied, partially dry and light brown coloring.	9	30	30	3.33	1	3.33	49.85	64.12	
				15	70	40	2.67	1	2.67	64.01		
2.80				18	110	40	2.22	1	2.22	78.51		
3.00	3.00		Clay, in-situ condition firm, medium bodied, partially dry and brown and gray coloring.	9	30	30	3.33	1	3.33	49.85	46.78	
				12	70	40	3.33	1	3.33	49.85		
				10	110	40	4.00	1	4.00	40.64		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 28/08/2014
CLOSING DATE OF TEST: 28/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 20

TEST DATA

Progresive: 9+500 — **Coordinated:** X Coordinate 17°18'25.50"S; Y Coordinate 62°53'53.50"O

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD				TEST RESULTS									
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.20		Clay in-situ condition dense, compact consistency, dry and gray coloring.	8	30	30	3.75	1	3.75	43.69	64.75	
				16	70	40	2.50	1	2.50	68.80		
0.20				14	100	30	2.14	1	2.14	81.77		
0.40	0.70		Clay in-situ condition dense, compact consistency, dry and light gray coloring.	5	40	40	8.00	1	8.00	18.70	29.33	
				8	80	40	5.00	1	5.00	31.66		
0.60				7	110	30	4.29	1	4.29	37.62		
0.80	1.20		Clay in-situ condition dense, compact consistency, dry and light gray color with gray patinas.	6	40	40	6.67	1	6.67	22.94	30.74	
				7	70	30	4.29	1	4.29	37.62		
1.00				6	100	30	5.00	1	5.00	31.66		
1.20	1.60		Clay, in-situ condition firm, medium consistency, saturated state and dark brown coloration.	5	30	30	6.00	1	6.00	25.81	33.31	
				8	70	40	5.00	1	5.00	31.66		
1.40				13	120	50	3.85	1	3.85	42.47		
1.60	2.10		Limo, in-situ condition firm, medium bodied, partially dry and brown with gray patinas.	10	40	40	4.00	1	4.00	40.64	50.42	
				10	70	30	3.00	1	3.00	56.10		
1.80				13	110	40	3.08	1	3.08	54.53		
2.00	2.70		Clay, in-situ condition firm, medium bodied, partially dry, reddish and gray coloring.	9	40	40	4.44	1	4.44	36.12	49.46	
				12	80	40	3.33	1	3.33	49.85		
2.20				11	110	30	2.73	1	2.73	62.41		
2.40	3.00		Clay, strong in-situ condition, medium consistency, partially dry and reddish coloration gray skate.	14	30	30	2.14	1	2.14	81.77	92.82	
				24	70	40	1.67	1	1.67	108.35		
2.60				20	110	40	2.00	1	2.00	88.34		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done..

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 28/08/2014
CLOSING DATE OF TEST: 28/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 21

TEST DATA

Progresive: 10+000
Coordinated: X Coordinate 17°18'41.60"S; Y Coordinate 62°53'52.80"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Filled with Granular Base Layer Material Type	15	30	30	2.00	1	2.00	88.34	88.34	(For the First Item) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone. Adopt CBR = 88.34%.
				22	60	30	1.36	1	1.36	135.66		
				24	90	30	1.25	1	1.25	149.54		
0.20												
0.40			Clay in-situ condition dense, compact consistency, dry and light gray coloring.	8	40	40	5.00	1	5.00	31.66	28.75	
				6	80	40	6.67	1	6.67	22.94		
0.60	0.60			6	110	30	5.00	1	5.00	31.66		
0.80												
			Clay in-situ condition dense, compact consistency, dry and light gray coloring.									
1.00				10	40	40	4.00	1	4.00	40.64	68.08	
				13	70	30	2.31	1	2.31	75.26		
1.20	1.20			15	100	30	2.00	1	2.00	88.34		
1.40												
			Clay, in-situ condition firm, medium bodied, partially saturated state and light gray coloring.	6	30	30	5.00	1	5.00	31.66	34.81	
				6	70	40	6.67	1	6.67	22.94		
1.60	1.60			15	120	50	3.33	1	3.33	49.85		
1.80												
			Clay, in-situ condition firm, medium bodied, partially saturated state and light gray coloring.	8	40	40	5.00	1	5.00	31.66	66.17	
				15	70	30	2.00	1	2.00	88.34		
2.00	2.00			18	110	40	2.22	1	2.22	78.51		
2.20												
			Clay, in-situ condition firm, medium bodied, partially dry, reddish and gray coloring.	14	40	40	2.86	1	2.86	59.25	74.34	
				16	70	30	1.88	1	1.88	94.96		
2.40	2.40			16	110	40	2.50	1	2.50	68.80		
2.60												
			Clay, strong in-situ condition, medium consistency, partially dry and reddish coloration gray skate.	12	40	40	3.33	1	3.33	49.85	63.04	
				15	80	40	2.67	1	2.67	64.01		
2.80	2.80			13	110	30	2.31	1	2.31	75.26		
3.00				11	30	30	2.73	1	2.73	62.41		
			Clay, in-situ condition firm, medium bodied, partially dry and reddish coloration.	19	70	40	2.11	1	2.11	83.41	69.94	
	3.00			15	110	40	2.67	1	2.67	64.01		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 28/08/2014
CLOSING DATE OF TEST: 28/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 22

TEST DATA

Progresive: 10+500
Coordinated: X Coordinate 17°18'57.80"S; Y Coordinate 62°53'52.50"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Filled with Granular Base Layer Material Type	24	30	30	1.25	1	1.25	149.54	149.54	(For the Closeup) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				26	60	30	1.15	1	1.15	163.57		
				22	90	30	1.36	1	1.36	135.66		
0.20												
0.40			Clay in-situ condition dense, compact consistency, dryness and reddish coloration gray patinas.	11	40	40	3.64	1	3.64	45.22	51.44	
				9	70	30	3.33	1	3.33	49.85		
0.50	0.50			14	110	40	2.86	1	2.86	59.25		
0.60												
0.80				9	40	40	4.44	1	4.44	36.12		
			Clay in-situ condition dense, compact consistency, dry and light brown and gray coloring.	6	70	30	5.00	1	5.00	31.66	34.33	
1.00	1.00			11	120	50	4.55	1	4.55	35.22		
1.20												
			Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	11	40	40	3.64	1	3.64	45.22	54.58	
				10	70	30	3.00	1	3.00	56.10		
1.40	1.40			11	100	30	2.73	1	2.73	62.41		
1.60												
			Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	15	50	50	3.33	1	3.33	49.85	64.64	
				13	80	30	2.31	1	2.31	75.26		
1.90	1.90			12	110	30	2.50	1	2.50	68.80		
2.00												
			Firm clay in-situ condition, medium bodied, dry and gray and reddish coloration.	9	40	40	4.44	1	4.44	36.12	49.54	
				8	70	30	3.75	1	3.75	43.69		
2.30	2.30			12	100	30	2.50	1	2.50	68.80		
2.40												
2.60			Clay, strong in-situ condition, medium consistency, partially dry and reddish coloration gray skate.	12	50	50	4.17	1	4.17	38.83	42.17	
				11	90	40	3.64	1	3.64	45.22		
2.80	2.80			13	140	50	3.85	1	3.85	42.47		
3.00												
			Clay, in-situ condition firm, medium bodied, partially dry and reddish coloration.	8	40	40	5.00	1	5.00	31.66	39.68	
				8	70	30	3.75	1	3.75	43.69		
	3.00			8	100	30	3.75	1	3.75	43.69		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 28/08/2014
CLOSING DATE OF TEST: 28/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 23

TEST DATA

Progresive: 10+995
Coordinated: X Coordinate 17°19'13.90"S; Y Coordinate 62°53'51.80"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10			Clay with gravel mixture isolated from in-situ condition dense, compact consistency, dry and light brown with gray patinas	9	30	30	3.33	1	3.33	49.85		
0.20	0.20			10	60	30	3.00	1	3.00	56.10	54.01	
				10	90	30	3.00	1	3.00	56.10		
0.40	0.50		Silty Sand in-situ condition dense, compacted compactness of dry and gray coloring.	16	40	40	2.50	1	2.50	68.80		
				21	80	40	1.90	1	1.90	93.30	85.13	
0.60				21	120	40	1.90	1	1.90	93.30		
0.80												
			Firm clay in-situ condition, medium bodied, dry and brown and gray coloring.	7	40	40	5.71	1	5.71	27.26		
1.00	1.00			9	80	40	4.44	1	4.44	36.12	36.20	
				11	120	40	3.64	1	3.64	45.22		
1.20												
			Firm clay in-situ condition, medium consistency, dry state and gray coloration brown patina.	5	40	40	8.00	1	8.00	18.70		
1.40	1.50			9	90	50	5.56	1	5.56	28.13	24.99	
				9	140	50	5.56	1	5.56	28.13		
1.60												
			Firm clay in-situ condition, medium bodied, dry and reddish brown with gray patinas.	6	40	40	6.67	1	6.67	22.94		
1.80	1.80			6	70	30	5.00	1	5.00	31.66	28.75	
				6	100	30	5.00	1	5.00	31.66		
2.00												
			Firm clay in-situ condition, medium bodied, dry and reddish brown coloration.	4	30	30	7.50	1	7.50	20.10		
2.20	2.30			5	60	30	6.00	1	6.00	25.81	23.91	
				5	90	30	6.00	1	6.00	25.81		
2.40												
			Firm clay in-situ condition, medium bodied, dry and reddish brown coloration.	3	40	40	13.33	1	13.33	10.55		
2.60	2.80			4	70	30	7.50	1	7.50	20.10	16.45	
				5	110	40	8.00	1	8.00	18.70		
2.80												
			Clay, strong in-situ condition, medium consistency, partially dry and reddish coloration with dark gray skate.	4	40	40	10.00	1	10.00	14.56		
3.00	3.00			4	70	30	7.50	1	7.50	20.10	15.34	
				4	120	50	12.50	1	12.50	11.34		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 29/08/2014
CLOSING DATE OF TEST: 29/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 24

TEST DATA

Progresive: 11+490
Coordinated: X Coordinate 17°19'30.10"S; Y Coordinate 62°53'51.40"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10			Filled with Granular Base Layer Material Type	19	30	30	1.58	1	1.58	115.11		(For the first item) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
0.20	0.15			23	60	30	1.30	1	1.30	142.58	131.12	
				22	90	30	1.36	1	1.36	135.66		
0.40			Clay in-situ condition dense, compact consistency, dry and gray and reddish brown coloration	5	40	40	8.00	1	8.00	18.70		
0.60	0.60			8	80	40	5.00	1	5.00	31.66	28.83	
				9	120	40	4.44	1	4.44	36.12		
0.80												
			Clay in-situ condition dense, compact consistency, dry and gray color with reddish brown patina.	4	40	40	10.00	1	10.00	14.56		
1.00				7	70	30	4.29	1	4.29	37.62	29.44	
1.20	1.30			9	110	40	4.44	1	4.44	36.12		
1.40												
			Firm clay in-situ condition, medium bodied, dry and yellowish coloring with reddish patinas.	6	40	40	6.67	1	6.67	22.94		
1.60				8	80	40	5.00	1	5.00	31.66	30.24	
1.80				9	120	40	4.44	1	4.44	36.12		
2.00												
2.20	2.30											
2.40												
			Firm clay in-situ condition, medium bodied, dry and light brown with small isolated clasts.	7	40	40	5.71	1	5.71	27.26		
2.60				5	70	30	6.00	1	6.00	25.81	23.92	
2.80	2.80			5	110	40	8.00	1	8.00	18.70		
3.00												
			Clay, firm-situ, medium bodied, partially dry, reddish brown with gray patinas condition.	5	30	30	6.00	1	6.00	25.81		
3.20	3.00			4	60	30	7.50	1	7.50	20.10	22.00	
				4	90	30	7.50	1	7.50	20.10		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 29/08/2014
CLOSING DATE OF TEST: 29/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 25

TEST DATA

Progresive: 11+990
Coordinated: X Coordinate 17°19'46.20"S; Y Coordinate 62°53'49.90"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
010	0.10		Filled with Granular Base Layer Material Type	28	30	30	1.07	1	1.07	177.72	177.72	(For the first item) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				26	60	30	1.15	1	1.15	163.57		
				22	90	30	1.36	1	1.36	135.66		
020												
040			Firm clay in-situ condition, medium bodied, dry and dark brown coloration.	8	40	40	5.00	1	5.00	31.66	46.43	
				11	80	40	3.64	1	3.64	45.22		
060	0.60			11	110	30	2.73	1	2.73	62.41		
080				8	40	40	5.00	1	5.00	31.66	42.24	
			Firm clay in-situ condition, medium bodied, dry and reddish coloration gray patinas.	12	80	40	3.33	1	3.33	49.85		
100	1.10			11	120	40	3.64	1	3.64	45.22		
120												
			Firm clay in-situ condition, medium bodied, dry and light brown coloring containing small clasts.	20	50	50	2.50	1	2.50	68.80	72.04	
140				18	90	40	2.22	1	2.22	78.51		
160	1.60			16	130	40	2.50	1	2.50	68.80		
180				28	40	40	1.43	1	1.43	128.77	169.53	
			Firm clay in-situ condition, medium bodied, dry and light brown coloring containing small clasts.	31	80	40	1.29	1	1.29	144.32		
200				36	110	30	0.83	1	0.83	235.50		
	2.10											
220				40	50	50	1.25	1	1.25	149.54	154.83	(For points 5,6 and 7) Due to caracteristcas of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
			Firm clay in-situ condition, medium consistency, dry, reddish brown with the presence of small clasts and light brown patina.	31	90	40	1.29	1	1.29	144.32		
240				36	130	40	1.11	1	1.11	170.63		
260	2.60											
280			Clay, in-situ condition Firm, medium bodied, partially dry and reddish coloration with small clasts.	19	30	30	1.58	1	1.58	115.11	131.12	
				22	60	30	1.36	1	1.36	135.66		
300	3.00			23	90	30	1.30	1	1.30	142.58		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey conducted .

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 29/08/2014
CLOSING DATE OF TEST: 29/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 26

TEST DATA

Progresive: 12+485
Coordinated: X Coordinate 17°20'02.30"S; Y Coordinate 62°53'48.70"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
010	0.10		Filled with Granular Base Layer Material Type	23	30	30	1.30	1	1.30	142.58	142.58	(For the first item) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				22	60	30	1.36	1	1.36	135.66		
				18	90	30	1.67	1	1.67	108.35		
020												
040			Firm clay in-situ condition, medium consistency, dry and dark brown color with light brown patina.	5	40	40	8.00	1	8.00	18.70	23.02	
				5	80	40	8.00	1	8.00	18.70		
060	0.60			6	110	30	5.00	1	5.00	31.66		
080				3	30	30	10.00	1	10.00	14.56	14.56	
			Firm clay in-situ condition, medium bodied, dry and light brown with gray patinas.	4	70	40	10.00	1	10.00	14.56		
100	1.10			4	110	40	10.00	1	10.00	14.56		
120												
			Firm clay in-situ condition, medium bodied, dry and light brown with small isolated clasts.	4	40	40	10.00	1	10.00	14.56	13.23	
140				3	80	40	13.33	1	13.33	10.55		
160	1.60			4	120	40	10.00	1	10.00	14.56		
180				2	30	30	15.00	1	15.00	9.25	8.40	
			Limo Clay of Firm in-situ condition, soft consistency, partially dry and gray coloring.	2	70	40	20.00	1	20.00	6.70		
200				2	100	30	15.00	1	15.00	9.25		
	2.10											
220				6	40	40	6.67	1	6.67	22.94	21.99	
			Limo Clay of Firm in-situ condition, soft consistency, saturated state and gray coloring.	6	80	40	6.67	1	6.67	22.94		
240	2.40			4	110	30	7.50	1	7.50	20.10		
260												
280			Limo Clay of Firm in-situ condition, soft consistency, partially dry and light brown coloring.	4	40	40	10.00	1	10.00	14.56	36.21	
				8	80	40	5.00	1	5.00	31.66		
300	3.00			11	110	30	2.73	1	2.73	62.41		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done. Presence of water hanging 2,10 m. to 2.40 m.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 29/08/2014
CLOSING DATE OF TEST: 29/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 27

TEST DATA

Progresive: 12+980 — **Coordinated:** X Coordinate 17°20'02.30"S; Y Coordinate 62°53'48.70"O

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD				TEST RESULTS								
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10			Silty Sand with presence of Firm in-situ gravels isolated condition, compasidad dense, dry state and dark brown coloration.	7	30	30	4.29	1	4.29	37.62	53.21	(For the first item) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone. The average CBR of the first two was adopted.
0.20	0.20			12	60	30	2.50	1	2.50	68.80		
				21	90	30	1.43	1	1.43	128.77		
0.40	0.40		Firm clay in-situ condition, medium bodied, dry and light brown with light brown patina gray.	5	40	40	8.00	1	8.00	18.70	24.43	
				6	80	40	6.67	1	6.67	22.94		
0.60				6	110	30	5.00	1	5.00	31.66		
0.80	0.90		Firm clay in-situ condition, medium bodied, dry and light brown with gray patinas.	4	40	40	10.00	1	10.00	14.56	13.23	
				3	80	40	13.33	1	10.00	10.55		
1.00				4	120	40	10.00	1	10.00	14.56		
1.20	1.40		Firm clay in-situ condition, medium bodied, dry and light brown and gray coloring.	6	30	30	5.00	1	5.00	31.66	30.19	
				7	70	40	5.71	1	5.71	27.26		
1.40				6	100	30	5.00	1	5.00	31.66		
1.60	1.90		Arcilla de condición in-situ firme, de consistencia media, de estado seco y de coloración gris y marrón claro	6	40	40	6.67	1	6.67	22.94	27.83	
				6	80	40	6.67	1	6.67	22.94		
1.80				7	110	30	4.29	1	4.29	37.62		
2.00	2.40		Firm clay in-situ condition, soft consistency, saturated state and gray color with reddish patinas.	2	40	40	20.00	1	20.00	6.70	12.45	
				3	80	40	13.33	1	13.33	10.55		
2.20				4	110	30	7.50	1	7.50	20.10		
2.40												
2.60	3.00		Firm clay in-situ condition, soft consistency, partially dry and greenish coloration with brown patinas.	6	40	40	6.67	1	6.67	22.94	27.28	
				7	80	40	5.71	1	5.71	27.26		
2.80				6	110	30	5.00	1	5.00	31.66		
3.00												

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 29/08/2014
CLOSING DATE OF TEST: 29/08/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: **KATAHIRA & Engineers International.**
PROYECTO / Proyect: **Preparatory Study of the Okinawa I - II and III Road Paving Project**
UBICACIÓN / Location: **Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City**

DCP N°: 28

TEST DATA

Progresive: 13+480 — **Coordinated:** X Coordinate 17°20'34.60"S; Y Coordinate 62°53'47.50"O

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD				TEST RESULTS								
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10			Silty Sand Firm condition in-situ, on average compactness of dry and dark brown coloration.	6	30	30	5.00	1	5.00	31.66		
	0.30			5	60	30	6.00	1	6.00	25.81	24.01	
0.20				3	90	30	10.00	1	10.00	14.56		
0.40	0.40		Weak clay in-situ condition, soft consistency, dry and light brown color and gray with light brown patina gray.	4	40	40	10.00	1	10.00	14.56	12.79	
				3	70	30	10.00	1	10.00	14.56		
0.60				2	100	30	15.00	1	15.00	9.25		
0.80	0.80		Firm clay in-situ condition, medium bodied, dry and light brown with dark gray patina.	4	40	40	10.00	1	10.00	14.56	14.56	
				4	80	40	10.00	1	10.00	14.56		
1.00				4	120	40	10.00	1	10.00	14.56		
1.20	1.10		Firm clay in-situ condition, medium bodied, dry and light brown with light gray patina.	7	50	50	7.14	1	7.14	21.23	20.39	
				7	100	50	7.14	1	7.14	21.23		
1.40				5	140	40	8.00	1	8.00	18.70		
1.60	1.60		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	3	40	40	13.33	1	13.33	10.55	16.02	
				4	80	40	10.00	1	10.00	14.56		
1.80				6	120	40	6.67	1	6.67	22.94		
2.00	2.10		Firm clay in-situ condition, soft consistency, partially saturated state and reddish brown coloration	10	50	50	5.00	1	5.00	31.66	30.48	
				9	100	50	5.56	1	5.56	28.13		
2.20				6	130	30	5.00	1	5.00	31.66		
2.40	2.50		Limo Clay of Firm in-situ condition, soft consistency, partially dry, reddish brown with presence of clasts.	4	40	40	10.00	1	10.00	14.56	20.17	
				5	80	40	8.00	1	8.00	18.70		
2.60				7	120	40	5.71	1	5.71	27.26		
2.80	3.00		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	8	50	50	6.25	1	6.25	24.66	25.81	
				9	100	50	5.56	1	5.56	28.13		
3.00				8	150	50	6.25	1	6.25	24.66		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 01/09/2014
CLOSING DATE OF TEST: 01/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 29

TEST DATA

Progresive: 13+980
Coordinated: X Coordinate 17°20'50.60"S; Y Coordinate 62°53'44.70"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Firm presence of clay in-situ gravels isolated condition, compact consistency, dry and dark brown coloration.	29	30	30	1.03	1	1.03	184.85	210.17	(For the first item) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				36	60	30	0.83	1	0.83	235.50		
				38	90	30	0.79	1	0.79	250.20		
0.20	0.40		Firm clay in-situ condition, medium bodied, dry and reddish brown with gray patinas.	8	40	40	5.00	1	5.00	31.66	37.66	
0.40				8	70	30	3.75	1	3.75	43.69		
				7	100	30	4.29	1	4.29	37.62		
0.60	0.90		Firm clay in-situ condition, dense consistency, dry and light brown with gray patinas.									
0.80				10	40	40	4.00	1	4.00	40.64	35.17	
				7	80	40	5.71	1	5.71	27.26		
1.00				7	110	30	4.29	1	4.29	37.62		
1.00	1.40		Firm clay in-situ condition, medium bodied, dry and light brown and gray coloring.	4	30	30	7.50	1	7.50	20.10	30.78	
1.20				9	70	40	4.44	1	4.44	36.12		
1.40				9	110	40	4.44	1	4.44	36.12		
1.60	1.80		Firm clay in-situ condition, soft consistency, partially dry, reddish brown with presence of small clasts.	9	40	40	4.44	1	4.44	36.12	42.20	
1.80				10	80	40	4.00	1	4.00	40.64		
				9	110	30	3.33	1	3.33	49.85		
2.00	2.30		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	6	40	40	6.67	1	6.67	22.94	24.38	
2.20				7	80	40	5.71	1	5.71	27.26		
				6	120	40	6.67	1	6.67	22.94		
2.40	2.80		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	5	40	40	8.00	1	8.00	18.70	21.54	
2.60				5	70	30	6.00	1	6.00	25.81		
2.80				4	100	30	7.50	1	7.50	20.10		
3.00	3.00		Limo Clay of Firm in-situ condition, soft consistency, partially dry and reddish brown coloration.	4	30	30	7.50	1	7.50	20.10	17.79	
				5	70	40	8.00	1	8.00	18.70		
				4	110	40	10.00	1	10.00	14.56		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 01/09/2014
CLOSING DATE OF TEST: 01/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 30

TEST DATA

Progresive: 14+475
Coordinated: X Coordinate 17°21'06.60"S; Y Coordinate 62°53'42.10"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Silty Sand condition in-situ Firm, compact consistency, dry and dark brown coloration.	28	30	30	1.07	1	1.07	177.72	56.10	(For the first item) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone. CBR was adopted 56,10.
				21	60	30	1.43	1	1.43	128.77		
				10	90	30	3.00	1	3.00	56.10		
0.20	0.40		Limo Clay of Firm in-situ condition, medium bodied, dry and light brown and gray coloring.	3	40	40	13.33	1	13.33	10.55	10.55	
0.40				3	80	40	13.33	1	13.33	10.55		
				3	120	40	13.33	1	13.33	10.55		
0.60	0.80		Limo Clay of Firm in-situ condition, medium bodied, dry and light brown and gray coloring.									
0.80				5	50	50	10.00	1	10.00	14.56	13.23	
				3	90	40	13.33	1	13.33	10.55		
1.00				3	120	30	10.00	1	10.00	14.56		
1.00	1.50		Limo Clay of Firm in-situ condition, medium bodied, dry, reddish and gray coloring.	6	50	50	8.33	1	8.33	17.86	21.25	
1.20				6	90	40	6.67	1	6.67	22.94		
1.40				6	130	40	6.67	1	6.67	22.94		
1.60	1.90		Limo Clay of Firm in-situ condition, medium bodied, dry and reddish brown with gray patinas.	5	50	50	10.00	1	10.00	14.56	14.56	
1.80				4	90	40	10.00	1	10.00	14.56		
				4	130	40	10.00	1	10.00	14.56		
2.00	2.20		Firm clay in-situ condition, soft consistency, partially dry and reddish brown coloration.	6	60	60	10.00	1	10.00	14.56	15.48	
2.20				7	120	60	8.57	1	8.57	17.31		
				4	160	40	10.00	1	10.00	14.56		
2.40	2.80		Sandy Limo Firm condition in-situ soft compactness, partially dry and reddish brown coloration.									
2.60				5	70	70	14.00	1	14.00	9.99	9.53	
2.80				5	140	70	14.00	1	14.00	9.99		
				5	220	80	16.00	1	16.00	8.60		
3.00	3.00		Sandy Limo Firm condition in-situ soft compactness, partially dry and reddish coloration.									
				7	70	70	10.00	1	10.00	14.56	18.62	
				9	140	70	7.78	1	7.78	19.30		
				13	230	90	6.92	1	6.92	21.99		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 01/09/2014
CLOSING DATE OF TEST: 01/09/2014

LABORATORY MANAGER

CAEM ISO 9001:2008

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 31

TEST DATA

Progresive: 14+970
Coordinated: X Coordinate 17°21'22.40"S; Y Coordinate 62°53'39.00"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD				TEST RESULTS								
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.15		Filled with Granular Base Layer Material Type	16	30	30	1.88	1	1.88	94.96	108.35	(For the first item was adopted from CBR 94.96) (for the second point) Given the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since data would inconsistent. This is because the test was conducted on an isolated haberce stone.
				19	60	30	1.58	1	1.58	115.11		
0.20				18	90	30	1.67	1	1.67	108.35		
0.40	0.40		Silty Sand Firm condition in-situ, on average compactness of dryness and light gray coloring.	34	50	50	1.47	1	1.47	124.66	135.70	
				36	100	50	1.39	1	1.39	132.90		
0.60				32	140	40	1.25	1	1.25	149.54		
0.80	0.90		Limo Clay of Firm in-situ condition, medium bodied, dry and reddish brown coloration containing small clasts.	5	50	50	10.00	1	10.00	14.56	14.56	
				5	100	50	10.00	1	10.00	14.56		
1.00				5	150	50	10.00	1	10.00	14.56		
1.20	1.40		Limo Clay of Firm in-situ condition, medium bodied, dry and reddish brown coloration containing small clasts.	4	30	30	7.50	1	7.50	20.10	12.96	
				3	70	40	13.33	1	13.33	10.55		
1.40				3	120	50	16.67	1	16.67	8.22		
1.80	1.90		Sandy Limo Firm condition in-situ, on average compactness, partially dry and reddish brown coloration.	7	70	70	10.00	1	10.00	14.56	11.17	
				6	140	70	11.67	1	11.67	12.26		
				3	200	60	20.00	1	20.00	6.70		
2.20	2.30		Sandy Limo Firm condition in-situ, on average compactness, partially dry and reddish brown coloration.	6	50	50	8.33	1	8.33	17.86	16.45	
				6	110	60	10.00	1	10.00	14.56		
				8	180	70	8.75	1	8.75	16.91		
2.60	2.80		Silty Sand Firm condition in-situ, on average compactness, partially saturated state and browning.	3	40	40	13.33	1	13.33	10.55	13.23	
				4	80	40	10.00	1	10.00	14.56		
2.80				3	110	30	10.00	1	10.00	14.56		
3.00	3.00		Silty Sand loose condition in-situ, compactness loose, partially saturated state and browning.	4	50	50	12.50	1	12.50	11.34	14.87	
				5	100	50	10.00	1	10.00	14.56		
				5	140	40	8.00	1	8.00	18.70		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 02/09/2014
CLOSING DATE OF TEST: 02/09/2014

LABORATORY MANAGER

CAEM ISO 9001:2008

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 32

TEST DATA

Progresive: 15+465
Coordinated: X Coordinate 17°21'38.40"S; Y Coordinate 62°53'36.40"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD				TEST RESULTS								
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Filled with Granular Base Layer Material Type	15	50	50	3.33	1	3.33	49.85	84.39	(For the second point) Given the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				18	80	30	1.67	1	1.67	108.35		
0.20				16	110	30	1.88	1	1.88	94.96		
0.40	0.40		Silty Sand Firm condition in-situ, on average compactness of dry and gray coloring.	30	40	40	1.33	1	1.33	139.11	137.43	
				32	80	40	1.25	1	1.25	149.54		
0.60				27	120	40	1.48	1	1.48	123.63		
0.80	0.90		Clayey Sand weak condition in-situ, soft consistency, partially dry and reddish coloration.	2	40	40	20.00	1	20.00	6.70	9.27	
				3	80	40	13.33	1	13.33	10.55		
1.00				3	120	40	13.33	1	13.33	10.55		
1.20	1.30		Clayey Sand weak condition in-situ, soft consistency, partially dry and reddish brown coloration.	3	50	50	16.67	1	16.67	8.22	11.38	
				4	100	50	12.50	1	12.50	11.34		
1.40				5	150	50	10.00	1	10.00	14.56		
1.80	2.20		Limo Clay weak condition in-situ, soft consistency, partially dry and brown with presence of clasts.	4	50	50	12.50	1	12.50	11.34	9.26	
				3	100	50	16.67	1	16.67	8.22		
				3	150	50	16.67	1	16.67	8.22		
2.20	2.30											
2.40	A.C.		Limo Clay weak condition in-situ, soft consistency, saturated state and reddish brown coloration.	3	40	40	13.33	1	13.33	10.55	10.12	
				3	80	40	13.33	1	13.33	10.55		
2.60	2.70			2	110	30	15.00	1	15.00	9.25		
2.80			Weak clay in-situ condition, soft consistency, partially saturated state and reddish brown with presence of clasts.	8	50	50	6.25	1	6.25	24.66	41.61	
				11	100	50	4.55	1	4.55	35.22		
3.00	3.00			19	150	50	2.63	1	2.63	64.96		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done. Hanging water of 2.30 m was evident. to 2.70 m.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 02/09/2014
CLOSING DATE OF TEST: 02/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)

NORMA ASTM-D-6951-03

REV:	00
Date :	20/09/2014
REPORT	RP 00
PAG:	01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*

PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*

UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 33

TEST DATA

Progresive: 15+960

Coordinated: X Coordinate 17°21'54.30"S; Y Coordinate 62°53'33.30"O

WATER TABLE: not Applicable

WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Filled with Granular Base Layer Material Type	10	30	30	3.00	1	3.00	56.10	56.12	(For the second point) Given the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				9	60	30	3.33	1	3.33	49.85		
				11	90	30	2.73	1	2.73	62.41		
0.20	0.40		Silty Sand condition in-situ Firm, dense compactness of dry and gray coloring.	42	50	50	1.19	1	1.19	157.94	173.70	
0.40				40	100	50	1.25	1	1.25	149.54		
				44	140	40	0.91	1	0.91	213.63		
0.60	0.90		Clayey Sand weak condition in-situ, soft consistency, partially dry and light gray coloring.	4	40	40	10.00	1	10.00	14.56	11.89	
0.80				3	80	40	13.33	1	13.33	10.55		
1.00				3	120	40	13.33	1	13.33	10.55		
1.20	1.40		Clayey Sand weak condition in-situ, soft consistency, partially dry and reddish brown coloration.	4	70	70	17.50	1	17.50	7.78	8.27	
1.40				4	140	70	17.50	1	17.50	7.78		
				4	200	60	15.00	1	15.00	9.25		
1.60	1.70		Clayey Sand weak condition in-situ, soft consistency, partially dry and reddish brown coloration.	2	40	40	20.00	1	20.00	6.70	9.53	
				3	80	40	13.33	1	13.33	10.55		
1.80				4	130	50	12.50	1	12.50	11.34		
2.00	2.30		Silty Sand Firm condition in-situ, on average compactness, partially saturated state and reddish brown coloration.	8	60	60	7.50	1	7.50	20.10	26.85	
2.20				13	120	60	4.62	1	4.62	34.62		
				10	180	60	6.00	1	6.00	25.81		
2.40	A.C.		Limo weak in-situ condition, soft consistency of saurado state and light brown coloring.	2	30	30	15.00	1	15.00	9.25	8.83	
2.60	2.60			2	70	40	20.00	1	20.00	6.70		
				3	110	40	13.33	1	13.33	10.55		
2.80	3.00		Weak clay in-situ condition, soft consistency, partially saturated state, light brown with presence of clasts.	5	70	70	14.00	1	14.00	9.99	13.04	
				7	140	70	10.00	1	10.00	14.56		
3.00				7	210	70	10.00	1	10.00	14.56		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done. Hanging water of 2.30 m was evident. to 2.70 m.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 02/09/2014

CLOSING DATE OF TEST: 02/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)

NORMA ASTM-D-6951-03

REV:	00
Date :	20/09/2014
REPORT	RP 00
PAG:	01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*

PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*

UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 34

TEST DATA

Progresive: 16+505

Coordinated: X Coordinate 17°22'09.70"S; Y Coordinate 62°53'38.30"O DERECHO

WATER TABLE: 1,50 m.

WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Silty sand with gravel presence of isolated, in-situ condition compact, dense compactness of dry, light brown in color	16	30	50	3.13	1	3.13	53.59		
				14	100	50	3.57	1	3.57	46.14	59.41	
				18	140	40	2.22	1	2.22	78.51		
0.20	0.50		Silty sand, compacted in-situ condition, dense compactness of dry and gray coloring.									
0.40				20	50	50	2.50	1	2.50	68.80		
				22	100	50	2.27	1	2.27	76.55	76.25	
0.60				19	140	40	2.11	1	2.11	83.41		
0.80	1.00		Silty sand, firm-situ, on average compactness, partially dry and gray coloring condition.	6	50	50	8.33	1	8.33	17.86		
				4	90	40	10.00	1	10.00	14.56	17.51	
1.00				4	120	30	7.50	1	7.50	20.10		
1.20	1.50		Silty sand, firm-situ, on average compactness, partially saturated state and light gray coloring condition.	3	30	30	10.00	1	10.00	14.56		
1.40				3	60	30	10.00	1	10.00	14.56	14.56	
				4	100	40	10.00	1	10.00	14.56		
1.60	N.F.		Silty sand, firm-situ, on average compactness, saturated state and dark brown coloring condition.	1	60	60	60.00	1	60.00	1.96		
1.80	2.00			3	120	60	20.00	1	20.00	6.70	4.63	
				2	170	50	25.00	1	25.00	5.22		
2.00	2.50		Silty sand, firm-situ, on average compactness, saturated state and reddish brown coloration condition.	5	60	60	12.00	1	12.00	11.87		
2.20				6	120	60	10.00	1	10.00	14.56	13.67	
2.40				6	180	60	10.00	1	10.00	14.56		
2.60	3.00		Silty sand, firm-situ, on average compactness, saturated state and reddish brown coloration condition.	6	70	70	11.67	1	11.67	12.26		
2.80				7	140	70	10.00	1	10.00	14.56	13.79	
3.00				7	210	70	10.00	1	10.00	14.56		

N.F.

OBSERVATIONS:

The presence of the Water Table at a depth of 1.50 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 02/09/2014

CLOSING DATE OF TEST: 02/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 35

TEST DATA

Progresive: 17+020
Coordinated: X Coordinate 17°22'22.30"S; Y Coordinate 62°53'49.00"O
WATER TABLE: 1,50 m. **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Silty sand, in-situ condition compact, dense compactness of dryness and light gray coloring.	28	30	30	1.07	1	1.07	177.72	192.04	(For the first item) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				32	60	30	0.94	1	0.94	206.39		
				30	90	30	1.00	1	1.00	192.00		
0.40	0.50		Silty sand, in-situ condition compact, dense compactness of dry and gray coloring.	16	60	60	3.75	1	3.75	43.69	42.89	
				14	110	50	3.57	1	3.57	46.14		
				12	160	50	4.17	1	4.17	38.83		
0.80	0.90		Silty sand, firm-situ, on average compactness, partially dry and gray coloring condition.	4	40	40	10.00	1	10.00	14.56	13.67	
				4	80	40	10.00	1	10.00	14.56		
				5	140	60	12.00	1	12.00	11.87		
1.20	1.40		Silty sand, firm-situ, on average compactness, partially saturated state and light gray coloring condition.	6	60	60	10.00	1	10.00	14.56	14.87	N.F.
				5	100	40	8.00	1	8.00	18.70		
				4	150	50	12.50	1	12.50	11.34		
1.60	1.50 / N.F.		Silty sand, firm-situ, on average compactness, saturated state and reddish brown coloration condition.	4	60	60	15.00	1	15.00	9.25	9.25	
				4	120	60	15.00	1	15.00	9.25		
	1.90			4	180	60	15.00	1	15.00	9.25		
2.20	2.40		Silty sand, firm-situ, on average compactness, saturated state and reddish brown coloration condition.	3	40	40	13.33	1	13.33	10.55	12.15	
				5	90	50	10.00	1	10.00	14.56		
				4	140	50	12.50	1	12.50	11.34		
2.60	2.90		Silty sand of medium grain, firm in-situ condition, average compactness, saturated state and light brown coloring.	4	60	60	15.00	1	15.00	9.25	12.79	
				6	120	60	10.00	1	10.00	14.56		
				6	180	60	10.00	1	10.00	14.56		
3.00	3.30		Silty sand of medium grain, firm in-situ condition, average compactness, saturated state and light brown coloring.	4	50	50	12.50	1	12.50	11.34	15.69	
				6	100	50	8.33	1	8.33	17.86		
				6	150	50	8.33	1	8.33	17.86		

OBSERVATIONS:
The presence of the Water Table at a depth of 1.50 m was evident, until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 02/09/2014
CLOSING DATE OF TEST: 02/09/2014
LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 36

TEST DATA

Progresive: 17+515
Coordinated: X Coordinate 17°22'38.30"S; Y Coordinate 62°53'51.10"O
WATER TABLE: 2,50 m. **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Silty sand, in-situ condition compact, dense compactness of dry and dark brown coloration.	19	30	30	1.58	1	1.58	115.11	115.13	(For the first item) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				20	60	30	1.50	1	1.50	121.92		
				18	90	30	1.67	1	1.67	108.35		
0.40	0.50		Silty sand, flimsy-situ, loose compactness, partially dry and light brown coloring condition.	9	40	40	4.44	1	4.44	36.12	53.12	
				15	80	40	2.67	1	2.67	64.01		
				14	120	40	2.86	1	2.86	59.25		
0.80	0.90		Clayey sand, in-situ condition firm, medium compactness, partially dry and reddish coloration.	8	50	50	6.25	1	6.25	24.66	26.42	
				10	100	50	5.00	1	5.00	31.66		
				6	140	40	6.67	1	6.67	22.94		
1.20	1.40		Clayey sand, in-situ condition firm, medium compactness, partially dry and reddish coloration.	5	30	30	6.00	1	6.00	25.81	27.37	
				6	60	30	5.00	1	5.00	31.66		
				8	110	50	6.25	1	6.25	24.66		
1.60	1.90		Clayey sand, Firm condition in-situ, on average compactness of soft, partially dry and reddish coloration.	3	50	50	16.67	1	16.67	8.22	12.45	
				5	100	50	10.00	1	10.00	14.56		
				5	150	50	10.00	1	10.00	14.56		
2.20	2.40		Clayey sand, Firm condition in-situ, on average compactness of soft, partially saturated state and reddish coloration.	3	40	40	13.33	1	13.33	10.55	10.56	N.F.
				4	100	60	15.00	1	15.00	9.25		
				5	160	60	12.00	1	12.00	11.87		
2.60	2.50 / N.F.		Silty sand of medium grain, firm in-situ condition, average compactness, saturated state and light brown coloring.	7	50	50	7.14	1	7.14	21.23	31.76	
				11	100	50	4.55	1	4.55	35.22		
	2.90			12	150	50	4.17	1	4.17	38.83		
3.00	3.30		Silty sand of medium grain, firm in-situ condition, average compactness, saturated state and light brown coloring.	5	40	40	8.00	1	8.00	18.70	19.54	
				5	80	40	8.00	1	8.00	18.70		
				7	130	50	7.14	1	7.14	21.23		

OBSERVATIONS:
The presence of the Water Table at a depth of 2.50 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 02/09/2014
CLOSING DATE OF TEST: 02/09/2014
LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)

NORMA ASTM-D-6951-03

REV: 00
Date: 20/09/2014
REPORT RP 00
PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International.*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 37

TEST DATA

Progresive: 18+015

Coordinated: X Coordinate 17°22'54.50"S; Y Coordinate 62°53'52.80"O

WATER TABLE: 2,60 m. **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.15		Clayey silt with presence of isolated gravel, compact in-situ, dense compactness of dryness and reddish coloration condition.	12	30	40	3.33	1	3.33	49.85	65.81	(For the first item) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				20	80	40	2.00	1	2.00	88.34		
0.20				14	120	40	2.86	1	2.86	59.25		
	0.40		Limo Clay, in-situ condition Firm, medium soft consistency, partially dry and reddish coloration.	5	50	50	10.00	1	10.00	14.56	18.46	
0.40				6	100	50	8.33	1	8.33	17.86		
				6	140	40	6.67	1	6.67	22.94		
0.60												
			Limo Clay, in-situ condition Firm, medium soft consistency, partially dry and reddish coloration containing small clasts.	8	50	50	6.25	1	6.25	24.66	31.14	
0.80				9	100	50	5.56	1	5.56	28.13		
	0.90			10	140	40	4.00	1	4.00	40.64		
1.00												
			Limo Clay, in-situ condition Firm, medium soft consistency, partially dry and reddish coloration containing small clasts.	3	60	60	20.00	1	20.00	6.70	8.40	
1.20				4	120	60	15.00	1	15.00	9.25		
	1.40			4	180	60	15.00	1	15.00	9.25		
1.60												
			Clayey sand, Firm condition in-situ, medium soft consistency, partially dry and reddish coloration.	3	70	70	23.33	1	23.33	5.64	8.05	
1.80				4	130	60	15.00	1	15.00	9.25		
	1.80			4	190	60	15.00	1	15.00	9.25		
2.00												
			Clayey sand, Firm condition in-situ, on average compactness of soft, partially saturated state and reddish coloration.	3	60	60	20.00	1	20.00	6.70	7.55	
2.20				3	120	60	20.00	1	20.00	6.70		
	2.30			4	180	60	15.00	1	15.00	9.25		
2.40												
			Silty sand of medium grain, firm in-situ condition, average compactness, saturated state and reddish coloration.	10	60	60	6.00	1	6.00	25.81	30.75	N.F.
	2.60			15	120	60	4.00	1	4.00	40.64		
2.80				10	180	60	6.00	1	6.00	25.81		
	N.F.											
			Silty sand of medium grain, firm in-situ condition, average compactness, saturated state and reddish coloration.	5	40	40	8.00	1	8.00	18.70	16.86	
3.00	3.00			5	90	50	10.00	1	10.00	14.56		
				7	150	60	8.57	1	8.57	17.31		

OBSERVATIONS:

The presence of the Water Table at a depth of 2.60 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 04/09/2014
CLOSING DATE OF TEST: 04/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)

NORMA ASTM-D-6951-03

REV: 00
Date: 20/09/2014
REPORT RP 00
PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International.*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 38

TEST DATA

Progresive: 18+490

Coordinated: X Coordinate 17°23'09.87"S; Y Coordinate 62°53'54.59"O

WATER TABLE: not Applicable **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10												
0.20												
0.30												
0.40												
0.50	0.50		Limo Sandy, in-situ condition compact, medium compact to dense, dry and dark brown coloration.	11	40	40	3.64	1	3.64	45.22	44.23	
0.60				9	70	30	3.33	1	3.33	49.85		
0.70				7	100	30	4.29	1	4.29	37.62		
0.80												
0.90												
1.00												
1.10												
1.20	1.20		Sandy loam, partially in-situ firm condition, loose compactness of dry and dark brown coloration.	1	30	30	30.00	1	30.00	4.26	3.86	
1.30				1	60	30	30.00	1	30.00	4.26		
1.40				1	100	40	40.00	1	40.00	3.08		
1.50												
1.60												
1.70												
1.80												
1.90												
2.00	2.00		Silty Clay, of Firm in-situ condition, soft to medium consistency, partially saturated state and browning.	1	50	50	50.00	1	50.00	2.40	3.34	
2.10				1	100	50	50.00	1	50.00	2.40		
2.20				2	150	50	25.00	1	25.00	5.22		
2.30												
2.40												
2.50												
2.60												
2.70												
2.80												
2.90												
3.00												
3.10	3.10		Silty Clay, of Firm in-situ condition, soft to medium consistency, partially saturated state and browning.	3	80	80	26.67	1	26.67	4.86	5.47	
3.20				3	160	80	26.67	1	26.67	4.86		
3.30				4	240	80	20.00	1	20.00	6.70		
3.40												
3.50												
3.60												
3.70												
3.80												
3.90												
4.00												
4.10												
4.20	4.20		Sandy loam, partially in-situ firm condition, average compactness of soft, partially saturated state and browning.	4	100	100	25.00	1	25.00	5.22	6.26	
4.30				3	200	100	33.33	1	33.33	3.78		
4.40				7	300	100	14.29	1	14.29	9.77		
4.50												
4.60												
4.70												
4.80												
4.90												
5.00												
5.10												
5.20	5.30		Limo Clay, in-situ condition Firm, medium soft consistency, partially saturated state and light brown coloring.	3	100	100	33.33	1	33.33	3.78	6.23	
5.30				5	200	100	20.00	1	20.00	6.70		
5.40				6	300	100	16.67	1	16.67	8.22		
5.50												
5.60												
5.70												
5.80												
5.90												
6.00	6.00		Limo Clay, in-situ condition Firm, medium soft consistency, partially saturated state and light brown coloring.	2	100	100	50.00	1	50.00	2.40	4.77	
6.10				4	200	100	25.00	1	25.00	5.22		
6.20				5	300	100	20.00	1	20.00	6.70		
6.30												

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 18/09/2014
CLOSING DATE OF TEST: 18/09/2014

LABORATORY MANAGER

CAEM

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International.*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 39

TEST DATA

Progresive: 18+555 | **Coordinated:** X Coordinate 17°23'11.98"S; Y Coordinate 62°53'54.77"O

WATER TABLE: not Applicable | **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE DEPTH (m)	SUCCESSIVE ASSESSMENT	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.15		Filled with Granular Base Layer Material Type	3	30	30	10.00	1	10.00	14.56		
			6	60	30	5.00	1	5.00	31.66	24.49	
			7	100	40	5.71	1	5.71	27.26		
0.80		Sandy clay, in-situ condition compact, medium compact to dense, dry and light brown coloring.	3	50	50	16.67	1	16.67	8.22		
			3	100	50	16.67	1	16.67	8.22	8.22	
			3	150	50	16.67	1	16.67	8.22		
1.10		Silty Clay, partially in-situ firm condition, soft consistency, partially saturated state and reddish brown coloration.	3	100	100	33.33	1	33.33	3.78		
			3	200	100	33.33	1	33.33	3.78	4.26	
A.C. 1.30			4	300	100	25.00	1	25.00	5.22		
2.40		Limo Clay, in-situ condition Firm, soft consistency, saturated state and browning.	2	100	100	50.00	1	50.00	2.40		
			3	200	100	33.33	1	33.33	3.78	4.29	
			5	300	100	20.00	1	20.00	6.70		
3.30		Silty Sand, Firm condition in-situ, on average compactness, partially saturated state and browning.	8	100	100	12.50	1	12.50	11.34		
			18	200	100	5.56	1	5.56	28.13	20.24	
			14	300	100	7.14	1	7.14	21.23		
4.20		Clay, in-situ condition Firm, medium bodied, partially saturated state and browning.	5	100	100	20.00	1	20.00	6.70		
			6	200	100	16.67	1	16.67	8.22	7.71	
			6	300	100	16.67	1	16.67	8.22		
5.00		Limo Clay, in-situ condition Firm, medium soft consistency, partially saturated state and reddish brown coloration.	4	100	100	25.00	1	25.00	5.22		
			5	200	100	20.00	1	20.00	6.70	5.71	
			4	300	100	25.00	1	25.00	5.22		
6.00		Limo Clay, in-situ condition Firm, medium soft consistency, partially saturated state and reddish brown coloration.	3	100	100	33.33	1	33.33	3.78		
			4	200	100	25.00	1	25.00	5.22	5.74	
			6	300	100	16.67	1	16.67	8.22		

OBSERVATIONS:
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done. Hanging water of 1.10 m was evident. to 1.30 m.

A= number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unite ecumulative penetration (note b) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note c/ Note b
G= Correlation between CBR and DCP Index

DATE OF CREATION OF TEST: 18/09/2014
CLOSING DATE OF TEST: 18/09/2014
LABORATORY MANAGER

CAEM

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International.*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 40

TEST DATA

Progresive: 18+630 | **Coordinated:** X Coordinate 17°23'14.39"S; Y Coordinate 62°53'55.08"O

WATER TABLE: 1,90 m. | **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE DEPTH (m)	SUCCESSIVE ASSESSMENT	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.18		Filled with Granular Base Layer Material Type	3	30	30	10.00	1	10.00	14.56		
			6	60	30	5.00	1	5.00	31.66	24.49	
			7	100	40	5.71	1	5.71	27.26		
1.20		Sandy clay with plasticity, firm condition in-situ, on average compactness of dry and dark brown coloration.	3	50	50	16.67	1	16.67	8.22		
			3	100	50	16.67	1	16.67	8.22	8.22	
			3	150	50	16.67	1	16.67	8.22		
1.90		Limo Sandy, in-situ condition firm, soft consistency, saturated state and light brown coloring.	3	50	50	16.67	1	16.67	8.22		
			3	100	50	16.67	1	16.67	8.22	8.22	
			3	150	50	16.67	1	16.67	8.22		N.F.
N.F.											
2.80		Limo Sandy, in-situ condition firm, soft consistency, partially saturated state and light brown coloring.	3	50	50	16.67	1	16.67	8.22		
			3	100	50	16.67	1	16.67	8.22	8.22	
			3	150	50	16.67	1	16.67	8.22		
3.70		Silty Sand, firm condition in-situ, on average compactness, saturated state and light brown coloring.	3	50	50	16.67	1	16.67	8.22		
			3	100	50	16.67	1	16.67	8.22	8.22	
			3	150	50	16.67	1	16.67	8.22		
4.50		ASilty Sand, firm condition in-situ, on average compactness, saturated state and light brown coloring.	3	50	50	16.67	1	16.67	8.22		
			3	100	50	16.67	1	16.67	8.22	8.22	
			3	150	50	16.67	1	16.67	8.22		
5.60		Silty Sand, firm condition in-situ, on average compactness, saturated state and light brown coloring.	3	50	50	16.67	1	16.67	8.22		
			3	100	50	16.67	1	16.67	8.22	8.22	
			3	150	50	16.67	1	16.67	8.22		
6.00		Silty Sand, firm condition in-situ, on average compactness, saturated state and light brown coloring.	3	50	50	16.67	1	16.67	8.22		
			3	100	50	16.67	1	16.67	8.22	8.22	
			3	150	50	16.67	1	16.67	8.22		

OBSERVATIONS:
The presence of the Water Table at a depth of 1.90 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unite ecumulative penetration (note b) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note c/ Note b
G= Correlation between CBR and DCP Index

DATE OF CREATION OF TEST: 18/09/2014
CLOSING DATE OF TEST: 18/09/2014
LABORATORY MANAGER

CAEM ISO 9001:2008

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 41

TEST DATA

Progresive: 19+120
Coordinated: X Coordinate 17°23'30.10"S; Y Coordinate 62°53'57.00"O
WATER TABLE: 1,80 m. **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD				TEST RESULTS									
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
010			Silty sand of medium grain, in-situ condition compacted, dense compactness, saturated state and dark brown colomation.	5	30	30	6.00	1	6.00	25.81	40.14	(For the second point) Given the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
020				5	60	30	6.00	1	6.00	25.81		
	0.20			12	90	30	2.50	1	2.50	68.80		
040			Silty fine-grained sand, in-situ condition compacted, dense compactness of dry and dark brown coloration	50	40	40	0.80	1	0.80	246.51	287.69	
				54	80	40	0.74	1	0.74	268.70		
060	0.40			51	110	30	0.59	1	0.59	347.86		
			Silty fine-grained sand, in-situ condition compacted, dense compactness of dry and dark brown coloration	12	40	40	3.33	1	3.33	49.85	43.79	
080	0.80			15	90	50	3.33	1	3.33	49.85		
100				12	150	60	5.00	1	5.00	31.66		
100			Silty sand of medium grain, strong in-situ condition, average compactness, partially dry and reddish brown coloration	8	60	60	7.50	1	7.50	20.10	25.86	
				12	120	60	5.00	1	5.00	31.66		
120	1.30			10	180	60	6.00	1	6.00	25.81		
140			Silty sand of medium grain, firm partially saturated condition and reddish brown coloration in-situ, on average compactness of state	6	60	60	10.00	1	10.00	14.56	14.56	N.F.
160				5	110	50	10.00	1	10.00	14.56		
	1.70			6	170	60	10.00	1	10.00	14.56		
180	1.80											
	N.F.		Silty sand, firm-situ, on average compactness, saturated state condition and reddish brown coloration	6	50	50	8.33	1	8.33	17.86	21.57	
200				5	90	40	8.00	1	8.00	18.70		
220	2.30			9	140	50	5.56	1	5.56	28.13		
240			Silty sand, firm-situ, on average compactness, saturated state condition and reddish brown coloration	5	40	40	8.00	1	8.00	18.70	18.14	
				6	90	50	8.33	1	8.33	17.86		
260	2.80			6	140	50	8.33	1	8.33	17.86		
280			Silty sand, firm-situ, on average compactness, saturated state condition and reddish brown coloration	6	60	60	10.00	1	10.00	14.56	16.79	
				6	120	60	10.00	1	10.00	14.56		
300	3.00			7	170	50	7.14	1	7.14	21.23		

OBSERVATIONS:
The presence of the Water Table at a depth of 1.80 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unitke cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 04/09/2014
CLOSING DATE OF TEST: 04/09/2014

LABORATORY MANAGER

CAEM ISO 9001:2008

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 42

TEST DATA

Progresive: 19+615
Coordinated: X Coordinate 17°23'46.20"S; Y Coordinate 62°53'59.10"O
WATER TABLE: 1,20 m. **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD				TEST RESULTS									
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
010			Filled with Granular Base Layer Material Type	6	30	30	5.00	1	5.00	31.66		
020				15	60	30	2.00	1	2.00	88.34	66.17	
	0.10			18	100	40	2.22	1	2.22	78.51		
040			Silty sand, firm-situ, dense compactness of dry reddish brown coloration and condition.	9	50	50	5.56	1	5.56	28.13		
				8	100	50	6.25	1	6.25	24.66	22.45	
060	0.60			5	150	50	10.00	1	10.00	14.56		
080			Silty Sand, in-situ condition firm, compact loose, partially saturated state and reddish coloration.	4	60	60	15.00	1	15.00	9.25		
				2	120	60	30.00	1	30.00	4.26	5.05	
100	1.10			1	190	70	70.00	1	70.00	1.65		
120	1.20											N.F.
	N.F.		Silty Sand, firm condition in-situ, loose to medium compact, saturated state and reddish coloration.	6	80	80	13.33	1	13.33	10.55		
140				5	160	80	16.00	1	16.00	8.60	8.34	
	1.60			4	250	90	22.50	1	22.50	5.87		
160			Silty Sand, firm condition in-situ, on average compactness, saturated state and reddish coloration.	4	60	60	15.00	1	15.00	9.25		
180				3	120	60	20.00	1	20.00	6.70	7.20	
200				3	190	70	23.33	1	23.33	5.64		
	2.10											
220			Silty Sand, firm condition in-situ, on average compactness, saturated state and reddish coloration.	6	50	50	8.33	1	8.33	17.86		
240				6	110	60	10.00	1	10.00	14.56	14.14	
	2.60			5	180	70	14.00	1	14.00	9.99		
260			Silty Sand, firm condition in-situ, on average compactness, saturated state and light brown color.	8	100	100	12.50	1	12.50	11.34		
280				8	200	100	12.50	1	12.50	11.34	11.34	
				8	300	100	12.50	1	12.50	11.34		
300	3.00											

OBSERVATIONS:
The presence of the Water Table at a depth of 1.20 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unitke cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 04/09/2014
CLOSING DATE OF TEST: 04/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)

NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*

PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*

UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 43

TEST DATA

Progresive: 20+110

Coordinated: X Coordinate 17°24'02.30"S; Y Coordinate 62°54'00.60"O

WATER TABLE: 3,00 m. **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.00			Clayey Silt, firm condition in-situ, dense compactness of dry and gray coloring.	15	30	30	2.00	1	2.00	88.34	97.22	(For the second point) Given the characteristics of this type of soil (Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data .This is because the test was conducted on an isolated haberce stone. Adopt CBR = 101.63% and the second was adopted CBR 93.3
0.20	0.20			16	60	30	1.88	1	1.88	94.96		
0.30				18	90	30	1.67	1	1.67	108.35		
0.40			Silty sand, firm-situ, dense compactness of dryness and light gray coloring condition.	32	40	40	1.25	1	1.25	149.54	93.30	
0.60				37	110	40	1.08	1	1.08	175.95		
0.70	0.70			21	150	40	1.90	1	1.90	93.30		
0.80			Silty sand, firm-situ, dense compactness, partially dry and light gray coloring condition.	7	60	60	8.57	1	8.57	17.31	12.81	
1.00				5	120	60	12.00	1	12.00	11.87		
1.20	1.30			4	180	60	15.00	1	15.00	9.25		
1.40			Silty Sand, firm condition in-situ, compactness loose to medium partially saturated state and gray coloring.	3	40	40	13.33	1	13.33	10.55	9.77	
1.60				3	140	40	13.33	1	13.33	10.55		
1.70	1.70			3	190	50	16.67	1	16.67	8.22		
1.80			Clayey sand, in-situ condition flimsy, soft compactness, partially saturated state and reddish coloration.	5	60	60	12.00	1	12.00	11.87	12.81	
2.00				4	210	60	15.00	1	15.00	9.25		
2.20	2.30			7	270	60	8.57	1	8.57	17.31		
2.40			Limo Clay, in-situ condition firm, medium bodied, partially saturated state and reddish coloration.	7	90	90	12.86	1	12.86	10.99	19.59	
2.60				14	240	90	6.43	1	6.43	23.89		
2.70	2.70			14	330	90	6.43	1	6.43	23.89		
2.80			Limo Clay, in-situ condition firm, medium consistency, saturated state and reddish coloration.	6	80	80	13.33	1	13.33	10.55	11.48	N.F.
3.00	3.00			7	340	80	11.43	1	11.43	12.54		
3.00	N.F.			4	390	50	12.50	1	12.50	11.34		

OBSERVATIONS:

The presence of the Water Table at a depth of 3.00 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 04/09/2014

CLOSING DATE OF TEST: 04/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)

NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*

PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*

UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 44

TEST DATA

Progresive: 20+610

Coordinated: X Coordinate 17°24'18.40"S; Y Coordinate 62°54'02.70"O

WATER TABLE: 2,80 m. **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10			Silty sand, firm-situ, dense compactness of dry and gray coloring condition	34	30	30	0.88	1	0.88	220.89	237.99	(For the first and second points) Given the characteristics of this type of soil (Silty Sand and Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
0.15	0.15			39	60	30	0.77	1	0.77	257.58		
0.20				36	90	30	0.83	1	0.83	235.50		
0.40			Silty sand, firm-situ, dense compactness of dry and gray coloring condition	52	50	50	0.96	1	0.96	200.62	241.58	
0.60	0.60			63	160	50	0.79	1	0.79	248.72		
0.80				69	210	50	0.72	1	0.72	275.40		
1.00			Clayey sand, in-situ condition firm, dense compactness, partially dry and reddish coloration.	5	50	50	10.00	1	10.00	14.56	15.66	
1.10	1.10			6	150	50	8.33	1	8.33	17.86		
1.20				4	190	40	10.00	1	10.00	14.56		
1.40			Sandy clay, in-situ condition firm, medium bodied, partially dry, light brown with dark gray patina and presence of small clasts.	15	60	60	4.00	1	4.00	40.64	44.73	
1.60	1.60			16	160	60	3.75	1	3.75	43.69		
1.80				18	220	60	3.33	1	3.33	49.85		
1.90			Clay, in-situ condition firm, medium bodied, partially dry and light brown with light gray patina and presence of small clasts.	10	50	50	5.00	1	5.00	31.66	33.79	
2.00				13	160	50	3.85	1	3.85	42.47		
2.10	2.10			7	200	40	5.71	1	5.71	27.26		
2.20			Clay, in-situ condition firm, medium compactness, partially saturated state, light brown with light gray patinas.	5	60	60	12.00	1	12.00	11.87	12.77	
2.40				5	160	60	12.00	1	12.00	11.87		
2.60	2.60			6	220	60	10.00	1	10.00	14.56		
2.80			Clayey sand, in-situ condition flimsy, soft compactness, partially saturated state and reddish coloration.	4	60	60	15.00	1	15.00	9.25	8.18	N.F.
2.80	2.80			3	240	60	20.00	1	20.00	6.70		
3.00				5	320	80	16.00	1	16.00	8.60		
3.00	N.F.		Limo Clay, in-situ condition firm, medium consistency, saturated state and reddish coloration.	4	40	40	10.00	1	10.00	14.56	15.48	
3.00	3.00			5	290	50	10.00	1	10.00	14.56		
3.00				7	350	60	8.57	1	8.57	17.31		

