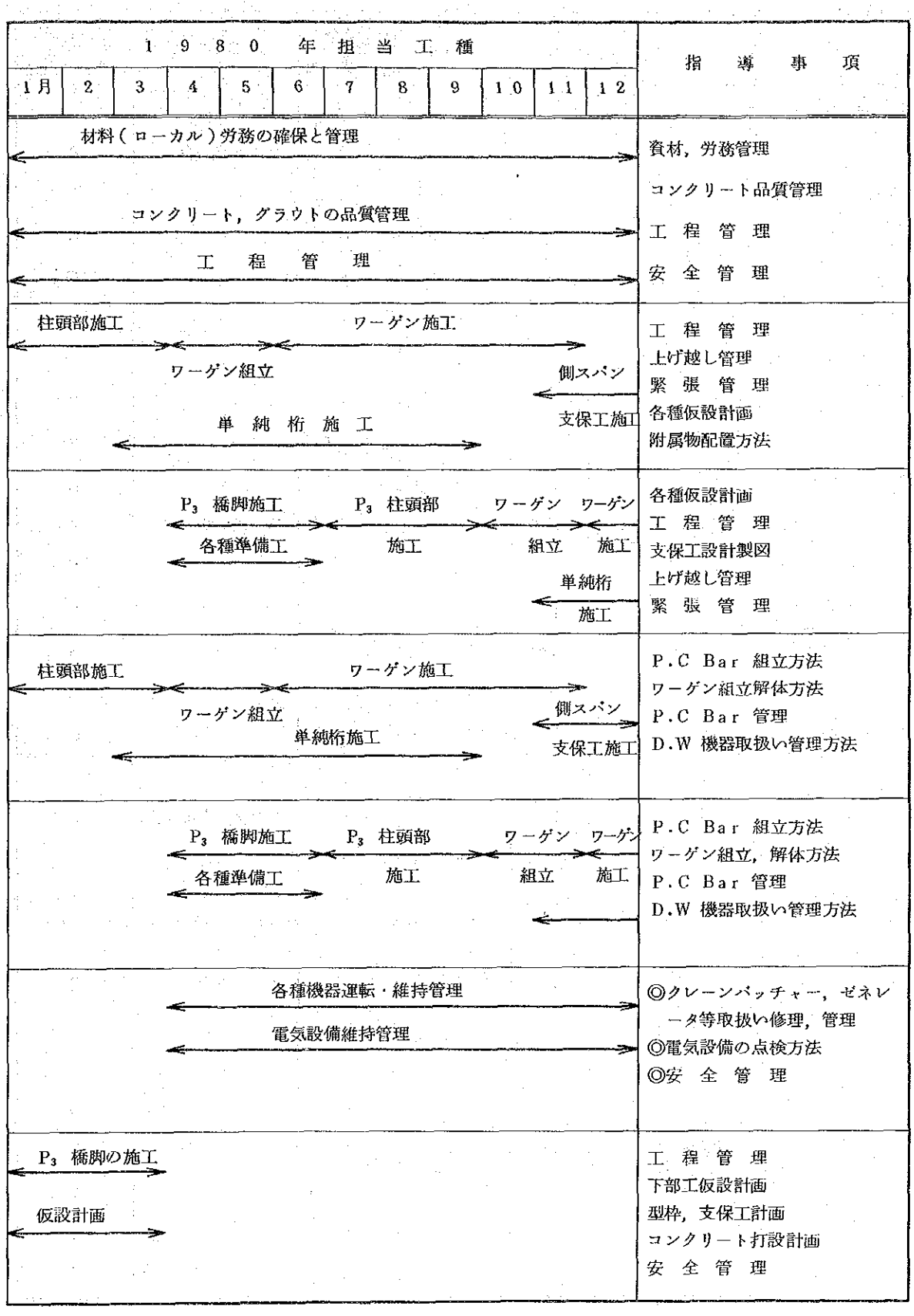
5. 添　付　資　料

O.J.T専門家の職務分担

専門家	カウンターパート		作業員（熟練工・普通作業員）
	E.E(所長)A.E:(主任)	S.A.E(技師)	
橋梁管理施工 高田志郎	・所長(E.E) ウ.キ.モン.イー ・副所長(A.B) ウ.ラ.ミン ・プラント担当 AEウ.ウィンティン		事務員 10名 製図工 5名 鳶工 溶接工 15名 普通作業員 50名
橋梁上部工 (P_2ツワナ側担当) 森伸樹	・ツワナ側上部担当 ウ.ソーヨーエラ ウ・セイ モン ・ツワナ側単純桁担当 AE ウ・ハンミン	ウ.バーワン ウ・トウン デー SAE ウ・トンキン	大工 15名 普通作業員 25名 鳶工 溶接工 10名 事務員 5名 製図工 2名
橋梁上部工 (P_3 タケダ側担当) 河野孝司	・タケダ側上部担当 ウ.ティーミィン ウ.ソー クロウ ・タケダ側単純桁担当 ウ.ハンミン	ウ.ミョーチョエ ウ.ラ グェ ウ.トン キン	大工 15名 普通作業員 25名 鳶工 溶接工 10名 事務員 5名 製図工 3名
橋梁上部工 (P_2 ツワナ側担当) 佐藤正幸	ウ.ソーヨーエラ ウ.セイセン ウ.ハンミン	ウ.バーワン ウ.トウン デー ウ.トン キン	大工 15名 普通作業員 25名 鳶工 溶接工 10名
P.C.指導工 (P_3 タケダ側担当) 松山春夫	ウ.ティー ミイン ウ.ソー グロウ ウ.ハン ミン	ウ.ミョーチョエ ウ.ラ グェ ウ.トン キン	大工 15名 普通作業員 25名 鳶工 溶接工 10名
機械電気 本田正	機械担当 ウ.アウン ミン 電気担当 ウ.タン トン	ウ.シャ.シュエ ウ.ティン.ウィン	機電工 10名 クレーンオペレーター 5名 普通作業員 名
橋梁下部工 池田正和	・所長(E.E) ウ.キ.モン.イー ・タケダ側下部工担当 ウ.ティーミィン	ウ.ラ.グェ ウ.ミョーチョエ	事務員 5名 製図工 3名 大工 15名 普通作業員 25名 鳶工 溶接工 10名


1 9 8 0 年 担 当 工 種
1月
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指 導 事 項
材料（ローカル）労務の確保と管理
コンクリート，グラウトの品質管理
工 程 管 理
資材，労務管理
コンクリート品質管理
工 程 管 理
安 全 管 理
柱頭部施工
ワーゲン施工
ワーゲン組立
側スパン
単 純 桁 施 工
支保工施工
工 程 管 理
上げ越し管理
緊 張 管 理
各種仮設計画
附属物配置方法
P3 橋脚施工
P3 柱頭部
施工
ワーゲン
組立
ワーゲン
施工
各種準備工
単純桁
施工
各種仮設計画
工 程 管 理
支保工設計製図
上げ越し管理
緊 張 管 理
柱頭部施工
ワーゲン施工
ワーゲン組立
側スパン
単純桁施工
支保工施工
P.C Bar 組立方法
ワーゲン組立解体方法
P.C Bar 管理
D.W 機器取扱い管理方法
P3 橋脚施工
P3 柱頭部
施工
ワーゲン
組立
ワーゲン
施工
各種準備工
P.C Bar 組立方法
ワーゲン組立，解体方法
P.C Bar 管理
D.W 機器取扱い管理方法
各種機器運転・維持管理
電気設備維持管理
◎クレーンバッチャー，ゼネレータ等取扱い修理，管理
◎電気設備の点検方法
◎安 全 管 理
P3 橋脚の施工
仮設計画
工 程 管 理
下部工仮設計画
型枠，支保工計画
コンクリート打設計画
安 全 管 理

品　　名　（年度）	数	稼動開始日	スペアパーツの今後の必要性	保管場所	維持管理状況
無償機材					
コンクリートバッチャープラント	1　式	56.10	要	サイト使用中	B
骨材選定プラント	1	〃	〃	〃	B
ディゼルコンプレッサー	1	56. 8	〃	〃	B
クローラークレーン	2	56. 9	〃	〃	C
ドーザーショベル	1	〃	〃	〃	B
油圧掘削機	1	〃	〃	〃	B
アジテータートラック	4	56.12	〃	〃	B
デッキパネル	560	56.10	不要	〃	B
H 型 鋼	268	〃	〃	〃	B
シートパイル	300	〃	〃	使用終了	B
リングビーム	6	〃	〃	〃	B
P.C 鋼 棒	210ケ	—	—	—	B
P.C 鋼 線	20ケ	—	〃	—	B
支	22ケ	57.11	〃	2ケを残して使用終了	B
伸縮継手	5	—	〃	〃	C
54年度					
ボーリングマシーン	1	55. 5	要	センター倉庫	A
ボーリングロッド	1	〃	〃	〃	〃
光波測距計	1	55. 7	〃	サイト事務所	A
55年度					
ディビダークジャッキ	2	58. 3	要	サイト使用中	B
同上ポンプ	2	〃	〃	〃	〃
ダイナモメーター	1	58. 7	〃	〃	B
グラウトポンプ	1	55. 7	〃	〃	B
ワインディングシース製管機	1	57.12	〃	〃	B
バーベンダー	1	57. 1	〃	〃	B
アジテータートラック	4	57.10	〃	〃	B
カーゴトラック	1	〃	〃	〃	B

プロジェクト後の使用計画	プロジェクト終了後の保管場所	使用頻度	有効度	摘　　要
B	現　在　地	B	A	
B	〃	B	A	
B	C．Cモータープール	B	B	
B	〃	A	A	
B	〃	B	A	
B	〃	B	B	
B	〃	B	A	
B	ミンガラドン資材置場	A	A	
B	〃	A	A	
B	〃	E	A	
B	〃	E	A	
—	—	A	A	材　　料
—	—	A	A	〃
—	—	A	A	〃
—	—	A	A	〃
B	上質試験場	E	B	
〃	〃	〃	〃	
B	C．C　本　社	C	A	
B	C．Cモータープール	B	A	
〃	〃	〃	〃	
B	C．C　本　社	D	A	
B	C．Cモータープール	C	A	
B	〃	B	A	
B	〃	B	A	
B	〃	B	A	
B	〃	A	A	

品　　名　（年度）	数	稼動開始日	スペアパーツの今後の必要性	保管場所	維持管理状況
複写器	1	55.12	要	サイト使用中	C
バイブロハンマー	1	56. 9	〃	〃	C
ディーゼル発電機	1	56. 9	〃	〃	C
リバースサーキュレーションドリル	1	57. 2	不要	使用終了	B
スタンドパイプ	1	〃	〃	〃	〃
グラブハンマー	1	〃	〃	〃	〃
カウンターウエイト	1	〃	〃	〃	〃
水中サンドポンプ	2	〃	要	サイト使用中	B
〃	2	〃	〃	〃	〃
56年度					
中型フォルバウワーゲン	2	58. 3	〃	サイト使用中	A
コンクリートブレーカー	1	58. 4	不要	〃	B
バイブロハンマー	1	57.11	要	〃	C
電動チェーンブロック	3	—	〃	サイト倉庫	A
8tonトラック	1	58. 2	〃	サイト使用中	B
バイブレーター	5	58. 4	〃	〃	A
P.C 鋼棒	13	58. 4	不要	〃	A
リバース機器	1式	58. 6	〃	サイト	A
ベルトコンベアー	9	58. 4	要	サイト使用中	A
57年度					
P.C 鋼棒	12.4ton	58. 4	不要	サイト使用中	A
ベルトコンベアー	5	58. 4	要	〃	A
コンクリート型枠作動機	10	58. 5	〃	〃	A
グランドホッパー	2	58. 4	〃	〃	A
ディビダークジャッキ	1	58. 9	〃	〃	A
グラウトミキサー	1	58. 6	〃	〃	A

プロジェクト後の使用計画	プロジェクト終了後の保管場所	使用頻度	有効度	摘　　要
B	C．C　本　社	A	A	
A	C．Cモータープール	C	A	
A	〃	C	A	
A	〃	—	—	
〃	〃	—	—	
〃	〃	—	—	
〃	C．C　本　社	—	—	
B	C．Cモータープール	B	B	
〃	〃	〃	〃	
B	〃	A	A	
B	〃	C	B	
B	〃	C	A	
C	〃	—	—	
B	〃	A	A	
B	〃	B	A	
—	—	—	A	材　　料
A	C．Cモータープール	D	B	
B	〃	B	A	
—	—	A	A	材　　料
B	C．Cモータープール	B	A	
B	〃	D	B	
B	〃	B	A	
B		B	A	
B		C	B	

S. O
S. O
S. O

O.J.T EE. AE

NAME	AGE	EDUCATION	PAST EXPERIENCE
U KHIN MANUG YI	50	A.G.T.I (CIVIL)	Major P.C Bridge Constructions Highway Constructions. Road and Bridge Plannings, Soil Laboratory Works.
U HLA MYINT	47	B.Sc ENGG. (CIVIL)	Road and Bridge Planning Factory Construction. Road Construction
U WIN TIN	45	B.Sc ENGG. (CIVIL)	Construction and Maintenance Works of Roads, Bridge and Building Works.
U TIN MAUNG CO	49	B.Sc ENGG. (CIVIL)	Construction and Maintenance Works of Roads, Bridge and Building Works.
U SAW YO E LA	46	A.G.T.I (CIVIL)	Major Bridge Construction and Road Construction Works
U HTAY MYINT	37	B.E (CIVIL)	Attended the B.E.T.C 1st Batch Construction and Maintenance works of roads and bridges, building designs and Factory construction works.
U SAW GLOW	39	B.E (CIVIL)	Attended the B.E.T.C 1st batch Construction and Maintenance Works in Taungyi Township.
U HAN MIN	36	B.E. (CIVIL)	Attended the B.E.T.C 2nd batch. Constructed the factory buildings
U SEIN MAUNG	32	B.E (CIVIL)	Attended the B.E.T.C 3rd batch and and construction works in buildings and roads and building design works.
U SAW RONALD WIN	38	B.E. (CIVIL)	Construction and maintenance works of roads and bridge in townships. Attended B.E.T.C 3rd batch
U AUNG MIN		B.E (AUTO MOBILE)	Repairing and Planning of Heavy equipments, plant and vehicles
U THAN TUN	37	B.E (ELECTRICAL)	All electrical works

I - STAFF OFFICER
I
III

Q EE EXECUTIVE ENGINEER
AE ASSISTANT ENGINEER
SAE SUB ASSISTANT ENGINEER

SPECIALIZED JOBS	ARRIVAL DATE	RANK	R E M A K S
P.C Bridge Construction	1979-7	EE	Constructed New Thaketa Bridge, Ye Bridge, Kamyawkin Bridge, Samon Bridge Rangoon Mandalay Highway Improvement Works.
Factory Constructions	1979-7	AE	Constructed Wazi Minting Factory, Sale Fertilizer factory, Sale Mola bituminous road and minor bridges.
Concrete Production and quality control	1980-9	AE	Township Engineer in Kyaik Hto Township.
Road and Bridge structions	1981-1	AE	Road and bridge construction works, in Mogok, Kyaukse and Mandalay township.
P.C Bridge Construction Works	1980-9	AE	Constructed Ye Chaung bridge, Kamyawkin bridge and Donthami bridge and road constructions in New Thaketa, Bridge and North Okkalapa new sattelite town.
P.C. Bridge Construction Works	1981-4	AE	Township Engineer in Gyobingauk township.
P.C. Bridge Construction	1981-4	AE	Township engineer in Taungyi township.
P.C. Bridge Construction	1982-4	AE	Constructed Light Vehicle manufacturing plant in Htonbo.
P.C. Bridge Construction	1983-	AE	Construction works in Pakakku township and dam construction in Pugyi Water Supply Project and building design works for Pyithu Hluttaw Construction Project.
Concrete Produc-Production & Quality Control	1983-4	AE	Township engineering works in Minhla, Pa an and Thaton townships.
Heavy equip-ments and plants	1981-1	AE	Road construction works in Northern Shan state Repair and planning works in Qua Corporation, Base workshop (South) and Mechanical Equipment Company (South)
Electrical Power	1981-3	AE	Township Engineer in Insein Towhship and as construction Engineer in Kyunchaung Gas Turbine Project.

