NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | Rubble Mound of Caisson | **Pay Item No. (BOQ)** | 2B - 0102 |
| **Quantity Item** | Leveling | **Unit** | $m^2$ |

**Calculation Procedure Applied**

1. Calculation of Lengths of Sections
2. Average of Lengths of Sections
3. Calculation of Area : Average of Lengths of Sections times distance between Sections (Excel)

**References, Calculation Base and Revisions**

References : Tender Drawings :

From QW-QW-01-009 Container Berth 01

To QW-QW-01-018 Container Berth 10

(Same as Rubble).

| Rev | Prepared by | Prepared Date | No. of Pages | Checked by | Checked Date | Reviewed by | Reviewed Date | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| 0 | Karla G. [signature] | | | Mr. Inuma | | Mr. Ando | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

FN : Calculation_Cover_Sheet_020504_seg cover

○Container Berth

5. Final Trimming of Rubble Mound

| Section No. | Length (m) | Average Length of 2 Sections (m) | Distance Between Sections (m) | Area ($m^2$) |
|---|---|---|---|---|
| | | | | |
| No.0-1 | 23.00 | | | |
| | | 23.00 | 1.00 | 23.00 |
| No.0 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.1 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.2 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.3 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.4 | 23.00 | | | |
| | | 23.00 | 20.00 | 460.00 |
| No.4+20.00 | 23.00 | | | |
| | | 23.00 | 5.00 | 115.00 |
| No.5 | 23.00 | | | |
| | | 23.00 | 1.00 | 23.00 |
| No5+1.00 | 23.00 | | | |
| | | 23.00 | 24.00 | 552.00 |
| No.6 | 23.00 | | | |
| | | 23.00 | 26.00 | 575.00 |
| No.7 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.8 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.9 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.10 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.11 | 23.00 | | | |
| | | 23.00 | 16.73 | 384.79 |
| No.11+16.73 | 23.00 | | | |
| | | 23.00 | 8.00 | 184.00 |
| No.11+24.73 | 23.00 | | | |
| | | 23.00 | 0.27 | 6.21 |
| No.12 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.13 | 23.00 | | | |
| | | 23.00 | 15.00 | 345.00 |
| No.14 | 23.00 | | | |
| | | | | |
| Total | | 437.00 | 341.00 | 7,843.00 |

○Container Berth

6. Rough Trimming of Rubble Mound

| Section No. | Length (m) | Average Length of 2 Sections (m) | Distance Between Sections (m) | Area ($m^2$) |
|---|---|---|---|---|
| No.0-64.66 | 0.00 | | | |
| | | 21.26 | 10.46 | 222.38 |
| No.0-54.20 | 42.52 | | | |
| | | 46.93 | 13.62 | 639.12 |
| No.0-40.58 | 51.33 | | | |
| | | 51.69 | 1.81 | 93.55 |
| No.0-38.77 | 52.04 | | | |
| | | 53.24 | 6.16 | 327.93 |
| No.0-32.61 | 54.43 | | | |
| | | 55.74 | 6.96 | 387.95 |
| No.0-25.65 | 57.05 | | | |
| | | 57.05 | 24.65 | 1,406.28 |
| No.0-1.00 | 57.05 | | | |
| | | 45.55 | 0.00 | 0.00 |
| No.0-1.00' | 34.05 | | | |
| | | 34.05 | 1.00 | 34.05 |
| No.0 | 34.05 | | | |
| | | 34.05 | 25.00 | 851.25 |
| No.1 | 34.05 | | | |
| | | 34.05 | 25.00 | 851.25 |
| No.2 | 34.05 | | | |
| | | 34.05 | 25.00 | 851.25 |
| No.3 | 34.05 | | | |
| | | 34.05 | 25.00 | 851.25 |
| No.4 | 34.05 | | | |
| | | 34.05 | 20.00 | 681.00 |
| No.4+20.00 | 34.05 | | | |
| | | 21.50 | 5.00 | 107.48 |
| No.5 | 8.94 | | | |
| | | 8.94 | 1.00 | 8.94 |
| No5+1.00 | 8.94 | | | |
| | | 8.94 | 24.00 | 214.56 |
| No.6 | 8.94 | | | |
| | | 8.94 | 25.00 | 223.50 |
| No.7 | 8.94 | | | |
| | | 8.94 | 25.00 | 223.50 |
| No.8 | 8.94 | | | |
| | | 8.94 | 25.00 | 223.50 |
| No.9 | 8.94 | | | |
| | | 8.94 | 25.00 | 223.50 |
| No.10 | 8.94 | | | |
| | | 8.94 | 25.00 | 223.50 |
| No.11 | 8.94 | | | |
| | | 8.94 | 16.73 | 149.57 |
| No.11+16.73 | 8.94 | | | |
| | | 24.64 | 8.00 | 197.12 |
| No.11+24.73 | 40.34 | | | |
| | | 40.34 | 0.27 | 10.89 |
| No.12 | 40.34 | | | |
| | | 40.34 | 25.00 | 1,008.50 |
| No.13 | 40.34 | | | |
| | | 40.34 | 15.00 | 605.10 |
| No.14 | 40.34 | | | |
| | | | | |
| Total | | 774.42 | 404.66 | 10,616.91 |

| Project | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
|---|---|---|---|
| Section | Rubble Mound of Caisson | Calc. Index No. | |
| Subject | Leveling | Page No. | Rev. |