OBSERVATIONS:

The presence of the Water Table at a depth of 2.80 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 04/09/2014

CLOSING DATE OF TEST: 04/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 45

TEST DATA

Progresive: 21+110
Coordinated: X Coordinate 17°24'34.50"S; Y Coordinate 62°54'04.30"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Filled with Granular Base Layer Material Type	26	30	30	1.15	1	1.15	163.57	94.96	(For the first item) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone. CBR was adopted from 94.96
				26	60	30	1.15	1	1.15	163.57		
				16	90	30	1.88	1	1.88	94.96		
0.40	0.60		Clay loam of strong in-situ condition, medium consistency, dry and dark brown color with light brown patina.	5	40	40	8.00	1	8.00	18.70	18.70	
				5	80	40	8.00	1	8.00	18.70		
				5	120	40	8.00	1	8.00	18.70		
0.80	0.80		Limo Clay of strong in-situ condition, soft consistency, dry and light brown and gray coloring.	3	50	50	16.67	1	16.67	8.22	8.22	
				3	100	50	16.67	1	16.67	8.22		
				3	150	50	16.67	1	16.67	8.22		
1.00	1.00		Limo Clay of strong in-situ condition, soft consistency to medium dry state and dark brown coloration.	2	40	40	20.00	1	20.00	6.70	9.99	
				3	100	60	20.00	1	20.00	6.70		
				5	170	70	14.00	1	14.00	9.99		
1.40	1.50		Firm-situ, soft consistency half of dry and light brown with gray patinas condition Limo Clay.	7	50	50	7.14	1	7.14	21.23	24.66	
				9	100	50	5.56	1	5.56	28.13		
				8	150	50	6.25	1	6.25	24.66		
1.80	2.00		Clay-situ firm, soft consistency to medium dry state and condition light brown coloration with dark gray patinas.	7	50	50	7.14	1	7.14	21.23	31.66	
				9	100	50	5.56	1	5.56	28.13		
				10	150	50	5.00	1	5.00	31.66		
2.20	2.50		Clay in-situ condition firm, soft consistency to medium partially dry and light brown with light gray patina and small clasts.	9	50	50	5.56	1	5.56	28.13	31.66	
				10	100	50	5.00	1	5.00	31.66		
				8	140	40	5.00	1	5.00	31.66		
2.60	3.00		Clay-situ firm, soft consistency to medium partially dry and light brown coloring condition with light gray patinas.	10	50	50	5.00	1	5.00	31.66	24.66	
				9	100	50	5.56	1	5.56	28.13		
				8	150	50	6.25	1	6.25	24.66		

OBSERVATIONS:
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 05/09/2014
CLOSING DATE OF TEST: 05/09/2014
LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 46

TEST DATA

Progresive: 21+605
Coordinated: X Coordinate 17°24'50.50"S; Y Coordinate 62°54'06.50"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Filled with Granular Base Layer Material Type	35	40	40	1.14	1	1.14	165.33	250.20	(For the first item) Due to the characteristics of these soils (Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				42	70	30	0.71	1	0.71	279.88		
				38	100	30	0.79	1	0.79	250.20		
0.30	0.30		Silty Sand, firm condition in-situ, dense compactness of dryness and reddish brown coloration.	10	30	30	3.00	1	3.00	56.10	88.34	
				12	70	40	3.33	1	3.33	49.85		
				20	110	40	2.00	1	2.00	88.34		
0.70	0.70		Silty Sand, firm condition in-situ, dense compactness of dryness and light gray coloring.	6	40	40	6.67	1	6.67	22.94	20.10	
				6	90	50	8.33	1	8.33	17.86		
				8	150	60	7.50	1	7.50	20.10		
1.20	1.20		Firm-situ, soft consistency to medium dry state and to dark brown clayey silt condition.	5	50	50	10.00	1	10.00	14.56	21.23	
				6	90	40	6.67	1	6.67	22.94		
				7	140	50	7.14	1	7.14	21.23		
1.70	1.70		Clay-situ firm, soft consistency to medium partially dry condition and reddish coloration with dark gray patinas.	5	50	50	10.00	1	10.00	14.56	18.70	
				4	90	40	10.00	1	10.00	14.56		
				5	130	40	8.00	1	8.00	18.70		
2.30	2.30		Clayey Sand weak condition in-situ, soft consistency to medium partially saturated state and reddish coloration.	3	80	80	26.67	1	26.67	4.86	6.70	
				4	160	80	20.00	1	20.00	6.70		
				3	220	60	20.00	1	20.00	6.70		
2.80	2.80		Silty Sand weak condition in-situ, compactness soft to medium partially saturated state and reddish brown coloration.	9	50	50	5.56	1	5.56	28.13	36.76	
				12	110	60	5.00	1	5.00	31.66		
				16	180	70	4.38	1	4.38	36.76		
3.00	3.00		Silty Sand of average in-situ condition, compactness soft to medium partially saturated state and reddish brown coloration	16	80	80	5.00	1	5.00	31.66	45.22	
				18	160	80	4.44	1	4.44	36.12		
				22	240	80	3.64	1	3.64	45.22		

OBSERVATIONS:
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey conducted.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 05/09/2014
CLOSING DATE OF TEST: 05/09/2014
LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 47

TEST DATA

Progresive: 22+100 — Coordinated: X Coordinate 17°25'06.60"S; Y Coordinate 62°54'08.10"O

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Filled with Granular Base Layer Material Type	23	30	30	1.30	1	1.30	142.58	121.92	(For the first point) Given the characteristics of these soils (Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone. For the second point to CBR 73.64 was adopted.
				26	70	40	1.54	1	1.54	118.51		
				20	100	30	1.50	1	1.50	121.92		
0.20	0.40		Silty Sand, firm condition in-situ, dense compactness of dry and dark brown coloration.	37	40	40	1.08	1	1.08	175.95	73.64	
0.40				27	80	40	1.48	1	1.48	123.63		
				17	120	40	2.35	1	2.35	73.64		
0.60	0.90		Limo Clay of strong in-situ condition, soft consistency, dryness and reddish coloration with dark gray patina.	7	50	50	7.14	1	7.14	21.23	18.70	
0.80				6	100	50	8.33	1	8.33	17.86		
				5	140	40	8.00	1	8.00	18.70		
1.00	1.30		Limo Clay of strong in-situ condition, soft consistency to medium partially dry and reddish coloration.	5	40	40	8.00	1	8.00	18.70	14.56	
1.20				5	80	40	8.00	1	8.00	18.70		
				4	120	40	10.00	1	10.00	14.56		
1.40	1.80		Limo firm in-situ condition, soft consistency to medium partially dry and light brown color.	9	70	70	7.78	1	7.78	19.30	9.99	
1.60				7	140	70	10.00	1	10.00	14.56		
1.80				5	210	70	14.00	1	14.00	9.99		
2.00	2.30		Limo firm in-situ condition, soft consistency to medium partially dry and light brown color.	8	60	60	7.50	1	7.50	20.10	14.56	
2.20				6	120	60	10.00	1	10.00	14.56		
				6	180	60	10.00	1	10.00	14.56		
2.40	2.80		Limo Clay of strong in-situ condition, soft consistency to medium partially saturated state, light brown with light gray patina and small clasts of clayey silt condition	9	70	70	7.78	1	7.78	19.30	19.30	
2.60				9	130	60	6.67	1	6.67	22.94		
2.80				9	200	70	7.78	1	7.78	19.30		
3.00	3.00		Limo Clay of strong in-situ condition, soft consistency to medium partially saturated state and light brown coloring and small clasts.	8	60	60	7.50	1	7.50	20.10	21.23	
				9	120	60	6.67	1	6.67	22.94		
				7	170	50	7.14	1	7.14	21.23		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 05/09/2014
CLOSING DATE OF TEST: 05/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 48

TEST DATA

Progresive: 22+600 — Coordinated: X Coordinate 17°25'22.70"S; Y Coordinate 62°54'10.20"O

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.15		Silty Sand condition in-situ firm, dense compactness of dryness and light gray coloring.	42	40	40	0.95	1	0.95	202.78	251.71	(For the first item) Due to the characteristics of these soils (Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				43	70	30	0.70	1	0.70	287.35		
				40	100	30	0.75	1	0.75	264.99		
0.20	0.60		Silty Sand condition in-situ firm, dense compactness of dry and dark brown coloration.	10	50	50	5.00	1	5.00	31.66	43.88	
0.40				12	100	50	4.17	1	4.17	38.83		
0.60				18	150	50	2.78	1	2.78	61.14		
0.80	1.10		Clayey Sand weak condition in-situ, soft consistency, partially dry and dark brown coloration.	9	50	50	5.56	1	5.56	28.13	24.99	
1.00				9	100	50	5.56	1	5.56	28.13		
				5	140	40	8.00	1	8.00	18.70		
1.20	1.60		Clayey Sand weak condition in-situ, soft consistency, partially dry and reddish coloration.	4	40	40	10.00	1	10.00	14.56	18.17	
1.40				5	80	40	8.00	1	8.00	18.70		
1.60				7	130	50	7.14	1	7.14	21.23		
1.80	2.10		Silty Sand firm condition in-situ, on average compactness, partially saturated state and light brown color.	9	70	70	7.78	1	7.78	19.30	16.14	
2.00				7	140	70	10.00	1	10.00	14.56		
				6	200	60	10.00	1	10.00	14.56		
2.20	2.40		Firm-situ, on average compactness, partially saturated state and browning Sandy Limo clear condition	6	40	40	6.67	1	6.67	22.94	18.27	
2.40				5	90	50	10.00	1	10.00	14.56		
				7	150	60	8.57	1	8.57	17.31		
2.60	2.50											
	A.C.		Silty Sand, fine-grained condition in-situ firm, medium compact, saturated state and light brown color	4	60	60	15.00	1	15.00	9.25	7.91	
2.80				3	120	60	20.00	1	20.00	6.70		
				4	190	70	17.50	1	17.50	7.78		
3.00	2.90		Weak clay in-situ, partially saturated soft consistency, status and condition light brown color with small clasts.	7	50	50	7.14	1	7.14	21.23	21.23	
	3.00			7	100	50	7.14	1	7.14	21.23		
				7	150	50	7.14	1	7.14	21.23		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done. Hanging water of 2.50 m was evident. to 2.90 m.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 05/09/2014
CLOSING DATE OF TEST: 05/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 49

TEST DATA

Progresive: 23+100 — Coordinated: X Coordinate 17°25'38.80"S — Y Coordinate 62°54'11.90"O — IZQUIERDO

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.15		Filled with Granular Base Layer Material Type	36	30	30	0.83	1	0.83	235.50	255.17	(For the first item) Due to the characteristics of these soils (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				41	60	30	0.73	1	0.73	272.42		
				39	90	30	0.77	1	0.77	257.58		
0.20	0.40		Silty Sand condition in-situ firm, dense compactness of dry and gray coloring.	4	40	40	10.00	1	10.00	14.56	14.56	
0.40				3	70	30	10.00	1	10.00	14.56		
				3	100	30	10.00	1	10.00	14.56		
0.60	0.90		Firm-situ, medium bodied, partially dry and light gray color with brown patinas condition Limo Clay.	7	60	60	8.57	1	8.57	17.31	19.08	
0.80				7	110	50	7.14	1	7.14	21.23		
				5	150	40	8.00	1	8.00	18.70		
1.00	1.40		Firm-situ, soft consistency to medium partially dry and reddish brown coloration Sandy Clay condition.	7	50	50	7.14	1	7.14	21.23	20.11	
1.20				7	100	50	7.14	1	7.14	21.23		
				6	150	50	8.33	1	8.33	17.86		
1.60	1.70		Firm-situ, soft consistency to medium partially dry and reddish brown coloration Sandy Clay condition.	6	40	40	6.67	1	6.67	22.94	21.99	
				6	80	40	6.67	1	6.67	22.94		
				8	140	60	7.50	1	7.50	20.10		
1.80	2.20		Firm-situ, medium bodied, partially dry and light brown with small presence of clayey silt clasts condition.	9	60	60	6.67	1	6.67	22.94	21.99	
2.00				9	120	60	6.67	1	6.67	22.94		
				8	180	60	7.50	1	7.50	20.10		
2.20	2.40		Firm-situ, medium bodied, partially dry and light brown with small presence of clayey silt clasts condition.	7	40	40	5.71	1	5.71	27.26	24.38	
2.40				6	80	40	6.67	1	6.67	22.94		
				6	120	40	6.67	1	6.67	22.94		
2.60	3.00		Clayey Sand weak condition in-situ, soft consistency, partially saturated state and reddish coloration	4	70	70	17.50	1	17.50	7.78	6.35	
2.80				3	140	70	23.33	1	23.33	5.64		
				3	210	70	23.33	1	23.33	5.64		
3.00												

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 05/09/2014
CLOSING DATE OF TEST: 05/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 50

TEST DATA

Progresive: 23+595 — Coordinated: X Coordinate 17°25'54.90"S — Y Coordinate 62°54'12.90"O

WATER TABLE: 2,60 m. — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.10	0.10		Silty sand with gravel isolated presence of strong in-situ condition, dense compactness of dry and gray coloring.	17	40	40	2.35	1	2.35	73.64	73.64	(For the first point) Given the characteristics of this type of soil (Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone. CBR was adopted from 73.64
				24	70	30	1.25	1	1.25	149.54		
				25	100	30	1.20	1	1.20	156.54		
0.20	0.40		Silty sand, firm-situ, dense compactness of dry and dark brown coloring condition.	8	50	50	6.25	1	6.25	24.66	44.58	
0.40				14	90	40	2.86	1	2.86	59.25		
				12	130	40	3.33	1	3.33	49.85		
0.60	0.90		Silty sand, firm-situ, dense compactness of dry and gray coloring condition.	16	50	50	3.13	1	3.13	53.59	52.40	
0.80				18	100	50	2.78	1	2.78	61.14		
				13	150	50	3.85	1	3.85	42.47		
1.00	1.20		Silty sand, firm-situ, dense compactness of dry and gray coloring condition.	12	40	40	3.33	1	3.33	49.85	52.98	
				14	80	40	2.86	1	2.86	59.25		
1.20				18	140	60	3.33	1	3.33	49.85		
1.40	1.50		Clayey sand, in-situ condition firm, medium bodied, partially dry and reddish brown coloration.	4	50	50	12.50	1	12.50	11.34	8.75	
				3	100	50	16.67	1	16.67	8.22		
				2	140	40	20.00	1	20.00	6.70		
1.60	2.00		Clayey sand, in-situ condition firm, medium bodied, partially saturated state and reddish coloration.	5	60	60	12.00	1	12.00	11.87	11.00	
1.80				5	120	60	12.00	1	12.00	11.87		
				4	180	60	15.00	1	15.00	9.25		
2.00	2.50		Limo Sandy, in-situ condition firm, soft compactness, partialy saturated state and light brown coloring.	7	70	70	10.00	1	10.00	14.56	10.42	
2.20				5	140	70	14.00	1	14.00	9.99		
2.40				3	200	60	20.00	1	20.00	6.70		
	2.60											
2.60	N.F.		Silty Sand medium grained, firm-situ, soft compactness, saturated state and condition light brown coloring.	6	60	60	10.00	1	10.00	14.56	12.86	
2.80				3	120	60	20.00	1	20.00	6.70		
				7	180	60	8.57	1	8.57	17.31		
3.00	3.00											

OBSERVATIONS:

The presence of the Water Table at a depth of 2.60 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 05/09/2014
CLOSING DATE OF TEST: 05/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 51

TEST DATA

Progresive: 24+100 — Coordinated: X Coordinate 17°26'10.20"S; Y Coordinate 62°54'06.90"O

WATER TABLE: 2,80 m. — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD				TEST RESULTS									
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.00			Filled with Granular Base Layer Material Type	15	30	30	2.00	1	2.00	88.34		(For the first three points) Given the characteristics of this type of soil (Silty Sand and Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground. CBR of 88.34 was adopted at the first point, the second point 93.3 and 68.8 in the third point.
				23	60	30	1.30	1	1.30	142.58	88.34	
	0.10			29	90	30	1.03	1	1.03	184.85		
0.20												
0.40			Silty sand, firm-situ, dense compactness of dry and dark brown coloring condition.	21	40	40	1.90	1	1.90	93.30		
				26	80	40	1.54	1	1.54	118.51	93.30	
0.60				41	120	40	0.98	1	0.98	197.38		
	0.60											
				8	20	20	2.50	1	2.50	68.80		
0.80			Silty sand, firm-situ, dense compactness of dry and brown with presence of clasts condition.	33	40	20	0.61	1	0.61	336.42	68.80	
	0.80			48	70	30	0.63	1	0.63	325.02		
1.00												
			Limo Sandy with plasticity condition in-situ firm, medium compact, partially dry and reddish brown coloration.	8	30	30	3.75	1	3.75	43.69		
1.20				8	60	30	3.75	1	3.75	43.69	41.67	
	1.30			7	90	30	4.29	1	4.29	37.62		
1.40												
1.60			Limo Sandy with plasticity condition in-situ firm, medium compact, partially dry and reddish brown coloration.	5	40	40	8.00	1	8.00	18.70		
				5	80	40	8.00	1	8.00	18.70	18.70	
1.80	1.90			5	120	40	8.00	1	8.00	18.70		
2.00												
2.20			Limo, in-situ condition firm, partially saturated soft consistency, state and browning.	5	40	40	8.00	1	8.00	18.70		
				4	80	40	10.00	1	10.00	14.56	15.94	
	2.40			4	120	40	10.00	1	10.00	14.56		
2.60												
			Clay, in-situ condition firm, partially saturated soft consistency, status and presence of brown with small clasts.	7	40	40	5.71	1	5.71	27.26		
				7	80	40	5.71	1	5.71	27.26	27.26	
	2.70			7	120	40	5.71	1	5.71	27.26		N.F.
2.80	2.80		Limo, in-situ condition flimsy, soft consistency, saturated state and browning.	3	40	40	13.33	1	13.33	10.55		
	N.F.			4	80	40	10.00	1	10.00	14.56	14.61	
3.00	3.00			5	120	40	8.00	1	8.00	18.70		

OBSERVATIONS:

The presence of the Water Table at a depth of 2.80 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey conducted.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 09/09/2014
CLOSING DATE OF TEST: 09/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 52

TEST DATA

Progresive: 24+615 — Coordinated: X Coordinate 17°26'26.60"S; Y Coordinate 62°54'07.10"O

WATER TABLE: 2,70 m. — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD				TEST RESULTS									
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.00			Filled with Granular Base Layer Material Type	25	30	30	1.20	1	1.20	156.54		(For the first two points) Given the characteristics of this type of soil (Silty Sand and Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground.
				32	60	30	0.94	1	0.94	206.39	156.54	
	0.05			40	90	30	0.75	1	0.75	264.99		
0.20												
0.40			Silty sand, firm-situ, dense compactness of dry and dark brown coloring condition	20	20	20	1.00	1	1.00	192.00		
				28	40	20	0.71	1	0.71	279.88	277.07	
0.60				35	60	20	0.57	1	0.57	359.34		
	0.70											
0.80												
			Silty fine-grained sand, firm in-situ condition of compactness loose to medium partially dry and brown color	5	20	20	4.00	1	4.00	40.64		
1.00				5	40	20	4.00	1	4.00	40.64	40.64	
1.20	1.20			5	60	20	4.00	1	4.00	40.64		
1.40												
			Silty fine-grained sand, firm in-situ condition of compactness loose to medium partially dry and brown color	3	30	30	10.00	1	10.00	14.56		
1.60				6	60	30	5.00	1	5.00	31.66	25.96	
	1.70			6	90	30	5.00	1	5.00	31.66		
1.80												
			Silty fine-grained sand, firm in-situ condition of compactness loose to medium partially dry and brown color.	5	30	30	6.00	1	6.00	25.81		
2.00				6	60	30	5.00	1	5.00	31.66	25.39	
2.20	2.20			5	100	40	8.00	1	8.00	18.70		
2.40												
			Silty fine-grained sand, firm in-situ condition of compactness loose to medium partially dry and brown color.	4	40	40	10.00	1	10.00	14.56		
				5	80	40	8.00	1	8.00	18.70	17.32	
2.60	2.70			5	120	40	8.00	1	8.00	18.70		N.F.
2.80												
	N.F.		Silty fine-grained sand, firm in-situ condition of compactness loose to medium partially dry and brown color.	5	40	40	8.00	1	8.00	18.70		
				5	80	40	8.00	1	8.00	18.70	18.70	
3.00	3.00			5	120	40	8.00	1	8.00	18.70		

OBSERVATIONS:

The presence of the Water Table at a depth of 2.70 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 09/09/2014
CLOSING DATE OF TEST: 09/09/2014

LABORATORY MANAGER

	DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03	REV: 00 Date: 20/09/2014 REPORT RP 00 PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*

PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*

UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 53

TEST DATA

Progresive: 25+110

Coordinated: X Coordinate 17°26'42.60"S; Y Coordinate 62°54'10.00"O

WATER TABLE: 2,70 m. **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	25	20	20	0.80	1	0.80	246.51	451.50	(For the first two points) Given the characteristics of this type of soil (Silty Sand and Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground.
				48	40	20	0.42	1	0.42	511.84		
	0.05			55	60	20	0.36	1	0.36	596.15		
020												
			Silty sand, firm-situ, dense compactness of dry brown coloration and condition.	18	30	30	1.67	1	1.67	108.35	490.75	
040				58	50	20	0.34	1	0.34	632.68		
	0.60			66	70	20	0.30	1	0.30	731.20		
060												
080			Silty sand grained, firm in-situ condition of compactness loose to medium partially dry and dark brown coloration.									
				5	30	30	6.00	1	6.00	25.81		
100				4	60	30	7.50	1	7.50	20.10	22.00	
	1.20			4	90	30	7.50	1	7.50	20.10		
120												
140			Clayey sand, in-situ condition firm, medium compactness, partially dry and brown color.	4	30	30	7.50	1	7.50	20.10		
				4	60	30	7.50	1	7.50	20.10	19.63	
160				5	100	40	8.00	1	8.00	18.70		
	1.80											
180												
200												
			Limo Sandy, in-situ condition firm loose compactness, partially saturated state and browning.	4	40	40	10.00	1	10.00	14.56		
220				3	80	40	13.33	1	13.33	10.55	11.89	
				3	120	40	13.33	1	13.33	10.55		
240												
260	2.70											N.F.
	N.F.			6	50	50	8.33	1	8.33	17.86		
280			Limo Sandy, in-situ condition firm loose compactness, partially saturated state and browning.	7	100	50	7.14	1	7.14	21.23	21.25	
300	3.00			16	200	100	6.25	1	6.25	24.66		

OBSERVATIONS:

The presence of the Water Table at a depth of 2.70 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note ti
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 09/09/2014

CLOSING DATE OF TEST: 09/09/2014

LABORATORY MANAGER

	DYNAMIC PENETRATION TESTING (DCP) NORMA ASTM-D-6951-03	REV: 00 Date: 20/09/2014 REPORT RP 00 PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*

PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*

UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 54

TEST DATA

Progresive: 25+610

Coordinated: X Coordinate 17°26'58.50"S; Y Coordinate 62°54'13.40"O

WATER TABLE: 2,50 m. **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	11	20	20	1.82	1	1.82	98.29		
				12	40	20	1.67	1	1.67	108.35	98.29	(For the first two points) Given the characteristics of this type of soil (Silty Sand and Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground. CBR of 98.29 was adopted for the first point.
	0.03			20	60	20	1.00	1	1.00	192.00		
020												
			Silty sand, firm-situ, dense compactness of dry brown coloration and condition.	55	30	30	0.55	1	0.55	378.56		
040				51	50	20	0.39	1	0.39	547.81	636.63	
	0.50			86	70	20	0.23	1	0.23	983.53		
060												
			Silty fine-grained sand, firm in-situ condition, average compactness, partially dry and brown coloring.	7	30	30	4.29	1	4.29	37.62		
080				9	60	30	3.33	1	3.33	49.85	45.77	
	1.00			9	90	30	3.33	1	3.33	49.85		
100												
120			Silty fine-grained sand, firm in-situ condition, average compactness, partially dry and brown coloring.	6	40	40	6.67	1	6.67	22.94		
				6	80	40	6.67	1	6.67	22.94	22.94	
140				6	120	40	6.67	1	6.67	22.94		
	1.60											
160												
			Silty fine-grained sand, firm in-situ condition, average compactness, partially dry, light brown with brown patinas.	5	40	40	8.00	1	8.00	18.70		
180				6	80	40	6.67	1	6.67	22.94	21.52	
	2.00			6	120	40	6.67	1	6.67	22.94		
200												
220			Silty sand, firm-situ, compactness loose to medium partially saturated state and browning condition.	3	50	50	16.67	1	16.67	8.22		
				3	100	50	16.67	1	16.67	8.22	8.22	
240				3	150	50	16.67	1	16.67	8.22		N.F.
	2.50											
260	N.F.											
			Silty fine-grained sand, firm in-situ condition, average compactness, saturated state and light brown color	5	50	50	10.00	1	10.00	14.56		
280				6	100	50	8.33	1	8.33	17.86	16.76	
				6	150	50	8.33	1	8.33	17.86		
300	3.00											

OBSERVATIONS:

The presence of the Water Table at a depth of 2.50 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note ti
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 09/09/2014

CLOSING DATE OF TEST: 09/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 55

TEST DATA

Progresive: 26+110 — Coordinated: X Coordinate 17°27'14.40"S; Y Coordinate 62°54'16.70"O

WATER TABLE: 1,80 m. — **WEIGHT HAMMER:** 8 Kg.

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	15	20	20	1.33	1	1.33	139.11	153.17	(For the first item) Due to the characteristics of this type of soil (Silty Sand and Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground.
				15	40	20	1.33	1	1.33	139.11		
	0.05			19	60	20	1.05	1	1.05	181.28		
020												
			Silty sand, firm-situ, dense compactness of dry brown coloration and condition.	13	30	30	2.31	1	2.31	75.26	84.05	
040				17	60	30	1.76	1	1.76	101.63		
	0.50			13	90	30	2.31	1	2.31	75.26		
060												
			Silty fine-grained sand, partially in-situ firm condition, compactness loose to medium partially dry and dark brown coloration.	3	30	30	10.00	1	10.00	14.56	14.56	
080				3	60	30	10.00	1	10.00	14.56		
100	1.00			4	100	40	10.00	1	10.00	14.56		
120												
			Silty sand, partly in-situ final condition of average compactness, partially saturated state and reddish brown coloration.	3	40	40	13.33	1	13.33	10.55	12.15	
140				5	90	50	10.00	1	10.00	14.56		
				4	140	50	12.50	1	12.50	11.34		
160												
180	1.80											N.F.
200	N.F.		Sandy loam, partially solid in-situ condition, loose to medium compact, saturated state and light brown color.	4	50	50	12.50	1	12.50	11.34	13.49	
				5	100	50	10.00	1	10.00	14.56		
220	2.30			5	150	50	10.00	1	10.00	14.56		
240												
			Silty fine-grained sand, firm condition in-situ, on average compactness, saturated state and browning.	2	50	50	25.00	1	25.00	5.22	7.26	
260				2	100	50	25.00	1	25.00	5.22		
				4	150	50	12.50	1	12.50	11.34		
280	2.80											
			Silty fine-grained sand, firm condition in-situ, on average compactness, saturated state and browning.	6	50	50	8.33	1	8.33	17.86	15.66	
300	3.00			5	100	50	10.00	1	10.00	14.56		
				5	150	50	10.00	1	10.00	14.56		

OBSERVATIONS:

The presence of the Water Table at a depth of 1.80 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 09/09/2014
CLOSING DATE OF TEST: 09/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 56

TEST DATA

Progresive: 26+610 — Coordinated: X Coordinate 17°27'30.20"S; Y Coordinate 62°54'20.40"O

WATER TABLE: 2,50 m. — **WEIGHT HAMMER:** 8 Kg.