NAME	AGE	EDUCATION	PAST EXPERIENCE
U BA WAN	39	G.T.I. (CIVIL)	Construction of buildings, Airfield, ads and major steel bridge.
U MYO KYWE	37	A.G.T.I. (CIVIL)	Construction of new roads and bridges and repairing of roads and bridges.
U HIA NGWE	37	A.G.T.I. (CIVIL)	Construction of P.C bridge and factory construction works. Also served as draftsman and store-keeper.
U MYINT THEIN	35	A.G.T.I. (CIVIL)	Construction of roads in Chin state and quantity survey works and dam construction works.
U THAN AYE	32	G.T.I. (CIVIL)	Maintenance of roads and bridges and factory construction works.
U TUN KYI	45	G.T.I. (CIVIL)	Construction of buildings and factories and new bituminous roads.
U TUN KHIN	39	G.T.I. (CIVIL)	Construction of major P.C bridges and minor R.C.C bridges Construction of factory buildings.
U HLA SHWE	32	G.T.I. (CIVIL)	Construction of building and maintenance of roads and bridges.
U CHIT MYA	59	I.S.T.C. (CIVIL)	Construction of airfields and maintenance of roads and bridges.
U KYAW NYEIN	32	G.T.I. (CIVIL)	Production of glue laminated structures, construction and maintenance of buildings.
U MYA SHWE	44	G.T.I. (MECHANICAL)	Repair works of Heavy machines Equipment and vehicles.
U TIN NU	37	A.G.T.I. (MECHANICAL)	Repair works of Heavy machines, Equipments and vehicles.
U TIN WIN	37	A.G.T.I. (ELECTRICAL)	All Electrical Works

SPECIALIZED JOB	ARRIVAL DATE	RANK	R E M A R K S
P.C Bridge Construction	1981-6	SEA	Construction of Nyaung Co Airfield, roads and bridge in Natogyi, Pyinmana and Kyaukpadaung township. Constructed one major steel bridge of 356 feet span at Ngaleik chaung.
P.C Bridge Construction	1981-1	SEA	Constructed Samon and Dan chaung major P.C bridges and minor bridges in new Rangoon Mandalay Expressway constructions and township engineer in Myitha township.
P.C Bridge Construction	1981-4	SEA	Construction of Khaipaung P.C bridge in Kyone pyaw township and factory construc-tions in Kyone pyaw Jute Mill project.
Road Construction Works	1981-4	SEA	Construction of roads in Chin state and quantity survey works in Construction Corporation Head Quarter.
Concrete Pro-duction and Quality Control	1981-4	SAE	Maintenance works in Paungde township and factory construction works at Spinning and wearing machine Project at Paleik.
P.C Bridge Construction	1981-4	SAE	Construction of factory buildings in Plywood factory No.3 at Swa and improve-ment of Waw - Sittaung road.
P.C Bridge Construction	1981-1	SAE	Construction of Samon P.C bridge and other minor R C C bridges. Construction of Ywathitkyi textile mill at Sagaing and other buildings in Shwebo Township.
P.C Bridge Construction	1981-4	SAE	Construction buildings in Nyaung Lay Bin township maintenance of roads and bridge in Toungoo township.
Asphalt Road Construction	1981-4	SAE	Construction of airfields at Mazin in Sand and Akyab airfield constructions. Building Constructions in Political Science School at Phaungyi and as township engineer at Kayan.
P.C Bridge Construction	1983-10	SAE	Production of glue laminated structures at Glulami: factory and as township engineer in South Okkalapa township and in drawing section at Karaweik Construction Project.
Repair of Heavy Machines	1981-10	SAE	Repair works of Heavy machines, equipments and vehicles at Base Work shop (South) and National Housing Board
Repair of Heavy Machines	1982-1	SAE	Repair works of heavy machines and vehicles at machanical Equipment company (south) and Heavy Industry Project
Electrical Works	1982-4	SAE	Electrical Works at Rangoon Mandalay Express-way Construction Project, Kun lone bridge project in Shan state and Yazin Agriculture Institute Construction Project.

指導項目による成果表

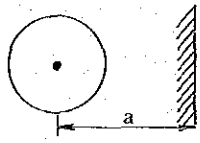
A：日本人なしで十分こなせる
B：日本人がなしでは一抹の不安あり
C：日本人なくしては不可能

指導項目	カウンターパート A・E	S.A.E
工程管理	E.E ウ.キモンイー ウ.ラ.ミン	—
材料管理		ウ.チィー.シャ ウ.ミィン.ティン
安全管理	ウ.キ.モン.イー ウ.ラ.ミィン	
P.C鋼棒貯蔵	ウ.ティ.モン.ウ	ウ.ミィン.ティン
P.C鋼棒加工	ウ.ソーヨーエラー ウ.ティ.ミィン	ウ.バーワン.ウ.トンヂー ウ.ラ.グェ ウ.ミョーチョエ
P.C鋼棒配置（継手も含む）	ウ.セイ.モン ウ.ソー.グロウ	ウ.バーワン.ウ.トンヂー ウ.ラ.グェ.ウ.ミョーチョエ
P.C鋼棒緊張	ウ.ソーヨエラ.ウ.セイモン ウ.ティ.ミィン ウ.ソーグロー	ウ.バー.ワン.ウ.トンヂー ウ.ラ.グェ.ウ.ミョーチョエ
ワーゲン組立撤去	〃	〃
ワーゲン移動セット	〃	〃
バッチャープラント維持管理	ウ.ウィン.ティン ウ.ソードカレド.ウィン	ウ.タン.エー
コンクリート打設管理	ウ.ソーヨーエラー.ウ.セイモン ウ.ティ.ミィン ウ.ソー.グロー	ウ.バーワン.ウ.トン.ヂー ウ.ラ.グェ.ウ.ミョーチョエ
型枠製作・組立	〃	〃
上げ越し管理	〃	〃
グラウト	〃	〃
鉄筋・加工組立	〃	〃
機械維持管理	ウ.アウン.ミン	ウ.シャ.シュエ ウ.ティン.ヌ
電気関係保守	ウ.タン.トン	ウ.ティン.ウィン
単純桁の施工	ウ.ハン.ミン	ウ.トン.キン
クレーン運転技術	ウ.アゥン.ミン	ウ.ミャ.シュエ ウ.ティン.ヌ

評　価	摘　要
B	工事経験がないので先が続めない。
A	管理はこの国の方式でやっているが，材料不足からの原因が多い。
C	安全面では大いに不安がある（労務者，エンジニアの安全意識の欠如）
B	材料の仕分け，種類の確認方法については不十分
B	未経験の者が未だ多少いる。プロジェクト終了時はAと考えられる。
B	〃
B	〃
A	概ね習得は終了したものと考えられる安全面，段取りに不安を残す。
B	未経験者が多少いる　　プロジェクト終了時はA。
A	概　ね　良　好
B	一抹の不安あり
A	概ね良好も，材料不足を材料の入手難あり。
C	経験不足（１橋の経験では不可能）
C	工事未着手（一部のみ）
A	非常に良い。
B	国情にもよるが，修理技術は良いがメンテナンスが今一歩。
B	〃
A	経験豊富で殆んど必配ない。
B	運転技術者（５名）のうち概ね良好なるもE掛け，段取りに不安あり。

Thuwanna 橋の設計に係る問題点

No.	問題項目	対処	今後の問題
1.	設計に用いる平均導入張力が基準を超えている。	鋼棒の本数を変えることができなかったので，ほとほどの鋼棒に限界の緊張力を導入するようにしている。	○設計で仮定したよりも実際の方が摩擦が大きい場合や，間違いが生じた場合には，所要緊張力が導入されない事が心配される。
2.	施工時の解析のうち，①側径間支保工施工時，②中央径間支保工施工時，の検討（応力解析およびたわみ計算）が行なわれていない。	センターにおいて実施	
3.	緊張計算が理論的でない。 No.1に関連して，施工時導入張力が許容値を超える箇所がある。 No.2に関連して弾性短縮量の計算が概略すぎる。	センターにおいて当初設計を変更	○No.1に関連して，鋼棒に限界の緊張力を導入するため，緊張計算に特殊な方法を用いており，DWの標準的な方法も教える必要がある。
4.	ジャッキ・ラップにより支点調整をすることにしているが，No.2の解析がないため，ジャッキの調整量が解析できず，したがって不足している。 また，橋脚P_1，P_2にはジャッキ・セットの設計がなされていなかった。 更に，プロジェクト開始時の調査では，支点調整のためのジャッキがピルマにあるとの事であったが，実際には支点調整に適用できるジャッキが見つからなかった。	概略検討で支点調整なしで応力的に橋梁が耐え得るかをセンターで検討し，その結果がOKであったので，支点調整しなかい方式に変更した。 No.1～4に対して，センターで専門家の指導のもとに，カウンターパートによりこれらの検討を行なった。すなわち， ①施工時の応力解析 （弾性短縮の解析含む） ②システムクリーンの解析 （クリープ結果） ③完成系の応力解析（活荷重，地震，支点沈下は当初設計の値を用いた） ④緊張計算 ⑤上げ越し量の計算 この作業は1982年7月ごろスタートし，本年3月ごろ一応完了したが，多少の鋼材図心位置の変更や考え違いがあり，5月まで修正作業が必要であった。	○支点調整に対して，当初の設計方針を変えたため，現地に解析の手本となるべきものがなく作業に手間どった。 ○また，時間的に早く結果を得ようとしたため，解析結果のまとめ方が決して良いものとは言えず，今後，多少の編集作業が必要である。 ○とりまとめ作業が遅れたので，上部工施工前に，設計計算書，図面一式が揃えられなかった。
5.	中央ヒンヂ部における局所的な正の曲げに対して解析ミスがあった。	鋼材継手位置の図面修正の際に，千代田Cで修正済。	
6.	鋼材形状の解析ミスがあり，実長に差が生じた。	同上	

No.	問題項目	対処	今後の問題
7.	横方向の解析で，不足や疑問点がある。 ①床版用横締め鋼棒の緊張計算がない。 ②端部および中央ヒンヂ部の横桁の解析がなされていない。 ③柱頭部横桁がＲＣ構造となっているが，通常はＰＣ構造。 ④床版の解析書に示された説明の算式にミスが多い。（解析は電算機で行なわれたので，結果はＯＫ）	No.7 ①センターで計算済 ②センターで計算予定 ③疑問点（ただし，柱頭部は施工済） ④センターで修正済	○センターの訓練として行なうには理由が付けにくいし，正規の訓練の妨げとなる。 ○また，この件を担当する専門家の負担が大きくなる。
8.	単純桁部，横桁の鋼材に対する緊張計算がなされていない。	センターで計算予定	同上
鋼棒配置			
9.	アンカーの縁辺距離の不足の箇所がある。  ＤＷ基準では a≧13.5 cm であるがこれ以下のものがある。	千代田Ｃで修正済 一部現場で対処。	
10.	当初設計で，斜鋼棒とワーゲンアンカーがぶつかる所がある。	配置変更し，桁寸法（ウェブ厚）の変更を行なった。	
11.	柱頭部でカプラーの上に横締めがのるようになっている。（カップラーシースがつぶれるため，横締めはカップラーの上にはのせられない。）	鋼棒配置時に限られた鋼棒のやりくりで修正しようとしたが，現実には難しい。横締め鋼棒の配置を大幅に変更した。（設計図と異なる配置となる。）	○横締めは計算通りの配置されていない。 ○一部，カップラーの上に配置せざるを得ず，カップラーがつぶれること及び曲げ加工と合わないため，配置が難しいという困難が生じた。 ○P_3 についても同じ困難が予想される。
12.	ＰＣ鋼棒が直線および滑らかな曲線的に配置されていない。鋼棒のアンカー順序に対する配慮が欠けており，アンカー配置のために，無理なスペースをとっている。 	対処の方法なし（設計図通り行なっている）	○緊張時摩擦が計算より大きくなり，また導入緊張力が最高圧力近いので所要緊張力を導入することが非常に困難である。

No.	問題項目	対処	今後の問題
13.	断面図（施工図）チエックが十分になされていない。 カップラー長，緊張方向，グラウト排出孔等の表示が不足。	サイトおよびセンターで全て補い，図面を修正した。	○専門家の負担が大きくなる。
14.	アンカーが片寄りすぎている。	設計図のまま行なっている。	○アンカー2本のブロックで，ワーゲン吊材，型枠等がジャッキとぶつかり緊張できない場合はワーゲンを少し出し，緊張し，その後またワーゲンを出すなど作業が重複し複雑となり，また危険もない。
鋼棒組立図			
15.	ネジ長が分類されていないため，ネジの種類が多い。 一般にはネジ長＝70＋60n（nは整数）mm 例　70,130,190,250,…	変更なし。（ＰＣ鋼棒のチェックを厳しくしている。）	○鋼棒の管理に大変な手間がかかる。 ○カップラーねじ込み長のチェックが難しい。
16.	カップラー・シース長は250,350,450の3種のみである。（通常は250から50mmピッチ）	変更なし。	○特に問題はない。
17.	Aアンカー側のネジ長が余裕がない（ネジ長不足の可能性がある）	変更なし。	○緊張端のＰＣ鋼棒の突き出し量を常に5cmにチェックしなければならない。又棲型枠とのアジャストができない。施工に細心の注意が必要。
18.	桁端鋼棒は単純桁施工後横桁が支障して緊張できない。	単純桁の端横桁を後打ちすることとした。	○単純桁の横桁を切欠き，主橋緊張後横桁を打設することになる。横桁のＰＣケーブル鉄筋等配置が困難である。作業が二重になる。
その他			
19.	ワーゲンの両トラス間隔を間違えて発注，製作した。	ビルマにて，　工修正した。	ワーゲン設計図の修正が必要。
20.	排水桝がワーゲン吊材（型枠支保Ｈ型鋼）とぶつかりセットできない。	桝は箱抜き後，後セットすることとした。鋼棒の位置を変更。	
21.	ワーゲーンが水に浸かる。		

LIST OF APPARATUS TO BE SUPPLEMENTED TO THE CONCRETE LABORATORY

SR. NO. (1)	NOMENCLATURE (2)	SPECIFICATIONS (3)	UNIT (4)	QTY (5)
1	SONOMETER WITH BUILT-IN OSCILLOSCOPE (FOR NON-DESTRUCTIVE TEST OF CONCRETE)	220 V; A.C; 1P; 50 Hz Complete with instruction manual and Trouble Shooting Manual	No.	1
2	STRAIN-METER; STATIC TYPE WITH SWITCH BOX AND ACCESSORIES	For the measurement of strain. (Inclusive of Instruction & Trouble Shooting Manuals.)	No.	1
3	STRAIN GAUGE TYPE PL-60, PL-30	(120 ± 0.3 Ω)		
4	P-2 ADHESIVE (STRAIN GAUGE CEMENT)	Drug A & B		
5	LOAD CELL	Capacity 400 t_f	No.	1
6	CONCRETE AIR METER	ASTM C-231-75	No.	2
7	BALANCE	Capacity: 300 gm Sensitivity: 0.01 gm	No.	4
8	BALANCE	Capacity: 5 Kg Sensitivity: 0.1 gm	No.	2
9	UNIVERSAL TESTING MACHINE	COMPRESSION & TENSION Capacity: 400 Tonne (In 3 Ranges) 220V; A.C.; 1P; 50 Hz (Inclusive of Tension Grippers)	No.	1

SR. NO. (1)	NOMENCLATURE (2)	SPECIFICATIONS (3)	UNIT (4)	QTY (5)
10	PORTABLE COMPRESSION MACHINE	Hydraulic/Manual Capacity: 200 Tonne	No.	2
11	FLEXURE ATTACHMENT	-	No.	2
12	MOTORIZED FLOW TABLE	ASTM C-230 220V; A.C; 1P; 50 Hz	No.	2
13	CHAPMAN CONCRETE FLASK	ASTM C-70	No.	12
14	BLAINE FINENESS APPARATUS with Manometer Oil	ASTM C-204	Set.	2
15	LE CHATELIER FLASK	ASTM C-188	No.	12
16	BALANCE	Capacity: 40 Kg Sensitivity: 1 gm	No.	2
17	CONCRETE TEST HAMMER	SCHIMDT TYPE	No.	2
18	STANDARD SIEVES COARSE SERIES	Made of Brass 80 mm to 5 mm	Set.	3
19	STANDARD SIEVES FINE SERIES	Made of Brass 5 mm to 0.074 mm	Set.	3
20	SIEVE COVER AND PAN	-	Set.	6
21	MECHANICAL SIEVE SHAKER	To fit in 8 sieves 220V; A.C.; 1P; 50 Hz	No.	2

LIST OF PUBLICATIONS REQUIRED FOR BETC. LIBRARY

Japanese Specifications in English on:-

- Cement
- Aggregales (Fine Aggregates & Coarse Aggregates)
- Cement concrete
- Rigid pavement
- Flexible pavement

Manuals in English on:-

- Cement concrete
- Rigid pavement construction & maintenance
- Flexible pavement construction & maintenance
- Substructures

Journals, Periodicals, Annual reports, Research papers on:-

- Concrete
- Soil mechanics
- Soil dynamics
- Movable bed hydraulics (erosion, scour, etc.)
- Rigid pavements
- Flexible pavements
- Pavement desires
- Substructures
- Highway economics
- Asphalt concrete

Seminar Publications on:-

- Highway construction seminar
- Bridge engineering
- Seismic engineering
- Hydrology

Also:-

* Proceedings of soil mechanics and foundation engineering conference (latest two)
* Proceedings on ingernational road federation conference (Held in Japan in 1977)
* JCA journals and annual reports
* JRA journals and annual reports
* JSCE journals and annual reports

NOTE:

Will be very useful, if important previous issued to all future issues are available.