References/ Notes

Final 7,843.00 m²

Rough 10,616.91 m²

total 18,459.91 m²

≒ 18,500 m²

| | Prepared by | | Checked by | |
|---|---|---|---|---|
| | | / /200 | | / /200 |

FN: Calculation_Sheet

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | Rubble Mound of Caisson | **Pay Item No. (BOQ)** | 2B - 0103 |
| **Quantity Item** | Compaction | **Unit** | $m^2$ |

**Calculation Procedure Applied**

1. Calculation of Lengths of Sections
2. Average of Lengths of Sections
3. Calculation of Volume : Average of Lengths of Sections times distance between Sections (Excel)

**References, Calculation Base and Revisions**

References : Tender Drawings :

From DW-QW-01-011 Container Berth 03
To DW-QW-01-018 Container Berth 10

(Same as Rubble)

| Rev | Prepared | | No. of Pages | Checked | | Reviewed | | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| | by | Date | | by | Date | by | Date | |
| 0 | Karla G. | | | Mr. Tsuma | | Mr. Ando | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

FN : Calculation_Cover_Sheet_020504_seg cover

○Container Berth

5. Final Trimming of Rubble Mound

| Section No. | Length (m) | Average Length of 2 Sections (m) | Distance Between Sections (m) | Area ($m^2$) |
|---|---|---|---|---|
| | | | | |
| No.0-1 | 23.00 | | | |
| | | 23.00 | 1.00 | 23.00 |
| No.0 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.1 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.2 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.3 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.4 | 23.00 | | | |
| | | 23.00 | 20.00 | 460.00 |
| No.4+20.00 | 23.00 | | | |
| | | 23.00 | 5.00 | 115.00 |
| No.5 | 23.00 | | | |
| | | 23.00 | 1.00 | 23.00 |
| No5+1.00 | 23.00 | | | |
| | | 23.00 | 24.00 | 552.00 |
| No.6 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.7 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.8 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.9 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.10 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.11 | 23.00 | | | |
| | | 23.00 | 16.73 | 384.79 |
| No.11+16.73 | 23.00 | | | |
| | | 23.00 | 8.00 | 184.00 |
| No.11+24.73 | 23.00 | | | |
| | | 23.00 | 0.27 | 6.21 |
| No.12 | 23.00 | | | |
| | | 23.00 | 25.00 | 575.00 |
| No.13 | 23.00 | | | |
| | | 23.00 | 15.00 | 345.00 |
| No.14 | 23.00 | | | |
| | | | | |
| Total | | 437.00 | 341.00 | 7,843.00 |

≃ 7,850 $m^2$

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | Container Berth | **Pay Item No. (BOQ)** | 2B - 02 |
| **Quantity Item** | Asphalt Mat | **Unit** | $m^2$ |

**Calculation Procedure Applied**

This area was computed multiplying the length by the width of a caisson plus 1 meter.

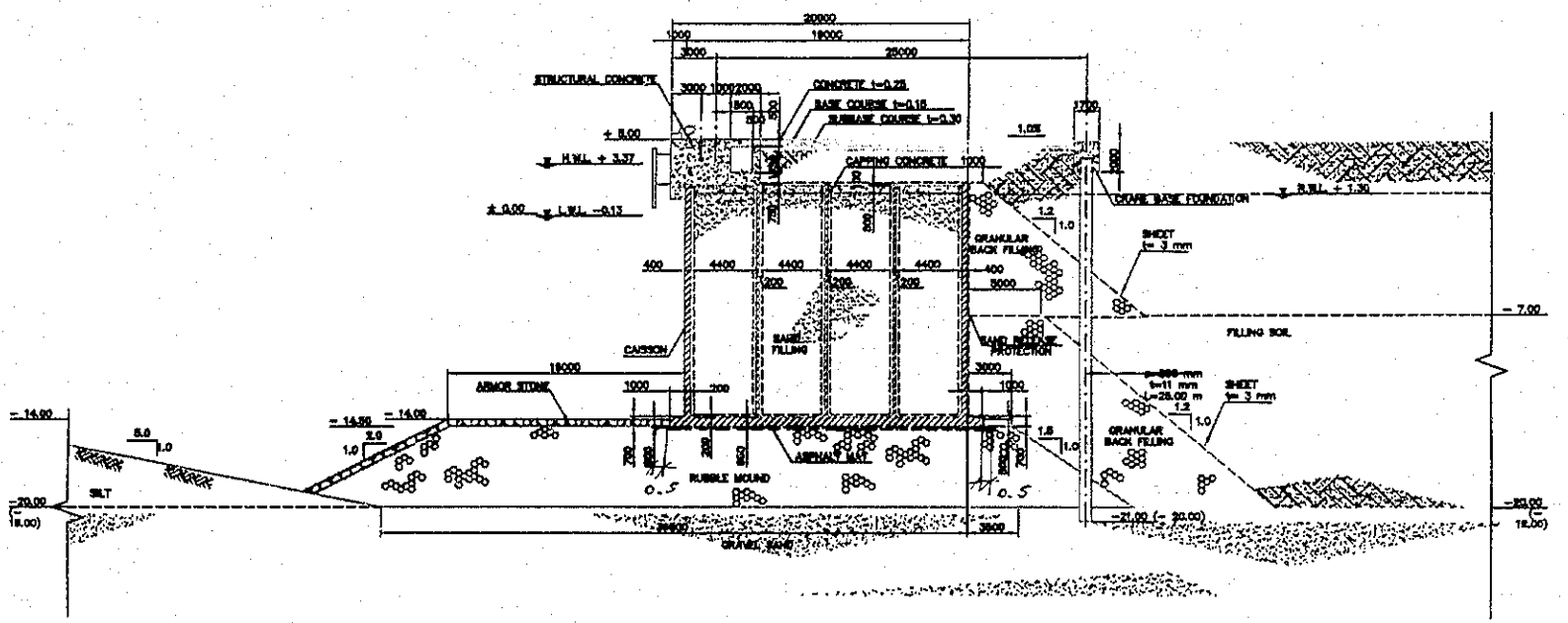
**References, Calculation Base and Revisions**