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	58	20	20	0.34	1	0.34	632.68	524.45	(For the first three points) Given the characteristics of this type of soil (Base Layer and Clayey and Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground. CBR of 68.8 was adapted for the second and third point.
				47	40	20	0.43	1	0.43	499.92		
				42	60	20	0.48	1	0.48	440.74		
020	0.20											
			Silty fine-grained sand, firm in-situ condition, dense compactness of dry and dark brown coloration.	12	30	30	2.50	1	2.50	68.80	68.80	
040				25	60	30	1.20	1	1.20	156.54		
	0.50			41	90	30	0.73	1	0.73	272.42		
060												
			Clayey sand, partially solid in-situ condition, average compactness, partially dry and reddish brown coloration.	8	20	20	2.50	1	2.50	68.80	68.80	
080				13	40	20	1.54	1	1.54	118.51		
100	1.10			13	60	20	1.54	1	1.54	118.51		
120												
			Silty sand, firm-situ, on average compactness, partially dry and browning condition.	5	30	30	6.00	1	6.00	25.81	25.81	
140				5	60	30	6.00	1	6.00	25.81		
				5	90	30	6.00	1	6.00	25.81		
160	1.60											
180			Silty fine-grained sand, firm condition in-situ, on average compactness, saturated state and browning.									
				3	50	50	16.67	1	16.67	8.22	7.22	
200				2	100	50	25.00	1	25.00	5.22		
				6	200	100	16.67	1	16.67	8.22		
220	2.10											
			Silty fine-grained sand, firm condition in-situ, on average compactness, saturated state and browning.	4	100	100	25.00	1	25.00	5.22	6.21	
240				5	200	100	20.00	1	20.00	6.70		
	2.50			5	300	100	20.00	1	20.00	6.70		
260	N.F.											N.F.
280			Limo Sandy, in-situ condition firm, medium compactness, saturated state and browning.	6	90	90	15.00	1	15.00	9.25	8.60	
				4	190	100	25.00	1	25.00	5.22		
				8	290	100	12.50	1	12.50	11.34		
300	3.00											

OBSERVATIONS:

The presence of the Water Table at a depth of 2.50 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 09/09/2014
CLOSING DATE OF TEST: 09/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 57

TEST DATA

Progresive: 27+100
Coordinated: X Coordinate 17°27'45.90"S; Y Coordinate 62°54'24.10"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD				TEST RESULTS								
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	23	30	30	1.30	1	1.30	142.58	192.54	(For the first three points) Given the characteristics of this type of soil (Base Layer and Clayey and Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground. CBR of 68.8 was adapted for the second point and the third point to 75.26.
				38	60	30	0.79	1	0.79	250.20		
	0.05			29	90	30	1.03	1	1.03	184.85		
020												
			Clay, in-situ condition firm, dense consistency, dryness and reddish brown with dark gray patina.	12	30	30	2.50	1	2.50	68.80	68.80	
040				25	60	30	1.20	1	1.20	156.54		
	0.60			41	90	30	0.73	1	0.73	272.42		
060												
			Clay, in-situ condition firm, dense consistency, dryness and reddish brown with dark gray patina.	13	30	30	2.31	1	2.31	75.26	75.26	
080				25	70	40	1.60	1	1.60	113.42		
100	1.00			41	110	40	0.98	1	0.98	197.38		
120			Sandy clay, in-situ condition firm, dense consistency, dryness and reddish brown with dark gray patinas.									
				19	40	40	2.11	1	2.11	83.41	93.41	
140				19	80	40	2.11	1	2.11	83.41		
	1.60			25	120	40	1.60	1	1.60	113.42		
160												
180			Sandy clay, in-situ condition firm, dense consistency, dryness and reddish brown with dark gray patinas.									(For the fifth points) Given the characteristics of this type of soil (clay Sandy) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground. CBR Average of 93.31 was adapted.
				33	40	40	1.21	1	1.21	154.79	93.31	
200				22	80	40	1.82	1	1.82	98.29		
				20	120	40	2.00	1	2.00	88.34		
220	2.30											
240			Limo Sandy, in-situ condition firm, medium compactness, saturated state and browning	2	50	50	25.00	1	25.00	5.22	5.22	
				2	100	50	25.00	1	25.00	5.22		
260				2	150	50	25.00	1	25.00	5.22		
280	2.80											
300			Silty Sand, firm condition in-situ, on average compactness, saturated state and browning.	2	50	50	25.00	1	25.00	5.22	7.22	
				3	100	50	16.67	1	16.67	8.22		
	3.00			3	150	50	16.67	1	16.67	8.22		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 10/09/2014
CLOSING DATE OF TEST: 10/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 58

TEST DATA

Progresive: 27+600
Coordinated: X Coordinate 17°28'01.60"S; Y Coordinate 62°54'28.20"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD				TEST RESULTS								
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	35	20	20	0.57	1	0.57	359.34	348.28	(For the first Item) Due to the characteristics of this type of soil (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground.
				39	40	20	0.51	1	0.51	405.64		
	0.05			28	60	20	0.71	1	0.71	279.88		
020												
			Clay, in-situ condition firm, dense consistency, dry and dark brown with dark gray patina and red.	5	30	30	6.00	1	6.00	25.81	29.71	
040				6	60	30	5.00	1	5.00	31.66		
	0.50			6	90	30	5.00	1	5.00	31.66		
060			Clay, in-situ condition firm, dense consistency, dry and dark brown with dark gray patina and red.	6	30	30	5.00	1	5.00	31.66	33.14	
				8	70	40	5.00	1	5.00	31.66		
080	0.80			9	110	40	4.44	1	4.44	36.12		
100												
			Clay, in-situ condition firm, dense consistency, dryness and reddish coloration with dark gray patinas.	10	40	40	4.00	1	4.00	40.64	37.63	
120				9	80	40	4.44	1	4.44	36.12		
				9	120	40	4.44	1	4.44	36.12		
140												
	1.50											
160												
			Clay, strong in-situ condition, medium consistency, dry, reddish coloration with light brown clasts.	9	40	40	4.44	1	4.44	36.12	35.52	
180				11	90	50	4.55	1	4.55	35.22		
				11	140	50	4.55	1	4.55	35.22		
200												
	2.10											
220												
			Clay, in-situ condition firm, dense consistency, partially dry and reddish coloration with brown patinas.	6	50	50	8.33	1	8.33	17.86	16.22	
240				6	100	50	8.33	1	8.33	17.86		
				9	200	100	11.11	1	11.11	12.94		
260	2.70											
280												
			Clay, in-situ condition firm, dense consistency, partially saturated state and reddish coloration with brown patinas.	7	70	70	10.00	1	10.00	14.56	13.48	
300				9	170	100	11.11	1	11.11	12.94		
	3.00			9	270	100	11.11	1	11.11	12.94		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 10/09/2014
CLOSING DATE OF TEST: 10/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 59

TEST DATA

Progresive: 28+100
Coordinated: X Coordinate 17°28'17.40"S; Y Coordinate 62°54'32.00"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	21	20	20	0.95	1	0.95	202.78	257.95	(For the first item) Due to the characteristics of this type of soil (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated habere stone or consolidated, dry ground.
				27	40	20	0.74	1	0.74	268.70		
	0.10			30	60	20	0.67	1	0.67	302.36		
020			Clay, in-situ condition firm, dense consistency, dry and dark brown with reddish patinas.	6	30	30	5.00	1	5.00	31.66	34.63	
040	0.40			9	70	40	4.44	1	4.44	36.12		
				9	110	40	4.44	1	4.44	36.12		
060			Clay, strong in-situ condition, a dense medium consistency, dry state and reddish coloration with dark gray skate.									
				15	40	40	2.67	1	2.67	64.01	68.82	
080				17	80	40	2.35	1	2.35	73.64		
100	1.00			16	120	40	2.50	1	2.50	68.80		
120			Sandy clay, in-situ condition firm, medium consistency to dense, dry and reddish coloration light gray patinas.									
140				19	50	50	2.63	1	2.63	64.96		
				16	100	50	3.13	1	3.13	53.59	52.46	
160	1.60			12	150	50	4.17	1	4.17	38.83		
180			Silty Clay, firm condition in-situ, medium bodied, dry and reddish coloration with brown patinas.									
				6	50	50	8.33	1	8.33	17.86		
				6	100	50	8.33	1	8.33	17.86	17.86	
200	2.10			6	150	50	8.33	1	8.33	17.86		
220			Clay, in-situ condition firm, dense consistency, partially dry and reddish coloration light gray patinas.									
				4	40	40	10.00	1	10.00	14.56		
240				6	90	50	8.33	1	8.33	17.86	16.76	
	2.60			6	140	50	8.33	1	8.33	17.86		
260												
			Clay, strong in-situ condition, a dense medium consistency, partially saturated state and reddish coloration yellowish brown patina.									
280				9	50	50	5.56	1	5.56	28.13		
				9	100	50	5.56	1	5.56	28.13	24.71	
300	3.00			12	200	100	8.33	1	8.33	17.86		

OBSERVATIONS:
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note ti.
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 10/09/2014
CLOSING DATE OF TEST: 10/09/2014
LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 60

TEST DATA

Progresive: 28+605
Coordinated: X Coordinate 17°28'33.40"S; Y Coordinate 62°54'36.10"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	31	20	20	0.65	1	0.65	313.67	218.52	(For the first item) Due to the characteristics of this type of soil (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated habere stone or consolidated, dry ground.
				15	40	20	1.33	1	1.33	139.11		
				21	60	20	0.95	1	0.95	202.78		
020	0.20											
			Clay, in-situ condition firm, dense consistency, dry and dark brown with reddish patinas.	12	40	40	3.33	1	3.33	49.85		
040				11	80	40	3.64	1	3.64	45.22	48.31	
060				12	120	40	3.33	1	3.33	49.85		
	0.60											
080			Clay, firm-situ, medium consistency to dense, dry and reddish coloration gray patinas condition.									
				15	40	40	2.67	1	2.67	64.01		
100				17	80	40	2.35	1	2.35	73.64	67.53	
120	1.20			19	130	50	2.63	1	2.63	64.96		
140			Sandy clay, in-situ condition firm, medium consistency to dense, dry, reddish coloration with dark gray skate.	17	40	40	2.35	1	2.35	73.64		
				18	80	40	2.22	1	2.22	78.51	76.23	
160				22	130	50	2.27	1	2.27	76.55		
	1.70											
180			Silty Clay, firm condition in-situ, medium bodied, dry and reddish coloration light gray patinas.									
				19	50	50	2.63	1	2.63	64.96		
200				22	100	50	2.27	1	2.27	76.55	68.83	
220				19	150	50	2.63	1	2.63	64.96		
	2.40											
240			Clay, strong in-situ condition, a dense medium consistency, partially saturated state and reddish coloration yellowish brown patina.									
260				5	40	40	8.00	1	8.00	18.70		
280				6	90	50	8.33	1	8.33	17.86	18.14	
				6	140	50	8.33	1	8.33	17.86		
300	3.00											

OBSERVATIONS:
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note ti.
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 10/09/2014
CLOSING DATE OF TEST: 10/09/2014
LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 61

TEST DATA

Progresive: 29+100 — Coordinated: X Coordinate 17°28'49.00"S; Y Coordinate 62°54'40.10"O

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
020	0.30		Filled with Granular Base Layer Material Type	39	30	30	0.77	1	0.77	257.58	239.20	(For the first item) Due to the characteristics of this type of soil (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground.
				23	50	20	0.87	1	0.87	224.53		
040				24	70	20	0.83	1	0.83	235.50		
060	0.80		Clay, in-situ condition firm, dense consistency, dry and dark brown with reddish patinas.	9	40	40	4.44	1	4.44	36.12	39.15	
				9	80	40	4.44	1	4.44	36.12		
080				11	120	40	3.64	1	3.64	45.22		
100												
120			Clay, in-situ condition firm, medium consistency to dense, dry and reddish coloration light gray patinas.	12	40	40	3.33	1	3.33	49.85	51.10	
140				15	90	50	3.33	1	3.33	49.85		
				16	140	50	3.13	1	3.13	53.59		
160												
	1.70											
180												
200	2.10		Clay, in-situ condition firm, medium bodied, dry and reddish color with dark gray patina and clasts.	7	50	50	7.14	1	7.14	21.23	21.23	
				7	100	50	7.14	1	7.14	21.23		
				7	150	50	7.14	1	7.14	21.23		
220			Silty Clay, firm condition in-situ, medium bodied, dry and reddish color with dark gray patinas.	6	50	50	8.33	1	8.33	17.86	17.86	
240	2.40			6	100	50	8.33	1	8.33	17.86		
				6	150	50	8.33	1	8.33	17.86		
260			Clay, strong in-situ condition, a dense medium consistency, partially saturated state and reddish coloration yellowish brown patina.									
				2	50	50	25.00	1	25.00	5.22	5.22	
280				4	150	100	25.00	1	25.00	5.22		
				4	250	100	25.00	1	25.00	5.22		
300	3.00											

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note ti
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 10/09/2014
CLOSING DATE OF TEST: 10/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 62

TEST DATA

Progresive: 29+600 — Coordinated: X Coordinate 17°29'04.70"S; Y Coordinate 62°54'44.60"O

WATER TABLE: 2,70 m. — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	21	20	20	0.95	1	0.95	202.78	221.16	(For the first item) Due to the characteristics of this type of soil (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground.
				20	40	20	1.00	1	1.00	192.00		
	0.05			27	60	20	0.74	1	0.74	268.70		
020												
			Clay, in-situ condition firm, medium bodied, dry and dark brown with reddish patinas.	6	30	30	5.00	1	5.00	31.66	29.71	
040				6	60	30	5.00	1	5.00	31.66		
	0.50			5	90	30	6.00	1	6.00	25.81		
060												
			Clay, strong in-situ condition, medium consistency, dry, reddish brown with dark gray skate.	4	50	50	12.50	1	12.50	11.34	8.26	
080				3	100	50	16.67	1	16.67	8.22		
				2	150	50	25.00	1	25.00	5.22		
100	1.00											
120			Clay, in-situ condition firm, medium bodied, dry and reddish coloration with brown clasts.	3	50	50	16.67	1	16.67	8.22	10.30	
140				4	100	50	12.50	1	12.50	11.34		
				4	150	50	12.50	1	12.50	11.34		
160	1.60											
180			Limo, in-situ condition firm, medium bodied, partially saturated state and patinas brown with yellowish.	6	80	80	13.33	1	13.33	10.55	14.33	
				10	180	100	10.00	1	10.00	14.56		
200				12	280	100	8.33	1	8.33	17.86		
	2.20											
220												
			Silty, solid condition in-situ, medium consistency, partially saturated state and of reddish brown with yellowish brown patina.	5	80	80	16.00	1	16.00	8.60	12.58	
240				10	180	100	10.00	1	10.00	14.56		
				10	280	100	10.00	1	10.00	14.56		N.F.
260	2.70											
	N.F.		Silty Sand, fine-grained, firm condition in-situ, on average compactness, saturated state and browning.	3	80	80	26.67	1	26.67	4.86	5.59	
280				4	180	100	25.00	1	25.00	5.22		
				5	280	100	20.00	1	20.00	6.70		
300	3.00											

OBSERVATIONS:

The presence of the Water Table at a depth of 2.70 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note ti
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 10/09/2014
CLOSING DATE OF TEST: 10/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 63

TEST DATA

Progresive: 30+100
Coordinated: X Coordinate 17°29'20.40"S; Y Coordinate 62°54'48.70"O
WATER TABLE: 2,80 m. **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD				TEST RESULTS									
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0				12	30	30	2.50	1	2.50	68.80		
			Filled with Granular Base Layer Material Type	23	60	30	1.30	1	1.30	142.58	68.80	
	0.05			23	90	30	1.30	1	1.30	142.58		
020												
			Clay, in-situ condition firm, medium bodied, dry and dark brown with reddish patinas and dark gray.	6	40	40	6.67	1	6.67	22.94		
040				10	80	40	4.00	1	4.00	40.64	36.27	
				11	120	40	3.64	1	3.64	45.22		
060	0.60											
080												
100				6	50	50	8.33	1	8.33	17.86		
			Clay, strong in-situ condition, medium consistency, dry, reddish coloration with dark gray skate.	8	100	50	6.25	1	6.25	24.66	20.13	
120				6	150	50	8.33	1	8.33	17.86		
140												
	1.50											
160												
				6	50	50	8.33	1	8.33	17.86		
180			Clay, strong in-situ condition, medium consistency, partially dry, reddish brown with dark gray skate	15	150	100	6.67	1	6.67	22.94	19.00	
				11	250	100	9.09	1	9.09	16.21		
200												
220	2.30											
240				10	100	100	10.00	1	10.00	14.56		
			Limo Arcilloso, de condición in-situ firme, de consistencia media, de estado parcialmente saturado y de coloración marrón con patinas de color rojizo y gris oscuro	11	200	100	9.09	1	9.09	16.21	16.21	
260				12	300	100	8.33	1	8.33	17.86		
	2.70											N.F.
280	2.80		Limo Inorganic, firm condition in-situ, medium consistency, saturated state and brown with dark brown clasts.	4	70	70	17.50	1	17.50	7.78		
	N.F.			13	170	100	7.69	1	7.69	19.54	20.85	
300	3.00			22	270	100	4.55	1	4.55	35.22		

OBSERVATIONS:

The presence of the Water Table at a depth of 2.80 m was evident. until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

(For the first item) Due to the characteristics of this type of soil (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground. CBR was adopted 68.8

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 11/09/2014
CLOSING DATE OF TEST: 11/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 64

TEST DATA

Progresive: 30+595
Coordinated: X Coordinate 17°29'36.10"S; Y Coordinate 62°54'53.10"O
WATER TABLE: not Applicable **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD				TEST RESULTS									
SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0				5	20	20	4.00	1	4.00	40.64		
			Filled with Granular Base Layer Material Type	9	40	20	2.22	1	2.22	78.51	75.83	
	0.05			12	60	20	1.67	1	1.67	108.35		
020				4	50	50	12.50	1	12.50	11.34		
			Sandy clay, in-situ condition firm, medium bodied, dry and dark brown with reddish patinas and dark gray.	4	100	50	12.50	1	12.50	11.34	12.42	
	0.30			5	150	50	10.00	1	10.00	14.56		
040				3	50	50	16.67	1	16.67	8.22		
			Sandy clay, in-situ condition firm, medium bodied, dry and dark brown with reddish patinas.	5	100	50	10.00	1	10.00	14.56	12.45	
060	0.60			5	150	50	10.00	1	10.00	14.56		
080												
100												
120				10	100	100	10.00	1	10.00	14.56		
			Clay, strong in-situ condition, medium consistency, dry, reddish coloration with dark gray skate.	10	200	100	10.00	1	10.00	14.56	15.11	
140				11	300	100	9.09	1	9.09	16.21		
160												
180												
	1.90											
200	A.C.			6	60	60	10.00	1	10.00	14.56		
			Limo Inorganic, firm condition in-situ, medium consistency, saturated state and yellowish brown coloration.	9	160	100	11.11	1	11.11	12.94	13.48	
220				9	260	100	11.11	1	11.11	12.94		
	2.40											
240												
			Silty, solid condition in-situ, medium consistency, partially saturated state and of reddish brown with yellowish brown patina.	5	100	100	20.00	1	20.00	6.70		
260				5	200	100	20.00	1	20.00	6.70	7.21	
				6	300	100	16.67	1	16.67	8.22		
280												
300	3.00											

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done. Presence of Water hanging 1,90 m. to 2.40 m.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 11/09/2014
CLOSING DATE OF TEST: 11/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 65

TEST DATA

Progresive: 31+090 — Coordinated: X Coordinate 17°29'51.80"S; Y Coordinate 62°54'57.20"O

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	7	20	20	2.86	1	2.86	59.25	73.79	(For the first item) Due to the characteristics of this type of soil (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground. Average CBR of 73.79 was adopted,
				10	40	20	2.00	1	2.00	88.34		
	0.10			18	60	20	1.11	1	1.11	170.63		
020			Silty Sand, fine-grained, firm condition in situ, on average compactness of dry and dark brown coloration.									
				17	50	50	2.94	1	2.94	57.35	48.68	
040				15	100	50	3.33	1	3.33	49.85		
	0.50			12	150	50	4.17	1	4.17	38.83		
060			Silty Sand, firm condition in-situ, compactness loose to medium partially saturated state and browning.									
080												
100												
				3	50	50	16.67	1	16.67	8.22	9.26	
120				3	100	50	16.67	1	16.67	8.22		
140				4	150	50	12.50	1	12.50	11.34		
160												
	1.70											
180			Limo Sandy, in-situ condition firm, compact loose to medium partially saturated state and browning.									
				5	100	100	20.00	1	20.00	6.70	7.71	
200				6	200	100	16.67	1	16.67	8.22		
220	2.20			6	300	100	16.67	1	16.67	8.22		
240			Silty Sand, firm condition in-situ, on average compactness, partially saturated state and browning.									
				5	60	60	12.00	1	12.00	11.87	11.52	
260				8	160	100	12.50	1	12.50	11.34		
	2.70			8	260	100	12.50	1	12.50	11.34		
280			Silty Sand, fine-grained, in-situ condition firm, medium compactness, partially saturated state and light brown color.									
				9	50	50	5.56	1	5.56	28.13	37.69	
300	3.00			13	100	50	3.85	1	3.85	42.47		
				13	150	50	3.85	1	3.85	42.47		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note is
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 11/09/2014
CLOSING DATE OF TEST: 11/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 66

TEST DATA

Progresive: 31+585 — Coordinated: X Coordinate 17°30'07.30"S; Y Coordinate 62°55'01.40"O

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Sandy clay, in-situ condition firm, medium consistency to dense, dry and dark brown with dark gray patinas.	20	20	20	1.00	1	1.00	192.00		(For the first item) Due to the characteristics of this type of soil (clay Sandy) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground.
020				23	40	20	0.87	1	0.87	224.53	202.84	
				20	60	20	1.00	1	1.00	192.00		
040	0.40											
			Clay, strong in-situ condition, medium consistency, dry and brown with dark gray skate.	7	50	50	7.14	1	7.14	21.23		
060				10	100	50	5.00	1	5.00	31.66	30.57	
080				12	150	50	4.17	1	4.17	38.83		
	0.90											
100												
120			Clay, strong in-situ condition, medium consistency, dry and brown with dark gray skate.	10	100	100	10.00	1	10.00	14.56		
140				11	200	100	9.09	1	9.09	16.21	15.66	
160				11	300	100	9.09	1	9.09	16.21		
180	1.80											
			Silty, solid condition in-situ, medium consistency, partially dry and reddish coloration with light brown patina and the presence of small clasto.									
200				6	50	50	8.33	1	8.33	17.86		
220				9	150	100	11.11	1	11.11	12.94	14.58	
				9	250	100	11.11	1	11.11	12.94		
240	2.40											
			Limo Inorganic, in-situ condition firm, medium bodied, partially saturated state and yellowish brown coloration.									
260				3	80	80	26.67	1	26.67	4.86		
280				5	180	100	20.00	1	20.00	6.70	6.59	
				6	280	100	16.67	1	16.67	8.22		
300	3.00											

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note is
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 11/09/2014
CLOSING DATE OF TEST: 11/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 67

TEST DATA

Progresive: 32+080
Coordinated: X Coordinate 17°30'23.10"S; Y Coordinate 62°55'05.40"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	15	30	30	2.00	1	2.00	88.34		
				16	60	30	1.88	1	1.88	94.96	97.22	
	0.10			18	90	30	1.67	1	1.67	108.35		
020			Clay, in-situ condition firm, medium consistency to dense, dry and brown with dark gray patina and red.									
040												
				12	30	30	2.50	1	2.50	68.80		
				18	70	40	2.22	1	2.22	78.51	75.27	
060				18	110	40	2.22	1	2.22	78.51		
080												
	0.90											
100			Clayey sand, in-situ condition firm, medium compactness, partially dry and brown with reddish patinas and presence of small clasts.									
				6	40	40	6.67	1	6.67	22.94		
120				7	80	40	5.71	1	5.71	27.26	25.82	
	1.30			7	120	40	5.71	1	5.71	27.26		
140			Clay, in-situ condition firm, medium bodied, partially dry, reddish brown patina coloration with dark gray.									
160												
				3	50	50	16.67	1	16.67	8.22		
				4	100	50	12.50	1	12.50	11.34	9.26	
180				3	150	50	16.67	1	16.67	8.22		
	1.90											
200			Limo Sandy fine-grained in-situ condition firm, medium compactness, partially saturated state and brown with dark gray patinas.									
				4	60	60	15.00	1	15.00	9.25		
220				5	120	60	12.00	1	12.00	11.87	10.12	
240	2.40			4	180	60	15.00	1	15.00	9.25		
			Silty Sand, fine-grained, firm condition in-situ, on average compactness, partially saturated state and browning.									
260												
				3	80	80	26.67	1	26.67	4.86		
280				3	180	100	33.33	1	33.33	3.78	4.14	
300	3.00			3	280	100	33.33	1	33.33	3.78		

OBSERVATIONS:
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note is
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 11/09/2014
CLOSING DATE OF TEST: 11/09/2014
LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 68

TEST DATA

Progresive: 32+590
Coordinated: X Coordinate 17°30'38.70"S; Y Coordinate 62°55'10.80"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	20	20	20	1.00	1	1.00	192.00		
				30	50	30	1.00	1	1.00	192.00	192.00	
	0.12			30	80	30	1.00	1	1.00	192.00		
020			Silty Sand, fine-grained, firm condition in-situ, on average compactness of dry and brown color.									(For the first Item) Due to the characteristics of this type of soil (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated habercе stone or consolidated, dry ground.
040												
				8	30	30	3.75	1	3.75	43.69		
				16	60	30	1.88	1	1.88	94.96	67.87	
060				19	110	50	2.63	1	2.63	64.96		
080	0.70											
			Limo Inorganic, in-situ condition firm, medium bodied, partially dry and brown with dark brown patina gray.									
100				5	40	40	8.00	1	8.00	18.70		
				6	80	40	6.67	1	6.67	22.94	21.52	
120				6	120	40	6.67	1	6.67	22.94		
140	1.40											
160			Sandy clay, in-situ condition firm, medium bodied, partially dry and brown with dark brown patina dark gray and reddish.									
				3	50	50	16.67	1	16.67	8.22		
180				3	100	50	16.67	1	16.67	8.22	6.90	
200	2.00			2	160	60	30.00	1	30.00	4.26		
220			Clay, in-situ condition firm, medium bodied, partially dry, reddish brown patina coloration with dark gray.									
				3	60	60	20.00	1	20.00	6.70		
240				5	120	60	12.00	1	12.00	11.87	11.05	
				7	190	70	10.00	1	10.00	14.56		
260	2.50											
280			Silty Sand, firm condition in-situ, on average compactness, partially saturated state and brown with dark gray patinas.									
				6	80	80	13.33	1	13.33	10.55		
				6	160	80	13.33	1	13.33	10.55	10.29	
300	3.00			7	260	100	14.29	1	14.29	9.77		

OBSERVACIONES:
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey conducted.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note is
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 11/09/2014
CLOSING DATE OF TEST: 11/09/2014
LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 69

TEST DATA

Progresive: 33+110
Coordinated: X Coordinate 17°30'55.40"S; Y Coordinate 62°55'13.80"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	12	20	20	1.67	1	1.67	108.35		
				15	40	20	1.33	1	1.33	139.11	135.84	
	0.05			17	60	20	1.18	1	1.18	160.05		(For the first two points) Given the characteristics of this type of soil (Base Layer and Clay) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground.
020												
040			Clay, in-situ condition firm, medium bodied, partially dry and reddish brown coloration.	18	30	30	1.67	1	1.67	108.35		
				20	60	30	1.50	1	1.50	121.92	117.40	
060				20	90	30	1.50	1	1.50	121.92		
080	0.80											
100												
			Silty Clay, firm condition in-situ, medium bodied, partially dry and reddish coloration yellowish patinas.	7	30	30	4.29	1	4.29	37.62		
120				5	80	50	10.00	1	10.00	14.56	22.25	
				5	130	50	10.00	1	10.00	14.56		
140	1.50											
160												
180												
			Clayey sand, in-situ condition firm, medium bodied, partially dry and reddish brown coloration	3	80	80	26.67	1	26.67	4.86		
200				5	160	80	16.00	1	16.00	8.60	6.72	
				5	260	100	20.00	1	20.00	6.70		
220												
240	2.40											
			Silty Sand, firm condition in-situ, on average compactness, partially saturated state and light brown color	6	50	50	8.33	1	8.33	17.86		
260				6	100	50	8.33	1	8.33	17.86	16.09	
	2.70			7	180	80	11.43	1	11.43	12.54		
280			Silty Sand, firm condition in-situ, on average compactness, partially saturated state and light brown color.	4	50	50	12.50	1	12.50	11.34		
				4	100	50	12.50	1	12.50	11.34	10.30	
300	3.00			3	150	50	16.67	1	16.67	8.22		

OBSERVATIONS:
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 11/09/2014
CLOSING DATE OF TEST: 11/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 70

TEST DATA

Progresive: 33+610
Coordinated: X Coordinate 17°31'11.30"S; Y Coordinate 62°55'17.00"O
WATER TABLE: not Applicable
WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	18	20	20	1.11	1	1.11	170.63		
				17	40	20	1.18	1	1.18	160.05	174.23	
	0.10			20	60	20	1.00	1	1.00	192.00		(For the first two points) Given the characteristics of this type of soil (Base Layer and Clay) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground.
020			Silty Sand, firm condition in-situ, medium compact to dense, dry and dark brown coloration	19	20	20	1.05	1	1.05	181.28		
				20	50	30	1.50	1	1.50	121.92	141.71	
040	0.40			20	80	30	1.50	1	1.50	121.92		
060												
			Silty Clay, firm condition in-situ, medium bodied, partially dry, reddish brown with dark gray patinas.	6	50	50	8.33	1	8.33	17.86		
080				5	100	50	10.00	1	10.00	14.56	15.66	
				5	150	50	10.00	1	10.00	14.56		
100	1.00											
120												
			Limo Clay, in-situ condition firm, medium bodied, partially dry and brown with reddish patinas and small clasts.	4	60	60	15.00	1	15.00	9.25		
140				4	120	60	15.00	1	15.00	9.25	9.25	
				4	180	60	15.00	1	15.00	9.25		
160	1.70											
180												
			Silty Sand, firm condition in-situ, on average compactness, partially saturated state and browning.	7	60	60	8.57	1	8.57	17.31		
200				7	120	60	8.57	1	8.57	17.31	14.62	
220				4	180	60	15.00	1	15.00	9.25		
240	2.50											
260			Silty Sand, fine-grained, firm condition in-situ, on average compactness, partially saturated state and browning.	3	50	50	16.67	1	16.67	8.22		
				4	100	50	12.50	1	12.50	11.34	10.30	
280	2.70			4	150	50	12.50	1	12.50	11.34		
			Limo Sandy fine-grained, firm partially saturated condition and light brown color in-situ, on average compactness of state .	6	50	50	8.33	1	8.33	17.86		
300	3.00			7	100	50	7.14	1	7.14	21.23	20.11	
				7	150	50	7.14	1	7.14	21.23		

OBSERVATIONS:
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 11/09/2014
CLOSING DATE OF TEST: 11/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 71

TEST DATA

Progresive: 34+105 — Coordinated: X Coordinate 17°31'27.30"S; Y Coordinate 62°55'19.80"O — IZQUIERDO

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	30	30	30	1.00	1	1.00	192.00	162.55	(For the first item) Due to the characteristics of this type of soil (Base Layer) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground.
				25	60	30	1.20	1	1.20	156.54		
	0.18			30	100	40	1.33	1	1.33	139.11		
020			Limo Sandy, in-situ condition firm, compact to medium dense, dry and dark brown coloration.									
040				8	30	30	3.75	1	3.75	43.69		
				15	60	30	2.00	1	2.00	88.34	68.56	
060				17	100	40	2.35	1	2.35	73.64		
	0.70											
080			Sandy clay, in-situ condition firm, medium bodied, partially saturated state and reddish brown coloration.									
100												
				5	30	30	6.00	1	6.00	25.81		
120				6	60	30	5.00	1	5.00	31.66	32.70	
				10	100	40	4.00	1	4.00	40.64		
140	1.50											
160			Limo Sandy, in-situ condition firm, medium compactness, partially saturated state and browning.									
180				9	50	50	5.56	1	5.56	28.13		
200				18	100	50	2.78	1	2.78	61.14	46.38	
				15	150	50	3.33	1	3.33	49.85		
220	2.30											
240			Silty Sand, fine-grained, firm condition in-situ, on average compactness, partially saturated state and browning.									
260				11	50	50	4.55	1	4.55	35.22		
				10	100	50	5.00	1	5.00	31.66	34.03	
280				11	150	50	4.55	1	4.55	35.22		
	2.90											
300			Silty Sand, fine-grained, firm condition in-situ, on average compactness, partially saturated state and browning .	10	50	50	5.00	1	5.00	31.66		
				16	100	50	3.13	1	3.13	53.59	51.35	
	3.00			20	150	50	2.50	1	2.50	68.80		

OBSERVATIONS:
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 19/09/2014
CLOSING DATE OF TEST: 19/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV: 00 | Date: 20/09/2014 | REPORT: RP 00 | PAG: 01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*
UBICACIÓN / Location: *Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 72

TEST DATA

Progresive: 34+610 — Coordinated: X Coordinate 17°31'43.25"S; Y Coordinate 62°55'23.43"O

WATER TABLE: not Applicable — **WEIGHT HAMMER:** 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
			Filled with Granular Base Layer Material Type	7	30	30	4.29	1	4.29	37.62		
				9	60	30	3.33	1	3.33	49.85	47.33	
	0.18			13	100	40	3.08	1	3.08	54.53		
020			Limo Sandy, in-situ condition firm, dense compactness of dry and dark brown coloring containing small clasts.									
040				19	50	50	2.63	1	2.63	64.96		
				25	100	50	2.00	1	2.00	88.34	81.87	
060				26	150	50	1.92	1	1.92	92.30		
	0.70											
080			Clayey Silt, firm condition in-situ, medium bodied, dry and dark brown coloration.									
100				6	50	50	8.33	1	8.33	17.86		
				8	100	50	6.25	1	6.25	24.66	23.55	
120				9	150	50	5.56	1	5.56	28.13		
	1.20											
140			Clay, in-situ condition firm, medium bodied, partially saturated state and browning.									
160												
				6	50	50	8.33	1	8.33	17.86		
180				13	100	50	3.85	1	3.85	42.47	34.27	
				13	150	50	3.85	1	3.85	42.47		
200												
	2.20											
220			Sandy Silt, firm partially saturated condition and light brown color in-situ, on average compactness of state.									
240				8	50	50	6.25	1	6.25	24.66		
				10	100	50	5.00	1	5.00	31.66	34.15	
260				14	150	50	3.57	1	3.57	46.14		
	2.80											
280			Silty Sand, fine-grained, in-situ condition firm, medium compactness, partially saturated state and light brown color.	6	50	50	8.33	1	8.33	17.86		
				5	100	50	10.00	1	10.00	14.56	17.89	
300	3.00			7	150	50	7.14	1	7.14	21.23		

OBSERVATIONS:
The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 19/09/2014
CLOSING DATE OF TEST: 19/09/2014

LABORATORY MANAGER

DYNAMIC PENETRATION TESTING (DCP)
NORMA ASTM-D-6951-03

REV:	00
Date :	20/09/2014
REPORT	RP 00
PAG:	01 de 01

CLIENTE / Client: *KATAHIRA & Engineers International*

PROYECTO / Proyect: *Preparatory Study of the Okinawa I - II and III Road Paving Project*

UBICACIÓN / Location: *Municipality of Okinawa I - II, 2ª Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City*

DCP N°: 73

TEST DATA

Progresive: 35+100

Coordinated: X Coordinate 17°31'59.05"S; Y Coordinate 62°55'27.26"O

DERECHO

WATER TABLE: not Applicable

WEIGHT HAMMER: 8 Kg.