MINISTRY OF CONSTRUCTION

CENTRAL TRAINING CENTRE, THUWUNNA

PROGRESS REPORT ON BRIDGE ENGINEERING TRAINING IN CENTRE

1. Introduction

The Bridge Engineering Training Project under Technical Cooperation between Burma and Japan started on 12th July, 1979. After completion of the project period of four years, it is extended two more years up to 11th July, 1985, after signing the Supplementary Record of Discussions in December, 1982. This report gives a brief information about the previous three courses and the up-to-date progress of the present training course.

2. Brief informations about previous three courses

2.1 After signing the Original Record of Discussions on 12th July, 1979, the project started with a preparation period up to the opening of the first training course on 21st April, 1980. In that period, Japanese Experts and counterparts made necessory preparations on the training schedule and curriculum.

2.2 Each course took a training period of about eleven months and was divided into three semesters.

2.3 Total number of trainees who completed the last three courses was 57. The trainees were from Construction Corporation, Railways Corporation, Irrigation Department, Rangoon Institute of Technology, Rangoon City Development Committee and Ministry of Defence.

2.4 Trainees had study basic civil engineering subjects in first semester and basic bridge engineering subjects in second semester. In third semester they had done some actual bridge design works.

2.5 During the training period the trainees made study trips to actual road and bridge construction Sites. As on-the-Job training, they could study the Construction works of Thuwunna Bridge.

2.6 The Counterparts also got some training in study of Japanese Highway Bridge Specifications, actual bridge design works, standardisation of bridges, microcomputer programming and etc.

2.7 During the past project period, 20 Burmese engineers got a chance to take counterpart training in Japan.

3. Progress on the present fourth training course

3.1 This fourth training course is mainly to emphasize in study of the design of Dywidag system bridge, based on Thuwunna Bridge.

3.2 The training period will take two years. In the first year, the trainees are to study the design of Thuwunna Bridge in detail, and in the second year an actual Dywidag system bridge is to be designed as an exercise.

3.3 Ten trainees, chosen from counterparts and trainees of the previous courses are now taking training.

3.4 Training Schedule is as per appendix (A). Based on this schedule, detail training schedule is discussed and prepared in every month.

3.5 In this course, training schedule is implemented as a design office training. Trainees have to study sometimes individually and sometimes in groups. After completion of each part, a presentation meeting is held among all the trainees and the guiding experts.

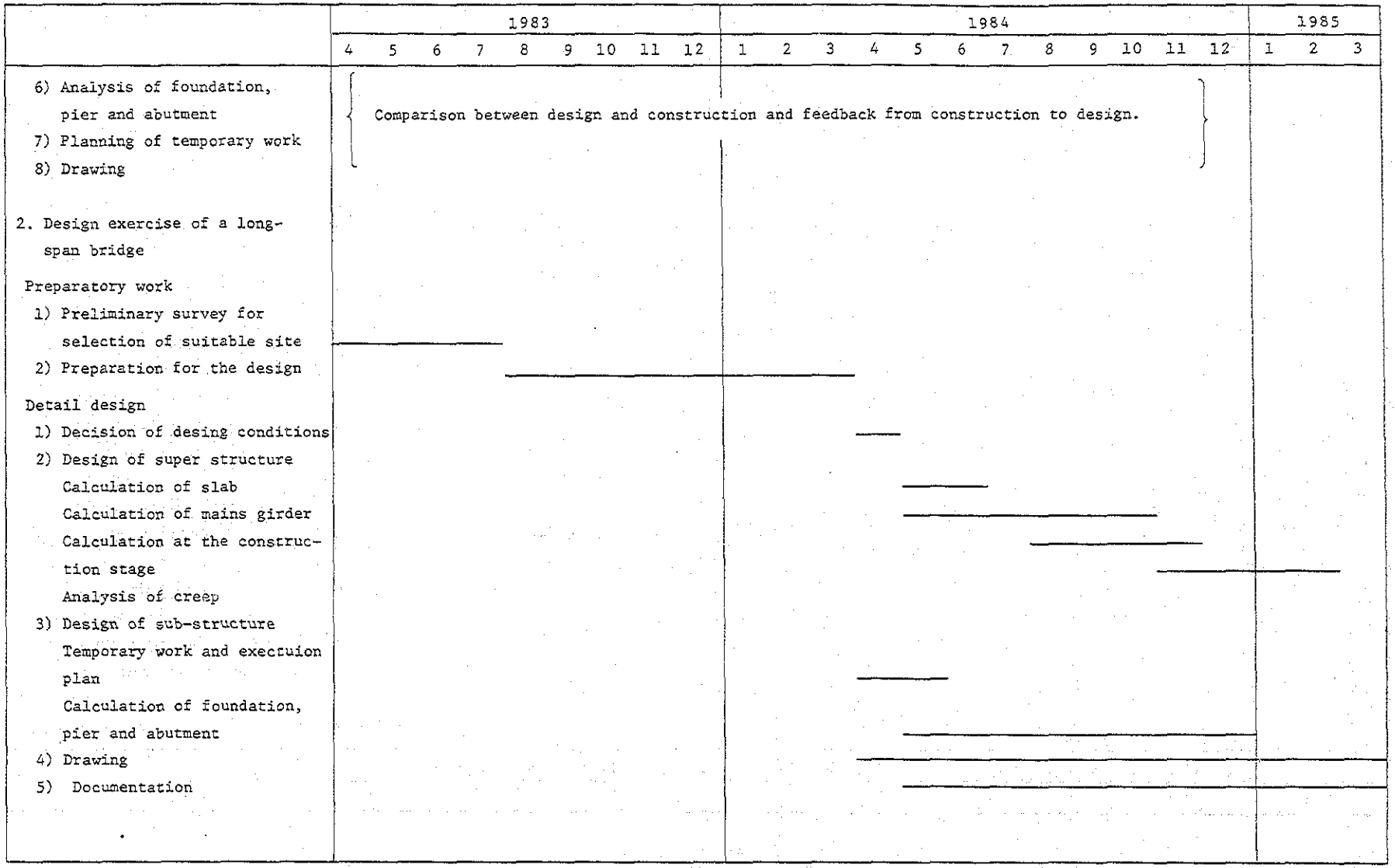
3.6 At present six trainees in the first group are studying the design works of superstructure, including microcomputer programming, the other four in second group are studying the design works of substructure.

3.7 Seven draftsmen are also attached, to take training in drawing works for Dywidag system bridge.

3.8 As on-the-Job training the trainees are also studying the detail of the superstructure works at Thuwunna Bridge site.

APPENDIX (A) THE TRAINING PROGRAMME FROM 1983 APRIL TO 1985 MARCH

	1983									1984												1985		
	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
0. Preparation	—																							
1. Detail study on the design of Thuwunna Bridge Supplementary calculation & report preparation	—	—	—	—	—																			
Computer programming					—	—	—	—	—	—	—	—	—											
1) Stress resultants due to dead load																								
2) Influence lines																								
3) Stress and strength																								
4) Transverse analysis																								
5) Stress resultants at cantilever erection																								
6) Camber																								
7) Creep																								
8) Others																								
Study of detail design & exercise		—	—	—	—	—	—	—	—	—	—	—	—											
1) Preliminary work																								
2) Design condition																								
3) Decision of type and main dimensions																								
4) Analysis of main girder																								
5) Calculation at the construction stage																								


1983
4 5 6 7 8 9 10 11 12
1984
1 2 3 4 5 6 7 8 9 10 11 12
1985
1 2 3
6) Analysis of foundation, pier and abutment
7) Planning of temporary work
8) Drawing
Comparison between design and construction and feedback from construction to design.
2. Design exercise of a long-span bridge
Preparatory work
1) Preliminary survey for selection of suitable site
2) Preparation for the design
Detail design
1) Decision of desing conditions
2) Design of super structure
Calculation of slab
Calculation of mains girder
Calculation at the construc-tion stage
Analysis of creep
3) Design of sub-structure
Temporary work and execruion plan
Calculation of foundation, pier and abutment
4) Drawing
5) Documentation

	1983									1984												1985		
	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
3. Design exercise of sub-structure of short-span bridges																								
4. Study trip																								

Ministry of Construction

Central Training Centre

Thuwunna

BRIDGE ENGINEERING TRAINING PROJECT

Progress Report

on

Bridge Engineering Training Centre.

May, 1982.

Ministry of Construction
Central Training Centre
Thuwunna

Progress report on Bridge Engineering Training in Centre.

1. Introduction

This project is the Technical Cooperation between Burma and Japan under Colombo Plan. It started after the signing of Record of Discussions on 12th., July, 1979. This report covers the progress of the project in the training centre up to May, 1982.

2. Organization of the project (Training Centre).

The Organization of this project in the training centre is as per annex I.

3. Outline of the project (Training Centre)

The outline of the project (Training Centre) is given as per annex II, based on the master plan of orginal R/D and actual conditions.

4. Preparation Period.

After signing the Record of Discussions, the design of Thuwunna was started in Japan by Chiyoda Engineering Consultants. Then 5 Burmese engineers were sent to Japan for Counterpart training from 20th., September to 25th November, 1979.

On 20th., December 1979, the 3 long term experts, headed by Team Leader Mr. Imamura arrived for the preparations to start the bridge engineering training courss. The experts and counterparts made discussions in preparing the curriculum for each subject. After arriving 3 more long term experts in March ,1980, the curriculum for each subject was finalised.

5. Training for the trainees and counterparts

5.1.1 First Training course.

First training course was opened by the Minister for Construction on 21st April, 1980. 20 Nos of trainees attended the course:

Construction Corporation	- 14
Railways Corporation	- 1
Ministry of Defence	- 2
Irrigation Department	- 1
Rangoon Institute of Technology.	- 1
Rangoon City Development Committee.	- 1
Total	- 20

5.1.2 Training schedule

The course was divided into three semesters, and training schedule was as per annex III.

5.1.3 Implementation of the schedule

In each semester, the following subjects were taught both in theory and practical exercise.

(a) First semester

(i) Structural Mechanics
(ii) Soil Mechanics and Foundation Engineering.
(iii) Reinforced Concrete.
(iv) Prestressed Concrete
(v) Concrete material.

Some special lectures on bridge engineering were given on Saturdays. Concrete materials were tested and design mixes were made in the concrete laboratories.

(b) Second semester

Basic ideas of bridge design were given to the trainees, and the they had to do practical design exercises in the following subject.

(i) Dywidag system long span bridge.
(ii) Reinforced concrete bridges.
(iii) Prestressed Concrete bridges.
(iv) Foundations.

(c) Third Semester

The trainees were divided into three groups to do actual design works.

Group 1 : Check of Dywidag System bridge of Thuwunna Bridge.

Group 2 : Check of caisson and Pile foundation of Thuwunna bridge.

Group 3 : Design of Pegu over head bridge.

During the third semester, short term experts gave some special lectures on quality control of concrete, concfete mixing plant, earthquake engineering, foundation engineering and micro-computer.

5.1.4 Experts and counterparts.

Lectures were given by counterparts under the guidance and assistance of experts. In same lectures, the experts explained themselves. Distribution of experts and counterparts for each subject was as per annex IV.

5.1.5 Training for Counterparts.

In the first and second semesters, all experts and counterpaets were engaged with preparations of lecture notes, and training for counterparts could not be carried out. In the third semester, the counterparts took part together with the trainees for the design of Pegu overhead bridge, check of Dywidag system of Thuwunna bridge and check of pile and caisson foundation of Thuwunna bridge.

5.1.6 On-the-Job Training.

As Thuwunna Bridge construction was not started yet, the trainees could not get on-the-job training in long span bridge construction. But the trainees got a chance to visit the Donthami bridge site near Thaton and Bassein-Monywa Higyway Project to study actual P.C bridge construction and road works.

5.1.7 Counterpart training in Japan

As per annex V, during the first course, one trainee from Railways Corporation and one from Ministry of Defence got a chance to go to Japan to have counterpart training in the field of concrete and foundation. After their return, they joined the training centre as counterparts.

5.1.8 Review on the first course.

After completion of the first training course, the trainees could get the basic ideas of concrete bridge design and some of the trainees got high impression in their training. Out of the proposed counterparts among them, four trainees were assigned as counterparts in the training centre and at Thuwunna Bridge Site. One of the outstanding trainees could go to Japan for futher training in 1981, and three trainees are now taking counterpart training in Japan.

5.2 Second Training Course

5.2.1 Second Training Course was started on 27th., April 1981. 18 trainees attended the course:

Construction Corporation	-	12
Railways Corporation	-	1
Ministry of Defence	-	2
Irrigation Department	-	1
Rangoon Institute of Technology	-	1
Rangoon city Development Committee.	-	1
		18

The trainee from Irrigation Department had to stop the training in the first semester due to his health condition. Only 17 trainees completed the course.

5.2.2 Training schedule

The course was also divided into three semesters and training schedule was as per annex VI.

5.2.3 Implementation of the schedule

Schedule fo training was carried out as follows:

(a) First semester.

(i) Structural Mechanics.
(ii) Soil Mechanics and Foundation Engineering
(iii) Reinforced concrete.
(iv) Prestressed concrete.
(v) Concrete Material.

(b) Second Semester.

(i) Dywidag system long span bridge.
(ii) Reinforced concrete bridges.
(iii) Prestressed concrete bridges.
(iv) Foundations.

(c) Third semester.

The trainees were divided into groups to do actual bridge design works:

(i) Design of Ngawun bridge, using Dywidag system long span bridge.
(ii) Design of Ngawun bridge, using multispan system of 30m span P.C girders.
(iv) Design of Zawgyi chaung bridge
(v) Design of Kunchaung bridge.

In Design exercise of Reinforced Concrete and Prestressed Concrete bridges, the trainees had made calculations for various spans and sections for the future standard bridges.

The trainees also made a report on their study trip to Magwe. They checked the structure of Yin Chaung bridge and the foundation of Pin Chaung bridges, and proposed the possible foundations for Daung Nay Chaung bridge under the guidance of Japanese experts and counterparts.

5.2.4 Experts and Counterparts.

The lectures were given by the experts and counterparts as per annex VII.