References: Tender Drawings:

DW - QW - 01 - 003 Typical Cross Section
Type I Container Berth (-14.0 m)

| Rev | Prepared | | No. of Pages | Checked | | Reviewed | | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| | by | Date | | by | Date | by | Date | |
| 0 | Karla G. | | | Mr. Inuma | | Mr. Ando | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

FN : Calculation_Cover_Sheet_020504_seg cover



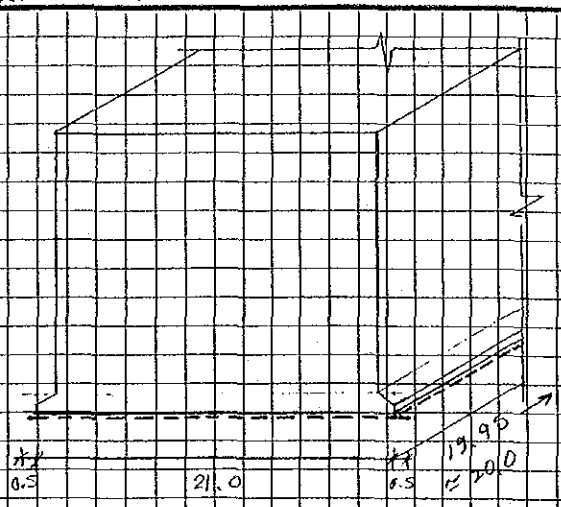

TYPICAL CROSS SECTION TYPE I
CONTAINER BERTH (−14.0 m)

SCALE 1:300 0 5.0 10.0 15.0 20.0 25.0 30.0

DW-QW-01-003

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
| **Section** | Container Berth | Calc. Index No. | |
| **Subject** | CAISSON ASPHALT MAT | Page No. | Rev. |

References/ Notes




ESC 1:400

$A = (22.0\,m)(20.0\,m) = 440.00\ m^2$

Container Berth: $A = (440\,m^2)(17) = \boxed{7,480\ m^2}$ — $V = 7,480\ m^2$

Multipurpose Berth: $A = (440\,m^2)(11) = 4,840\ m^2$ — $V = 4,840\ m^2$

Transitional: $A = (440\,m^2)(1) = 440\ m^2$ — $V = 440\ m^2$

$V_T = 12,760\ m^2$

| | | | | | |
|---|---|---|---|---|---|
| | | Prepared by | | Checked by | |
| | | Kaila García | 28 / May / 2002 | S. García | 28 / 05 / 200 |

FN: Calculation_Sheet

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | Armor Stone | **Pay Item No. (BOQ)** | 213-0301 |
| **Quantity Item** | Rubble | **Unit** | $m^3$ |

**Calculation Procedure Applied**

1. Calculation of Areas of Sections
2. Average of Areas of Sections
3. Calculation of Volume : Average of Areas of Sections times distance between Sections (Excel)

**References, Calculation Base and Revisions**

Reference : Tender Drawings :

from DVI-GVI-01-009 Container Bulk 01

To DVI-GVI-01-018 Container Bulk 010

(Same as "Rubble Mound of Caisson")

| Rev | Prepared | | No. of Pages | Checked | | Reviewed | | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| | by | Date | | by | Date | by | Date | |
| 0 | Karla G. | | | Mr. Inuma | | Mr. Ando | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

FN : Calculation_Cover_Sheet_020504_seg cover

○Container Berth

7. Armor Stone

| Section No. | Area ($m^2$) | Average Area of 2 Sections ($m^2$) | Distance Between Sections (m) | Volume ($m^3$) |
|---|---|---|---|---|
| | | | | |
| No.0-64.66 | 0.00 | | | |
| | | 9.75 | 10.46 | 101.99 |
| No.0-54.20 | 19.50 | | | |
| | | 20.70 | 13.62 | 281.87 |
| No.0-40.58 | 21.89 | | | |
| | | 22.07 | 1.81 | 39.94 |
| No.0-38.77 | 22.24 | | | |
| | | 17.09 | 6.16 | 105.24 |
| No.0-32.61 | 11.93 | | | |
| | | 12.61 | 6.96 | 87.73 |
| No.0-25.65 | 13.28 | | | |
| | | 13.28 | 25.65 | 340.63 |
| No.0 | 13.28 | | | |
| | | 13.28 | 25.00 | 332.00 |
| No.1 | 13.28 | | | |
| | | 13.28 | 25.00 | 332.00 |
| No.2 | 13.28 | | | |
| | | 13.28 | 25.00 | 332.00 |
| No.3 | 13.28 | | | |
| | | 13.28 | 25.00 | 332.00 |
| No.4 | 13.28 | | | |
| | | 13.28 | 20.00 | 265.60 |
| No.4+20.00 | 13.28 | | | |
| | | 8.36 | 5.00 | 41.78 |
| No.5 | 3.43 | | | |
| | | 3.43 | 1.00 | 3.43 |
| No5+1.00 | 3.43 | | | |
| | | 3.43 | 24.00 | 82.32 |
| No.6 | 3.43 | | | |
| | | 3.43 | 25.00 | 85.75 |
| No.7 | 3.43 | | | |
| | | 3.43 | 25.00 | 85.75 |
| No.8 | 3.43 | | | |
| | | 3.43 | 25.00 | 85.75 |
| No.9 | 3.43 | | | |
| | | 3.43 | 25.00 | 85.75 |
| No.10 | 3.43 | | | |
| | | 3.43 | 25.00 | 85.75 |
| No.11 | 3.43 | | | |
| | | 3.43 | 16.73 | 57.38 |
| No.11+16.73 | 3.43 | | | |
| | | 8.92 | 8.00 | 71.32 |
| No.11+24.73 | 14.40 | | | |
| | | 14.40 | 0.27 | 3.89 |
| No.12 | 14.40 | | | |
| | | 14.40 | 25.00 | 360.00 |
| No.13 | 14.40 | | | |
| | | 14.40 | 15.00 | 216.00 |
| No.14 | 14.40 | | | |
| | | | | |
| Total | | 249.79 | 404.66 | 3,815.86 |