RECORD FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	observations
0.00			Filled with Granular Base Layer Material Type	7	30	30	4.29	1	4.29	37.62		
				9	60	30	3.33	1	3.33	49.85	56.96	
	0.15			19	100	40	2.11	1	2.11	83.41		
0.00												(For the second point) Given the characteristics of this type of soil (Sandy Limo) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground. CBR of 88.34 was adopted.
0.00			Limo Sandy, in-situ condition firm, dense compactness of dry and dark brown coloring containing small clasts.	20	40	40	2.00	1	2.00	88.34		
0.00				25	80	40	1.60	1	1.60	113.42	88.34	
0.00				29	120	40	1.38	1	1.38	133.93		
0.00	0.80											
1.00												
1.00			Silty Clay, firm condition in-situ, medium bodied, partially dry and brown color.	5	40	40	8.00	1	8.00	18.70		
1.20				7	80	40	5.71	1	5.71	27.26	25.87	
1.40				8	120	40	5.00	1	5.00	31.66		
1.60	1.60											
1.80			Limo Clay, in-situ condition firm, medium bodied, partially saturated state and browning.									
				4	50	50	12.50	1	12.50	11.34		
2.00				5	100	50	10.00	1	10.00	14.56	14.59	
2.20				6	150	50	8.33	1	8.33	17.86		
	2.20											
2.40			Sandy Silt, firm partially saturated condition and light brown color in-situ, on average compactness of state.	5	50	50	10.00	1	10.00	14.56		
2.60				5	100	50	10.00	1	10.00	14.56	15.66	
2.80				6	150	50	8.33	1	8.33	17.86		
	2.70											
2.80			Sandy Silt, firm partially saturated condition and light brown color in-situ, on average compactness of state.	5	50	50	10.00	1	10.00	14.56		
				6	100	50	8.33	1	8.33	17.86	16.76	
3.00	3.00			6	150	50	8.33	1	8.33	17.86		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

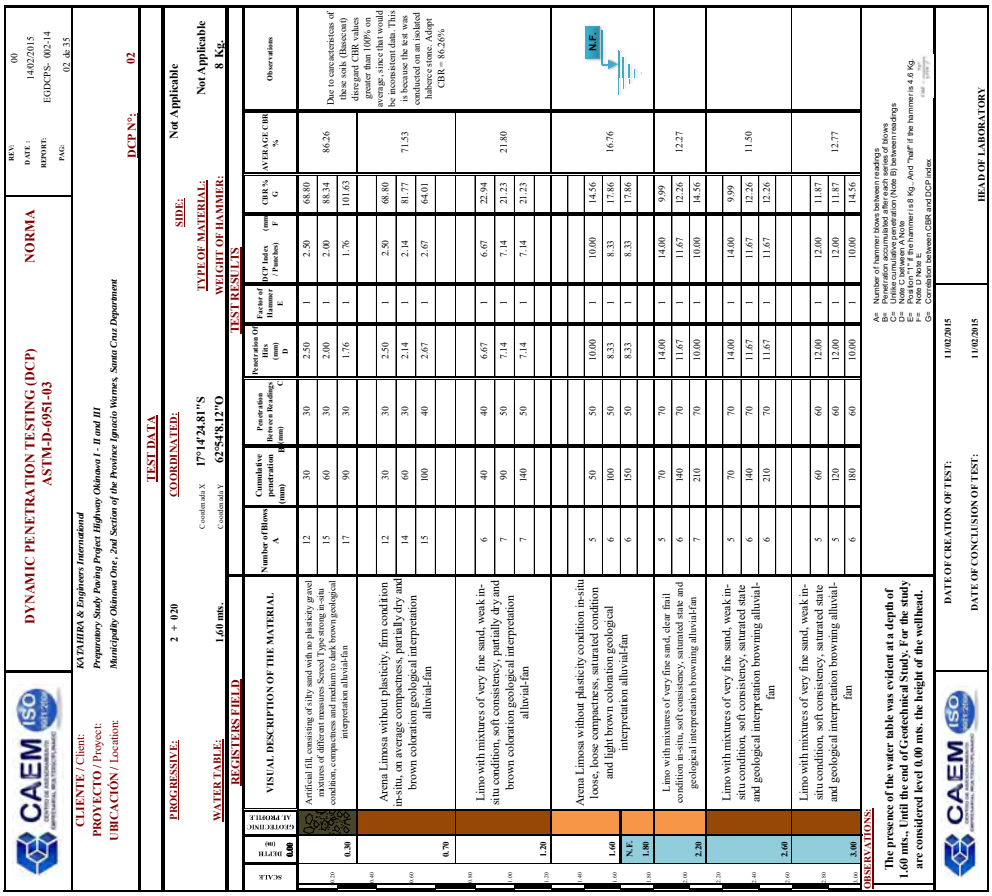
A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 19/09/2014

CLOSING DATE OF TEST: 19/09/2014

LABORATORY MANAGER

DCP試験結果（雨期）



DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 01 de 35

CLIENTE / Client: KATAHIRA & Engineers International
PROYECTO / Proyect: Preparatory Study Paving Project Highway Okinawa I - II and III
UBICACIÓN / Location: Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department

DCP Nº: 01

TEST DATA

PROGRESSIVE: 1 + 020
COORDINATED: Coordenada X 17°13'52.27"S; Coordenada Y 62°54'8.74"O
SIDE:
TYPE OF MATERIAL:
WEIGHT OF HAMMER: Not Applicable / 8 Kg.

WATER TABLE: 0,00 mts.

REGISTERS FIELD

TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm/Blow) F	CBR % G	AVERAGE CBR %	Observations
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, compact and medium consistency, dark brown geological interpretation alluvial-fan	12	30	30	2.50	1	2.50	68.80	86.26	Due to caracteristicas of these soils (Basecoat) disregard CBR values greater than (100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberoz stone. Adopt CBR = 86.26%
				15	60	30	2.00	1	2.00	88.34		
				17	90	30	1.76	1	1.76	101.63		
0.60	0.70		Arena Limosa without plasticity, firm condition in-situ, on average compactness, partially dry and brown coloration geological interpretation alluvial-fan	12	30	30	2.50	1	2.50	68.80	71.53	
				14	60	30	2.14	1	2.14	81.77		
				15	100	40	2.67	1	2.67	64.01		
1.00	1.20		Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and brown coloration geological interpretation alluvial-fan	6	40	40	6.67	1	6.67	22.94	21.80	
				7	90	50	7.14	1	7.14	21.23		
				7	140	50	7.14	1	7.14	21.23		
1.40	1.60		Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated condition and light brown coloration geological interpretation alluvial-fan	5	50	50	10.00	1	10.00	14.56	16.76	N.F.
				6	100	50	8.33	1	8.33	17.86		
1.80	N.F.			6	150	50	8.33	1	8.33	17.86		
2.00	2.20		Limo with mixtures of very fine sand, clear finil condition in-situ, soft consistency, saturated state and geological interpretation browning alluvial-fan	5	70	70	14.00	1	14.00	9.99	12.27	
				6	140	70	11.67	1	11.67	12.26		
				7	210	70	10.00	1	10.00	14.56		
2.40	2.60		Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, saturated state and geological interpretation browning alluvial-fan	5	70	70	14.00	1	14.00	9.99	11.50	
				6	140	70	11.67	1	11.67	12.26		
				6	210	70	11.67	1	11.67	12.26		
2.80	3.00		Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, saturated state and geological interpretation browning alluvial-fan	5	60	60	12.00	1	12.00	11.87	12.77	
				5	120	60	12.00	1	12.00	11.87		
				6	180	60	10.00	1	10.00	14.56		

OBSERVATIONS:

The presence of the water table was evident at a depth of 1.60 mts.. Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Lokes cumulative penetration (Note B) between readings
D= Note C between A Note
E= Note D Model
F= Note D / Factor E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 11/02/2015
DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 01 de 35

CLIENTE / Client: KATAHIRA & Engineers International
PROYECTO / Proyect: Preparatory Study Paving Project Highway Okinawa I - II and III
UBICACIÓN / Location: Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department

DCP Nº: 01

TEST DATA

PROGRESSIVE: 1 + 020
COORDINATED: Coordenada X 17°13'52.27"S; Coordenada Y 62°54'8.74"O
SIDE:
TYPE OF MATERIAL:
WEIGHT OF HAMMER: Not Applicable / 8 Kg.

WATER TABLE: 0,00 mts.

REGISTERS FIELD

TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm/Blow) F	CBR % G	AVERAGE CBR %	Observations
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, compact and medium consistency, dark brown geological interpretation alluvial-fan	12	30	30	2.50	1	2.50	68.80	81.84	Due to caracteristicas of these soils (Basecoat) disregard CBR values greater than (100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberoz stone. Adopt CBR = 81.84%
				14	60	30	2.14	1	2.14	81.77		
				16	90	30	1.88	1	1.88	94.96		
0.60	0.90		Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and yellowish discoloration of geological interpretation alluvial-fan									
				11	30	30	2.73	1	2.73	62.41	65.07	
				15	70	40	2.67	1	2.67	64.01		
				16	110	40	2.50	1	2.50	68.80		
1.00	1.20		Limo Clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan									
				6	40	40	6.67	1	6.67	22.94	21.42	
				7	90	50	7.14	1	7.14	21.23		
				8	150	60	7.50	1	7.50	20.10		
1.40	1.60		Limo Clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan									
				7	60	60	8.57	1	8.57	17.31	18.24	
				7	120	60	8.57	1	8.57	17.31		
				8	180	60	7.50	1	7.50	20.10		
1.80	2.00		Limo Clay, in-situ condition weak, partially saturated soft consistency, state and browning geological interpretation alluvial-fan									
				2	30	30	15.00	1	15.00	9.25	8.06	
				2	70	40	20.00	1	20.00	6.70		
				3	120	50	16.67	1	16.67	8.22		
2.20	2.40		Limo Clay, in-situ condition weak, partially saturated soft consistency, state and browning geological interpretation alluvial-fan									
				3	40	40	13.33	1	13.33	10.85	10.82	
				3	80	40	13.33	1	13.33	10.85		
				4	130	50	12.50	1	12.50	11.34		
2.60	2.80		Limo Clay, in-situ condition weak, partially saturated soft consistency, state and reddish colouration geological interpretation alluvial-fan									
				3	50	50	16.67	1	16.67	8.22	11.38	
				4	100	50	12.50	1	12.50	11.34		
				5	150	50	10.00	1	10.00	14.56		
3.00	3.20											

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Lokes cumulative penetration (Note B) between readings
D= Note C between A Note
E= Note D Model
F= Note D / Factor E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 11/02/2015
DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

CAEM — CENTRO DE ASESORAMIENTO EMPRESARIAL MULTIDISCIPLINARIO — ISO 9001:2008

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 03 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 03

TEST DATA

PROGRESSIVE: 3 + 020 **COORDINATED:** **SIDE:** Not Applicable

Coordenada X 17°14'57.36"S **TYPE OF MATERIAL:** Not Applicable

WATER TABLE: 2.00 mts. Coordenada Y 62°54'7.52"O **WEIGHT OF HAMMER:** 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.20	**0.00**											
			Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, compactness and medium to dark brown geological interpretation alluvial-fan	10	30	30	3.00	1	3.00	56.10	77.59	Due to the characteristics of these soils (Basecoat) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone. Adopt CBR = 77.59%
				15	60	30	2.00	1	2.00	88.34		
0.40	**0.30**			15	90	30	2.00	1	2.00	88.34		
0.60			Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan									
				8	30	30	3.75	1	3.75	43.69	54.07	
0.80	**0.70**			10	60	30	3.00	1	3.00	56.10		
				11	90	30	2.73	1	2.73	62.41		
1.00			Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan									
				8	40	40	5.00	1	5.00	31.66	36.18	
1.20	**1.00**			8	80	40	5.00	1	5.00	31.66		
				11	120	40	3.64	1	3.64	45.22		
1.40			Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and brown colomation geological interpretation alluvial-fan									
				5	70	70	14.00	1	14.00	9.99	11.52	
1.60	**1.60**			5	140	70	14.00	1	14.00	9.99		
				7	210	70	10.00	1	10.00	14.56		
1.80			Limo Clay, in-situ condition weak, partially saturated soft consistency, state and browning geological interpretation alluvial-fan									
				2	50	50	25.00	1	25.00	5.22	7.06	
2.00	**2.00**	N.F.		3	110	60	20.00	1	20.00	6.70		N.F.
				4	170	60	15.00	1	15.00	9.25		
2.20	**2.10**		Limo Clay, in-situ condition weak, soft consistency, saturated state and geological interpretation browning alluvial-fan									
				7	80	80	11.43	1	11.43	12.54	13.22	
2.40				7	160	80	11.43	1	11.43	12.54		
	2.50			8	240	80	10.00	1	10.00	14.56		
2.60			Limo Clay, in-situ condition firm, medium consistency, saturated state and geological interpretation browning alluvial-fan									
				10	60	60	6.00	1	6.00	25.81	30.70	
2.80				12	120	60	5.00	1	5.00	31.66		
3.00	**3.00**			13	180	60	4.62	1	4.62	34.62		

OBSERVATIONS:

The presence of the water table was evident at a depth of 2.00 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM — ISO 9001:2008

DATE OF CREATION OF TEST: 11/02/2015
DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

CAEM — CENTRO DE ASESORAMIENTO EMPRESARIAL MULTIDISCIPLINARIO — ISO 9001:2008

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 04 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 04

TEST DATA

PROGRESSIVE: 4 + 000 **COORDINATED:** **SIDE:** Not Applicable

Coordenada X 17°15'29.90"S **TYPE OF MATERIAL:** Not Applicable

WATER TABLE: 1.50 mts. Coordenada Y 62°54'6.93"O **WEIGHT OF HAMMER:** 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.20	**0.00**											
			Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	5	30	30	6.00	1	6.00	25.81	43.92	Due to the characteristics of these soils (Basecoat) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone. CBR adopt average of the first two.
				9	60	30	3.33	1	3.33	49.85		
0.40	**0.30**			10	90	30	3.00	1	3.00	56.10		
0.60			Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and dark brown coloration geological interpretation alluvial-fan									
				9	30	30	3.33	1	3.33	49.85	62.49	
0.80	**0.70**			12	60	30	2.50	1	2.50	68.80		
				12	90	30	2.50	1	2.50	68.80		
1.00			Limo with mixtures of very fine sand, weak condition partially in-situ firm, soft consistency half, partially dry and brown coloration geological interpretation alluvial-fan									
				5	50	50	10.00	1	10.00	14.56	22.45	
1.20	**1.10**			8	100	50	6.25	1	6.25	24.66		
				9	150	50	5.56	1	5.56	28.13		
1.40			Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially saturated state and geological interpretation browning alluvial-fan									
				4	50	50	12.50	1	12.50	11.34	12.63	
1.60	**1.50**	N.F.		4	110	60	15.00	1	15.00	9.25		N.F.
				7	170	60	8.57	1	8.57	17.31		
1.80	**1.60**											
			Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and geological interpretation browning alluvial-fan									
				4	80	80	20.00	1	20.00	6.70	9.27	
2.00				6	160	80	13.33	1	13.33	10.55		
				6	240	80	13.33	1	13.33	10.55		
2.20	**2.20**											
			Limo Clay, in-situ condition weak, soft consistency, saturated state and geological interpretation browning alluvial-fan									
				2	40	40	20.00	1	20.00	6.70	10.61	
2.40				3	80	40	13.33	1	13.33	10.55		
				4	120	40	10.00	1	10.00	14.56		
2.60	**2.60**											
			Limo Clay, weak condition to sign in-situ, soft consistency to medium saturated state and geological interpretation browning alluvial-fan									
				5	100	100	20.00	1	20.00	6.70	11.40	
2.80				9	200	100	11.11	1	11.11	12.94		
3.00	**3.00**			10	300	100	10.00	1	10.00	14.56		

OBSERVATIONS:

The presence of the water table was evident at a depth of 1.50 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM — ISO 9001:2008

DATE OF CREATION OF TEST: 11/02/2015
DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

CAEM ISO 9001:2008

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE : 14/02/2015
REPORT: EGDCPS- 002-14
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CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP Nº: 05

TEST DATA

PROGRESSIVE: 5 + 000
COORDINATED: Coordenada X 17°16'1.75"S; Coordenada Y 62°54'6.34"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 2.60 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.20	0.00		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, compactness and medium to dark brown geological interpretation alluvial-fan	6	30	30	5.00	1	5.00	31.66	43.81	Due to the characteristics of these soils (Basecoat) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone. CBR adopt average of the first two.
				8	60	30	3.75	1	3.75	43.69		
	0.30			10	90	30	3.00	1	3.00	56.10		
0.40			Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and gray coloring geological interpretation alluvial-fan	10	30	30	3.00	1	3.00	56.10	75.44	
0.60	0.60			13	60	30	2.31	1	2.31	75.26		
				16	90	30	1.88	1	1.88	94.96		
0.80			Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and gray color with brown patinas geological interpretation alluvial-fan	2	30	30	15.00	1	15.00	9.25	7.58	
	0.90			2	60	30	15.00	1	15.00	9.25		
1.00				1	90	30	30.00	1	30.00	4.26		
1.20			Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and light brown with gray patina and dark brown geological interpretation alluvial-fan	2	40	40	20.00	1	20.00	6.70	6.74	
				1	70	30	30.00	1	30.00	4.26		
1.40	1.40			2	100	30	15.00	1	15.00	9.25		
1.60			Clayey silt with presence of clasts in minimum percentage isolated, light flimsy-situ, partially dry soft consistency, state and browning geological interpretation alluvial-fan status	3	50	50	16.67	1	16.67	8.22	7.22	
				2	100	50	25.00	1	25.00	5.22		
1.80	1.90			3	150	50	16.67	1	16.67	8.22		
2.00			Weak-situ, soft consistency, partially dry and light brown with gray patinas geological interpretation-range condition alluvial clayey silt	2	40	40	20.00	1	20.00	6.70	7.21	
	2.20			2	80	40	20.00	1	20.00	6.70		
2.20				3	130	50	16.67	1	16.67	8.22		
2.40			Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, saturated state, light brown with gray patinas geological interpretation alluvial-fan	1	50	50	50.00	1	50.00	2.40	2.40	N.F.
2.60	2.60	N.F.		1	100	50	50.00	1	50.00	2.40		
2.80	2.70			1	150	50	50.00	1	50.00	2.40		
3.00	3.00		Limo Clay weak condition in-situ in the presence of clasts in minimum percentage isolated, soft consistency, saturated state, light brown with reddish brown patinas interpreting geological alluvial-fan	6	80	80	13.33	1	13.33	10.55	11.24	
				5	160	80	16.00	1	16.00	8.60		
				8	240	80	10.00	1	10.00	14.56		

OBSERVATIONS:

The presence of the water table was evident at a depth of 2.60 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM ISO 9001:2008

DATE OF CREATION OF TEST: 04/02/2015
DATE OF CONCLUSION OF TEST: 04/02/2015
HEAD OF LABORATORY

CAEM ISO 9001:2008

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE : 14/02/2015
REPORT: EGDCPS- 002-14
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CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP Nº: 06

TEST DATA

PROGRESSIVE: 6 + 000
COORDINATED: Coordenada X 17°16'34.30"S; Coordenada Y 62°54'5.71"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 0,90 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.20	0.00		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, compactness and medium to dark brown geological interpretation alluvial-fan	15	30	30	2.00	1	2.00	88.34	86.18	Due to the characteristics of these soils (Basecoat) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone. Adopt CBR average of the first two
				13	60	30	2.31	1	2.31	75.26		
	0.30			16	90	30	1.88	1	1.88	94.96		
0.40			Limo with mixtures of very fine sand, weak condition partially in-situ firm, soft consistency half, partially dry and brown coloration geological interpretation alluvial-fan	5	30	30	6.00	1	6.00	25.81	35.77	
0.60	0.60			6	60	30	5.00	1	5.00	31.66		
				9	90	30	3.33	1	3.33	49.85		
0.80			Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, saturated state and geological interpretation browning alluvial-fan								N.F.	
	0.90			2	40	40	20.00	1	20.00	6.70		
1.00				3	90	50	16.67	1	16.67	8.22		
1.20	N.F.			3	140	50	16.67	1	16.67	8.22		
	1.20											
1.40			Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and geological interpretation browning alluvial-fan	6	80	80	13.33	1	13.33	10.55	11.88	
1.60	1.60			7	160	80	11.43	1	11.43	12.54		
1.80				7	240	80	11.43	1	11.43	12.54		
2.00			Limo Clay, in-situ condition weak, soft consistency, saturated state and geological interpretation browning alluvial-fan	4	60	60	15.00	1	15.00	9.25	12.81	
				5	120	60	12.00	1	12.00	11.87		
2.20	2.30			7	180	60	8.57	1	8.57	17.31		
2.40			Limo Clay, weak condition to sign in-situ, soft consistency to medium saturated state and geological interpretation browning alluvial-fan	6	90	90	15.00	1	15.00	9.25	13.40	
2.60				9	180	90	10.00	1	10.00	14.56		
2.80				10	270	90	9.00	1	9.00	16.39		
3.00	3.00											

OBSERVATIONS:

The presence of the water table was evident at a depth of 0.90 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM ISO 9001:2008

DATE OF CREATION OF TEST: 04/02/2015
DATE OF CONCLUSION OF TEST: 04/02/2015
HEAD OF LABORATORY

CAEM — CENTRO DE ASESORAMIENTO EMPRESARIAL MULTIDISCIPLINARIO — ISO 9001:2008

DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03

NORMA

REV: 00 | DATE: 14/02/2015 | REPORT: EGDCPS- 002-14 | PAG: 07 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*

PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*

UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 07

TEST DATA

PROGRESSIVE: 7 + 020 **COORDINATED:** **SIDE:** Not Applicable

Coordenada X 17°17'7.49"S **TYPE OF MATERIAL:** Not Applicable

WATER TABLE: 2.30 mts. Coordenada Y 62°54'5.08"O **WEIGHT OF HAMMER:** 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Puncheo) F	CBR % G	AVERAGE CBR %	Observations
0.20	0.00		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	11	30	30	2.73	1	2.73	62.41	71.00	
				12	60	30	2.50	1	2.50	68.80		
	0.30			14	90	30	2.14	1	2.14	81.77		
0.40			Limo with mixtures of very fine sand, weak condition to dry in-situ, soft consistency, partially dry and brown coloration geological interpretation alluvial-fan									
0.60				5	30	30	6.00	1	6.00	25.81	34.23	
				8	70	40	5.00	1	5.00	31.66		
	0.70			11	110	40	3.64	1	3.64	45.22		
0.80			Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan									
1.00				12	40	40	3.33	1	3.33	49.85	42.50	
				12	90	50	4.17	1	4.17	38.83		
1.20	1.30			12	140	50	4.17	1	4.17	38.83		
1.40			Arena Limosa without plasticity, condition loose in-situ, on average compactness, partially dry and brown coloration geological interpretation alluvial-fan									
1.60				4	40	40	10.00	1	10.00	14.56	12.79	
				4	100	60	15.00	1	15.00	9.25		
1.80	1.80			6	160	60	10.00	1	10.00	14.56		
2.00			Limo Clay, in-situ condition weak, partially saturated soft consistency, state and browning geological interpretation alluvial-fan									
				8	80	80	10.00	1	10.00	14.56	17.17	
2.20				10	160	80	8.00	1	8.00	18.70		
	2.30			11	250	90	8.18	1	8.18	18.24		N.F.
2.40	N.F.		Limo Clay, in-situ condition weak, soft consistency, saturated state and geological interpretation browning alluvial-fan	5	50	50	10.00	1	10.00	14.56	13.03	
				6	120	70	11.67	1	11.67	12.26		
2.60	2.60			6	190	70	11.67	1	11.67	12.26		
2.80			Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, saturated state and geological interpretation browning alluvial-fan									
3.00	3.00			5	70	70	14.00	1	14.00	9.99	14.61	
				8	140	70	8.75	1	8.75	16.91		
				8	210	70	8.75	1	8.75	16.91		

OBSERVATIONS:

The presence of the water table was evident at a depth of 2.30 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM — ISO 9001:2008

DATE OF CREATION OF TEST: 11/02/2015

DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

CAEM — CENTRO DE ASESORAMIENTO EMPRESARIAL MULTIDISCIPLINARIO — ISO 9001:2008

DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03

NORMA

REV: 00 | DATE: 14/02/2015 | REPORT: EGDCPS- 002-14 | PAG: 08 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*

PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*

UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 08

TEST DATA

PROGRESSIVE: 8 + 020 **COORDINATED:** **SIDE:** Not Applicable

Coordenada X 17°17'40.03"S **TYPE OF MATERIAL:** Not Applicable

WATER TABLE: 1,60 mts. Coordenada Y 62°54'4.29"O **WEIGHT OF HAMMER:** 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Puncheo) F	CBR % G	AVERAGE CBR %	Observations
0.20	0.00		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, compactness and medium to dark brown geological interpretation alluvial-fan	11	30	30	2.73	1	2.73	62.41	75.34	
				13	60	30	2.31	1	2.31	75.26		
	0.30			15	90	30	2.00	1	2.00	88.34		
0.40			Low plasticity clay, feeble condition in-situ firm, soft consistency half, partially dry and brown coloration geological interpretation alluvial-fan									
0.60												
				4	40	40	10.00	1	10.00	14.56	30.56	
				7	80	40	5.71	1	5.71	27.26		
	0.80			12	120	40	3.33	1	3.33	49.85		
1.00			Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan									
				11	50	50	4.55	1	4.55	35.22	41.28	
1.20	1.20			13	100	50	3.85	1	3.85	42.47		
1.40				14	150	50	3.57	1	3.57	46.14		
1.60			Limo with mixtures of very fine sand, clear frail condition in-situ, soft consistency, saturated state and geological interpretation browning alluvial-fan									
	1.60			6	70	70	11.67	1	11.67	12.26	13.03	
				6	140	70	11.67	1	11.67	12.26		
1.80	N.F.			7	210	70	10.00	1	10.00	14.56		N.F.
2.00	1.90											
			Limo Clay, in-situ condition weak, soft consistency, saturated state and geological interpretation browning alluvial-fan	5	60	60	12.00	1	12.00	11.87	12.90	
2.20				6	130	70	11.67	1	11.67	12.26		
	2.20			7	200	70	10.00	1	10.00	14.56		
2.40			Limo Clay, in-situ condition weak, soft consistency, saturated condition and light brown coloration geological interpretation alluvial-fan	4	70	70	17.50	1	17.50	7.78	12.30	
				7	140	70	10.00	1	10.00	14.56		
2.60	2.60			7	210	70	10.00	1	10.00	14.56		
2.80			Low plasticity clay, flimsy-situ, soft consistency, saturated condition and light brown coloration geological interpretation alluvial-fan status									
3.00	3.00			7	70	70	10.00	1	10.00	14.56	14.56	
				8	150	80	10.00	1	10.00	14.56		
				8	230	80	10.00	1	10.00	14.56		

OBSERVATIONS:

The presence of the water table was evident at a depth of 1.60 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM — ISO 9001:2008

DATE OF CREATION OF TEST: 11/02/2015

DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

CAEM ISO 9001:2008 — CENTRO DE ASESORAMIENTO EMPRESARIAL MULTIDISCIPLINARIO

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
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CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 09