5.2.5 Training for Counterparts.

During the second course, the counterparts could study the specifications of Japan Road Association together with the experts. Bridge design works were started under the guidance of the experts:

(i) Design of Pegu overhead bridge.
(ii) Check of Caisson and reverse pile for Thuwunna bridge.
(iii) Design of Standard Reinforced Concrete bridges
(iv) Design of Standard Prestressed Concrete bridges.
(v) Micro computer programming by short term expert in the last semester.

5.2.7 On-the-job training

The trainees could study the following works at Thuwunna Bridge site during second and third semesters.

(i) Temporary bridge works
(ii) Temporary island works.
(iii) Caisson works.
(iv) Reverse pile works.
(v) Concrete mixing plant.

The trainees made also the study trips to Donthami bridge construction and the bridge sites in Magwe Division and Bassein-Monywa highway Project.

5.2.7 Counterpart training in Japan

During the second course, a group of 5 persons were sent to Japan for counterpart training shown as per annex V.

5.2.8 Review on of the second course.

In the second course, the lectures became more well prepared and the trainees could do mofe design exercises. At the end of the course, in the Design Works Presentation meeting the trainees and counterparts could present their design works, done in the third semester. From the trainees, 4 trainees were selected as counterparts: 2 for the centre and 2 for Thuwunna bridge.

5.3 Third Training Course

5.3.1 The third training course is how under way starting from 26th., April, 1982. Now 20 trainees are attending this coursr:

Construction Corporation	- 18
Railways Corporation	- 1
Rangoon City Development Committee	- 1
Total	- 20

5.3.2 Training schedule

This course is also divided into three semesters, and training schedule is as per annex VIII.

5.3.3 Implementation of the schedule

Training schedule for the first semester is now being carried out, teaching the following basic subjects as before:

(i) Structural Mechanics
(ii) Concrete Material
(iii) Reinforced concrete
(iv) Prestressed Concrete
(v) Soil Mechanics and Foundation Engineering.
(vi) Special lectures on bridge engineering.

5.3.4 Experts and counterparts.

Experts and Counterparts are giving lectures as per annex IX.

5.3.5 Training schedule for the Second, semester and Third semester.

In the second semester, basic bridge design ideas are to be given to the trainees in Dywidag system long span bridge, Reinforced concrete bridges, Prestressed Concrete bridges and foundations. In the third semester, the trainees will do the actual bridge design works in groups.

5.3.6 Training for counterparts.

The counterparts will have to do more actual bridge design works, checking of the superstructure of Thuwunna bridge during construction and micro-computer programmes.

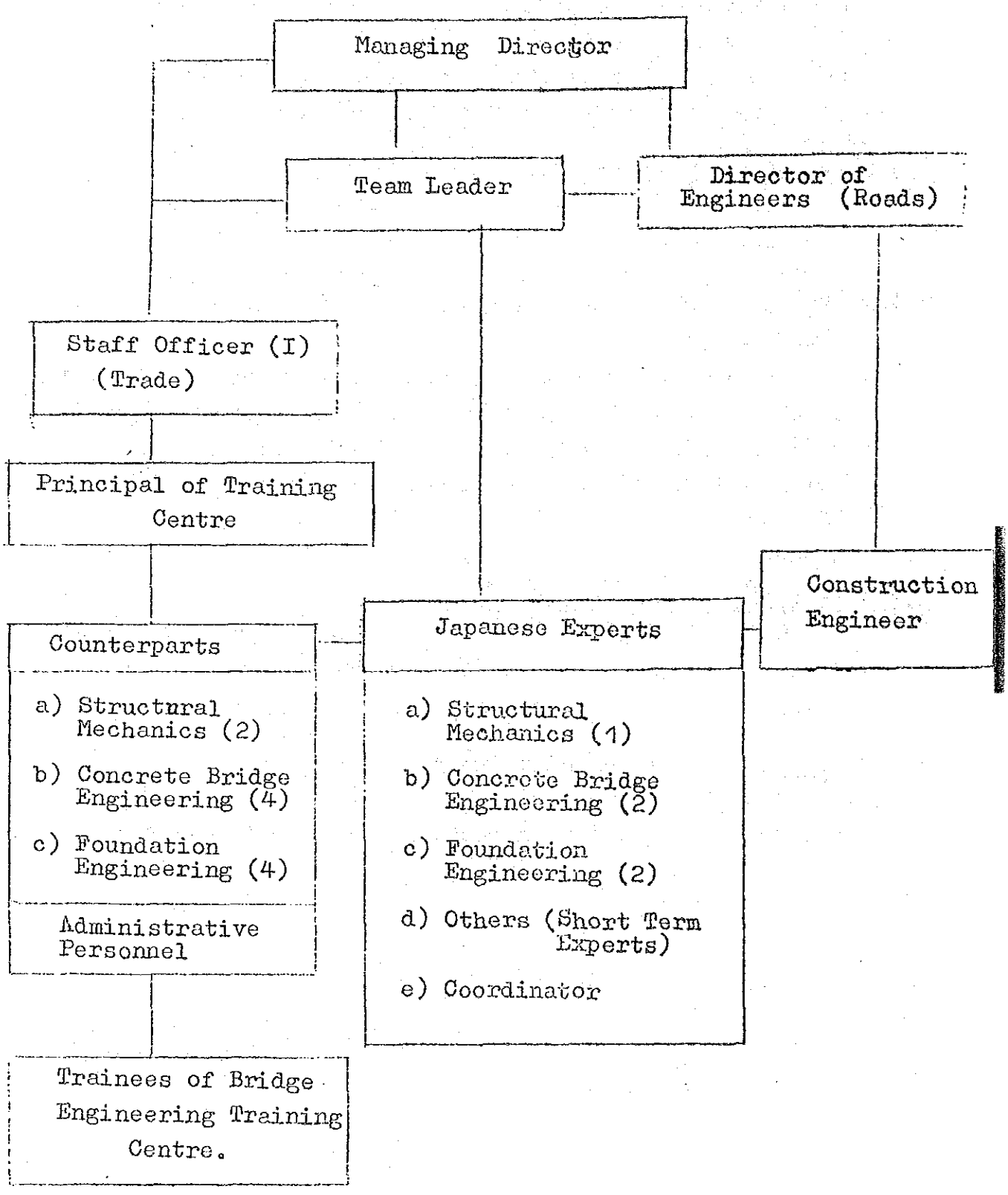
5.3.7 Counterpart training in Japan

3 trainees from the first course are now taking counterpart training in Japan, shown as per annex V.

Annex I

Organization of the Project

(Training Centre)



Annex II

Outline of the Project
(Training Centre)

Item \ Year	1979	1980	1981	1982	1983	1984
Term of Record of Discussions.	12/7		4 years		11/7	
Training: in centre		21/4 1st	28/3 22/4 2nd	13/3 26/4 3rd	19/3 4th	
Training: On the Job Training (Thuwunna bridge.)		Temporary work	Substructure / Superstructure		11/7	
Dispatch of Experts. Long Term: Team leader (1 person)	20/12			18/1 14/1	11/7	
Concrete bridge engineering (2 persons)	20/12		20/12	27/3 4/3	11/7	
Structural Mechanics (1 person)		20/2		26/3 4/3	11/7	
Foundation Engineering (2 persons)		1/4		26/3	11/7	
					11/7	
Equipment (300 million yen- Technical Cooperation	60 million yen Testing equip-ments Micro-computer	170-million yen Construc-tion. Mechineries	70-million yen Construc-tion Mechine			

Annex III

Bridge Engineering Training Course No. (1)

Training Schedule (21/4/80 to 28/3/81)

I. First Semester (21/4/80 to middle of October)

Basic Course

1. Structural Mechanics.
2. Concrete Material.
3. Reinforced Concrete.
4. Prestressed Concrete.
5. Soil mechanics and Foundation Engineering.
6. Special lectures.

II. Second Semester (middle of October to end of December)

1. Design of Dywidag System long-span Concrete Bridges.
2. Design of Reinforced Concrete Bridges.
3. Design of Prestressed Concrete Bridges.
4. Design of Foundations.

III. Third Semester (Beginning of January to 28/3/82)

Group Design exercise.

1. Check of Superstructure of Thuwunna Bridge.
2. Check of caisson and Pile Foundation of Thuwunna Bridge.
3. Design of Pegu overhead bridge.

Annex IV

Bridge Engineering Training Course No. (1)

Expert and Counterpart for each subject.

No.	Subject	Expert	Counterpart
1.	Structural Mechanics and Dywidag System Bridge.	Mr. Ono	U Han Zaw U Kyaw Hoe
2.	Concrete material	Mr. Ichimasu	U Shwe Tun Maung
3.	Reinforced concrete	Mr. Ichimasu	U Han Zaw
4.	Prestressed concrete	Mr. Asakura	U Khin Maung Oo
5.	Soil Mechanics and Foundation engineering	Mr. Asakura	U Shwe Tun Maung U Khin Maung Oo.
6.	Special lectures	Mr. Ikeda Mr. Matsumoto	U Khin Maung Yi

Annex V

Counterpart Training in Japan

No.	Training Period	Name	Department
1.	20/9/79 to 25/11/79	U Khin Maung Yi	C.C.
		U Shwe Tun Maung	C.C.
		U Kyaw Hoe	C.C.
		U Han Zaw	C.C.
		U Khin Maung Oo	C.C.
2.	10/11/80 to 22/12/80	U Saw Yoe E Hla	C.C.
		U Myint Maung Htwe	Railways
		Captain Win Myint	Defence
3.	7/5/81 to 27/7/81	U Saw Lwin	C.C.
		U Thin Tu	Railways
		U Hla Myint	C.C.
		U Win Tin	C.C.
		Captain Win Myint	Defence
4.	5/4/82 to 7/7/82	U Win	C.C.
		U Phone Myint	R.I.T.
		U Htay Myint	C.C.

Annex VI

Bridge Engineering Training Course No.(2)

TRAINING SCHEDULE (27/4/1981 to 13/4/81)

I. First Semester (27/4/81 to 11/10/81)

Basic course

1. Structural Mechanics.
2. Concrete Material.
3. Reinforced Concrete.
4. Prestressed Concrete.
5. Soil mechanics and Foundation Engineering.

II. Second Semester (19/10/81 to 24/12/82)

Basic Design Course

1. Design of Dywidag System long-span Concrete Bridges.
2. Design of Reinforced Concrete Bridges.
3. Design of Prestressed Concrete Bridges.
4. Design of Foundations.

III. Third Semester (5/1/82 to 13/3/82)

Group Design Exercise.

1. Design of long-span Concrete Bridge
2. Design of Actual Bridges.
3. Design of Standard Bridges.
   (i) R.C. Standard Bridges.
   (ii) P.C. Standard Bridges.

Annex VII

Bridge Engineering Training Course No.(2)

Expert and Counterpart for each subject.

No	Subject	Expert	Counterpart.
1.	Structural Mechanics and Dywidag System Bridges.	Mr. Ono	U Han Zaw U Phone Myint.
2.	Concrete material	Mr. Ichimasu	U Shwe Tun Maung Mr. Mazunda
3.	Reinforced Concrete	Mr. Ichimasu	U Han Zaw
4.	Prestressed Concrete	Mr. Asakura	U Khin Maung Oo U Win.
5.	Soil Mechanics and Foundation Engineering	Mr. Asakura	U Shwe Tun Maung U Khin Maung Oo U Win.

Annex VIII

Bridge Engineering Training Course No.(3)
Training Schedule (26/4/82 to 19/3/83)

1. First Semester (26/4/82 to end of September)

   Basic Course.

   1. Structural Mechanics.
   2. Concrete Material.
   3. Reinforced Concrete.
   4. Prestressed Concrete
   5. Soil Mechanics and Foundation Engineering.
   6. Special lecture.

2. Second Semester (Beginning of October to end of December)

   1. Design of Dywidag System long-span Concrete Bridges.
   2. Design of Reinforced Concrete Bridges.
   3. Design of Prestressed Concrete Bridges.
   4. Design of Foundations.

3. Third Semester (Beginning of January to 19th March, 1983)

   1. Design of Dywidag system bridge.
   2. Design of actual bridges in Burma.

Annex IX

Bridge Engineering Training Course No.(3)

Expert and Counterpart for Each sunject

No	Subject	Expert	Counterpart
1.	Structural Mechanics	Mr. Yokoyama	U Han Zaw Daw Thet Thet tin
2.	Concrete Material	Mr. Murasato	U Shwe Tun Maung Mr. Mazunda U Chit Pan
3.	Reinforced Concrete	Mr. Murasato	U Han Zaw U Myint Lwin
4.	Prestressed Concrete.	Mr. Chida	U Khin Maung Oo U Myint Lwin
5.	Soil Mechanics and Foundation Engineering.	Mr. Chida	U Khin Maung Oo Daw Thet Thet Tin
6.	Special lecture	Mr. Mori	

MINISTRY OF CONSTRUCTION

CENTRAL TRAINING CENTRE

BRIDGE ENGINEERING TRAINING PROJECT

THUWUNNA, RANGOON

BRIEF INFORMATION
ABOUT
THE BRIDGE ENGINEERING TRAINING PROJECT

December, 1983

I. Assignment of the Third batch trainees.

During the Third Training Course 20 trainees were selected and given training is Bridge Engineering. There were 18 trainees from Construction Corporation, one trainee from Railways Corporation and one trainee from Rangoon City Dovelopment Corporation. The trainee from Railways Corporation is now working in the Bridge Design Section in his Corporation, and the trainee from Rangoon City Development Corporation is presently a overhead bridge design in the City.

The trainees of Construction Corporation are now assigned as follows:

1. The following four engineers are assigned to attend the Fourth Training Course to take special training in Dywidag bridge design concepts.
   (1) U San Win
   (2) U Soe Aung
   (3) Daw Yee Yee Myint
   (4) Daw Myint Myint Thu
2. The following two engineers are assigned to Thuwunna Bridge Construction Project for counterpart training.
   (1) U Sein Maung
   (2) U Saw Ronald Win
3. The following four engineers are assigned in the Construction Corporation Design Offices:
   (1) U Ngun Sun Aung (Bridge Design Section)
   (2) U Kyaw Shein (------ ditto ------)
   (3) U Tint Lwin (Structural Design Section)
   (4) Daw Than Than Sein (-------- ditto --------)
4. Trainees who are assigned as Assistant Engineers at various Construction Offices:
   (1) U Myint Aung (Construction Industry Project, Bridge works)
   (2) U Than Swe (Construction Unit (4), Construction of Bridge Structures)
   (3) U Khin Maung Win (Bassein-Monywa Highway Project, Construction of bridge structures)

(4) U Khin Maung Latt (Construction Unit (1), Construction of bridge structures)

5. Trainees who are assigned as Township Engineers for maintenance and construction of bridges and roads in various townships:

(1) U Soo Tint (Mingala Taungnyunt Township)

(2) U Aung Kyaw Myint (Taungdwingyi Township)

(3) U Aye (Pakokku Township)

(4) Daw Thaung Htwe (Prome Township)

The trainees who joined the Fourth Training Course and Thuwunna Bridge Construction are continuing to study the design and construction of Dywidag system bridge.

The Trainees who are assigned in the design offices are now making good use of the technical knowledge, attained during the training for the design of Concrete bridges and structures.

The Trainees who are assigned in construction sites and townships can also make use of what they have studied for quality control of concrete works and construction of reinforced concrete bridges and structures.

II. Present situation and future plan.

1. As per original programme the training schedule is to be implemented in two years : in First year the design of Thuwunna Bridge is to be studied in detail, and in Second year one actual bridge is to be designed by the trainees under the guidance of Japanese experts.

For the implementation of the original programme, First year schedule was drawn in detail again, and based on that schedule monthly schedules are now being prepared, depending on the actual progress of the training.

As per schedule, all trainees have studied together all guidelines, concerning with the design of Dywidag bridge and substructure works. For the detail study and exercise, the trainees are divided into two groups, The group of four trainees are studying the design of substructures, including temporary works, and the other six trainees are studying the superstructure works of Dywidag bridge, including computer programming.