≒ 3820 $m^3$

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | Armor Stone | **Pay Item No. (BOQ)** | 2B-0302 |
| **Quantity Item** | Leveling | **Unit** | $m^2$ |

**Calculation Procedure Applied**

1. Calculation of Lengths of Sections
2. Average of Lengths of Sections
3. Calculation of Area : Average of Lengths of Sections times distance between Sections

(Excel)

**References, Calculation Base and Revisions**

Reference : Tender Drawings :

From DW-QW-01-009 Breakwater Bulk 01
To DW-QW-01-018 Breakwater Bulk 010

(Same as "Rubble Mound of Caisson")

| Rev | Prepared | | No. of Pages | Checked | | Reviewed | | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| | by | Date | | by | Date | by | Date | |
| 0 | Karla G. | | | Mr. Inuma | | Mr. Ando | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

○Container Berth

8. Trimming of Armor Stone

| Section No. | Length (m) | Average Length of 2 Sections (m) | Distance Between Sections (m) | Area ($m^2$) |
|---|---|---|---|---|
| | | | | |
| No.0-64.66 | 0.00 | | | |
| | | 19.50 | 10.46 | 203.97 |
| No.0-54.20 | 39.00 | | | |
| | | 41.67 | 13.62 | 567.48 |
| No.0-40.58 | 44.33 | | | |
| | | 44.69 | 1.81 | 80.88 |
| No.0-38.77 | 45.04 | | | |
| | | 34.74 | 6.16 | 213.97 |
| No.0-32.61 | 24.43 | | | |
| | | 25.81 | 6.96 | 179.60 |
| No.0-25.65 | 27.18 | | | |
| | | 27.18 | 24.65 | 669.99 |
| No.0-1.00 | 27.18 | | | |
| | | 27.18 | 1.00 | 27.18 |
| No.0 | 27.18 | | | |
| | | 27.18 | 25.00 | 679.50 |
| No.1 | 27.18 | | | |
| | | 27.18 | 25.00 | 679.50 |
| No.2 | 27.18 | | | |
| | | 27.18 | 25.00 | 679.50 |
| No.3 | 27.18 | | | |
| | | 27.18 | 25.00 | 679.50 |
| No.4 | 27.18 | | | |
| | | 27.18 | 20.00 | 543.60 |
| No.4+20.00 | 27.18 | | | |
| | | 17.33 | 5.00 | 86.63 |
| No.5 | 7.47 | | | |
| | | 7.47 | 1.00 | 7.47 |
| No5+1.00 | 7.47 | | | |
| | | 7.47 | 24.00 | 179.28 |
| No.6 | 7.47 | | | |
| | | 7.47 | 25.00 | 186.75 |
| No.7 | 7.47 | | | |
| | | 7.47 | 25.00 | 186.75 |
| No.8 | 7.47 | | | |
| | | 7.47 | 25.00 | 186.75 |
| No.9 | 7.47 | | | |
| | | 7.47 | 25.00 | 186.75 |
| No.10 | 7.47 | | | |
| | | 7.47 | 25.00 | 186.75 |
| No.11 | 7.47 | | | |
| | | 7.47 | 16.73 | 124.97 |
| No.11+16.73 | 7.47 | | | |
| | | 18.45 | 8.00 | 147.56 |
| No.11+24.73 | 29.42 | | | |
| | | 29.42 | 0.27 | 7.94 |
| No.12 | 29.42 | | | |
| | | 29.42 | 25.00 | 735.50 |
| No.13 | 29.42 | | | |
| | | 29.42 | 15.00 | 441.30 |
| No.14 | 29.42 | | | |
| | | | | |
| Total | | 540.44 | 404.66 | 7,869.07 |

≃ 7870 $m^2$

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | Scaffolding of Caisson | **Pay Item No. (BOQ)** | 2B-0401 |
| **Quantity Item** | Outer | **Unit** | $m^2$ |

**Calculation Procedure Applied**

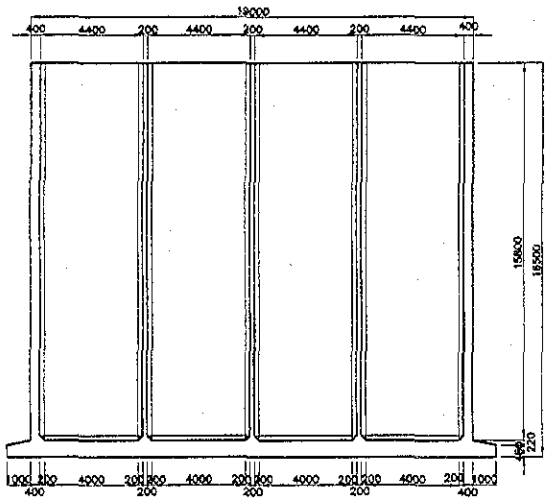
Outer Scaffolding is put up on the outside of a caisson from the bottom to the top in the caisson yard.