TEST DATA

PROGRESSIVE: 9 + 020 **COORDINATED:** **SIDE:** Not Applicable

Coordenada X 17°18'9.73"S **TYPE OF MATERIAL:** Not Applicable

WATER TABLE: 0,00 mts. Coordenada Y 62°53'53.87"O **WEIGHT OF HAMMER:** 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNIC PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.20	0.00		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	11	30	30	2.73	1	2.73	62.41	81.90	Due to the characteristics of these soils (Basecon) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone. Adopt CBR = 81.90%
				15	60	30	2.00	1	2.00	88.34		
	0.30			16	90	30	1.88	1	1.88	94.96		
0.60			Limo Clay, in-situ condition firm, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan									
				10	40	40	4.00	1	4.00	40.64		
				12	80	40	3.33	1	3.33	49.85	46.78	
	0.70			12	120	40	3.33	1	3.33	49.85		
0.80			Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and brown coloration geological interpretation alluvial-fan	5	30	30	6.00	1	6.00	25.81	25.33	
				6	70	40	6.67	1	6.67	22.94		
	0.90			7	110	40	5.71	1	5.71	27.26		
1.00			Low plasticity clay, feeble condition in-situ firm, soft consistency half, partially dry and brown coloration geological interpretation alluvial-fan									
				8	40	40	5.00	1	5.00	31.66		
1.20				9	80	40	4.44	1	4.44	36.12	36.14	
	1.30			10	120	40	4.00	1	4.00	40.64		
1.40			Limo with mixtures of very fine sand, strong in-situ condition, medium bodied, dry and brown coloration geological interpretation alluvial-fan									
				9	40	40	4.44	1	4.44	36.12		
1.60				10	80	40	4.00	1	4.00	40.64	39.14	
1.80				10	120	40	4.00	1	4.00	40.64		
2.00	2.00											
2.20	2.30		Low plasticity clay, light-situ firm, soft consistency, dry and brown coloration geological interpretation alluvial-fan status	10	30	30	3.00	1	3.00	56.10	61.38	
				12	60	30	2.50	1	2.50	68.80		
2.40				14	100	40	2.86	1	2.86	59.25		
2.60	2.60		Limo with mixtures of very fine sand, clear firm condition in-situ, medium bodied, dry and brown coloration geological interpretation alluvial-fan	12	30	30	2.50	1	2.50	68.80	62.44	
				10	60	30	3.00	1	3.00	56.10		
2.80				11	90	30	2.73	1	2.73	62.41		
3.00	3.00		Clay of low plasticity, firm-situ, soft consistency, dry and brown coloration geological interpretation alluvial-fan status	9	30	30	3.33	1	3.33	49.85	48.86	
				10	60	30	3.00	1	3.00	56.10		
				10	100	40	4.00	1	4.00	40.64		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM ISO 9001:2008

DATE OF CREATION OF TEST: 11/02/2015

DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

CAEM ISO 9001:2008 — CENTRO DE ASESORAMIENTO EMPRESARIAL MULTIDISCIPLINARIO

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE : 14/02/2015
REPORT: EGDCPS- 002-14
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CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 10

TEST DATA

PROGRESSIVE: 10 + 020 **COORDINATED:** **SIDE:** Not Applicable

Coordenada X 17°18'42.27"S **TYPE OF MATERIAL:** Not Applicable

WATER TABLE: 0,00 mts. Coordenada Y 62°53'52.94"O **WEIGHT OF HAMMER:** 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNIC PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.20	0.00		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	13	30	30	2.31	1	2.31	75.26	81.79	(For the First Point) Due to the characteristics of these soils (Basecon) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone. Adopt CBR = 81.79%
				15	60	30	2.00	1	2.00	88.34		
	0.30			14	90	30	2.14	1	2.14	81.77		
0.60			Limo Clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan									
				5	30	30	6.00	1	6.00	25.81		
				7	70	40	5.71	1	5.71	27.26	28.24	
0.80	0.80			8	110	40	5.00	1	5.00	31.66		
1.00												
			Limo Clay, in-situ condition firm, medium bodied, dry and brown coloration geological interpretation alluvial-fan	12	30	30	2.50	1	2.50	68.80		
				15	70	40	2.67	1	2.67	64.01	65.60	
1.20	1.20			15	110	40	2.67	1	2.67	64.01		
1.40			Limo Clay, weak condition to sign in-situ, soft consistency half, partially dry and reddish coloration geological interpretation alluvial-fan									
				8	40	40	5.00	1	5.00	31.66		
				8	80	40	5.00	1	5.00	31.66	34.65	
1.60				10	120	40	4.00	1	4.00	40.64		
1.80	1.70											
2.00			Clay of low plasticity, firm-situ, medium bodied, dry and reddish coloration geological interpretation alluvial-fan status	10	30	30	3.00	1	3.00	56.10		
				12	60	30	2.50	1	2.50	68.80	68.89	
2.20	2.10			14	90	30	2.14	1	2.14	81.77		
2.40			Clay of low plasticity, firm-situ, medium bodied, dry and dark brown coloration geological interpretation alluvial-fan status									
				12	30	30	2.50	1	2.50	68.80		
				12	60	30	2.50	1	2.50	68.80	73.13	
2.60	2.60			14	90	30	2.14	1	2.14	81.77		
2.80												
			Limo Clay, in-situ condition firm, medium bodied, dry and dark brown coloration geological interpretation alluvial-fan	14	30	30	2.14	1	2.14	81.77		
				15	70	40	2.67	1	2.67	64.01	69.93	
3.00	3.00			15	110	40	2.67	1	2.67	64.01		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM ISO 9001:2008

DATE OF CREATION OF TEST: 11/02/2015

DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE : 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 11 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 11

TEST DATA

PROGRESSIVE: 11 + 000
COORDINATED: Coordenada X 17°19'14.13"S; Coordenada Y 62°53'51.94"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 0,00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
	0.00											
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed type in-situ condition to firm loose, loose to medium brown color compactness and geological interpretation alluvial-fan	8	30	30	3.75	1	3.75	43.69	49.89	
				8	60	30	3.75	1	3.75	43.69		
				10	90	30	3.00	1	3.00	56.10		
0.40			Limo Clay, partially in-situ firm firm condition, soft consistency half, partially dry and dark brown coloration geological interpretation alluvial-fan									
0.60				9	40	40	4.44	1	4.44	36.12	39.14	
				10	80	40	4.00	1	4.00	40.64		
0.80				10	120	40	4.00	1	4.00	40.64		
1.00			Limo Clay, in-situ condition firm, medium bodied, dry and dark brown coloration geological interpretation alluvial-fan	10	50	50	5.00	1	5.00	31.66	34.05	
				10	100	50	5.00	1	5.00	31.66		
1.20				12	150	50	4.17	1	4.17	38.83		
1.40			Limo Clay, in-situ condition firm, medium bodied, dry and brown coloration geological interpretation alluvial-fan	12	60	60	5.00	1	5.00	31.66	33.64	
1.60				12	120	60	5.00	1	5.00	31.66		
1.70				14	180	60	4.29	1	4.29	37.62		
1.80			Limo Clay, in-situ condition firm, medium bodied, dry and brown coloration geological interpretation alluvial-fan	14	50	50	3.57	1	3.57	46.14	48.63	
2.00				14	100	50	3.57	1	3.57	46.14		
2.10				16	150	50	3.13	1	3.13	53.59		
2.20			Limo Clay, in-situ condition weak, partially saturated soft consistency, state and browning geological interpretation alluvial-fan	4	70	70	17.50	1	17.50	7.78	10.78	
2.40				5	140	70	14.00	1	14.00	9.99		
2.60				7	210	70	10.00	1	10.00	14.56		
2.80			Low plasticity clay, flimsy-situ, soft consistency, partially saturated state and geological interpretation browning alluvial-fan status	3	60	60	20.00	1	20.00	6.70	9.27	
3.00	3.00			4	120	60	15.00	1	15.00	9.25		
				5	180	60	12.00	1	12.00	11.87		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 19/12/2014
DATE OF CONCLUSION OF TEST: 19/12/2014

HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE : 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 12 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 12

TEST DATA

PROGRESSIVE: 12 + 000
COORDINATED: Coordenada X 17°19'46.64"S; Coordenada Y 62°53'49.99"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 0,00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
	0.00											
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	20	30	30	1.50	1	1.50	121.92	138.04	(For the first point) Because of the characteristics of these soils (Basecoat) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is due to the assay was performed on an isolated hacerce stone.
				22	60	30	1.36	1	1.36	135.66		
				25	90	30	1.20	1	1.20	156.54		
0.40			Low plasticity clay, light-situ firm, medium bodied, dry and brown coloration geological interpretation alluvial-fan status									
0.60				8	40	40	5.00	1	5.00	31.66	48.48	
				13	80	40	3.08	1	3.08	54.53		
0.70				14	120	40	2.86	1	2.86	59.25		
0.80			Low plasticity clay, light-situ firm, medium bodied, dry and brown coloration geological interpretation alluvial-fan status	10	40	40	4.00	1	4.00	40.64	43.70	
				11	80	40	3.64	1	3.64	45.22		
1.00				11	120	40	3.64	1	3.64	45.22		
1.20			Clay of low plasticity, firm-situ, medium bodied, dry and reddish coloration geological interpretation alluvial-fan status									
1.40				12	30	30	2.50	1	2.50	68.80	76.93	
				15	60	30	2.00	1	2.00	88.34		
1.60				17	100	40	2.35	1	2.35	73.64		
1.70												
1.80			Clay of low plasticity, firm-situ, compact consistency, dry and brown coloration geological interpretation alluvial-fan status	22	30	30	1.36	1	1.36	135.66	163.74	(For points 5,6 and 7). Due to carcacteristcas of these soils (Basecoat) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is due to the assay was performed on an isolated hacerce stone.
2.00				26	60	30	1.15	1	1.15	163.57		
2.20				30	90	30	1.00	1	1.00	192.00		
2.40			Clay of low plasticity, firm-situ, compact consistency, dry and brown coloration geological interpretation alluvial-fan status	20	30	30	1.50	1	1.50	121.92	142.69	
2.60				23	60	30	1.30	1	1.30	142.58		
				26	90	30	1.15	1	1.15	163.57		
2.80			Limo Clay, in-situ condition firm, compact consistency, dry and brown coloration geological interpretation alluvial-fan	16	30	30	1.88	1	1.88	94.96	124.47	
3.00	3.00			20	60	30	1.50	1	1.50	121.92		
				25	90	30	1.20	1	1.20	156.54		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 11/02/2015
DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03	NORMA	REV: 00 · DATE: 14/02/2015 · REPORT: EGDCPS- 002-14 · PAG: 13 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 13

TEST DATA

PROGRESSIVE: 13 + 000 **COORDINATED:** **SIDE:** Not Applicable

Coordenada X 17°20'19.08"S **TYPE OF MATERIAL:** Not Applicable

WATER TABLE: 0,00 mts. Coordenada Y 62°53'47.46"O **WEIGHT OF HAMMER:** 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Puncheo) F	CBR % G	AVERAGE CBR %	Observations
0.20	0.00		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	9	30	30	3.33	1	3.33	49.85	56.12	(For the First Point) Due to the characteristics of these soils (Basecoat) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberee stone
				10	60	30	3.00	1	3.00	56.10		
0.40	0.30			11	90	30	2.73	1	2.73	62.41		
			Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan	5	30	30	6.00	1	6.00	25.81	24.85	
0.60	0.60			5	60	30	6.00	1	6.00	25.81		
				6	100	40	6.67	1	6.67	22.94		
0.80	0.80		Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan	3	40	40	13.33	1	13.33	10.55	14.33	
				5	90	50	10.00	1	10.00	14.56		
1.00				6	140	50	8.33	1	8.33	17.86		
1.20			Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan	6	30	30	5.00	1	5.00	31.66	30.19	
1.40	1.40			6	60	30	5.00	1	5.00	31.66		
				7	100	40	5.71	1	5.71	27.26		
1.60												
			Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan	4	30	30	7.50	1	7.50	20.10	25.86	
1.80				5	60	30	6.00	1	6.00	25.81		
2.00	2.00			6	90	30	5.00	1	5.00	31.66		
2.20												
			Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan	4	50	50	12.50	1	12.50	11.34	12.42	
2.40	2.50			4	100	50	12.50	1	12.50	11.34		
				5	150	50	10.00	1	10.00	14.56		
2.60												
			Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan	6	30	30	5.00	1	5.00	31.66	28.72	
2.80				7	70	40	5.71	1	5.71	27.26		
3.00	3.00			7	110	40	5.71	1	5.71	27.26		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 11/02/2015

DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03	NORMA	REV: 00 · DATE: 14/02/2015 · REPORT: EGDCPS- 002-14 · PAG: 14 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 14

TEST DATA

PROGRESSIVE: 14 + 000 **COORDINATED:** **SIDE:** Not Applicable

Coordenada X 17°20'51.39"S **TYPE OF MATERIAL:** Not Applicable

WATER TABLE: 0,00 mts. Coordenada Y 62°53'44.63"O **WEIGHT OF HAMMER:** 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Puncheo) F	CBR % G	AVERAGE CBR %	Observations
0.20	0.00		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	27	30	30	1.11	1	1.11	170.63	204.15	(For the first point) Because of the characteristics of these soils (Basecoat) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberee stone
				33	60	30	0.91	1	0.91	213.63		
0.40	0.40			35	90	30	0.86	1	0.86	228.18		
0.60			Low plasticity clay, flimsy-situ, soft consistency, dry and reddish coloration geological interpretation alluvial-fan status	7	30	30	4.29	1	4.29	37.62	37.66	
				8	70	40	5.00	1	5.00	31.66		
0.70	0.70			8	130	30	3.75	1	3.75	43.69		
0.80												
			Low plasticity clay, flimsy-situ, soft consistency, dry and reddish coloration geological interpretation alluvial-fan status	8	30	30	3.75	1	3.75	43.69	34.20	
1.00	1.00			6	60	30	5.00	1	5.00	31.66		
				7	100	40	5.71	1	5.71	27.26		
1.20			Low plasticity clay, flimsy-situ, soft consistency, dry and reddish coloration geological interpretation alluvial fan status	4	30	30	7.50	1	7.50	20.10	31.82	
	1.30			8	60	30	3.75	1	3.75	43.69		
1.40				8	140	40	5.00	1	5.00	31.66		
1.60												
			Clay of low plasticity, firm-situ, medium bodied, dry and brown coloration geological interpretation alluvial-fan status	10	40	40	4.00	1	4.00	40.64	40.64	
1.70	1.70			10	80	40	4.00	1	4.00	40.64		
1.80				10	120	40	4.00	1	4.00	40.64		
2.00												
			Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan	5	30	30	6.00	1	6.00	25.81	25.33	
2.20	2.20			6	70	40	6.67	1	6.67	22.94		
2.40				7	110	40	5.71	1	5.71	27.26		
2.60												
			Limo Clay, in-situ condition weak, partially dry soft consistency, state and light brown coloration geological interpretation alluvial-fan	5	30	30	6.00	1	6.00	25.81	23.44	
2.80	2.70			5	60	30	6.00	1	6.00	25.81		
3.00				5	100	40	8.00	1	8.00	18.70		
			Limo Clay, in-situ condition weak, partially dry soft consistency, state and light brown coloration geological interpretation alluvial-fan	2	30	30	15.00	1	15.00	9.25	16.02	
	3.00			4	60	30	7.50	1	7.50	20.10		
				5	100	40	8.00	1	8.00	18.70		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 11/02/2015

DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 15 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP Nº: 15

TEST DATA

PROGRESSIVE: 15 + 000
COORDINATED: Coordenada X 17°21'23.48"S; Coordenada Y 62°53'38.92"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 0,00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNIC CATEGORIES	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.20	0.00		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	14	30	30	2.14	1	2.14	81.77	101.74	Due to the characteristics of these soils (Basecon) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				18	60	30	1.67	1	1.67	108.35		
0.40	0.30			19	90	30	1.58	1	1.58	115.11		
0.60	0.60		Arena Limosa without plasticity, firm condition in-situ, on average compactness of dry and dark brown coloration geological interpretation alluvial-fan	25	40	40	1.60	1	1.60	113.42	134.05	
				29	80	40	1.38	1	1.38	133.93		
0.80				33	120	40	1.21	1	1.21	154.79		
1.00	1.00		Limo Clay, in-situ condition weak, partially dry soft consistency, state and dark brown coloration geological interpretation alluvial-fan	5	50	50	10.00	1	10.00	14.56	15.66	
				6	100	50	8.33	1	8.33	17.86		
1.20				6	160	60	10.00	1	10.00	14.56		
1.40	1.50		Limo Clay, in-situ condition weak, partially dry soft consistency, state and reddish coloration geological interpretation alluvial-fan	4	60	60	15.00	1	15.00	9.25	12.79	
				6	120	60	10.00	1	10.00	14.56		
1.60				6	180	60	10.00	1	10.00	14.56		
1.80	2.00		Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and reddish coloration geological interpretation alluvial-fan	4	60	60	15.00	1	15.00	9.25	12.81	
				5	120	60	12.00	1	12.00	11.87		
2.00				7	180	60	8.57	1	8.57	17.31		
2.20	2.40		Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and reddish coloration geological interpretation alluvial-fan	7	60	60	8.57	1	8.57	17.31	17.18	
				7	120	60	8.57	1	8.57	17.31		
2.40				8	190	70	8.75	1	8.75	16.91		
2.60	2.70		Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and reddish coloration geological interpretation alluvial-fan	3	50	50	16.67	1	16.67	8.22	12.45	
				5	100	50	10.00	1	10.00	14.56		
2.80				6	160	60	10.00	1	10.00	14.56		
3.00	3.00		Arena Limosa without plasticity condition in-situ loose, loose compactness of dry and reddish coloration geological interpretation alluvial-fan	4	40	40	10.00	1	10.00	14.56	15.05	
				5	80	40	8.00	1	8.00	18.70		
				5	140	60	12.00	1	12.00	11.87		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 11/02/2015
DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 16 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP Nº: 16

TEST DATA

PROGRESSIVE: 16 + 000
COORDINATED: Coordenada X 17°21'55.53"S; Coordenada Y 62°53'33.11"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 0.00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNIC ALTIPROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.20	0.00											
			Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type Single in-situ condition, loose brown color compactness and geological interpretation alluvial-fan	8	30	30	3.75	1	3.75	43.69	43.69	
0.40	0.40			8	60	30	3.75	1	3.75	43.69		
				8	90	30	3.75	1	3.75	43.69		
0.60												
			Limo with mixtures of very fine sand, weak condition partially in-situ firm, soft consistency half, partially dry and dark brown coloration geological interpretation alluvial-fan	7	40	40	5.71	1	5.71	27.26	33.89	
0.80	0.90			8	80	40	5.00	1	5.00	31.66		
				9	120	40	4.44	1	4.44	36.12		
1.00												
			Limo with mixtures of very fine sand, weak condition partially in-situ firm, soft consistency half, partially dry and dark brown coloration geological interpretation alluvial-fan	8	50	50	6.25	1	6.25	24.66	31.66	
1.20	1.30			10	100	50	5.00	1	5.00	31.66		
				10	150	50	5.00	1	5.00	31.66		
1.40			Limo Clay, in-situ condition firm, medium bodied, dry and brown coloration geological interpretation alluvial-fan	10	50	50	5.00	1	5.00	31.66	34.05	
1.60	1.60			10	100	50	5.00	1	5.00	31.66		
				12	200	50	4.17	1	4.17	38.83		
1.80												
			Limo Clay, in-situ condition weak, partially saturated soft consistency, state and light brown coloration geological interpretation alluvial-fan	3	60	60	20.00	1	20.00	6.70	10.56	
2.00	2.10			4	120	60	15.00	1	15.00	9.25		
				5	180	60	12.00	1	12.00	11.87		
2.20												
			Low plasticity clay, flimsy-situ, soft consistency, partially saturated state and browning clear geological interpretation alluvial-fan status	4	70	70	17.50	1	17.50	7.78	8.91	
2.40	2.50			4	140	70	17.50	1	17.50	7.78		
				6	210	70	11.67	1	11.67	12.26		
2.60												
			Limo Clay, in-situ condition weak, partially saturated soft consistency, state and dark brown coloration geological interpretation alluvial-fan	3	60	60	20.00	1	20.00	6.70	10.56	
2.80	3.00			4	120	60	15.00	1	15.00	9.25		
				5	180	60	12.00	1	12.00	11.87		
3.00												

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 22/12/2014
DATE OF CONCLUSION OF TEST: 22/12/2014

HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 17 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 17

TEST DATA

PROGRESSIVE: 17 + 010
COORDINATED:
Coordenada X 17°22'21.96"S
Coordenada Y 62°53'49.12"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 1.80 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.20	0.00		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	20	30	30	1.50	1	1.50	121.92	163.91	(For the first point) Because of the characteristics of these soils (Basecoat) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
0.40	0.30			27	60	30	1.11	1	1.11	170.63		
0.60				31	90	30	0.97	1	0.97	199.18		
0.80	0.60		Arena Limosa without plasticity, firm condition in-situ, on average compactness of dry and light brown coloration geological interpretation alluvial-fan	10	40	40	4.00	1	4.00	40.64	43.70	
1.00				11	80	40	3.64	1	3.64	45.22		
1.20	1.00		Arena Limosa without plasticity condition in-situ loose, loose compactness of dryness and light brown coloration geological interpretation alluvial-fan	11	120	40	3.64	1	3.64	45.22		
1.40				5	60	60	12.00	1	12.00	11.87	12.90	
1.60				6	120	60	10.00	1	10.00	14.56		
1.80				6	190	70	11.67	1	11.67	12.26		
2.00	1.30		Arena Limosa without plasticity condition in-situ loose, loose compactness of dryness and light brown coloration geological interpretation alluvial-fan	5	60	60	12.00	1	12.00	11.87	14.58	
2.20				6	120	60	10.00	1	10.00	14.56		
2.40				7	180	60	8.57	1	8.57	17.31		
2.60	1.70		Arena Limosa without plasticity condition in-situ loose, loose compactness, partially saturated state and light brown coloration geological interpretation alluvial-fan	5	80	80	16.00	1	16.00	8.60	9.92	
2.80				5	160	80	16.00	1	16.00	8.60		
3.00	1.80			7	240	80	11.43	1	11.43	12.54		
	N.F.		Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated condition and light brown coloration geological interpretation alluvial-fan	5	60	60	12.00	1	12.00	11.87	12.00	
	2.10			5	120	60	12.00	1	12.00	11.87		
				6	190	70	11.67	1	11.67	12.26		
	2.60		Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and reddish coloration geological interpretation alluvial-fan	6	70	70	11.67	1	11.67	12.26	13.03	
				6	140	70	11.67	1	11.67	12.26		
				7	210	70	10.00	1	10.00	14.56		
	3.00		Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and reddish coloration geological interpretation alluvial-fan	7	70	70	10.00	1	10.00	14.56	14.56	
				7	140	70	10.00	1	10.00	14.56		
				8	220	80	10.00	1	10.00	14.56		

OBSERVATIONS:

The presence of the water table was evident at a depth of 1.80 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 11/02/2015
DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 18 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 18

TEST DATA

PROGRESSIVE: 18 + 000
COORDINATED:
Coordenada X 17°22'53.98"S
Coordenada Y 62°53'52.83"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 2.80 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.20	0.00		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	10	30	30	3.00	1	3.00	56.10	64.59	(For the first point) Because of the characteristics of these soils (Basecoat) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
0.40	0.30			11	60	30	2.73	1	2.73	62.41		
0.60				13	90	30	2.31	1	2.31	75.26		
0.80	0.70		Limo Clay, in-situ condition weak, partially dry soft consistency, state and dark brown coloration geological interpretation alluvial-fan	4	40	40	10.00	1	10.00	14.56	17.32	
1.00				5	80	40	8.00	1	8.00	18.70		
1.20				5	120	40	8.00	1	8.00	18.70		
1.40	1.00		Limo Clay, in-situ condition firm, medium consistency, partially dry and dark brown coloration geological interpretation alluvial-fan	10	50	50	5.00	1	5.00	31.66	32.84	
1.60				11	100	50	4.55	1	4.55	35.22		
1.80				12	160	60	5.00	1	5.00	31.66		
2.00	1.30		Limo Clay, in-situ condition weak, partially dry soft consistency, state and dark brown coloration geological interpretation alluvial-fan	4	70	70	17.50	1	17.50	7.78	8.79	
2.20				5	140	70	14.00	1	14.00	9.99		
2.40				5	220	80	16.00	1	16.00	8.60		
2.60	1.70		Clayey sand, loose in-situ condition, loose compactness, partially dry and reddish coloration geological interpretation alluvial-fan	3	60	60	20.00	1	20.00	6.70	8.16	
2.80				4	130	70	17.50	1	17.50	7.78		
3.00				5	200	70	14.00	1	14.00	9.99		
	2.10		Clayey sand, loose in-situ condition, loose compactness, partially dry and reddish coloration geological interpretation alluvial-fan	3	70	70	23.33	1	23.33	5.64	7.80	
				4	140	70	17.50	1	17.50	7.78		
				5	210	70	14.00	1	14.00	9.99		
	2.70		Arena Limosa without plasticity, firm condition in-situ, on average compactness, partially saturated state and browning clear geological interpretation alluvial-fan	9	50	50	5.56	1	5.56	28.13	30.48	N.F.
				10	100	50	5.00	1	5.00	31.66		
				10	150	50	5.00	1	5.00	31.66		
	2.80		Arena Limosa without plasticity, firm condition in-situ, on average compactness, saturated state and browning clear geological interpretation alluvial-fan	8	70	70	8.75	1	8.75	16.91	16.91	
	N.F.			8	140	70	8.75	1	8.75	16.91		
	3.00			8	210	70	8.75	1	8.75	16.91		

OBSERVATIONS:

The presence of the water table was evident at a depth of 2.80 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 11/02/2015
DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 19 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP Nº: 19

TEST DATA

PROGRESSIVE: 19 + 000
COORDINATED: Coordenada X 17°23'26.33"S; Coordenada Y 62°53'56.61"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 2,00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm /Punches) F	CBR % G	AVERAGE CBR %	Observations
0.00												
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type Single in-situ condition, loose brown color compactness and geological interpretation alluvial-fan	7	30	30	4.29	1	4.29	37.62	41.67	(For the second point) Due to the characteristics of these soils (Basecon) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				8	60	30	3.75	1	3.75	43.69		
				8	90	30	3.75	1	3.75	43.69		
0.40			Arena bad Graduated with a few thin, firm condition in-situ, on average compactness of dry and reddish coloration geological interpretation alluvial-fan									
0.60	0.70			25	30	30	1.20	1	1.20	156.54	201.89	
				33	60	30	0.91	1	0.91	213.63		
0.80				36	90	30	0.83	1	0.83	235.50		
1.00	1.00		Arena bad Graduate with a few fine sand, loose condition in-situ, loose compactness of dry and reddish coloration geological interpretation alluvial-fan	7	30	30	4.29	1	4.29	37.62	41.67	
				8	60	30	3.75	1	3.75	43.69		
				8	90	30	3.75	1	3.75	43.69		
1.20			Arena bad Graduate with a few fine sand, loose condition in-situ, loose compactness of dry and reddish coloration geological interpretation alluvial-fan									
1.40	1.40			7	50	50	7.14	1	7.14	21.23	23.51	
				8	100	50	6.25	1	6.25	24.66		
1.60				8	150	50	6.25	1	6.25	24.66		
1.80	1.80		Arena bad Graduate with a few fine sand, loose condition in-situ, loose compactness of dry and reddish coloration geological interpretation alluvial-fan									
2.00				7	70	70	10.00	1	10.00	14.56	14.56	
				7	140	70	10.00	1	10.00	14.56		
2.20				7	210	70	10.00	1	10.00	14.56		
	2.00		Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and geological interpretation browning alluvial-fan									N.F.
	N.F.			7	50	50	7.14	1	7.14	21.23	22.37	
	2.20			7	100	50	7.14	1	7.14	21.23		
2.40				8	150	50	6.25	1	6.25	24.66		
2.60	2.70		Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and geological interpretation browning alluvial-fan									
				7	60	60	8.57	1	8.57	17.31	18.24	
2.80				7	120	60	8.57	1	8.57	17.31		
				8	180	60	7.50	1	7.50	20.10		
3.00	3.00		Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and reddish coloration geological interpretation alluvial-fan									
				7	70	70	10.00	1	10.00	14.56	16.13	
				8	140	70	8.75	1	8.75	16.91		
				8	210	70	8.75	1	8.75	16.91		

OBSERVATIONS:

The presence of the water table was evident at a depth of 2.00 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 11/02/2015
DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 20 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP Nº: 20

TEST DATA

PROGRESSIVE: 20 + 000
COORDINATED: Coordenada X 17°23'58.68"S; Coordenada Y 62°54'0.42"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 2,90 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.00												
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type Single in-situ condition, loose brown color compactness and geological interpretation alluvial-fan	12	30	30	2.50	1	2.50	68.80	104.27	(For the second point) Due to the characteristics of this type of soil (Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone. Adopt CBR = 104.27% and the second CBR was adopted by 92.96%
				18	60	30	1.67	1	1.67	108.35		
0.40				22	90	30	1.36	1	1.36	135.66		
0.60	0.80		Arena Limosa without plasticity, firm condition in-situ, on average compactness, partially dry and dark brown coloration geological interpretation alluvial-fan									
0.80				12	30	30	2.50	1	2.50	68.80	92.96	
1.00				16	60	30	1.88	1	1.88	94.96		
1.20	1.20		Arena Limosa without plasticity condition in-situ loose, loose compactness, partially dry and dark brown coloration geological interpretation alluvial-fan	19	90	30	1.58	1	1.58	115.11		
1.40												
1.60	1.50		Arena Limosa without plasticity condition in-situ loose, loose compactness, partially dry and brown coloration geological interpretation alluvial-fan	5	60	60	12.00	1	12.00	11.87	12.90	
1.80				6	130	70	11.67	1	11.67	12.26		
2.00	2.10		Clayey sand, loose in-situ condition, loose compactness, partially dry and brown coloration geological interpretation alluvial-fan	7	200	70	10.00	1	10.00	14.56		
2.20				4	60	60	15.00	1	15.00	9.25	9.50	
2.40	2.50		Limo Clay, in-situ condition weak, partially saturated soft consistency, state and browning geological interpretation alluvial-fan	4	120	60	15.00	1	15.00	9.25		
2.60				5	190	70	14.00	1	14.00	9.99		
2.80	2.90	N.F.	Limo Clay, in-situ condition weak, soft consistency, saturated state and geological interpretation browning alluvial-fan									
3.00	3.00			6	70	70	11.67	1	11.67	12.26	13.79	
				7	140	70	10.00	1	10.00	14.56		
				7	210	70	10.00	1	10.00	14.56		
				5	40	40	8.00	1	8.00	18.70	18.14	
				6	90	50	8.33	1	8.33	17.86		
				6	140	50	8.33	1	8.33	17.86		
				4	70	70	17.50	1	17.50	7.78	11.53	
				6	140	70	11.67	1	11.67	12.26		N.F.
				7	210	70	10.00	1	10.00	14.56		

OBSERVATIONS:

The presence of the water table was evident at a depth of 2.90 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 11/02/2015
DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 21 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP Nº: 21