It can be said that the training is going as per original programme, and some portions were done ahead of the schedule. For the design of superstructure, the trainees are now being given training in detailing, including the detail drawing.

As for second year course for the design exercise of Hlaing River bridge, detailed programme is now being under discussions with the Japanese Team.

2. Under the Technical Cooperation, Bridge Engineering Training Project had been receiving the technical equipments and machineries sent by JICA since 1979 - 80.

Most of the equipments and machineries have been fully utilised both at the Training Centre and Thuwunna Bridge Construction site. There was some shortage of spare parts. Construction Corporation made effort for the procurement of spareparts as much as possible. There will be still in need of some spareparts up to completion of this Project and for the future utilization of the above equipments.

The list of spareparts, required for the Training Centre and Thuwunna Bridge Construction is attached here as per Annex (A) and (B).

3. After the completion of Thuwunna Bridge, Hlaing River Bridge Project is expected to embark on. That project is now under discussions both on Burmese side and Japanese side. All the engineers and equipments of Thuwunna Bridge Construction Project are planned to be shifted to that project. Procurement of additional equipments is also to be considered.

For the Training Centre, it will be transformed gradually into a bridge design office. For the promotion of bridge engineering field in Burma, the Ministry of Construction is planning to send the present engineers under training for further academic studies in Japan.

ANNEX (A)

LIST OF REQUIRED TECHNICAL EQUIPMENTS

1)	Micro Computer		
	a) Micro Computor. CBM 32 k bytes	2	Sets
	b) Connecting wire 2m	4	Nos
	c) Ribbon (black)	50	Nos
	d) Printing papers with lines	50	Packets
	e) Printing papers without lines	50	Packets
	f) Diskette	10	Packets
	g) Cossette tape (C - 30)	100	Nos
2)	Generating Set		
	100 KVA, 80 KN, 125 Amps	1	No
	400/230 Volts 50 HZ		
	PHASE - 3, Cos ϕ - 0.8 RPM 1500		
3)	Gestener Machine	1	No
4)	Electronic Stencil Machine	1	No
5)	Drafting Machine with stand and lamp	10	Nos
6)	Drawing Instrument Set	10	Nos
7)	8 - Piece Set Drawing Pen (Rotring)	10	Sets
8)	0.2 Drawing Pen (nib only)	20	Nos
9)	0.3 Drawing Pen (nib only)	20	Nos
10)	Lettering Guide	10	Sets
11)	Electric Tracing Erasing Machine	4	Nos
12)	Eraser for electric Tracing Erasing Machine	10	Gross
13)	Tracing Edge Taping Machine	4	Nos
14)	Edge Tape	200	Rolls
15)	Drafting Tape	50	Rolls

LIST OF PUBLICATIONS REQUIRED FOR BETC-LIBRARY

Japanese Specifications in English on:-

- Cement
- Aggregates (Fine Aggregates & Coarse Aggregate)
- Cement Concrete
- Rigid pavement
- Flexible pavement

Manuals in English on:-

- Cement Concrete
- Rigid pavement Construction & Maintenance
- Flexible pavement Construction & Maintenance
- Substructures

Journals, Periodicals, Annual reports, Reserve papers on:-

- Concrete
- Soil Mechanics
- Soil Dynamics
- Movable Bed Hydraulics (erosion,scour,ch)
- Rigid pavements
- Flexible pavements
- Pavement designs
- Substructures
- Highway Economics
- Asphalt concrete

Seminar Publications on:-

- Highway Construction Seminar
- Bridge Engineering
- Seismic Engineering
- Hydrology

Also:-

- Proceedings of Soil Mechanics and Foundation Engineering conference (Latest two)

  Proceedings on International Road Federation conference (Held in Japan in 1977)

  JCA Journals and annual reports

  JRA journals and annual reports

  JSCE journals and annual reports

NOTE:

Will be very useful, if important previous issues &

All FUTURE issues are available.

ANNEX (A)

LIST OF APPARATUS TO BE SUPPLEMENTED TO THE CONCRETE LABORATORY

SR. NO (1)	NOMENCLATURE (2)	SPECIFICATIONS (3)	UNIT (4)	QTY (5)
1	SONOMETER WITH BUILT-IN OSCILLOSCOPE (FOR NON-DESTRUCTIVE TEST OF CONCRETE)	220 V;A.C.; 1P; 50 HZ Complete with instruction manual and Trouble Shooting Manual	No.	1
2	STRAIN-METER; STATIC TYPE WITH SWITCH BOX AND ACCESSORIES	For the measurement of strain. (Inclusive of Instruction & Trouble Shooting Manuals.)	No.	1
3	STRAIN GAUGE TYPE PL-60, PL-30	(120 ± 0.3)		
4	P-2 ADHESIVE (STRAIN GAUGE CEMENT)	Drug A & B		
5	LOAD CELL	Capacity 400 t_f	No.	1
6	CONCRETE AIR METER	ASTM C-231-75	No.	2
7	BALANCE	Capacity: 300 gm Sensitivity: 0.01gm	No.	4
8	BALANCE	Capacity: 5 Kg Sensitivity: 0.1 gm	No.	2
9	UNIVERSAL TESTING MACHINE	COMPRESSION & TENSION Capacity: 400 Tonne (In 3 Ranges) 220V;A.C.; 1P; 50HZ (Inclusive of Tension Grippers)	No.	1

ANNEX (A)

SR. NO. (1)	NOMENCLATURE (2)	SPECIFICATIONS (3)	UNIT (4)	QTY (5)
10	PORTABLE COMPRESSION MACHINE	Hydraulic/Manual Capacity: 200 Tonne	No.	2
11	FLEXURE ATTACHMENT	-	No.	2
12	MOTORISED FLOW TABLE	ASTM C-230 220V;A.C;1P; 50HZ	No.	2
13	CHAPMAN CONCRETE FLASK	ASTM C-70	No.	12
14	BLAINE FINENESS APPARATUS WITH MANOMETER OIL	ASTM C-204	Set.	2
15	LE CHATELIER FLASK	ASTM C-188	No.	12
16	BALANCE	Capacity : 40 kg Sensitivity : 1 gm	No.	2
17	CONCRETE TEST HAMMER	SCHMIDT TYPE	No.	2
18	STANDARD SIEVES COARSE SERIES	Made of Brass 80 mm to 5 mm	Set	3
19	STANDARD SIEVES FINE SERIES	Made of Brass 5 mm to 0.074 mm	Set	3
20	SIEVE COVER AND PAN	-	Set	6
21	MECHANICAL SIEVE SHAKER	To fit in 8 sieves 220V;A.C.;1P; 50 HZ	No.	2

THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

MINISTRY OF CONSTRUCTION

CONSTRUCTION CORPORATION

THUWUNNA BRIDGE CONSTRUCTION PROJECT

PROGRESS REPORT

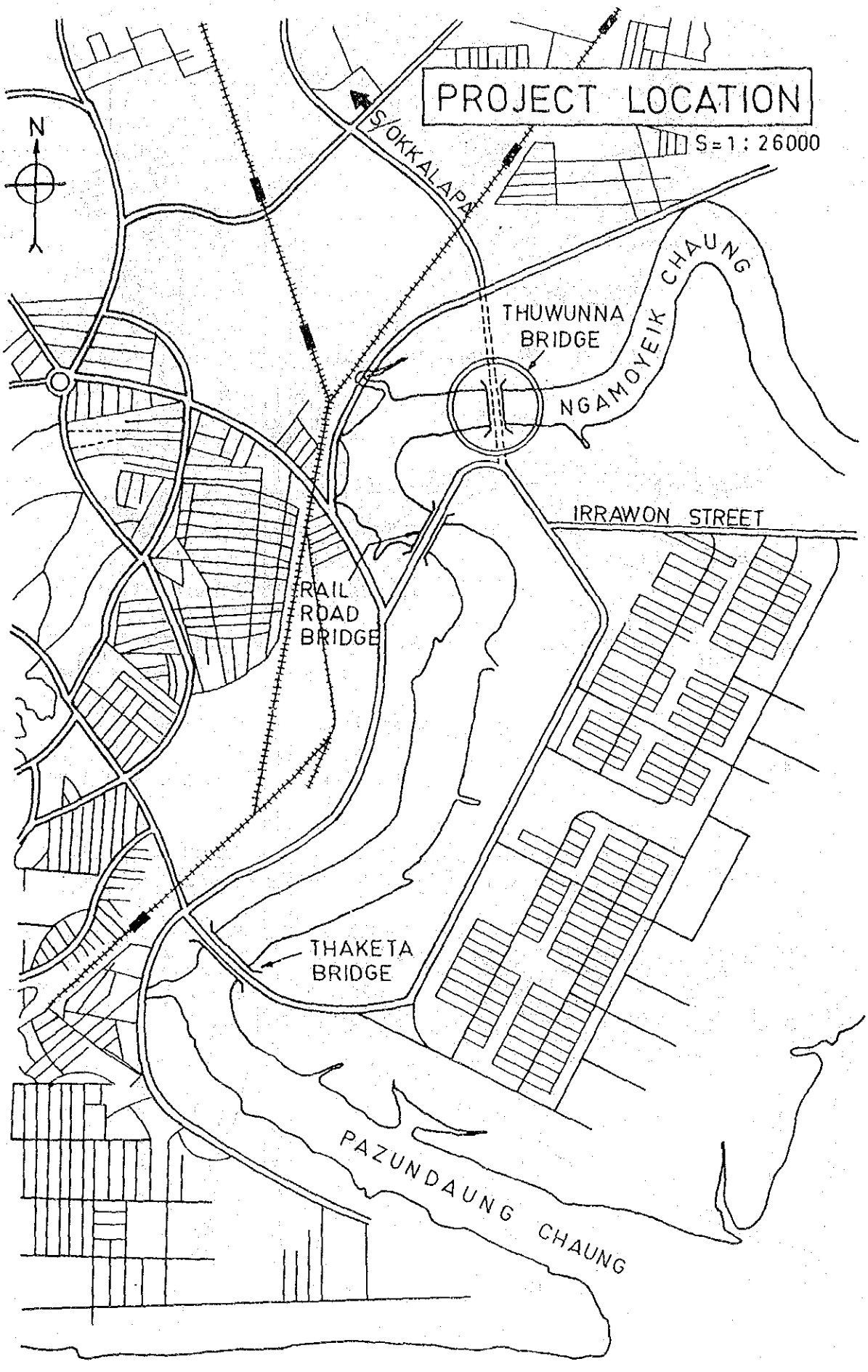
UP TO END OF DECEMBER 1983

BY

PROJECT ENGINEER OFFICE

(31-12-83)

C O N T E N T S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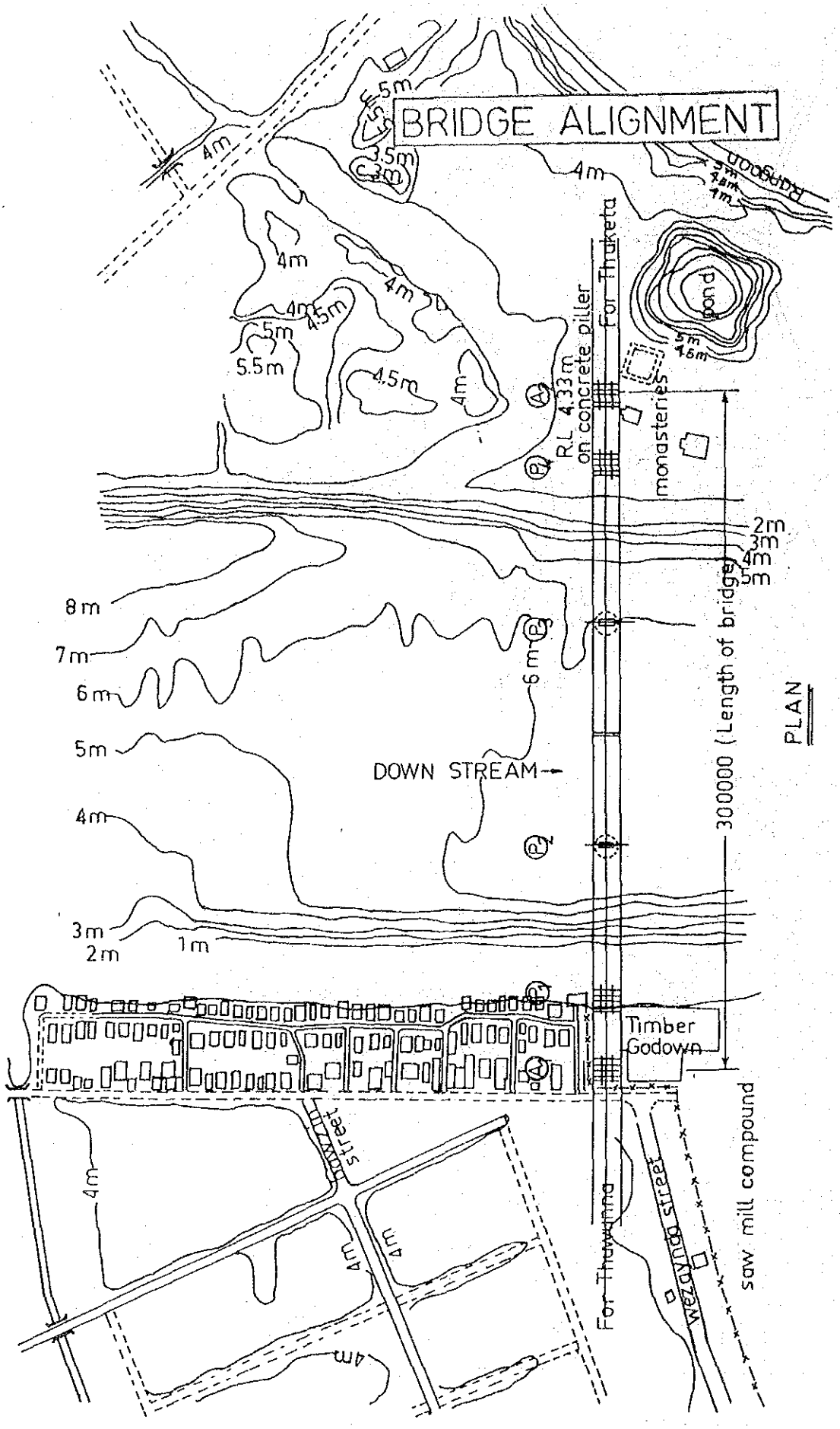
S/OKKALAPA
THUWUNNA BRIDGE
NGAMOYEIK CHAUNG
IRRAWON STREET
RAIL ROAD BRIDGE
THAKETA BRIDGE
PAZUNDAUNG CHAUNG


BRIDGE ALIGNMENT
4m
5.5m
3.5m
3m
4m
4m
4m
4.5m
5.5m
4.5m
4m
4m
R.L 4.33m on concrete piller
For Thuketa
monasteries
pond
5m
4.6m
2m
3m
4m
5m
8m
7m
6m
5m
4m
3m
2m
1m
6m
DOWN STREAM
300000 (Length of bridge)
PLAN
Timber Godown
saw mill compound
For Thuwunna
Wezayna street
Thuwunna street
4m
4m
4m
4m

Introduction

1. As per Technical Cooperation Programme between the Japanese Government and the Government of the Socialist Republic of the Union of Burma " The Bridge Engineering Training Course " (B.E.T.C). Project has been opened at the Central Training School, Thuwunna since 1979.

During the course of training, it is essential to demonstrate the practical know how (On- Job -Training) so as to teach the trainees, the theory as well as the practical knowledge of the advanced bridge engineering technology.

To formulate this programme Thuwunna Bridge Construction Project was implemented begining on October , 1979. Land acquisition and construction of access roads and buildings were then carried out.

The ground Breaking Ceremony was celebrated with pomp and publicity on 13th October 1981 and the actual bridge construction works started.

2. Project Implementation

The Project cost of " Thuwunna Bridge Construction Project" will be borne by the cooperation of the Japanese Government and the Burmese Government

2.1 Contribution by Japanese Government

Japanese Government contributed 500 million yen in 1980-81 under the Japanese Grant Aird Programme and 393 million yen during 1979-80 to 1983-84 under the Technical Cooperation Programme.