**References, Calculation Base and Revisions**

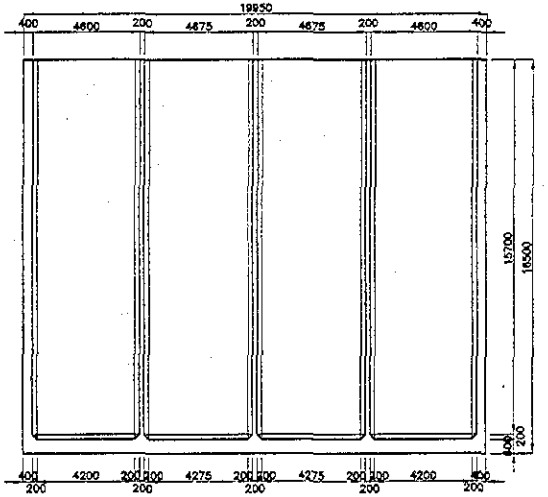
Refrances : Tender Drawings :

LWI - QW - 01 - 027 Details of Concrete Caisson

| Rev | Prepared | | No. of | Checked | | Reviewed | | Superseded |
|---|---|---|---|---|---|---|---|---|
| | by | Date | Pages | by | Date | by | Date | by Calc No. |
| 0 | Karla G. | | | Mr. Inuma | | Mr. Ando | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

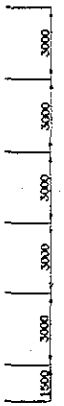


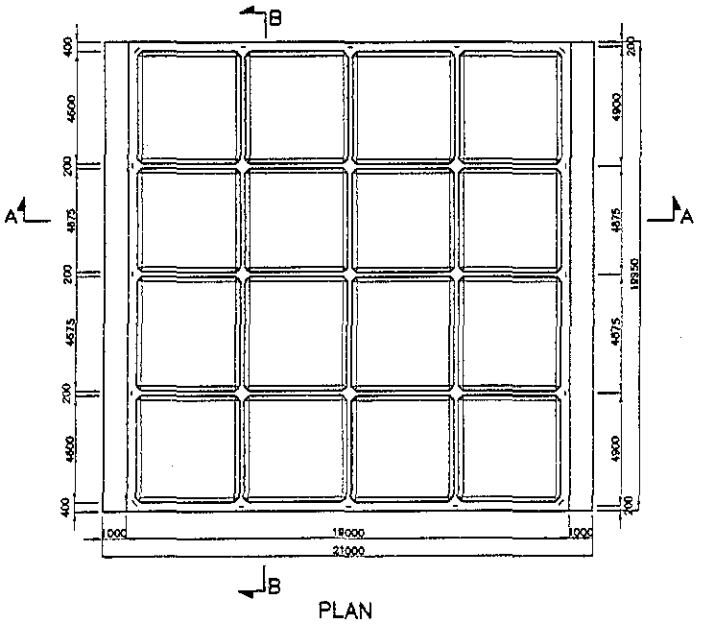

SECTION A–A




SECTION B–B

PLACING HEIGHT



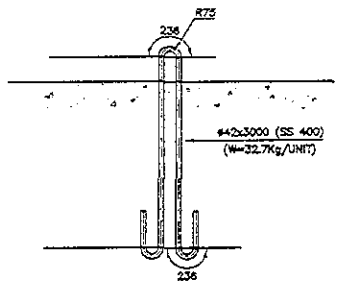




PLAN

| | | |
|---|---|---|
| Volume | V (m3) | 1113.03 |
| Weight | W (kN) | 28712.66 |
| Center of gravity | G (m) | 8.65 |
| Draught | D (m) | 8.91 |
| Center of Bouyancy | C (m) | 3.43 |
| Metacenter | M (m) | 4.31 |

NOTE:
WHERE HOLES ARE TO BE PROVIDED IN THE SIDE WALL OR PARTITION WALL FOR FLOODING THE CAISSON, THE POSITION OF THE WALL AROUND THE HOLE SHALL BE SUFFICIENTLY REINFORCED.

DETAIL OF PLACING BAR
(FOR REFERENCE)
SCALE 1:40




| | | | | | | |
|---|---|---|---|---|---|---|
| REV. NO. | DATE | COORDINATE | BY | APPROVED | DATE | |

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)

DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR

NIPPON KOEI CO., LTD.

DESIGNED BY :
CHECKED BY :
APPROVED BY :

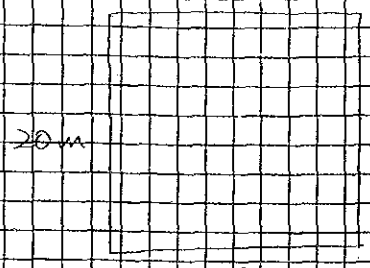
SECTION : QUAYWALL WORK
SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH
TITLE :

DETAILS OF CONCRETE CAISSON

DATE : JULY/2002
SCALE : 1 : 200
DRAWING NO. : DW-QW-01-027

| Project | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
|---|---|---|---|
| Section | Scaffolding of Caisson | Calc. Index No. | |
| Subject | Outer | Page No. | Rev. |

References/ Notes




height

$(19 \times 2 + 20 \times 2) \times 16.5$

$= 1287$

$\simeq 1290\ m^2$/caisson.