TEST DATA

PROGRESSIVE: 21 + 000
COORDINATED: Coordenada X 17°24'31.02"S; Coordenada Y 62°54'4.07"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 0,00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.00												
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type Single in-situ condition, loose brown color compactness and geological interpretation alluvial-fan	7	30	30	4.29	1	4.29	37.62	37.62	
				7	60	30	4.29	1	4.29	37.62		
				7	90	30	4.29	1	4.29	37.62		
0.40												
0.60	0.80		Arena Graduate bad few fine sand, loose condition in-situ, loose compactness, partially dry and dark brown coloration geological interpretation alluvial-fan									
				7	40	40	5.71	1	5.71	27.26	30.19	
				8	80	40	5.00	1	5.00	31.66		
				8	120	40	5.00	1	5.00	31.66		
0.80												
1.00	1.10		Arena bad Graduated with few fines, in-situ condition to dry loose sand, loose compactness half, partially dry and dark brown coloration geological interpretation alluvial-fan	8	50	50	6.25	1	6.25	24.66		
				10	100	50	5.00	1	5.00	31.66	29.32	
				10	150	50	5.00	1	5.00	31.66		
1.20												
1.40	1.50		Limo with mixtures of very fine sand, weak condition to dry in-situ, soft consistency half, partially dry and dark brown coloration geological interpretation alluvial fan	7	50	50	7.14	1	7.14	21.23		
				8	100	50	6.25	1	6.25	24.66	25.85	
				10	150	50	5.00	1	5.00	31.66		
1.60												
1.80	2.00		Limo Clay, weak condition to sign in-situ, soft consistency half, partially dry and brown coloration geological interpretation alluvial-fan	6	40	40	6.67	1	6.67	22.94		
				8	80	40	5.00	1	5.00	31.66	33.27	
				11	120	40	3.64	1	3.64	45.22		
2.00												
2.20	2.50		Limo Clay, weak condition to sign in-situ, soft consistency half, partially dry and brown coloration geological interpretation alluvial-fan	8	50	50	6.25	1	6.25	24.66		
				10	100	50	5.00	1	5.00	31.66	31.71	
				12	150	50	4.17	1	4.17	38.83		
2.40												
2.60	3.00		Limo Clay, in-situ condition firm, medium bodied, dry and brown coloration geological interpretation alluvial-fan	10	60	60	6.00	1	6.00	25.81		
				12	120	60	5.00	1	5.00	31.66	31.70	
				14	180	60	4.29	1	4.29	37.62		
3.00												

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 22/12/2014
DATE OF CONCLUSION OF TEST: 22/12/2014

HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 22 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP Nº: 22

TEST DATA

PROGRESSIVE: 22 + 000
COORDINATED: Coordenada X 17°25'3.34"S; Coordenada Y 62°54'7.88"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 0,00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.00												
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type Single in-situ condition, loose brown color compactness and geological interpretation alluvial-fan	16	30	30	1.88	1	1.88	94.96	112.99	(For the first point) Because of the characteristics of these soils (Arena Limosa) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone. For the second point CBR was adopted by 73.15%
				18	60	30	1.67	1	1.67	108.35		
				22	90	30	1.36	1	1.36	135.66		
0.40												
0.60	0.70		Arena Limosa without plasticity, firm condition in-situ, on average compactness, partially dry and brown coloration geological interpretation alluvial-fan	11	30	30	2.73	1	2.73	62.41	73.15	
				13	60	30	2.31	1	2.31	75.26		
				14	90	30	2.14	1	2.14	81.77		
0.80												
1.00	1.10		Limo Clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan	5	40	40	8.00	1	8.00	18.70		
				6	90	50	8.33	1	8.33	17.86	18.14	
				6	140	50	8.33	1	8.33	17.86		
1.20												
1.40	1.60		Limo Clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan	4	50	50	12.50	1	12.50	11.34		
				5	100	50	10.00	1	10.00	14.56	14.59	
				6	150	50	8.33	1	8.33	17.86		
1.60												
1.80	2.10		Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and reddish coloration geological interpretation alluvial-fan	5	60	60	12.00	1	12.00	11.87		
				6	120	60	10.00	1	10.00	14.56	14.58	
				7	180	60	8.57	1	8.57	17.31		
2.00												
2.20	2.60		Limo with mixtures of very fine sand, strong in-situ condition, medium bodied, dry and reddish coloration geological interpretation alluvial-fan	10	80	80	8.00	1	8.00	18.70		
				11	160	80	7.27	1	7.27	20.81	19.40	
				10	240	80	8.00	1	8.00	18.70		
2.40												
2.60												
2.80	3.00		Limo Clay, in-situ condition firm, medium bodied, dry and reddish coloration geological interpretation alluvial-fan	10	70	70	7.00	1	7.00	21.72		
				10	140	70	7.00	1	7.00	21.72	21.72	
				10	210	70	7.00	1	7.00	21.72		
3.00												

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 11/02/2015
DATE OF CONCLUSION OF TEST: 11/02/2015

HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 23 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP Nº: 23

TEST DATA

PROGRESSIVE: 23 + 010
COORDINATED:
Coordenada X 17°25'36.01"S
Coordenada Y 62°54'11.66"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 0,00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm /Punches) F	CBR % G	AVERAGE CBR %	Observations
0.00												
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type Single in-situ condition, loose brown color compactness and geological interpretation alluvial-fan	29	30	30	1.03	1	1.03	184.85	208.89	(For the first point) Because of the characteristics of these soils (Basecoat) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone.
				33	60	30	0.91	1	0.91	213.63		
0.40				35	90	30	0.86	1	0.86	228.18		
0.60	0.60		Arena Limosa without plasticity condition in-situ loose, loose compactness, partially dry and brown coloration geological interpretation alluvial-fan	3	40	40	13.33	1	13.33	10.55	14.61	
				4	80	40	10.00	1	10.00	14.56		
0.80				5	120	40	8.00	1	8.00	18.70		
1.00	1.00		Limo Clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan									
				4	30	30	7.50	1	7.50	20.10	19.63	
				4	60	30	7.50	1	7.50	20.10		
1.20				5	100	40	8.00	1	8.00	18.70		
1.40	1.50		Clayey sand, loose in-situ condition, loose compactness, partially dry and brown coloration geological interpretation alluvial-fan									
				4	30	30	7.50	1	7.50	20.10	21.54	
				5	60	30	6.00	1	6.00	25.81		
1.60				5	100	40	8.00	1	8.00	18.70		
1.80	1.90		Clayey sand, loose in-situ condition, loose compactness, partially dry and dark brown coloration geological interpretation alluvial-fan									
				5	30	30	6.00	1	6.00	25.81	22.06	
				3	60	30	10.00	1	10.00	14.56		
2.00				5	90	30	6.00	1	6.00	25.81		
2.20	2.30		Limo Clay, in-situ condition weak, partially dry soft consistency, state and dark brown coloration geological interpretation alluvial-fan									
				4	30	30	7.50	1	7.50	20.10	22.00	
				4	60	30	7.50	1	7.50	20.10		
2.40				5	90	30	6.00	1	6.00	25.81		
2.60	2.70		Limo Clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan									
				4	30	30	7.50	1	7.50	20.10	23.91	
				5	60	30	6.00	1	6.00	25.81		
2.80				5	90	30	6.00	1	6.00	25.81		
3.00	3.00		Clayey sand, loose in-situ condition, loose compactness, partially dry and dark brown coloration geological interpretation alluvial-fan	3	70	70	23.33	1	23.33	5.64	6.98	
				4	150	80	20.00	1	20.00	6.70		
				5	230	80	16.00	1	16.00	8.60		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 11/02/2015
DATE OF CONCLUSION OF TEST: 11/02/2015
HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 24 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP Nº: 24

TEST DATA

PROGRESSIVE: 24 + 000
COORDINATED:
Coordenada X 17°26'7.28"S
Coordenada Y 62°54'8.08"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 2,90 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.00												
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type Single in-situ condition, loose brown color compactness and geological interpretation alluvial-fan	10	30	30	3.00	1	3.00	56.10	88.72	(For the first three points) Due to the characteristics of this type of soil (Basecoat and Silty Sand) disregard CBR values greater than 100% on average, since it would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground. CBR was adopted by 88.72% on the first point, 93.19% in the second point and 68.8% in the third point.
				16	60	30	1.88	1	1.88	94.96		
0.40				19	90	30	1.58	1	1.58	115.11		
0.60	0.60		Arena Limosa without plasticity, firm condition in-situ, on average compactness, partially dry and brown coloration geological interpretation alluvial-fan	10	30	30	3.00	1	3.00	56.10	93.19	
				18	60	30	1.67	1	1.67	108.35		
0.80				19	90	30	1.58	1	1.58	115.11		
1.00	0.90		Arena Limosa without plasticity, firm condition in-situ, on average compactness, partially dry and brown coloration geological interpretation alluvial-fan	12	30	30	2.50	1	2.50	68.80	68.80	
				12	60	30	2.50	1	2.50	68.80		
				12	90	30	2.50	1	2.50	68.80		
1.20	1.20		Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan	10	40	40	4.00	1	4.00	40.64	42.17	
				11	80	40	3.64	1	3.64	45.22		
1.40				10	120	40	4.00	1	4.00	40.64		
1.60	2.00		Limo with mixtures of very fine sand, clear frail condition in-situ, soft consistency, partially dry and brown coloration geological interpretation alluvial-fan									
				6	50	50	8.33	1	8.33	17.86	18.43	
				7	110	60	8.57	1	8.57	17.31		
1.80				8	170	60	7.50	1	7.50	20.10		
2.00												
2.20	2.30		Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and brown coloration geological interpretation alluvial-fan	4	50	50	12.50	1	12.50	11.34	15.69	
				6	100	50	8.33	1	8.33	17.86		
2.40				6	150	50	8.33	1	8.33	17.86		
2.60	2.70		Clay of low plasticity, firm-situ, medium consistency, partially saturated state and reddish coloration geological interpretation alluvial-fan status									
				10	60	60	6.00	1	6.00	25.81	27.75	
				11	120	60	5.45	1	5.45	28.72		
2.80				11	180	60	5.45	1	5.45	28.72		
3.00	2.90	N.F.	Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, saturated state and reddish coloration geological interpretation alluvial-fan	5	60	60	12.00	1	12.00	11.87	14.58	N.F.
	3.00			6	120	60	10.00	1	10.00	14.56		
				7	180	60	8.57	1	8.57	17.31		

OBSERVATIONS:

The presence of the water table was evident at a depth of 2.90 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 11/02/2015
DATE OF CONCLUSION OF TEST: 11/02/2015
HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 25 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 25

TEST DATA

PROGRESSIVE: 25 + 000
COORDINATED:
Coordenada X 17°26'38.98"S
Coordenada Y 62°54'9.39"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 2,90 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD | **TEST RESULTS**

SCALE	DEPTH (m)	LITOLOGYCAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
	0.00											
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type Single in-situ condition, loose brown color compactness and geological interpretation alluvial-fan	25	20	20	0.80	1	0.80	246.51	302.74	(For the first two points) Due to the characteristics of this type of soil (Basecoat and Silty Sand) disregard CBR values greater than 100% on average, since it would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground.
				30	40	20	0.67	1	0.67	302.36		
				35	60	20	0.57	1	0.57	359.34		
0.40			Arena Limosa without plasticity, firm condition in-situ, on average compactness of dry and brown coloration geological interpretation alluvial-fan									
0.60	0.70			26	20	20	0.77	1	0.77	257.58	317.98	
				30	40	20	0.67	1	0.67	302.36		
0.80				38	60	20	0.53	1	0.53	394.01		
1.00	1.10		Arena Limosa without plasticity condition in-situ loose, loose compactness of dry and brown coloration geological interpretation alluvial-fan	5	30	30	6.00	1	6.00	25.81	22.48	
				5	70	40	8.00	1	8.00	18.70		
1.20				6	110	40	6.67	1	6.67	22.94		
1.40	1.60		Arena Limosa without plasticity condition in-situ loose, loose compactness of dry and brown coloration geological interpretation alluvial-fan	7	60	60	8.57	1	8.57	17.31	19.17	
				8	120	60	7.50	1	7.50	20.10		
1.60				8	180	60	7.50	1	7.50	20.10		
1.80												
2.00												
2.20	2.60		Clayey sand, loose in-situ condition, loose compactness, partially dry and dark brown coloration geological interpretation alluvial-fan	6	80	80	13.33	1	13.33	10.55	11.89	
				6	160	80	13.33	1	13.33	10.55		
2.40				8	240	80	10.00	1	10.00	14.56		
2.60												
2.80	2.90	N.F.	Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and dark brown coloration geological interpretation alluvial-fan	6	50	50	8.33	1	8.33	17.86	21.25	N.F.
				7	100	50	7.14	1	7.14	21.23		
3.00	3.00			8	150	50	6.25	1	6.25	24.66		

OBSERVATIONS:

The presence of the water table was evident at a depth of 2.90 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 12/02/2015
DATE OF CONCLUSION OF TEST: 12/02/2015
HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 26 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 26

TEST DATA

PROGRESSIVE: 26 + 000
COORDINATED:
Coordenada X 17°27'10.90"S
Coordenada Y 62°54'16.08"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 2,00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD | **TEST RESULTS**

SCALE	DEPTH (m)	LITOLOGYCAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
	0.00											
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	12	20	20	1.67	1	1.67	108.35	112.92	(For the first point) Because of the characteristics of these soils (Basecoat and Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground.
				14	40	20	1.43	1	1.43	128.77		
				17	70	30	1.76	1	1.76	101.63		
0.40			Arena Limosa without plasticity, firm condition in-situ, on average compactness of dry and dark brown coloration geological interpretation alluvial-fan	12	30	30	2.50	1	2.50	68.80	84.07	
0.60	0.60			14	60	30	2.14	1	2.14	81.77		
				17	90	30	1.76	1	1.76	101.63		
0.80	0.90		Arena Limosa without plasticity condition in-situ loose, loose compactness of dry and dark brown coloration geological interpretation alluvial-fan	2	30	30	15.00	1	15.00	9.25	12.79	
1.00				3	60	30	10.00	1	10.00	14.56		
				4	100	40	10.00	1	10.00	14.56		
1.20			Arena Limosa without plasticity condition in-situ loose, loose compactness, partially saturated state and dark brown coloration geological interpretation alluvial-fan									
1.40												
1.60												
1.80	1.90			4	50	50	12.50	1	12.50	11.34	13.49	
				5	100	50	10.00	1	10.00	14.56		
2.00				5	150	50	10.00	1	10.00	14.56		
2.20	2.00											N.F.
	N.F.		Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, saturated state and reddish coloration geological interpretation alluvial-fan	5	50	50	10.00	1	10.00	14.56	14.56	
2.40				5	100	50	10.00	1	10.00	14.56		
				6	160	60	10.00	1	10.00	14.56		
2.60	2.40											
			Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and reddish coloration geological interpretation alluvial-fan	2	60	60	30.00	1	30.00	4.26	7.61	
2.80	2.70			3	120	60	20.00	1	20.00	6.70		
				5	180	60	12.00	1	12.00	11.87		
3.00	3.00		Arena Limosa without plasticity condition in-situ loose, loose compactness, saturated state and reddish coloration geological interpretation alluvial-fan	5	60	60	12.00	1	12.00	11.87	14.58	
				6	120	60	10.00	1	10.00	14.56		
				7	180	60	8.57	1	8.57	17.31		

OBSERVATIONS:

The presence of the water table was evident at a depth of 2.00 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 12/02/2015
DATE OF CONCLUSION OF TEST: 12/02/2015
HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 27 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP Nº: 27

TEST DATA

PROGRESSIVE: 27 + 000
COORDINATED: Coordenada X 17°27'42.67"S; Coordenada Y 62°54'23.39"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 0,00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
	0.00											
0.20			Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	7	30	30	4.29	1	4.29	37.62		
0.40	0.40			7	60	30	4.29	1	4.29	37.62	41.70	
0.60			Limo Clay, weak condition to sign in-situ, soft consistency half, partially dry and reddish coloration geological interpretation alluvial-fan	9	90	30	3.33	1	3.33	49.85		
0.80	0.90			8	50	50	6.25	1	6.25	24.66		
1.00				11	100	50	4.55	1	4.55	35.22	38.85	
1.20	1.30		Limo Clay, in-situ condition firm, medium bodied, dry and reddish coloration geological interpretation alluvial-fan	13	150	50	3.85	1	3.85	42.47		
1.40				10	60	60	6.00	1	6.00	25.81		
1.60				14	120	60	4.29	1	4.29	37.62	35.17	
1.80	1.80		Limo with mixtures of very fine sand, weak condition partially in-situ firm, soft consistency half, partially dry and dark brown coloration geological interpretation alluvial-fan	15	180	60	4.00	1	4.00	40.64		
2.00				7	40	40	5.71	1	5.71	27.26		
2.20	2.10		Limo with mixtures of very fine sand, weak condition to dry in situ, soft consistency half, partially dry and dark brown coloration geological interpretation alluvial-fan	8	80	40	5.00	1	5.00	31.66	30.81	
2.40				9	120	40	4.44	1	4.44	36.12		
2.60	2.60		Limo Clay, in-situ condition weak, partially saturated soft consistency, state and dark brown coloration geological interpretation alluvial-fan	8	50	50	6.25	1	6.25	24.66		
2.80				8	100	50	6.25	1	6.25	24.66	21.85	
3.00	3.00		Limo Clay, in-situ condition weak, partially saturated soft consistency, state and dark brown coloration geological interpretation alluvial-fan	10	150	50	5.00	1	5.00	31.66		
				4	60	60	15.00	1	15.00	9.25		
				6	120	60	10.00	1	10.00	14.56	14.56	
				6	180	60	10.00	1	10.00	14.56		
				6	70	70	11.67	1	11.67	12.26		
				7	140	70	10.00	1	10.00	14.56	14.56	
				7	210	70	10.00	1	10.00	14.56		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 24/12/2014
DATE OF CONCLUSION OF TEST: 24/12/2014
HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 28 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP Nº: 28

TEST DATA

PROGRESSIVE: 28 + 000
COORDINATED: Coordenada X 17°28'14.33"S; Coordenada Y 62°54'31.24"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 0,00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
	0.00											
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	18	20	20	1.11	1	1.11	170.63	228.87	(For the first point) Because of the characteristics of these soils (Basecoat and Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated habercesto ne or consolidated, dry ground.
0.40				22	40	20	0.91	1	0.91	213.63		
0.60				30	60	20	0.67	1	0.67	302.36		
0.80	0.60		Low plasticity clay, flimsy-situ, soft consistency, dry and brown coloration geological interpretation alluvial-fan status	6	30	30	5.00	1	5.00	31.66	35.67	
1.00				6	60	30	5.00	1	5.00	31.66		
1.20	0.90		Clay of low plasticity, firm-situ, medium bodied, dry and brown coloration geological interpretation alluvial-fan status	8	90	30	3.75	1	3.75	43.69		
1.40				13	30	30	2.31	1	2.31	75.26		
1.60				15	70	40	2.67	1	2.67	64.01	70.97	
1.80	1.80		Shale Arena, in-situ condition firm, medium compactness of dry and brown coloration geological interpretation alluvial-fan	17	110	40	2.35	1	2.35	73.64		
2.00				17	50	50	2.94	1	2.94	57.35		
2.20	2.10		Clayey sand, loose in-situ condition, loose compactness, partially dry and dark brown coloration geological interpretation alluvial-fan	15	100	50	3.33	1	3.33	49.85	52.35	
2.40				18	160	60	3.33	1	3.33	49.85		
2.60	2.50		Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and reddish coloration geological interpretation alluvial-fan	6	50	50	8.33	1	8.33	17.86	17.86	
2.80				6	100	50	8.33	1	8.33	17.86		
3.00	3.00		Clay of low plasticity, firm-situ, medium consistency, partially dry and reddish coloration geological interpretation alluvial-fan status	6	150	50	8.33	1	8.33	17.86		
				5	50	50	10.00	1	10.00	14.56		
				6	100	50	8.33	1	8.33	17.86	16.76	
				6	150	50	8.33	1	8.33	17.86		
				8	60	60	7.50	1	7.50	20.10		
				10	120	60	6.00	1	6.00	25.81	25.86	
				12	180	60	5.00	1	5.00	31.66		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 12/02/2015
DATE OF CONCLUSION OF TEST: 12/02/2015
HEAD OF LABORATORY

	DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03	NORMA	REV: 00 · DATE: 14/02/2015 · REPORT: EGDCPS- 002-14 · PAG: 29 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 29

TEST DATA

PROGRESSIVE: 29 + 000 — **COORDINATED:** Coordenada X 17°28'45.90"S; Coordenada Y 62°54'39.43"O — **SIDE:** Not Applicable
WATER TABLE: 0,00 mts. — **TYPE OF MATERIAL:** Not Applicable — **WEIGHT OF HAMMER:** 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.00												
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	25	20	20	0.80	1	0.80	246.51	229.99	(For the first point) Because of the characteristics of these soils (Basecoat and Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground.
				28	40	20	0.71	1	0.71	279.88		
				26	70	30	1.15	1	1.15	163.57		
0.40	0.90		Clay of low plasticity, firm-situ, medium bodied, dry and reddish coloration clear geological interpretation alluvial-fan status								40.36	
0.60				10	40	40	4.00	1	4.00	40.64		
0.80				11	80	40	3.64	1	3.64	45.22		
1.00				11	130	50	4.55	1	4.55	35.22		
1.20	1.80		Clay of low plasticity, firm-situ, medium bodied, dry and brown coloration geological interpretation alluvial-fan status								51.11	
1.40				11	40	40	3.64	1	3.64	45.22		
1.60				13	80	40	3.08	1	3.08	54.53		
1.80				16	130	50	3.13	1	3.13	53.59		
2.00	2.20		Low plasticity clay, flimsy-situ, soft consistency, dry and light reddish coloration geological interpretation alluvial-fan status	6	40	40	6.67	1	6.67	22.94	21.25	
2.20				6	80	40	6.67	1	6.67	22.94		
2.40				6	130	50	8.33	1	8.33	17.86		
2.60	2.60		Limo with mixtures of very fine sand, clear frail condition in-situ, soft consistency, dry and brown coloration geological interpretation alluvial-fan	6	50	50	8.33	1	8.33	17.86	17.86	
2.80				6	100	50	8.33	1	8.33	17.86		
3.00	3.00		Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and light brown coloration geological interpretation alluvial-fan	6	150	50	8.33	1	8.33	17.86		
											5.51	
				2	80	80	40.00	1	40.00	3.08		
				3	160	80	26.67	1	26.67	4.86		
				5	240	80	16.00	1	16.00	8.60		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 12/02/2015
DATE OF CONCLUSION OF TEST: 12/02/2015
HEAD OF LABORATORY

	DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03	NORMA	REV: 00 · DATE: 14/02/2015 · REPORT: EGDCPS- 002-14 · PAG: 30 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 30

TEST DATA

PROGRESSIVE: 30 + 010 — **COORDINATED:** Coordenada X 17°29'17.73"S; Coordenada Y 62°54'48.00"O — **SIDE:** Not Applicable
WATER TABLE: 2,90 mts. — **TYPE OF MATERIAL:** Not Applicable — **WEIGHT OF HAMMER:** 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
0.00												
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	11	30	30	2.73	1	2.73	62.41	68.82	(For the first point) Because of the characteristics of these soils (Basecoat and Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground. CBR is adopted 68.82%
				12	60	30	2.50	1	2.50	68.80		
				13	90	30	2.31	1	2.31	75.26		
0.40	0.70		Low plasticity clay, light-situ firm, medium bodied, dry and brown coloration geological interpretation alluvial-fan status								37.71	
0.60				7	40	40	5.71	1	5.71	27.26		
0.80				10	80	40	4.00	1	4.00	40.64		
1.00				11	120	40	3.64	1	3.64	45.22		
1.20	1.70		Low plasticity clay, in-situ condition weak, partially dry soft consistency, state and light brown coloration geological interpretation alluvial-fan								21.23	
1.40				7	50	50	7.14	1	7.14	21.23		
1.60				7	100	50	7.14	1	7.14	21.23		
1.80				7	150	50	7.14	1	7.14	21.23		
2.00	2.40		Clay of low plasticity, firm-situ, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan status								19.42	
2.20				9	80	80	8.89	1	8.89	16.62		
2.40				10	160	80	8.00	1	8.00	18.70		
2.60	2.70		Clay of low plasticity, firm-situ, medium consistency, partially saturated state and geological interpretation browning alluvial-fan status	12	240	80	6.67	1	6.67	22.94	16.27	
2.80												
3.00	2.90	N.F.	Limo Clay, in-situ condition firm, medium consistency, saturated state and geological interpretation browning alluvial-fan	10	90	90	9.00	1	9.00	16.39		
				11	190	100	9.09	1	9.09	16.21		
				11	290	100	9.09	1	9.09	16.21		
	3.00			6	90	90	15.00	1	15.00	9.25		
				12	180	90	7.50	1	7.50	20.10	20.34	
				18	270	90	5.00	1	5.00	31.66		

OBSERVATIONS:

The presence of the water table was evident at a depth of 2.90 mts., Until the end of Geotechnical Study. For the study are considered level 0.00 mts. the height of the wellhead.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 12/02/2015
DATE OF CONCLUSION OF TEST: 12/02/2015
HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 31 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 31

TEST DATA

PROGRESSIVE: 31 + 020
COORDINATED:
Coordenada X 17°29'49.53"S
Coordenada Y 62°54'56.63"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 0,00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD | **TEST RESULTS**

SCALE	DEPTH (m)	LEGEND STRATIGRAPHIC PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
	0.00											
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	7	30	30	4.29	1	4.29	37.62	73.64	(For the first point) Because of the characteristics of these soils (Basecoat and Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground. Is taken the average of 73.79% CBR
				15	60	30	2.00	1	2.00	88.34		
				16	90	30	1.88	1	1.88	94.96		
0.40			Arena Limosa without plasticity, firm condition in-situ, on average compactness of dry and reddish coloration clear geological interpretation alluvial-fan									
0.60	0.70			11	50	50	4.55	1	4.55	35.22	46.28	
				13	100	50	3.85	1	3.85	42.47		
0.80				18	150	50	2.78	1	2.78	61.14		
1.00			Arena Limosa without plasticity condition in-situ loose, loose compactness, partially dry and brown coloration geological interpretation alluvial-fan									
				2	50	50	25.00	1	25.00	5.22		
1.20				3	100	50	16.67	1	16.67	8.22	9.33	
				5	150	50	10.00	1	10.00	14.56		
1.40												
	1.50											
1.60												
1.80			Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and reddish coloration clear geological interpretation alluvial-fan	5	90	90	18.00	1	18.00	7.54	7.99	
				6	190	100	16.67	1	16.67	8.22		
2.00				6	290	100	16.67	1	16.67	8.22		
2.20												
2.40	2.40											
			Arena Limosa without plasticity condition in-situ loose, loose compactness, partially dry and light brown coloration geological interpretation alluvial-fan	5	80	80	16.00	1	16.00	8.60	11.90	
2.60	2.70			7	160	80	11.43	1	11.43	12.54		
				8	240	80	10.00	1	10.00	14.56		
2.80			Arena Limosa without plasticity, firm condition in-situ, on average compactness of dry and light brown coloration geological interpretation alluvial-fan	11	50	50	4.55	1	4.55	35.22	36.22	
				12	100	50	4.17	1	4.17	38.83		
3.00	3.00			13	160	60	4.62	1	4.62	34.62		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 13/02/2015
DATE OF CONCLUSION OF TEST: 13/02/2015

HEAD OF LABORATORY

CAEM

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 32 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 32

TEST DATA

PROGRESSIVE: 32 + 000
COORDINATED:
Coordenada X 17°30'20.38"S
Coordenada Y 62°55'4.99"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 0,00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD | **TEST RESULTS**

SCALE	DEPTH (m)	LEGEND STRATIGRAPHIC PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
	0.00											
0.20	0.30		Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed Type strong in-situ condition, medium brown color compactness and geological interpretation alluvial-fan	14	30	30	2.14	1	2.14	81.77	92.79	(For the first point) Because of the characteristics of these soils (Basecoat and Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated haberce stone or consolidated, dry ground. Is taken the average of 92.79% CBR
				16	60	30	1.88	1	1.88	94.96		
				17	90	30	1.76	1	1.76	101.63		
0.40			Clay of low plasticity, firm-situ, medium bodied, dry and dark brown coloration geological interpretation alluvial-fan status									
0.60												
				10	30	30	3.00	1	3.00	56.10		
0.80				13	60	30	2.31	1	2.31	75.26	71.04	
				14	90	30	2.14	1	2.14	81.77		
1.00	1.00											
1.20			Arena condition Shale in-situ loose, loose compactness, partially dry and dark brown coloration geological interpretation alluvial-fan									
				5	30	30	6.00	1	6.00	25.81		
1.40				5	60	30	6.00	1	6.00	25.81	23.44	
				5	100	40	8.00	1	8.00	18.70		
1.60	1.60											
1.80			Limo Clay, in-situ condition weak, partially dry soft consistency, state and dark brown coloration geological interpretation alluvial-fan	3	50	50	16.67	1	16.67	8.22		
				4	110	60	15.00	1	15.00	9.25	9.78	
2.00				5	170	60	12.00	1	12.00	11.87		
2.20			Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and reddish coloration geological interpretation alluvial-fan									
				4	70	70	17.50	1	17.50	7.78		
2.40				4	140	70	17.50	1	17.50	7.78	9.27	
				6	210	70	11.67	1	11.67	12.26		
2.60	2.60											
2.80			Arena Limosa without plasticity condition in-situ loose, loose compactness, partially saturated state and reddish coloration geological interpretation alluvial-fan	2	70	70	35.00	1	35.00	3.58		
				3	150	80	26.67	1	26.67	4.86	4.43	
3.00	3.00			3	230	80	26.67	1	26.67	4.86		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM

DATE OF CREATION OF TEST: 13/02/2015
DATE OF CONCLUSION OF TEST: 13/02/2015

HEAD OF LABORATORY

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 33 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 33