Out of the total of 893 million yen 764.68 million yen had been contributed to the Thuwunna Bridge Construction Project alone, for the purchase of construction materials, machineries and equipments. Additional contribution of funds from the Japanese Government is expected with enthusiasm so as to complete this project in time successfully.

2.2 Contribution by Burmese Government

Burmese Government contributed a total of Ks. 49.8 million and the yearly budget allotment program me was as follows:-

Kyats (in millions)

Sr No	Name of Work	Budget Allotment					
		1980-81	1981-82	1982-83	1983-84	1984-85	Total
1.	Construction of Thuwunna bridge accross Ngamoyeik chaung.	5.0	10.0	10.0	6.0	1.4	32.4
2.	Construction of approach road of Thuwunna Bridge.	-	0.5	3.0	3.0	3.0	9.5
3.	Construction of Thuwunna Bridge accross Ngamoyeik chaung. (Japanese Aid)	-	7.9	-	-	-	7.9
	Total	5.0	18.4	13.0	9.0	4.4	49.8

2.3 Expenditures

Expenditures up to 30-11-83 in this fiscal year 1983-84 and total expenditures up to end of November 1983 is shown in the following tables.

CONSTRUCTION OF THUWUNNA BRIDGE ACCROSS NGAMOYEIK CHAUNG
EXPENDITURE UP TO (30-11-83)

(IN KYATS)

Sr: No	NAME OF WORK	PROJECT COST	EXPENDITURE UP TO END OF FISCAL YEAR 1982-83	TOTAL EXPENDITURE UP TO (30-11-83)	EXPENDITURE DURING THIRD QUARTER OF 1983-84	EXPENDITURE UP TO (30-11-83) in 1983-84	REMARKS
1	2	3	4	5	6	7	8
1	Construction of Thuwunna Bridge Accross Ngamo-yeik Chaung.	32400000	19933556.29	23024436.41	1044122.05	3090880.12	Including 24.31% of C.C charges.

Construction of Approach Road of Thuwunna Bridge Expenditure

Up to (30-11-83)

Sr: No:	NAME OF WORK	PROJECT COST	EXPENDITURE UP TO END OF FISCAL YEAR 1982-83	TOTAL EXPENDITURE UP TO (30-11-83)	EXPENDITURE DURING THIRD QUARTER OF 1983-84	EXPENDITURE TO (30-11-83) IN 1983-84	REMARKS
1	2	3	4	5	6	7	8
1	Construction of Approach Road of Thuwunna Bridge.	9500000	3701654.54	4873754 . 81	464625.00	1172100.27	Including 24.31%

3. Period of Project

The actual construction works started on the date of celebration of Ground Breaking Ceremony. The 13th October 1981 and the Project must be completed by 31st March 1985. The total duration of construction period is 3½ years.

4. Design Standards and Specifications

4-1 Design Standard

1. Design standards	-	Specification for Japan Highway bridges published by Japan Road Association. (J.R.A)
2. Permissible vehicle loadings	-	60 tons if only one vehicle is crossing
	-	20 tons for continuous crossings in both directions.

4-2 Specifications

1. Type of bridge	-	Prestressed concrete box girder bridge using Cantilever Construction method.
2. Length	-	300 metres.
3. Span lengths	-	(30+70+100+70+30)metres.
4. Pavement width	-	8 metres.

5. Side walk - 1.5 metres on each side

6. Clearance above H.H.F.L - 9 metres.

7. Side way clearance - 33 metres.

5. Schedule of works and Progress

5.1 Bridge

5.1.1 Yearly Schedule of works for the whole project is shown in annexure 1 (a).

5.1.2 Progress of works during 1981-82 and 1982-83 is shown in annexure 2.

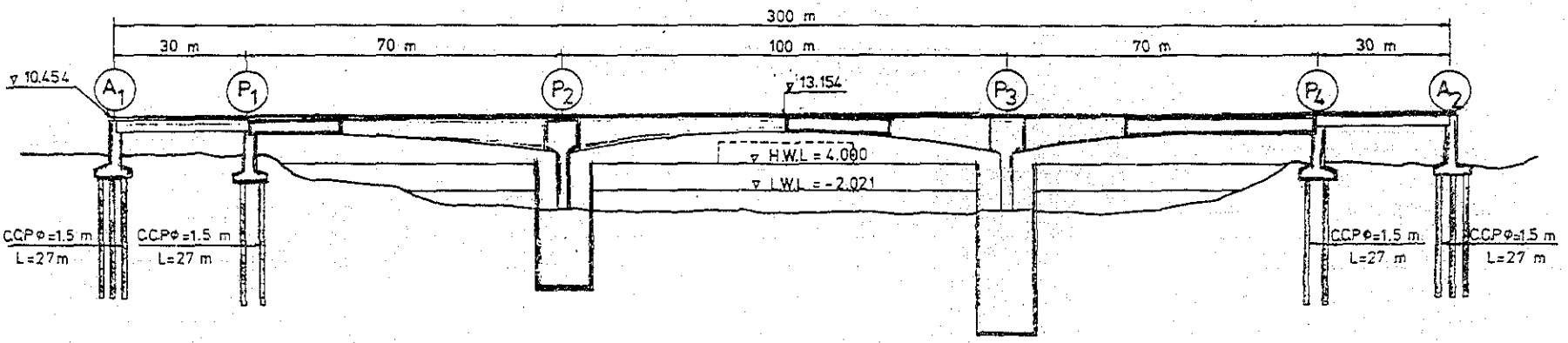
5.1.3 Works programme for 1983-84 and progress up to December 1983 is shown in annexure 3, 3-a, 3-b and 3-c.

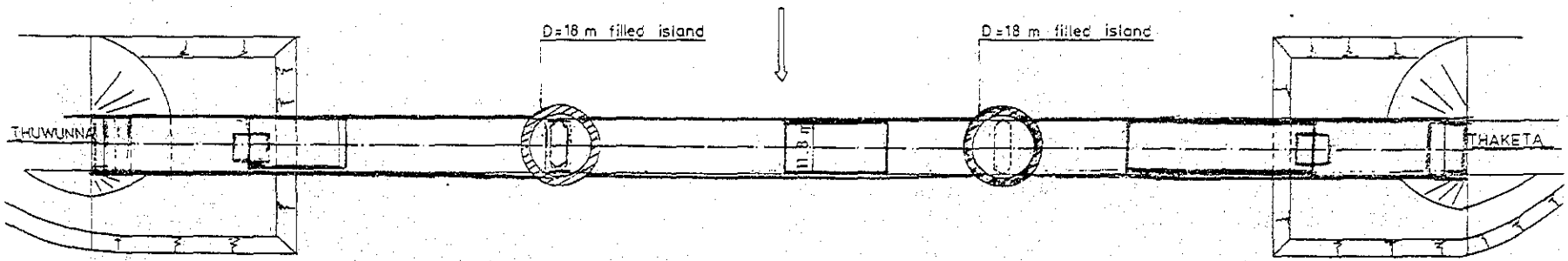
5.1.4 Works Programme for 1984-85 is shown in annexure.4.

5.2 Approach Road

5.2.1 Schedule of works for the whole project and progress during 1981-82 and 1982-83 is shown in Annexure 5.

5.2.2. Works programme for 1983-84 and up to date progress is shown in annexure 6.





INDEX

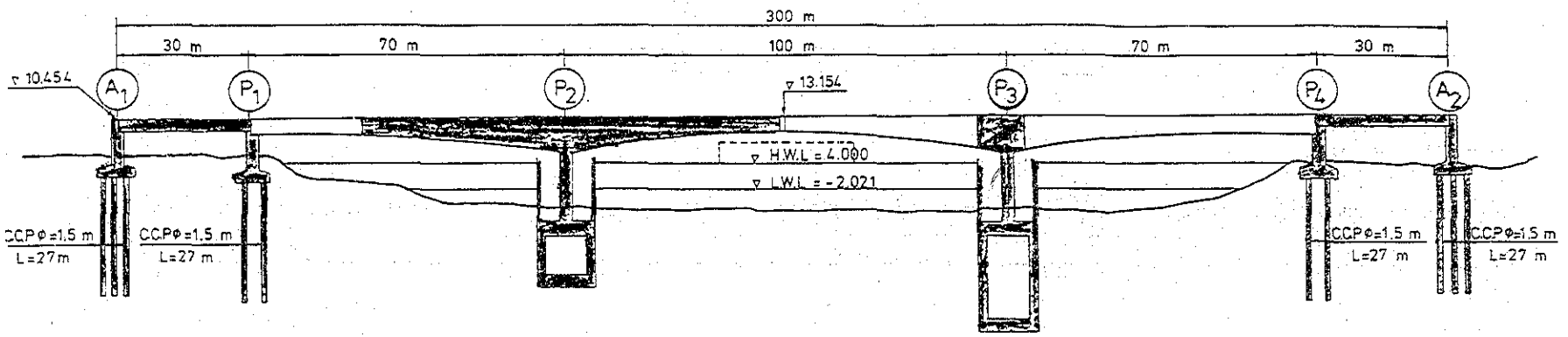
	1981-82
	1982-83
	1983-84
	1984-85

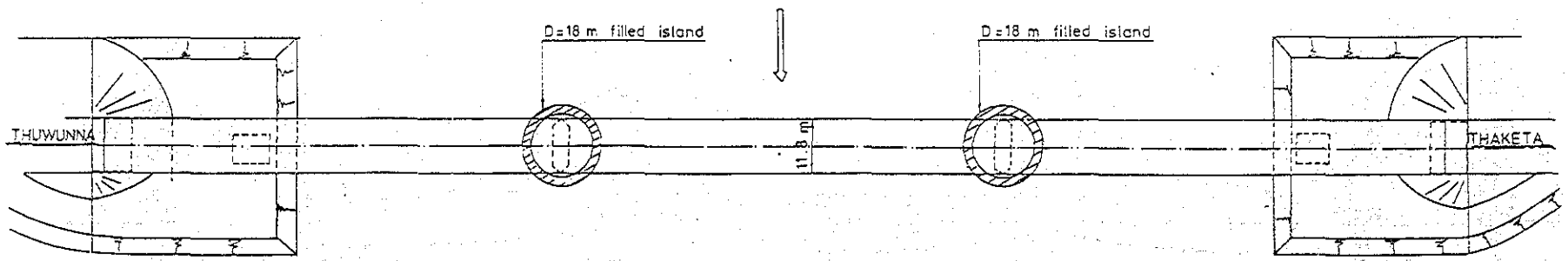
THUWUNNA BRIDGE CONSTRUCTION PROJECT.

GENERAL PLAN.

Drawn&Traced by - - - - Sapai Chit.

Annexure 3:a





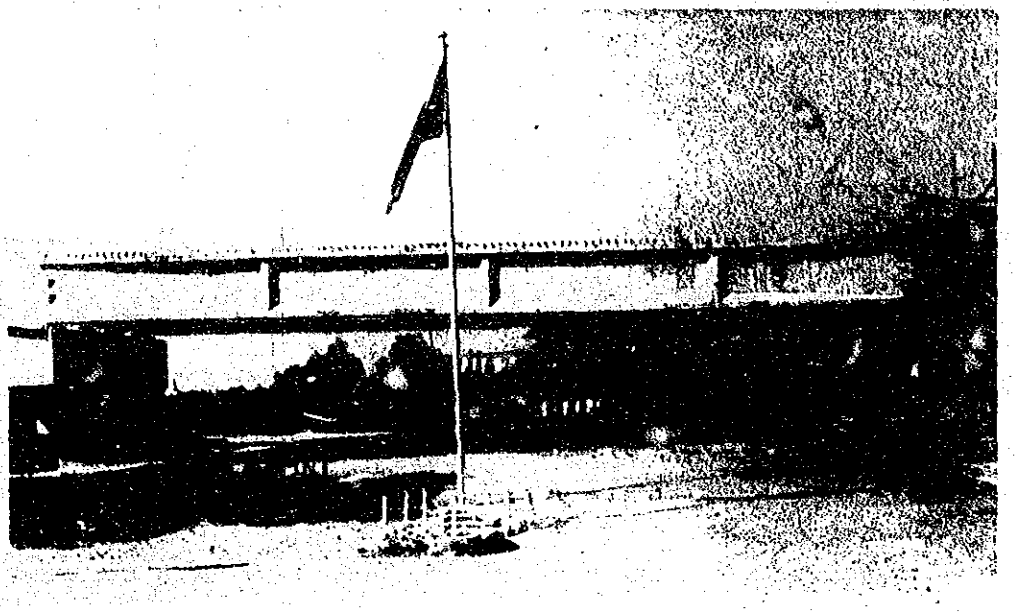
THUWUNNA BRIDGE CONSTRUCTION PROJECT.

GENERAL PLAN.

PROGRESS UP TO DEC:'83.

Drawn&Traced by - - - - Sapai Chit.

PROGRESS UP TO 25-11-83



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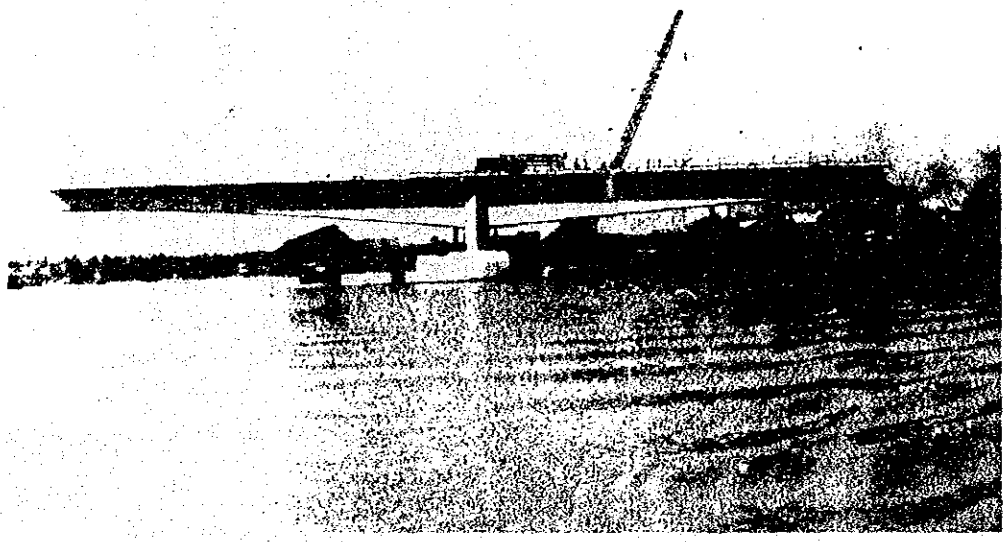
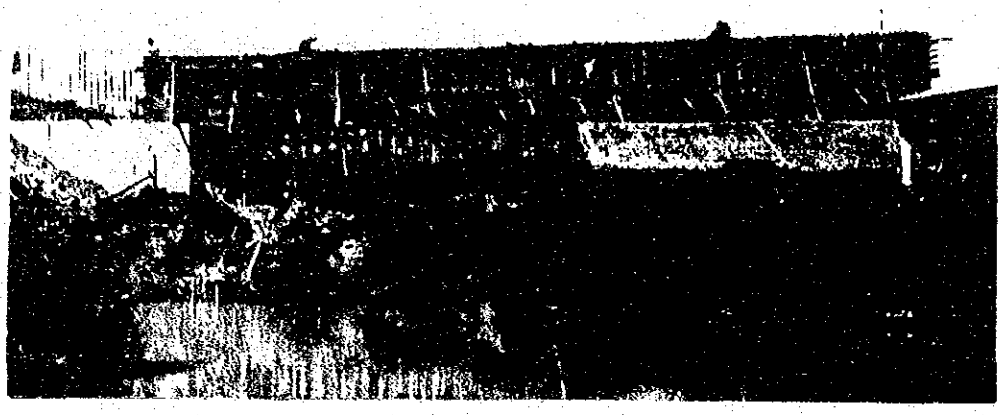


P_2

THUWUNNA SIDE

PROGRESS UP TO 25-11-83



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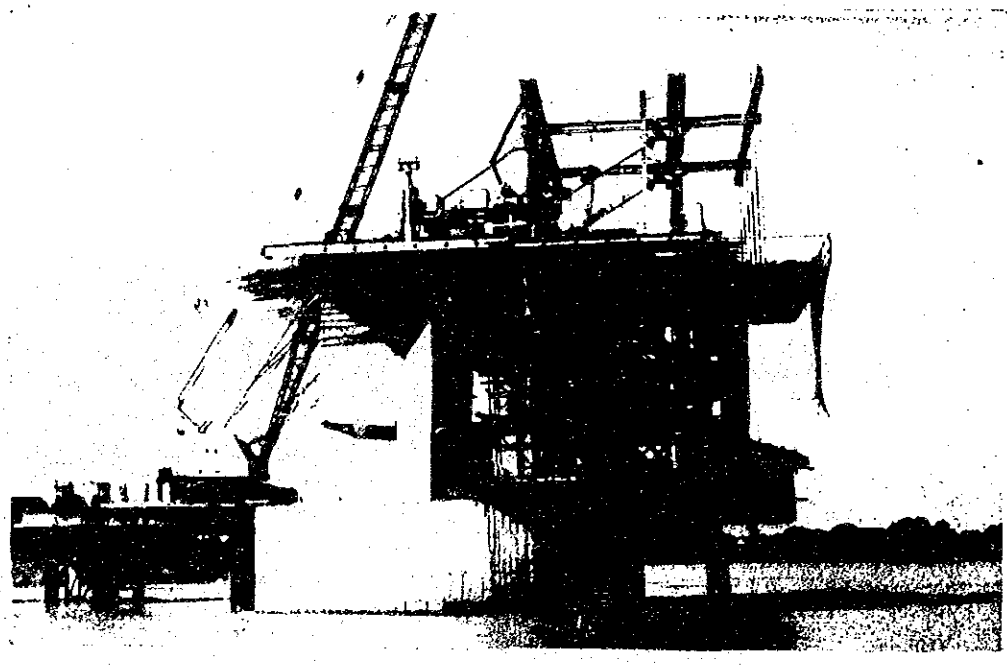


P_3

THAKETA SIDE

Annexure-2

Progress of works in 1981-82 and 1982-83.