Container Berth

$1290 \times 17 = 21930$

$\simeq$ 22,000 $m^2$

Multi-purpose Berth

$1290 \times 12 = 15480$

$\simeq 15,500\ m^2$

| | Prepared by | | Checked by | |
|---|---|---|---|---|
| | | / /200 | | / /200 |

FN: Calculation_Sheet

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | Scaffolding of Caisson | **Pay Item No. (BOQ)** | 2B-0402 |
| **Quantity Item** | Inner | **Unit** | $m^2$ |

**Calculation Procedure Applied**

Inner Scaffolding can be moved up with the progress of placing concrete. So, the height of Inner Scaffolding is computed as 1.6 m.

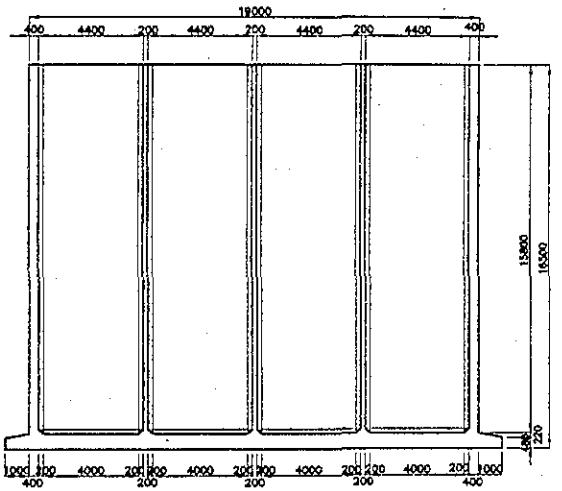
**References, Calculation Base and Revisions**

References : Tender Drawings :

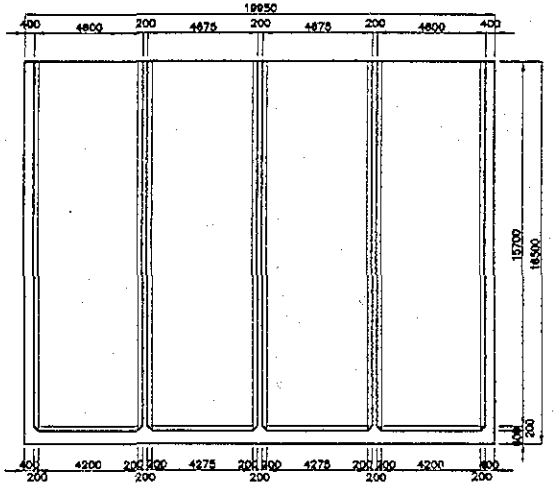
DW - QW - 01- 027 Details of Concrete Caisson.

| Rev | Prepared | | No. of Pages | Checked | | Reviewed | | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| | by | Date | | by | Date | by | Date | |
| 0 | Kaila G. | | | Mr. Inuma | | Mr. Ando | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

FN : Calculation_Cover_Sheet_020504_seg cover

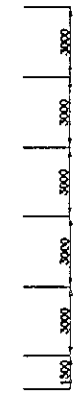


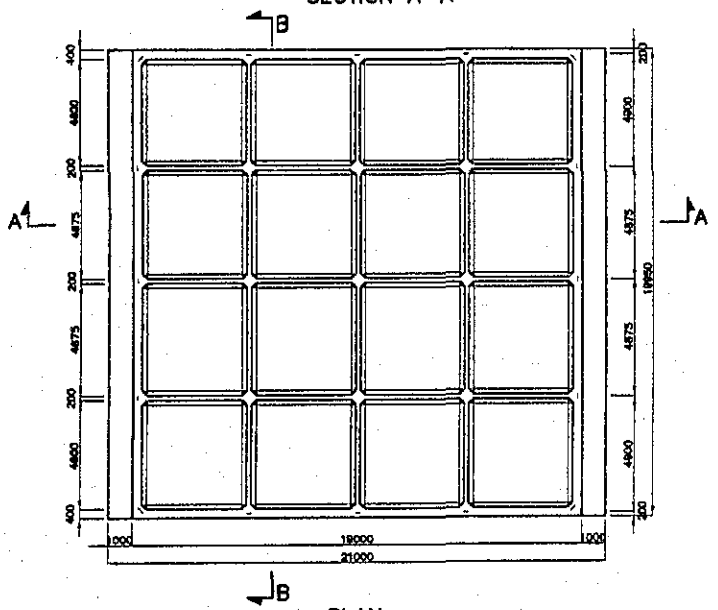

SECTION A–A




SECTION B–B

PLACING HEIGHT



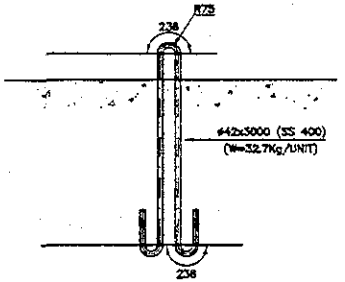




PLAN

| | | |
|---|---|---|
| Volume | V (m3) | 1113.03 |
| Weight | W (kN) | 26712.86 |
| Center of gravity | G (m) | 6.85 |
| Draught | D (m) | 6.91 |
| Center of Bouyancy | C (m) | 3.43 |
| Metacenter | M (m) | 4.31 |

NOTE:
WHERE HOLES ARE TO BE PROVIDED IN THE SIDE WALL OR PARTITION WALL FOR FLOODING THE CAISSON, THE POSITION OF THE WALL AROUND THE HOLE SHALL BE SUFFICIENTLY REINFORCED.