TEST DATA

PROGRESSIVE: 33 + 010
COORDINATED: Coordenada X 17°30'52.17"S; Coordenada Y 62°55'13.32"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 0,00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
	0.00											
0.20			Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed type in-situ condition partially loose firm, medium and weak compactness browning geological interpretation alluvial-fan	13	20	20	1.54	1	1.54	118.51		(For the first two points) Due to the characteristics of these soils (Basecoat and Silty Sand) disregard CBR values greater than 100% on average, since it would be inconsistent data. This is because the test was conducted on an isolated habercce stone or consolidated, dry ground.
0.40	0.40			14	50	30	2.14	1	2.14	81.77	98.41	
0.60				16	80	30	1.88	1	1.88	94.96		
0.80			Limo Clay, in-situ condition firm, medium consistency, partially dry and reddish coloration geological interpretation alluvial-fan	13	30	30	2.31	1	2.31	75.26		
1.00	0.90			15	60	30	2.00	1	2.00	88.34	91.65	
1.20				16	90	30	1.88	1	1.88	94.96		
1.40			Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and reddish coloration geological interpretation alluvial-fan	6	40	40	6.67	1	6.67	22.94		
1.60	1.70			6	80	40	6.67	1	6.67	22.94	22.08	
1.80				7	130	50	7.14	1	7.14	21.23		
2.00			Clayey sand, loose in-situ condition, loose compactness, partially dry and dark brown coloration geological interpretation alluvial-fan	2	70	70	35.00	1	35.00	3.58		
2.20	2.20			3	140	70	23.33	1	23.33	5.64	6.71	
2.40				4	210	70	17.50	1	17.50	7.78		
2.60	2.60		Arena Limosa without plasticity condition in-situ loose, loose compactness, partially dry and dark brown coloration geological interpretation alluvial-fan	5	60	60	12.00	1	12.00	11.87		
2.80				6	130	70	11.67	1	11.67	12.26	11.25	
3.00	3.00			6	200	70	11.67	1	11.67	12.26		
			Arena Limosa without plasticity condition in-situ loose, loose compactness, partially saturated state and dark brown coloration geological interpretation alluvial-fan	4	60	60	15.00	1	15.00	9.25		
				5	120	60	12.00	1	12.00	11.87	10.56	
				4	180	60	15.00	1	15.00	9.25		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unitke cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 13/02/2015
DATE OF CONCLUSION OF TEST: 13/02/2015
HEAD OF LABORATORY

DYNAMIC PENETRATION TESTING (DCP)
ASTM-D-6951-03

NORMA

REV: 00
DATE: 14/02/2015
REPORT: EGDCPS- 002-14
PAG: 34 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*
PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*
UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 34

TEST DATA

PROGRESSIVE: 34 + 000
COORDINATED: Coordenada X 17°31'23.87"S; Coordenada Y 62°55'19.34"O
SIDE: Not Applicable
TYPE OF MATERIAL: Not Applicable
WATER TABLE: 0.00 mts.
WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / **TEST RESULTS**

SCALE	DEPTH (m)	GEOTECHNICAL PROFILE	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
	0.00											
0.20			Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed type in-situ condition partially loose firm, medium and weak compactness browning geological interpretation alluvial-fan	11	20	20	1.82	1	1.82	98.29		(For the first point) Because of the characteristics of these soils (Basecoat) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated habercce stone or consolidated, dry ground.
0.40	0.30			16	40	20	1.25	1	1.25	149.54	135.96	
0.60				17	60	20	1.18	1	1.18	160.05		
0.80			Limo with mixtures of very fine sand, strong in-situ condition, medium consistency, partially dry and brown coloration geological interpretation alluvial-fan	10	30	30	3.00	1	3.00	56.10		
1.00	0.80			13	60	30	2.31	1	2.31	75.26	63.53	
1.20				14	100	40	2.86	1	2.86	59.25		
1.40			Limo Clay, in-situ condition weak, partially dry soft consistency, state and browning geological interpretation alluvial-fan	6	30	30	5.00	1	5.00	31.66		
1.60	1.60			6	60	30	5.00	1	5.00	31.66	31.66	
1.80				8	100	40	5.00	1	5.00	31.66		
2.00			Limo with mixtures of very fine sand, strong in-situ condition, medium bodied, dry and brown coloration geological interpretation alluvial-fan	10	40	40	4.00	1	4.00	40.64		
2.20	2.40			11	80	40	3.64	1	3.64	45.22	46.80	
2.40				13	120	40	3.08	1	3.08	54.53		
2.60	2.70		Shale Arena, in-situ condition firm, medium compactness of dry and brown coloration geological interpretation alluvial-fan	10	50	50	5.00	1	5.00	31.66		
2.80				11	100	50	4.55	1	4.55	35.22	35.24	
3.00	3.00			12	150	50	4.17	1	4.17	38.83		
			Shale Arena, in-situ condition firm, medium compactness of dry and brown coloration geological interpretation alluvial-fan	10	40	40	4.00	1	4.00	40.64		
				13	80	40	3.08	1	3.08	54.53	51.47	
				14	120	40	2.86	1	2.86	59.25		

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unitke cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

DATE OF CREATION OF TEST: 13/02/2015
DATE OF CONCLUSION OF TEST: 13/02/2015
HEAD OF LABORATORY

CAEM	DYNAMIC PENETRATION TESTING (DCP) ASTM-D-6951-03	NORMA	REV: 00 DATE : 14/02/2015 REPORT: EGDCPS- 002-14 PAG: 35 de 35

CLIENTE / Client: *KATAHIRA & Engineers International*

PROYECTO / Proyect: *Preparatory Study Paving Project Highway Okinawa I - II and III*

UBICACIÓN / Location: *Municipality Okinawa One , 2nd Section of the Province Ignacio Warnes, Santa Cruz Department*

DCP N°: 35

TEST DATA

PROGRESSIVE: 35 + 000

COORDINATED:
Coordenada X 17°31'55.70"S
Coordenada Y 62°55'26.49"O

SIDE: Not Applicable

TYPE OF MATERIAL: Not Applicable

WATER TABLE: 0.00 mts.

WEIGHT OF HAMMER: 8 Kg.

REGISTERS FIELD / TEST RESULTS

SCALE	DEPTH (m)	GEOTECHNIC LAYERING	VISUAL DESCRIPTION OF THE MATERIAL	Number of Blows A	Cumulative penetration (mm) B	Penetration Between Readings (mm) C	Penetration Of Hits (mm) D	Factor of Hammer E	DCP Index (mm / Punches) F	CBR % G	AVERAGE CBR %	Observations
	0.00											
020			Artificial fill, consisting of silty sand with no plasticity gravel mixtures of different measures Screed type in-situ condition partially loose firm, medium and weak compactness browning geological interpretation alluvial-fan	9	30	30	3.33	1	3.33	49.85	56.12	(For the second point) Due to the characteristics of these soils (Basecoat and Silty Sand) disregard CBR values greater than 100% on average, since that would be inconsistent data. This is because the test was conducted on an isolated habercе stone or consolidated, dry ground.
				11	60	30	2.73	1	2.73	62.41		
	0.30			10	90	30	3.00	1	3.00	56.10		
040												
060												
080			Limo with mixtures of very fine sand, strong in-situ condition, medium bodied, dry and gray coloring geological interpretation alluvial-fan	12	30	30	2.50	1	2.50	68.80	84.03	
000				16	60	30	1.88	1	1.88	94.96		
				20	100	40	2.00	1	2.00	88.34		
100	**1.00**											
120			Clayey sand with presence of clasts in minimum percentage isolated, light-situ loose, loose compactness, partially dry and brown coloration geological interpretation alluvial-fan status	6	40	40	6.67	1	6.67	22.94	24.38	
				6	80	40	6.67	1	6.67	22.94		
140				7	120	40	5.71	1	5.71	27.26		
	1.50											
160			Low plasticity clay, flimsy-situ, soft consistency, partially dry and light brown with gray patinas alluvial fan-colored geological interpretation condition	5	50	50	10.00	1	10.00	14.56	15.48	
180				6	110	60	10.00	1	10.00	14.56		
				7	170	60	8.57	1	8.57	17.31		
200	**2.00**											
220			Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially dry and light brown with gray patinas geological interpretation alluvial-fan	6	50	50	8.33	1	8.33	17.86	16.76	
240				5	100	50	10.00	1	10.00	14.56		
				6	150	50	8.33	1	8.33	17.86		
	2.50											
260			Limo with mixtures of very fine sand, weak in-situ condition, soft consistency, partially saturated state, light brown with brown patinas geological interpretation alluvial-fan	6	50	50	8.33	1	8.33	17.86	17.86	
280				6	100	50	8.33	1	8.33	17.86		
				6	150	50	8.33	1	8.33	17.86		
300	**3.00**											

OBSERVATIONS:

The presence of the Water Table was not evidenced until the end of Geotechnical Study. For the study is considered the mouth 0.00 level survey done.

A= Number of hammer blows between readings
B= Penetration accumulated after each series of blows
C= Unlike cumulative penetration (Note B) between readings
D= Note C between A Note
E= Position "1" if the hammer is 8 Kg., And "half" if the hammer is 4.6 Kg.
F= Note D Note E
G= Correlation between CBR and DCP index

CAEM	DATE OF CREATION OF TEST: 13/02/2015 DATE OF CONCLUSION OF TEST: 13/02/2015	HEAD OF LABORATORY

材料試験結果

P

CAEM ISO 9001:2008

REV: 00
REPORT: 308-14
DATE: 20/01/2015

Client: KATAHIRA & Engineers International. **Proyect:** Preparatory Study of the Okinawa I - II and III Road Paving Project
Location: Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City

Nº POLL	Nº SAMPLES	Progresivas / Progressive	HUMEDAD NATURAL Nat. / Moisture	GRANULOMETRIA Grading 4	10	40	200	LIMITES DE ATTHERBERG Atterberg Limits L.L	L.P	I.P	CLASIFICACION Clasification A.A.S.H.T.O.	CLASIFICACION Clasificatio S.U.S.C.	Proctor T-180 MOD. grs/cm3	HUMEDAD OPTIMA Opt. Moisture	% DE C.B.R. P/ 0.10"PENETRATION 95%	100%		OSERVACIONES Observations
01	01	BANCO 1	6.68%	100.00	99.91	99.31	55.15	0.00%	0.00%	N.P.	A-4 (0)	ML	2.097	7.75%	24.48	34.99		Material Natural
02	02	BANCO 1	3.56%	100.00	99.91	99.50	55.76	0.00%	0.00%	N.P.	A-4 (0)	ML	2.099	7.75%	25.64	36.94		Material Natural
03	01	BANCO 1	3.22%	100.00	99.69	98.51	51.45	0.00%	0.00%	N.P.	A-4 (0)	ML	2.029	8.79%	34.74	47.27		Mezcla con Cal al 4%
04	02	BANCO 1	3.07%	100.00	99.95	97.79	56.43	0.00%	0.00%	N.P.	A-4 (0)	ML	2.043	8.70%	37.65	48.78		Mezcla con Cal al 4%
05	01	BANCO 1	2.83%	100.00	99.79	99.13	54.51	0.00%	0.00%	N.P.	A-4 (0)	ML	2.016	8.62%	45.94	57.27		Mezcla con Cal al 6%
06	02	BANCO 1	2.72%	100.00	99.88	99.33	55.81	0.00%	0.00%	N.P.	A-4 (0)	ML	2.035	8.51%	41.22	55.88		Mezcla con Cal al 6%
07	01	BANCO 1	2.73%	100.00	99.88	98.94	58.77	0.00%	0.00%	N.P.	A-4 (0)	ML	2.009	8.69%	40.56	49.29		Mezcla con Cal al 8%
08	02	BANCO 1	2.72%	100.00	99.75	99.27	58.40	0.00%	0.00%	N.P.	A-4 (0)	ML	2.010	8.46%	34.12	46.82		Mezcla con Cal al 8%
09	01	BANCO 1	3.28%	100.00	99.78	99.35	56.38	0.00%	0.00%	N.P.	A-4 (0)	ML	2.102	8.60%	74.77	92.81		Mezcla con Cemento al 4%
10	02	BANCO 1	2.89%	100.00	99.90	99.39	56.85	0.00%	0.00%	N.P.	A-4 (0)	ML	2.098	8.47%	66.73	90.20		Mezcla con Cemento al 4%
11	01	BANCO 1	2.87%	100.00	99.95	99.34	56.08	0.00%	0.00%	N.P.	A-4 (0)	ML	2.057	8.66%	70.36	92.30		Mezcla con Cemento al 6%
12	02	BANCO 1	3.26%	100.00	99.90	99.90	56.43	0.00%	0.00%	N.P.	A-4 (0)	ML	2.065	8.86%	69.89	90.54		Mezcla con Cemento al 6%
13	01	BANCO 1	4.14%	100.00	99.84	99.41	59.56	0.00%	0.00%	N.P.	A-4 (0)	ML	2.104	9.54%	57.88	80.63		Mezcla con Cemento al 8%
14	02	BANCO 1	2.70%	100.00	99.88	99.38	57.52	0.00%	0.00%	N.P.	A-4 (0)	ML	2.123	9.73%	67.83	83.08		Mezcla con Cemento al 8%

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CAEM ISO 9001:2008

REV: 00
REPORT: 308-14
DATE: 14/01/2015

Client: KATAHIRA & Engineers International. **Proyect:** Preparatory Study of the Okinawa I - II and III Road Paving Project
Location: Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City

Nº POLL	Nº SAMPLES	Progresivas / Progressive	HUMEDAD NATURAL Nat. / Moisture	GRANULOMETRIA Grading 4	10	40	200	LIMITES DE ATTHERBERG Atterberg Limits L.L	L.P	I.P	CLASIFICACION Clasification A.A.S.H.T.O.	CLASIFICACION Clasificatio S.U.S.C.	Proctor T-180 MOD. grs/cm3	HUMEDAD OPTIMA Opt. Moisture	% DE C.B.R. P/ 0.10"PENETRATION 95%	100%		OSERVACIONES Observations
01	01	BANCO 2	4.97%	100.00	100.00	99.45	38.17	0.00%	0.00%	N.P.	A-4 (0)	SM	1.941	9.46%	18.86	25.45		Material Natural
02	02	BANCO 2	4.80%	100.00	100.00	99.67	38.60	0.00%	0.00%	N.P.	A-4 (0)	SM	1.977	8.60%	21.07	26.42		Material Natural
03	01	BANCO 2	4.93%	100.00	99.69	98.51	41.54	0.00%	0.00%	N.P.	A-4 (0)	SM	1.982	8.44%	29.73	39.17		Mezcla con Cal al 4%
04	02	BANCO 2	4.56%	100.00	100.00	99.64	41.79	0.00%	0.00%	N.P.	A-4 (0)	SM	1.975	8.38%	26.98	36.15		Mezcla con Cal al 4%
05	01	BANCO 2	4.32%	100.00	100.00	99.46	41.65	0.00%	0.00%	N.P.	A-4 (0)	SM	1.968	8.36%	38.52	50.14		Mezcla con Cal al 6%
06	02	BANCO 2	5.14%	100.00	100.00	99.16	40.26	0.00%	0.00%	N.P.	A-4 (0)	SM	1.933	8.36%	34.69	47.12		Mezcla con Cal al 6%
07	01	BANCO 2	4.73%	100.00	100.00	99.63	70.52	0.00%	0.00%	N.P.	A-4 (0)	SM	1.953	7.76%	29.37	38.99		Mezcla con Cal al 8%
08	02	BANCO 2	4.07%	100.00	100.00	98.22	38.92	0.00%	0.00%	N.P.	A-4 (0)	SM	1.964	7.48%	27.72	35.50		Mezcla con Cal al 8%
09	01	BANCO 2	4.75%	100.00	100.00	98.90	39.69	0.00%	0.00%	N.P.	A-4 (0)	SM	2.068	8.70%	38.86	52.58		Mezcla con Cemento al 4%
10	02	BANCO 2	5.33%	100.00	100.00	99.24	39.21	0.00%	0.00%	N.P.	A-4 (0)	SM	2.018	7.96%	37.61	48.57		Mezcla con Cemento al 4%
11	01	BANCO 2	4.95%	100.00	100.00	95.88	39.77	0.00%	0.00%	N.P.	A-4 (0)	SM	2.065	8.86%	48.00	65.07		Mezcla con Cemento al 6%
12	02	BANCO 2	4.43%	100.00	100.00	98.52	40.98	0.00%	0.00%	N.P.	A-4 (0)	SM	2.034	9.02%	43.11	58.85		Mezcla con Cemento al 6%
13	01	BANCO 2	5.08%	100.00	100.00	99.29	39.37	0.00%	0.00%	N.P.	A-4 (0)	SM	2.062	8.78%	62.86	79.42		Mezcla con Cemento al 8%
14	02	BANCO 2	4.02%	100.00	100.00	99.33	40.27	0.00%	0.00%	N.P.	A-4 (0)	SM	2.042	8.53%	51.40	70.73		Mezcla con Cemento al 8%

CAEM ISO 9001:2008

REV: 00
REPORT: 308-14
DATE: 26/01/2015

Client: KATAHIRA & Engineers International.

Proyect: Preparatory Study of the Okinawa I - II and III Road Paving Project
Location: Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City

Nº POLL	Nº SAMPLES	Progresivas / Progressive	HUMEDAD NATURAL Nat. / Moisture	GRANULOMETRIA Grading 4	10	40	200	LIMITES DE ATTHERBERG Atterberg Limits L L	L P	I P	CLASIFICACION Clasification A.A.S.H.T.O.	CLASIFICACION Clasificatio S.U.S.C.	Proctor T-180 MOD. grs/cm3	HUMEDAD OPTIMA Opt. Moisture	% DE C.B.R. P/ 0.10"PENETRATION 95%	100%		OSERVACIONES Observations
01	01	BANCO 3	5.39%	100.00	100.00	99.33	26.58	0.00%	0.00%	N.P.	A-2-4 (0)	SM	1.985	9.47%	22.48	32.71		Material Natural
02	02	BANCO 3	5.04%	100.00	100.00	99.40	24.02	0.00%	0.00%	N.P.	A-2-4 (0)	SM	1.974	9.13%	23.62	32.19		Material Natural
03	01	BANCO 3	1.25%	100.00	99.69	98.51	27.04	0.00%	0.00%	N.P.	A-2-4 (0)	SM	2.012	8.86%	22.49	33.70		Mezcla con Cal al 4%
04	02	BANCO 3	1.11%	100.00	100.00	99.39	27.46	0.00%	0.00%	N.P.	A-2-4 (0)	SM	2.021	8.57%	23.97	32.70		Mezcla con Cal al 4%
05	01	BANCO 3	1.10%	100.00	99.96	99.34	30.19	0.00%	0.00%	N.P.	A-2-4 (0)	SM	2.049	8.62%	32.32	39.79		Mezcla con Cal al 6%
06	02	BANCO 3	1.14%	100.00	99.91	99.35	30.66	0.00%	0.00%	N.P.	A-2-4 (0)	SM	2.058	8.51%	31.91	38.48		Mezcla con Cal al 6%
07	01	BANCO 3	2.02%	100.00	100.00	99.39	30.96	0.00%	0.00%	N.P.	A-2-4 (0)	SM	2.038	8.69%	24.36	33.15		Mezcla con Cal al 8%
08	02	BANCO 3	2.29%	100.00	100.00	99.38	29.98	0.00%	0.00%	N.P.	A-2-4 (0)	SM	2.045	8.55%	23.72	32.30		Mezcla con Cal al 8%
09	01	BANCO 3	1.53%	100.00	99.80	99.06	26.51	0.00%	0.00%	N.P.	A-2-4 (0)	SM	1.966	9.39%	44.12	56.86		Mezcla con Cemento al 4%
10	02	BANCO 3	2.05%	100.00	100.00	99.13	32.61	0.00%	0.00%	N.P.	A-2-4 (0)	SM	1.975	9.42%	46.88	53.94		Mezcla con Cemento al 4%
11	01	BANCO 3	1.15%	100.00	100.00	99.34	30.93	0.00%	0.00%	N.P.	A-2-4 (0)	SM	1.981	8.97%	47.20	62.99		Mezcla con Cemento al 6%
12	02	BANCO 3	1.33%	100.00	100.00	98.93	30.73	0.00%	0.00%	N.P.	A-2-4 (0)	SM	1.975	9.14%	53.84	65.42		Mezcla con Cemento al 6%
13	01	BANCO 3	1.21%	100.00	100.00	99.30	33.15	0.00%	0.00%	N.P.	A-2-4 (0)	SM	2.041	8.99%	57.62	73.02		Mezcla con Cemento al 8%
14	02	BANCO 3	1.19%	100.00	100.00	99.30	33.30	0.00%	0.00%	N.P.	A-2-4 (0)	SM	2.031	9.03%	59.60	74.88		Mezcla con Cemento al 8%

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REPORT: 308-14
DATE: 08/01/2015

Client: KATAHIRA & Engineers International.

Proyect: Preparatory Study of the Okinawa I - II and III Road Paving Project
Location: Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City

Nº POLL	Nº SAMPLES	Progresivas / Progressive	HUMEDAD NATURAL Nat. / Moisture	GRANULOMETRIA Grading 4	10	40	200	LIMITES DE ATTHERBERG Atterberg Limits L L	L P	I P	CLASIFICACION Clasification A.A.S.H.T.O.	CLASIFICACION Clasificatio S.U.S.C.	Proctor T-180 MOD. grs/cm3	HUMEDAD OPTIMA Opt. Moisture	% DE C.B.R. P/ 0.10"PENETRATION 95%	100%		OSERVACIONES Observations
01	01	1+000	11.19%	100.00	100.00	99.38	97.03	21.75%	0.00%	N.P.	A-4 (8)	ML	1.876	13.16%	1.34	2.66		Material Natural
02	02	1+000	11.20%	100.00	100.00	99.14	96.82	21.51%	0.00%	N.P.	A-4 (8)	ML	1.886	13.00%	1.32	2.49		Material Natural
03	01	1+000	12.16%	100.00	99.69	98.51	96.74	28.98%	0.00%	N.P.	A-4 (8)	ML	1.847	14.74%	14.08	26.48		Mezcla con Cal al 4%
04	02	1+000	12.56%	100.00	99.93	99.22	97.18	28.43%	0.00%	N.P.	A-4 (8)	ML	1.848	14.53%	13.86	26.16		Mezcla con Cal al 4%
05	01	1+000	13.84%	100.00	99.93	99.21	96.35	29.15%	0.00%	N.P.	A-4 (8)	ML	1.825	15.77%	17.46	32.31		Mezcla con Cal al 6%
06	02	1+000	12.91%	100.00	99.84	99.23	96.30	29.81%	0.00%	N.P.	A-4 (8)	ML	1.817	14.71%	16.75	31.80		Mezcla con Cal al 6%
07	01	1+000	11.74%	100.00	99.90	99.06	95.72	29.95%	0.00%	N.P.	A-4 (8)	ML	1.796	15.94%	18.89	35.21		Mezcla con Cal al 8%
08	02	1+000	11.45%	100.00	99.59	98.04	95.52	31.04%	0.00%	N.P.	A-4 (8)	ML	1.795	16.08%	18.41	33.21		Mezcla con Cal al 8%
09	01	1+000	14.35%	100.00	99.86	99.37	97.09	25.12%	0.00%	N.P.	A-4 (8)	ML	1.783	15.62%	19.82	30.36		Mezcla con Cemento al 4%
10	02	1+000	14.65%	100.00	99.92	99.25	96.61	24.27%	0.00%	N.P.	A-4 (8)	ML	1.784	14.96%	21.39	31.73		Mezcla con Cemento al 4%
11	01	1+000	13.85%	100.00	99.89	99.33	96.96	25.31%	0.00%	N.P.	A-4 (8)	ML	1.801	15.82%	22.83	36.59		Mezcla con Cemento al 6%
12	02	1+000	14.44%	100.00	99.90	99.34	96.92	25.89%	0.00%	N.P.	A-4 (8)	ML	1.781	16.28%	20.30	35.38		Mezcla con Cemento al 6%
13	01	1+000	14.51%	100.00	99.95	99.02	96.37	25.99%	0.00%	N.P.	A-4 (8)	ML	1.800	15.35%	29.24	41.24		Mezcla con Cemento al 8%
14	02	1+000	13.99%	100.00	99.88	99.28	97.28	24.76%	0.00%	N.P.	A-4 (8)	ML	1.802	15.28%	29.15	41.32		Mezcla con Cemento al 8%

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REV: 00
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Client: KATAHIRA & Engineers International. **Proyect:** Preparatory Study of the Okinawa I - II and III Road Paving Project
Location: Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City

Nº POLL	Nº SAMPLES	Progresivas / Progressive	HUMEDAD NATURAL Nat. / Moisture	GRANULOMETRIA Grading 4	10	40	200	LIMITES DE ATTHERBERG Atterberg Limits L.L	L.P	I.P	CLASIFICACION Clasification A.A.S.H.T.O.	CLASIFICACION Clasificatio S.U.S.C.	Proctor T-180 MOD. grs/cm3	HUMEDAD OPTIMA Opt. Moisture	% DE C.B.R. P/ 0.10"PENETRATION 95%	100%		OSERVACIONES / Observations
01	01	11+200	7.05%	100.00	99.77	98.81	93.21	49.94%	24.53%	25.41%	A-7-6 (17)	CL	1.783	17.35%	0.97	1.96		Material Natural
02	02	11+200	10.24%	100.00	99.54	98.67	93.22	48.88%	23.86%	25.02%	A-7-6 (16)	CL	1.724	17.48%	1.36	1.95		Material Natural
03	01	11+200	9.54%	100.00	99.95	99.17	93.97	48.24%	0.00%	N.P.	A-5 (10)	ML	1.752	19.06%	5.67	9.76		Mezcla con Cal al 4%
04	02	11+200	9.53%	100.00	99.88	99.26	93.72	47.24%	0.00%	N.P.	A-5 (10)	ML	1.755	18.97%	5.83	9.62		Mezcla con Cal al 4%
05	01	11+200	16.33%	100.00	99.95	98.98	93.33	45.82%	0.00%	N.P.	A-5 (10)	ML	1.739	20.02%	8.63	14.46		Mezcla con Cal al 6%
06	02	11+200	16.86%	100.00	99.89	99.07	93.83	45.36%	0.00%	N.P.	A-5 (10)	ML	1.738	19.49%	7.13	13.05		Mezcla con Cal al 6%
07	01	11+200	8.57%	100.00	99.84	98.97	93.88	42.74%	0.00%	N.P.	A-5 (9)	ML	1.725	19.25%	9.32	18.01		Mezcla con Cal al 8%
08	02	11+200	8.31%	100.00	99.88	98.62	93.83	42.33%	0.00%	N.P.	A-5 (9)	ML	1.729	19.35%	9.79	19.17		Mezcla con Cal al 8%
09	01	11+200	9.92%	100.00	99.94	99.02	93.71	36.64%	19.58%	17.06%	A-6 (11)	CL	1.752	17.50%	4.26	6.47		Mezcla con Cemento al 4%
10	02	11+200	9.73%	100.00	99.78	98.97	93.58	37.38%	20.48%	16.90%	A-6 (11)	CL	1.750	17.43%	3.97	6.06		Mezcla con Cemento al 4%
11	01	11+200	9.64%	100.00	99.86	99.02	93.54	35.76%	22.47%	13.29%	A-6 (10)	CL	1.750	16.75%	7.35	10.03		Mezcla con Cemento al 6%
12	02	11+200	9.96%	100.00	99.93	99.34	94.86	34.50%	21.50%	13.00%	A-6 (10)	CL	1.754	16.41%	7.00	10.04		Mezcla con Cemento al 6%
13	01	11+200	9.12%	100.00	99.85	99.09	93.92	39.41%	24.21%	15.20%	A-6 (11)	CL	1.750	16.93%	9.83	16.00		Mezcla con Cemento al 8%
14	02	11+200	9.03%	100.00	99.89	99.03	94.18	39.79%	24.21%	15.58%	A-6 (11)	CL	1.759	17.15%	10.72	17.03		Mezcla con Cemento al 8%

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REV: 00
REPORT: 308-14
DATE: 17/01/2015

Client: KATAHIRA & Engineers International. **Proyect:** Preparatory Study of the Okinawa I - II and III Road Paving Project
Location: Municipality of Okinawa I - II, 2° Section, Warnes Province, Northern Region of Santa Cruz de la Sierra City

Nº POLL	Nº SAMPLES	Progresivas / Progressive	HUMEDAD NATURAL Nat. / Moisture	GRANULOMETRIA Grading 4	10	40	200	LIMITES DE ATTHERBERG Atterberg Limits L.L	L.P	I.P	CLASIFICACION Clasification A.A.S.H.T.O.	CLASIFICACION Clasificatio S.U.S.C.	Proctor T-180 MOD. grs/cm3	HUMEDAD OPTIMA Opt. Moisture	% DE C.B.R. P/ 0.10"PENETRATION 95%	100%		OSERVACIONES / Observations
01	01	28+000	11.35%	100.00	99.86	98.26	93.31	50.79%	24.91%	25.89%	A-7-6 (17)	CH	1.734	15.40%	1.23	1.62		Material Natural
02	01	28+000	11.19%	100.00	100.00	99.38	97.03	47.50%	23.79%	23.71%	A-7-6 (15)	CL	1.749	15.60%	0.94	1.20		Material Natural
03	01	28+000	10.47%	100.00	99.69	98.51	94.61	36.38%	0.00%	N.P.	A-4 (8)	ML	1.748	16.66%	3.02	3.76		Mezcla con Cal al 4%
04	02	28+000	10.83%	100.00	99.83	98.88	95.92	29.56%	0.00%	N.P.	A-4 (8)	ML	1.757	17.22%	3.09	3.88		Mezcla con Cal al 4%
05	01	28+000	9.81%	100.00	99.90	98.97	94.48	34.66%	0.00%	N.P.	A-4 (8)	ML	1.719	16.37%	4.53	6.04		Mezcla con Cal al 6%
06	02	28+000	13.10%	100.00	99.81	98.84	95.16	37.30%	0.00%	N.P.	A-4 (8)	ML	1.721	17.42%	4.13	5.68		Mezcla con Cal al 6%
07	01	28+000	10.08%	100.00	99.80	98.76	94.25	30.15%	0.00%	N.P.	A-4 (8)	ML	1.720	15.90%	5.83	7.86		Mezcla con Cal al 8%
08	02	28+000	10.81%	100.00	99.92	99.30	94.37	30.92%	0.00%	N.P.	A-4 (8)	ML	1.731	15.76%	5.65	7.46		Mezcla con Cal al 8%
09	01	28+100	10.86%	100.00	99.93	98.80	93.84	46.06%	24.54%	21.52%	A-7-6 (14)	CL	1.797	17.99%	6.26	8.04		Mezcla con Cemento al 4%
10	02	28+000	14.65%	100.00	99.92	99.25	96.61	45.93%	24.45%	21.48%	A-7-6 (14)	CL	1.792	17.53%	6.34	8.07		Mezcla con Cemento al 4%
11	01	28+000	10.02%	100.00	99.85	99.38	97.16	46.77%	25.56%	21.21%	A-7-6 (14)	CL	1.802	17.08%	7.02	9.37		Mezcla con Cemento al 6%
12	02	28+000	11.95%	100.00	99.93	98.91	95.24	42.88%	24.57%	18.31%	A-7-6 (12)	CL	1.807	17.49%	6.01	7.64		Mezcla con Cemento al 6%
13	01	28+000	11.32%	100.00	99.93	98.72	93.68	41.75%	24.36%	17.39%	A-7-6 (12)	CL	1.792	18.89%	11.66	14.72		Mezcla con Cemento al 8%
14	02	28+000	10.18%	100.00	99.84	98.71	94.73	38.16%	22.82%	15.34%	A-6 (11)	CL	1.752	18.58%	11.46	14.01		Mezcla con Cemento al 8%