1. Location - Rangoon Command.
2. Name of project - Construction of Thuwunna Bridge-Accross Ngamoyeik chaung.
3. Estimated cost - Kyats 324 lakhs.
4. Expenditure up to 31-3-83- Kyats 250 lakhs.
5. Allotment in 1983-84 - Kyats 60 lakhs.
6. Allotment up to 1983-84 - Kyats 310 lakhs.

Sr No	Works completed in 1981-82		Works completed in 1982-83
1.	Land acquisition, surveying, Soil testing.	1	Sinking of R.C.C caisson foundation of P_2 on Thuwunna side 100% completed.
2.	Preparation of work site area and access roads.	2	Construction of pier shaft and top head of pier P_2 on Thuwunna side 100% completed.
3.	Construction of temporary buildings, concrete batching plant and classifier plant.	3	Sinking of R.C.C caisson foundation P_3 on Thaketa side 100% completed.
4	Construction of temporary steel bridge and artificial islands on both Thuwunna and Thaketa sides.	4.	Construction of pier shaft of pier P_3 completed.
5.	Provision of temporary electrical and water supply works.	5.	Reversed circulation Drill foundation works at pier P_4 on Thaketa side 100% completed.
6.	Sinking of R.C.C caisson foundation of P_2 on Thuwunna side 25% completed.	6.	Reversed circulation Drill foundation works at Abutment A_2 on Thaketa side 100% completed.
7.	Reversed circulation Drill foundation works at abutment A_1 and Pier P_1 on Thuwunna Side 100% Completed.		

Annexure 3.

Works programme for 1983-84 and up to date progress.

Sr: No:	Description of Work	Main Programme	Programme for 1983-84	1983-84 Programme/Progress												Remarks
				4	5	6	7	8	9	10	11	12	1	2	3	
	Super structure works															Programme % / Progress %
1.	Construction of cantilever segmetal P.C box girder at pier P_2 using Dywidag method	120 M or 33 blocks	120 M 33 block	8 / 8	16 / 16	24 / 24	32 / 32	40 / 40	48 / 48	96 / 70	64 / 75	72 / 80	80	88	100	
2.	Construction of pier shaft and top head at pier P_3	100 %	100%	100%												
3.	Construction of lever segmental P.C box girders at Pier P_3 using diwg day method?	120 metre or 33 block	50 metre or 13 block						8 / 5	16 / 16	20 / 20	24 / 25	28	32	40	to be completed in 1984-85
4.	Construction of cast-in-place P.C girders. spanning P_1 and A_1 on Thuwunna.	4 Nos	4 Nos	25 / 25	50 / 50	75 / 75	100 / 100									
5.	Construction of cast-in-place P.C girders. spanning A_2 and P_4 on Thaketa side.	4 Nos	4 Nos							25	50	30 / 60	60	10		

Annexure 4.

Works Programme for 1984-85.

Sr: No:	Description of work	Main Programme	Programme for in 83-84	1983-84 Programme Progress												Remarks
				4	5	6	7	8	9	10	11	12	1	2	3	
	Super structure works.															
1.	Construction of cantilever segmental P.C box girders at pier P_3 using Dywidag Method.	120 metre or 33 boocks	70metre or 20blocks	45	50	60	70	80	90	100						
2	Construction of bridge surface and Hand rails															
	(a) Thuwunna side.	150metre	150metre						30	60	100					
	(b) Thaketa side.	150 "	150 "									30	60	100		

GENERAL PLAN

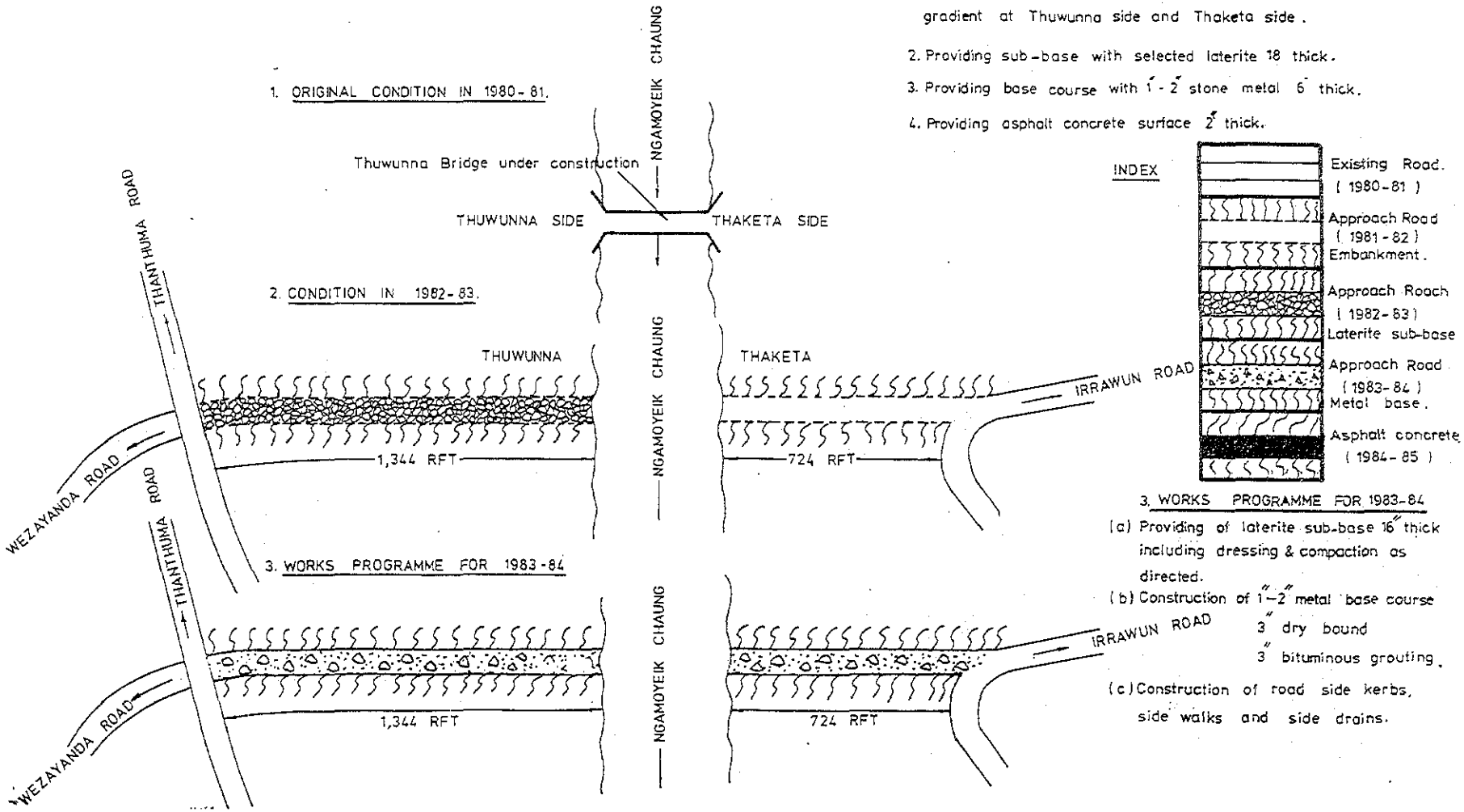
RANGOON DIVISION.

THUWUNNA, TOWN-SHIP.

1. NAME OF PROJECT - Construction of Thuwunna Bridge approach road project.
2. PROJECT SECTION - Thuwunna side + Thaketa side - 2068 RFT.
3. SECTION FOR EXECUTION
   IN 1981-82 - Thuwunna side - 1344 RFT.
4. 1981-82 BUDGET ALLOTMENT - Ks. 5,00,000.
5. 1982-83 BUDGET ALLOTMENT - Ks. 30,00,000.
6. 1983-84 BUDGET ALLOTMENT Ks. 30,00,000.

SPECIFICATION.

1. Providing of road embankment with transported selected earth including dressing and compaction to required section and gradient at Thuwunna side and Thaketa side.
2. Providing sub-base with selected laterite 18" thick.
3. Providing base course with 1" - 2" stone metal 6" thick.
4. Providing asphalt concrete surface 2" thick.



3. WORKS PROGRAMME FOR 1983-84

(a) Providing of laterite sub-base 16" thick including dressing & compaction as directed.

(b) Construction of 1"-2" metal base course
3" dry bound
3" bituminous grouting.

(c) Construction of road side kerbs, side walks and side drains.

Annexure 6

1. Location - Rangoon Command
2. Name of progect - Construction of Approach road of Thuwunna Bridge.
3. Length of road - 2070.92 feet.
4. Type of road - Asphalt concrete pavement
5. Project cost - Kyats 95 lakhs.
6. Expenditure up to 31-3-83 - Kyats 35 lakhs.
7. Allotment in 1983-84 - Kyats 30 lakhs.

Sr: No	Description of work	Main Programme	Progress in 83-84	1983-84 works Programme/ Progress												Remarks
				4	5	6	7	8	9	10	11	12	1	2	3	
1	Construction of embankment	2070 Rft	2070rft	40	70	80	100									Programme %
				40	70	80	100									Progress%
2	Construction of Laterite	2070 "	2070 "	40	60	80	100									
				40	60	80	80	80	80	80	85	85				
3	Construction of metal base	2070 "	2070 "						20	50	100					
									40	40	45	50				
4	Construction of side walks and side drain.	item	item							10	20	40	60	80	100	

5.3 Concreting Works

Progress of all the concreting works for the whole bridge construction up to 25th, December is shown in the following table.

Progress up to end of (25/12/83)

STRUCTURE	Total vol of each structure	Progress in %			
		vol of conc laid(m^3)	% on own structure	% on sub-structure	over-all %
A_1	823	823	100	10	
P_1	605	605	100	7	
P_2	2442	2442	100	24	
P_3	3186	3186	100	36.5	
P_4	635	635	100	7.5	
A_2	823	823	100	10.0	
Total of sub-struct:	8514	8514	-	100	75.25
Super structure	2800	1230	44%		10.85
Overall	11314	9744			86.10

5.4 Overall Progress

Overall progress on the whole project is going ahead of the scheduled programme. Prompt availability of spare parts for heavy machines when in urgent need will facilitate the completion of the bridge ahead of the scheduled date.

6. Plants and Equipments.

Almost all of the machines and equipments are in good working order, due to the prompt availability of spare parts initiated by the Japanese Experts and Burmese engineers working together at this project.

The Progress and serviceability returns of plants and equipments are shown in the following tables.

(21-9-83) to (20-12-83)

PROGRESS RETURN

SUPPLIED BY	DESCRIPTION	UNIT	IN HAND	RECEIVED DURING THE MONTH	TOTAL	UNDER REPAIR	SERVICEABLE	REMARKS.
Japanese Grant Aid	Reverse Circulation Drill & Accessories.	Set	1		1		1	Works completed
	Air compressor	No	1		1		1	
	Generator	"	2		2		2	
	Crawler crane	"	2		2		2	
	Hino Truck 8½ ton	"	2		2		2	
	Agitator Truck	"	8		8		8	
	Batching Plant	set	1		1		1	
	Classifier Plant	"	1		1		1	
	Vibro Hammer	"	2		2		2	
	Are Welding	"	2		2		2	
	Sheet Rolling Machine	"	1		1		1	
	Shovel Dozer	No	1		1		1	
	Hydraulic Excavator	"	1		1		1	
	Vorbau Wagon	Unit	2		2		2	
	Grout Mixer & Pump	set	1		1		1	

PROGRESS RETURN (21-9-83)to(20-12-83)

SUPPLIED BY	DESCRIPTION	UNIT	IN HAND	RECEIVED DURING THE MONTH	TOTAL	UNDER REPAIR	SERVICEABLE	REMARKS.
CONSTRUCTION CORPORATION	Dozer T.D.9	No	1		1		1	
	Water Bowzer	"	1		1		1	
	Sheet Foot Roller.	"	2		2		2	
	Concrete Mixer	"	1		1		1	
	Concrete Vibrater	"	2		2		2	
	Max Are Welding Transfermer.	"	1		1		1	
	Harbo master 7.5 H.P.	"	2		2		2	
	Stone crusher	"	1		1		1	
	Front End Loader	"	1		1		1	
	Road Roller	"	1		1		1	
	Prestressing Machine.	Unit	2		2		2	

(21.9.83)to(20-12-83)

SERVICEABILITY RETURN

SUPPLIED BY	DESCRIPTION	UNIT	QUANT:	SHEDULED HOURS (S)	WORKING HOURS (W)	REPAIR HOURS (R)	IDLE HOURS	AVAILABILITY % $\frac{S-R}{S} \times 100$	UTILIZATION $\frac{W}{S-R} \times 100$ %	REMARKS.
JAPANESE GRANT AID	Reverse Circulation Drill & accessories	set	1							Work completed
	Air compressor	No	1	180	90	-	90	100	50	
	Generator	"	2	480	240	-	240	100	50	
	Crawler crane	"	2	480	480	-	-	100	100	
	Hino truck 8½ ton	"	2	480	480	-	-	100	100	
	Agitator truck	"	8	480	180	-	300	100	37.5	
	Batching Plant	set	1	540	180	-	360	100	33.33	
	Classifier plant	"	1	540	540	-	-	100	100	
	Vibro Hammer	"	2	180	90	-	90	100	50	
	ARC welding	"	2	480	480	-	-	100	100	
	Sheet Rolling Machine	"	1	180	90	-	-	100	50	
	Shovel Dozer	No	1	270	90	180	-	33.33	100	
	Hydraulic Excavator	"	1	270	270	-	-	100	100	
	Vorbau Wagon	Unit	2	540	540	-	-	100	100	
	Grout Mixer & Pump	set	1	180	60	—	120	100	33.33	

SERVICEABILITY RETURN (21-9-83) to (20-12-83)

SUPPLIED BY	DESCRIPTION	UNIT	QUANTITY	SCHEDULED HOURS (S)	WORKING HOURS (W)	REPAIR HOURS (R)	IDEE HOURS	AVAILABILITY % $\frac{S-R}{S} \times 100$	UTILIZI-TION % $\frac{W}{S-R} \times 100$	REMARKS
CONSTRUCTION CORPORATION	Dozer TD 9	No	1	540	270	270	-	50	100	
	Water Bowzer	"	1	270	270	-	-	100	100	
	Sheet Foot Roller	"	2	480	-	-	480	100	100	
	Concrete Mixer	"	1	480	480	-	-	100	100	
	Concrete Vibrator	"	2	480	-	-	480	100	-	
	Max Are Welding Transfermer	"	1	480	480	-	-	100	100	
	Harbo master 7.5 H.P	"	2	180	120	-	60	100	66.66	
	Stone crusher	"	1	480	480	-	-	100	100	
	Front End loader	"	1	540	540	-	-	100	100	
	Road Roller	"	1	540	540	-	-	100	100	
	Prestressing Machine	Unit	2	90	90	-	-	100	100	

7. Procurement of stores.

7.1 Prourement of construction stores was going smoothly according to plan resulting the progress of works going according to the scheduled programme.