DETAIL OF PLACING BAR
(FOR REFERENCE)
SCALE 1:40




| REV. NO. | DATE | DESCRIPTION | BY | APPROVED | DATE |
|---|---|---|---|---|---|

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)

DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR

NIPPON KOEI CO., LTD.

DESIGNED BY :
CHECKED BY :
APPROVED BY :

SECTION : QUAYWALL WORK
SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH
TITLE :

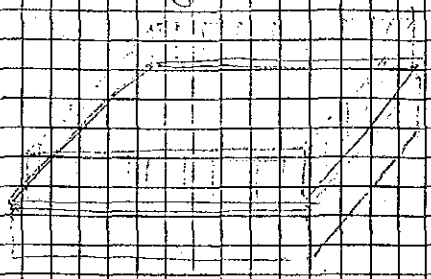
DETAILS OF CONCRETE CAISSON

DATE : JULY/2002
SCALE : 1 : 200
DRAWING NO. DW-QW-01-027

| Project | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
|---|---|---|---|
| Section | Scaffolding of Caisson. | Calc. Index No. | |
| Subject | Inner | Page No. | Rev. |

References/ Notes

Image



$A = (4.9 \times 4.6 \times 1.6 \times 8) + (4.4 \times 4.675 \times 1.6 \times 8)$

$= 574\ m^2/caisson$

Container Berth

$574 \times 17 = 8908$

$\simeq \boxed{8910\ m^2}$

Multi-purpose Berth

$574 \times 12 = 6888$

$\simeq 6890\ m^2$

| | Prepared by | Checked by |
|---|---|---|
| | / /200 | / /200 |

FN: Calculation_Sheet

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | REINFORCEMENT OF CAISSON | **Pay Item No. (BOQ)** | 2B - 0403 |
| **Quantity Item** | | **Unit** | t |

**Calculation Procedure Applied**

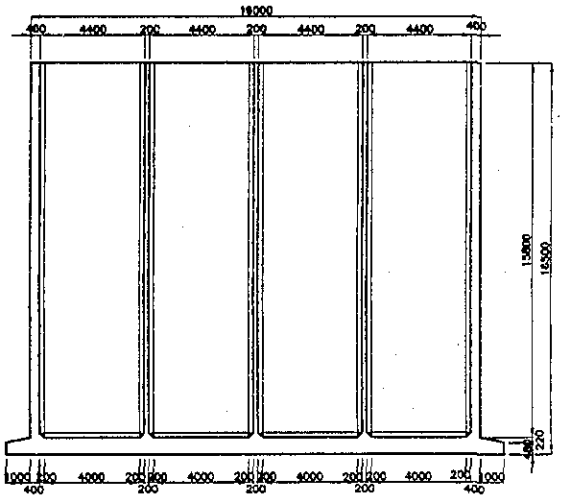
Reinforcement of caisson was computed including lifting bar. A caisson has 16 lifting bars.

**References, Calculation Base and Revisions**

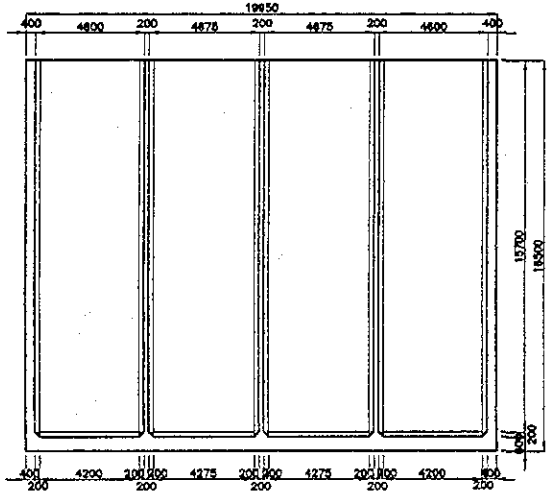
References : Tender Drawings :

DW - QW - 01 - 027 Details of Concrete Caisson.

| Rev | Prepared | | No. of Pages | Checked | | Reviewed | | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| | by | Date | | by | Date | by | Date | |
| 0 | Karlo G. | | | Mr. Inuma | | Mr. Ando | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