Local stores received during the third quarter of this fiscal year 1983-84 and the latest position of stores is shown in the following table.

Procurement of Construction Materials Local Stores Received During 3rd Quarter 1983 is shown in the following table.

Sr: No:	Description	Unit	Requirement in 1983-84	Receipt in 3rd Quarter	Total Receipt at end 3rd Qr:	Futher Requirement	Remark
1.	Cement	Ton	1285	325	1075	210	
2.	River Shingle	m^3	1820	605.48	2152.48	Nil	
3.	Pyinbongyi sand	m^3	1005	-	183	822	
4.	Laterite	m^3	5400	1214.73	2718.73	2681.27	
5.	H.S.D	gal	96000	8800	34400	61600	
6.	Motor sprit	"	15480	2926	8224	7256	
7.	Pre. 140 EP.	"	552	"	"	552	
8.	Pre 90 EP.	"	552	"	"	552	
9	P.D.O S.A.E (	"	1656	-	184	1472	
10.	S.A.E (30)(SDO)	"	552	-	138	412	
11.	Brake Fluid	"	120	12	16	104	
12.	Grease	lb	2400	400	400	2000	
13.	Gungle wood	ton	200	92.709	191.709	8.291	
14.	Teak	"	40	-	15	25	

8. Personnal Engaged

8-1 Japanese Staff

Despatch of Experts.

Inaccordance with the paragraph II Sub-Para(2) of the Original Record of Discuss, the following Japanese Experts have fulfilled their duties and assigments in 1980-81, 1981-82, 1982-83 and 1983-84 respectively.

No.	Name	Field	Duration of Assigment
1	Mr. Kozo Imamura	Team Leader	22-12-79 to 18-1-82
2	Mr. Hisanobu Ichimasu	Concrete Bridge Engineer.	do
3	Mr. Hajime Asakura	-do-	do
4	Mr. Takayoshi Ono	Structure Mechanic	28-2-80 to 30-3-82
5	Mr. Yasuteru Matsumoto	Foundation Engineer	2-4-80 to 30-3-82
6	Mr. Masakazu Ikeda	-do-	2-4-80 to 30-3-83
7	Mr. Ryuchi Murata	Co-ordinator	1-3-80 to 29-4-82
8.	Mr. Kazuro Yanagida	Team Leader	10-1-82 to 31-1-84
9.	Mr. Masahiko Murasato	Concrete Bridge Engineer.	26-12-82 to 31-12-83
10.	Mr. Koichi Yokoyama	-do-	4-4-82 to 31-3-84
11.	Mr. Kobutsuu Chida	-do-	4-4-82 to 30-7-85
12.	Mr. Nobuyuki Yamaura	Co-ordinator	22-4-82 to 30-7-85
13.	Mr. Nobuki Mori	Foundation Engineer	18-3-82 to 31-5-85
14.	Mr. Shirou Takada	Management Constructions.	8-7-82 to 8-7-84
15.	Mr. Kawano	Mechanical Engineer	21-3-83 to 30-7-85
16.	Mr. Honda	Mech: and Elect: Engineer.	21-3-83 to 30-9-84
17.	Mr. Sato	P.C Expert	24-12-82 to 31-4-84
18.	Mr. Matsuyama	P.C. Expert	2-7-83 to 30-9-84

SHORT TERM EXPERTS. 1981-82 (O.J.T)

Sr:No:	Name	Field	Duration of Assigment
1.	Mr. Hiroshi Kotaki	Mecha & Elect Engineer.	27-8-81 to 3-8-82
2.	Mr. Takashi Tazawa	Instructor for Crane operation	27-8-81 to 3-5-82
3.	Mr. Masamitsu Ogawawara	-do-	27-8-81 to 3-9-82
4.	Mr. Tajiro Takahara	Instructor for shilled mechanics	27-8-81 to 3-5-82
5.	Mr. Akikatsu Kii	-do-	14-9-81 to 20-5-82
6.	Mr. Shiro Ojima	Instructor for Reversed pile	11-2-82 to 18-5-82

The following short term Experts were also Assigned at The Bridge Engineering Centre and have given lectures and practical training to the Burmese trainees and counterparts on the Subjects mentioned below:-

Sr: No:	Name	Field	Duration
1	Mr. Kunihiko Kobayashi	Micro Computor	22-2-81
2	Mr. Yukitaka Shioi	Foundation Engineer	1-3-81 to 22-3-81
3	Mr. Tasuo Kawahito	Seismic Design	1-3-81 to 22-3-81
4	Mr. Suji Sugjura	Soil Machine	do
5	Mr. Shoji Isonura	Concrete Materials	2-3-81 to 9-4-81
6	Mr. Tetsuo Obusi	Elec: Engineer	2-3-81 to 9-6-81
7	Mr. Kenjiro Isumi	Foundation Engg:	12-10-81 to 15-10-81
8.	Mr. Hajime Ikeda	Soil Machine	5-10-81 to 15-10-81
9	Mr. Kenjio Hbriuchi	Micro Computor	25-2-82 to 22-3-82
10.	Mr. Teruyoshi Anan	Concrete Engineer	11-2-82 to 8-3-82
11.	Mr. Kazuro Onuki	Seismic Design	25-2-81 to 15-3-82
12.	Mr. Hichiro Furusawa	Sheathed Rolling Machine.	14-3-82 to 17-4-82

8-2 Burmese Staff

(a) Civil Engineering Staff

1.	U Khin Maung Yi	-	Project Engineer
2.	U Tin Maung Oo	-	Engineer Grade III
3.	U Saw Glow	-	-do-
4.	U Saw Yo E Hla	-	-do-
5.	U Hla Myint	-	-do-
6.	U Win Tin	-	-do-
7.	U Htay Myint	-	-do-
8.	U Saw Ronald Win	-	-do-
9.	U Sein Mg	-	-do-
10.	U Han Min	-	-do-
11.	U Ba Wunn	-	Engineer Grade IV (Special)
12.	U Tun Kyi	-	-do-
13.	U Chit Mya	-	-do-
14.	U Myo Kyaw	-	Engineer Grade IV
15.	U Tun Khin	-	-do-
16.	U Than Aye	-	-do-
17.	U Hla Shwe	-	-do-
18.	U Myint Thein	-	-do-
19.	U Hla Ngwe	-	-do-
20.	U Mya Win	-	Junior Engineer
21.	U Htay Lwin	-	-do-
22.	U San Tint	-	-do-

(b) Mechanical Engineering Staff

1.	U Aung Min	-	Engineer Grade III(Mecht)
2.	U Mya Shwe	-	Engineer Grade IV (")
3.	U Tin Nu	-	-do- T. attached

(c) Electrical Engineering Staff

1.	U Than Htun	-	Engineer Grade III(Elect:)
2.	U Tin Win	-	Engineer Grade IV (")
3.	U Maung Maung	-	-do-
4.	U Myint	-	Electrician Grade I
5.	U Pa	-	-do- II
6.	U Mya Maung	-	-do- III
7.	Helpers	-	(W/C)

(d) Administration

1. Account	–	3 Nos
2. B/C	–	Nil
3. U.D.C	–	1No
4. L.D.C	–	2 Nos
5. Typist	–	2 Nos
6. S.K.LD	–	2 "
7. Draftsman Grade I	–	4 "
8. Tracer	–	Nil
9. Designer	–	1 No
10. Office Peon	–	1 No
11. Office Helper	–	1 No
12. Interperter	–	1 No

(e) Field staff

1. Mechanical operator Drivers & Mechanics.

(a) Operator	–	12 Nos
(b) Drivers	–	3 Nos
(c) Mechanics	–	2 Nos

2. Cappenter

(a) Grade I	–	7 Nos
(b) Grade II	–	13 Nos
(c) Grade III	–	10 Nos

3. Bar Benders

(a) Grade II	–	5 Nos
(b) Grade III	–	4 Nos

4. Welders

(1) Grade II	–	2 Nos
(2) Grade III	–	6 Nos

5. Fitter

(1) Grade I	–	4 Nos
(2) Grade II	–	2 Nos
(3) Grade III	–	1 Nos

6. Mason

Grade II	–	2 Nos

7. Blacksmith
   (a) Grade I - 1 No
   (b) Grade II - 1 No

8. Medical
   Nurse Grade I - 1 No

9. Divers
   (a) Grade I - 1 No
   (b) Grade II - 2 Nos

10. Unskilled Labour - 65 Nos

9. General

1. The Minister and high officials from Construction Corporation had visited the Project on 9th November, inspect the progress of works and gave necessary instructions.

2. A Japanese 6 members O C A J I team had visited the Project on 11th November and discussed with the Japanese experts here, about the construction works and the progress acheived.

3. The Managing Director of Construction Corporation gave a special breakfast to all the workers on 19th November and a special dinner to all the Japanese and Burmese engineers on 20th November, to honour the achevements they had made to complete successfully P_2 superstructure works ahead of schedule.

4. The Ambassador from Japanese Embassy had visited the worksite on 1st December and the Japanese Team Leader had explained the progress of works.

5. The team from the Directorate of Project Appraisal and Project Reporting had visited the worksite on 6th December and discussed about the progress of works.

6. The Managing Director of Construction Corporation had visited and given necessary instructions for the construction of approach road.

7. The evaluation team from Japan had visited the project on 21st December and discussed about the progress of construction works and the availability of spare parts required for machines and equipments to be in running order up to the completion time of this project.

CONFIDENTIAL

MINISTRY OF CONSTRUCTION

THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

HLAING RIVER BRIDGE CONSTRUCTION PROJECT

PROJECT INFORMATION FOR FEASIBILITY STUDY

27-11-75

RANGOON

CONFIDENTIAL

PROJECT INFORMATION FOR FEASIBILITY STUDY

Objective

1. The purpose of this short report is to illustrate on the significance of the proposed construction of a bridge across Hlaing river at Insein in promoting and developing the economy of Burma, especially the Irrawaddy delta region.

2. The long term development plan of Burma aims at expanding and developing agricultural, fishery and livestock breeding, establishing related industries, effectively utilizing forest mineral resources and developing industries which would greatly contribute to the increased production to the agricultural sector. In order to achieve these objectives it becomes imperative to improve the communication infrastructure and to adequately meet the ever increasing demands for goods and passenger transport.

Economic Justification.

1. Production of main crops in Irrawaddy delta region in the year 1974-75 is 3.8 million tons. The Irrawaddy delta region is so fertile that the rice productiln in that area alone account for as much as 31% of the nation's total rice production. The bulk of this rice is to be transported to Rangoon for internal consumption and export to foreign countries.

2. In addition to rice, jute, beams, tobacco, fruits are also grown extensively in delta region. Burma is earning quite a good amount of foreign exchange every year by exporting jute and soyabeams.

3. The following industrial projects are under Construction in Irrawaddy delta region.

S.N	Project Name	Industrial products
1	Myaungmya jute factory	Gunny bags
2	Kyonepyaw jute depot	Jute bales
3	Danubyu " "	" "
4	Ma-U-bin " "	" "
5	Bassein sheet glass factory	Sheet glass
6	Kyangin cement factory	Cement

Transport of raw materials to various factories and distribution of finished products demands a proper road network in delta region.

4. The development and promotion of livestock farming and fishery in delta region also depend on proper road network in the area. Irrawaddy delta region alone accounts for, as much as 80% of the nation's total river fish production.

5. Though the delta region is blessed with numerous rivers and creeks, it has only a few miles of road network to its credit. The very number of rivers and creeks coupled with the enormous cost of construction of bridges has hampered further development of the road network. If in the near future, an uninterrupted road link could be made between Bassein and Rangoon, the transportation of goods and passengers between the two cities would be greatly facilitated.

6. The Government is planning to construct a river port at Yandoon , so that goods and passengers coming from the north and the delta region by river crafts could be expeditiously transported to Rangoon by way of Insein/Yandoon Road. To attain this objective, the bridge must be built across the Hlaing River.

7. The construction of Haling river bridge will stimulate in-flow of population into western bank of Hlaing river. This population will in turn contribute to the development of agriculture, livestock breeding, fishery and other industries. The workers can stay on the western bank of Hlaing river and commute to Rangoon over this bridge.

8. In evaluating this project, not only the economic side but also the much more overall side of national development planning, as well as environmental and social phases should be reviewed as far as possible.

Communications

1. To connect the towns in Upper Burma there are Rangoon Pegu - Mandalay highway and Rangoon - Prome - Mandalay highway. One road from Rangoon leads to Mandalay through Pegu, Toungoo and Meiktila. Another road leads northwards to Mandalay through Prome. There is also one road from Rangoon via Pegu to Martaban. All these roads are leading to Northern Burma and Southern Burma.

2. There is no road link from other parts of the country to the Irrawaddy delta, the biggest rice producing and fish supplying area to the whole of the country. A road construction project is under implementation on the western bank of Irrawaddy. It is planned to connect Bassein and Monywa. An East west connection road also has been proposed from Prome across Irrawaddy river. Prome is 180 miles away from Rangoon.

3. Insein - Yandoon road is the shortest road planned to connect the delta area to Rangoon. At present, the road is being constructed up to Yandoon, 34 miles only. But this road will be extended from the opposite bank of the Irrawaddy river up to Pantanaw, Kyaunggone until it reaches Bassein.

Topography

1. Hlaing river flows through the western part of Insein and enters the Gulf of Martaban flowing via Southern part of Rangoon city. Hlaing river is one of the distributories of Irrawaddy river which flows from North to South.

2. Insein is about 10 miles away from Rangoon city and is now quite densely populated. The opposite side of Insein is not as yet developed.

3. The Insein Yandoon road terminates on the opposite bank of Insein. There is a ferry service for passengers who wish to cross over and for those, who wish to travel by road to Yandoon. Yandoon - Insein road is at present under construction. The roads in Rangoon city are bitumenous surface and the average width is 50 feet.

Bridge Planning.

1. The width of the river is about 1700 feet and the depth of water at low tide is about 30 feet. The maximum difference of water levels is estimated to be 30 feet. During the flood seasons, the river over-flows the western side of the river bank about 200 feet. The total length of the bridge is roughly estimated about 2000 feet.

2. Traffic at present is very heavy at Insein side. Daily passengers traffic across the Hlaing River is estimated between 7000 and 15000. The width of the proposed bridge therefore, required to accommodate the traffic shall be 28'-0" with a curb of 5'-0" on both sides of the roadway.

3. Span length between the piers shall be at least 300 feet. There will be five or six piers in the river. The number of vessels operating up and down the river, including to and fro services are about 100 in number. The type of ferry boats and ships operating in river are about 150 feet long but the length of timber rafts are fairly long. Freeboard required for the types of river crafts shall be about 55 feet above high flood level. It is therefore necessary to select either raised deck or bascule type of bridge.

HLAING RIVER BRIDGE PROJECT