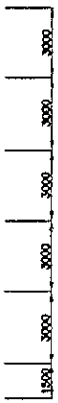


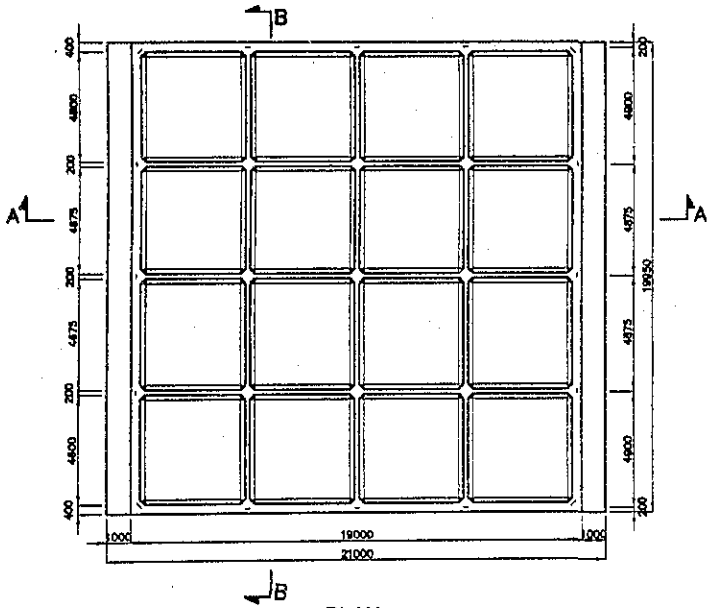

SECTION A–A




SECTION B–B

PLACING HEIGHT



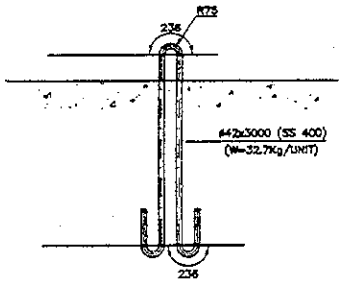




PLAN

| | | |
|---|---|---|
| Volume | V (m3) | 1113.03 |
| Weight | W (kN) | 26712.86 |
| Center of gravity | G (m) | 6.85 |
| Drought | D (m) | 6.81 |
| Center of Bouyancy | C (m) | 3.43 |
| Metacenter | M (m) | 4.31 |

NOTE:
WHERE HOLES ARE TO BE PROVIDED IN THE SIDE WALL OR PARTITION WALL FOR FLOODING THE CAISSON, THE POSITION OF THE WALL AROUND THE HOLE SHALL BE SUFFICIENTLY REINFORCED.

DETAIL OF PLACING BAR
(FOR REFERENCE)
SCALE 1:40




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| REV. NO. | DATE | DESCRIPTION | BY | APPROVED | DATE | | |

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)

DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR

NIPPON KOEI CO., LTD.

DESIGNED BY :
CHECKED BY :
APPROVED BY :

SECTION : QUAYWALL WORK
SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH
TITLE :

DETAILS OF CONCRETE CAISSON

DATE : JULY/2002
SCALE : 1 : 200
DRAWING NO. DW-QW-01-027

# REINFORCEMENT OF CAISSON (13)

## BAR SCHEDULE

| BAR No. | | DIA. | LENGTH (mm) | UNIT WT. (kg) | Q'TY. | WEIGHT (kg) | TOTAL WT. | SHAPE |
|---|---|---|---|---|---|---|---|---|
| B1 | 1 | D13 | 8,520 | 0.995 | 101 | 8,477 | 858 | |
| | 2 | D13 | 8,500 | 0.995 | 101 | 8,453 | 853 | |
| | 3 | D13 | 7,550 | 0.995 | 101 | 9,955 | 750 | |
| B2 | | D22 | 4,780 | 3.040 | 50 | 14,562 | 728 | |
| B3 | | D16 | 4,380 | 1.560 | 42 | 7,160 | 301 | |
| B4 | | D22 | 3,690 | 3.040 | 50 | 5,818 | 541 | |
| B5 | | D19 | 2,900 | 1.560 | 50 | 4,524 | 226 | |
| B6 | | D13 | 2,800 | 0.995 | 43 | 2,886 | 124 | |
| B7 | | D13 | 2,180 | 0.995 | 50 | 3,166 | 457 | |
| B8 | 1 | D13 | 8,530 | 0.995 | 33 | 8,582 | 828 | |
| | 2 | D13 | 10,000 | 0.995 | 33 | 9,950 | 825 | |
| | 3 | D13 | 7,000 | 0.995 | 33 | 6,965 | 648 | |
| B9 | | D22 | 4,800 | 3.040 | 24 | 14,630 | 351 | |
| B10 | | D19 | 4,720 | 2.250 | 22 | 10,620 | 234 | |
| B11 | | D16 | 4,870 | 1.560 | 93 | 7,207 | 300 | |
| B12 | | D13 | 4,520 | 0.995 | 84 | 4,497 | 378 | |
| B13 | | D22 | 3,000 | 3.040 | 38 | 9,120 | 228 | |
| B14 | | D19 | 3,990 | 2.250 | 33 | 8,794 | 223 | |
| B15 | | D16 | 3,800 | 1.560 | 33 | 4,992 | 134 | |
| B16 | | D13 | 3,000 | 0.995 | 66 | 2,985 | 197 | |
| B17 | 1 | D13 | 3,960 | 0.995 | 101 | 3,920 | 601 | |
| | 2 | D13 | 10,000 | 0.995 | 101 | 9,950 | 1,005 | |
| | 3 | D13 | 4,000 | 0.995 | 101 | 3,980 | 402 | |
| B18 | | D13 | 2,980 | 0.995 | 70 | 2,913 | 477 | |
| B19 | | D16 | 3,800 | 1.560 | 50 | 5,928 | 226 | |
| B20 | | D13 | 2,900 | 0.995 | 43 | 2,886 | 171 | |
| B21 | | D16 | 1,740 | 2.250 | 38 | 3,915 | 186 | |
| B22 | | D13 | 1,740 | 0.995 | 43 | 1,731 | 73 | |
| B23 | 1 | D13 | 6,430 | 0.995 | 116 | 6,599 | 742 | |
| | 2 | D13 | 10,000 | 0.995 | 116 | 9,950 | 1,154 | |
| | 3 | D13 | 4,500 | 0.995 | 116 | 4,478 | 518 | |
| B24 | | D19 | 1,780 | 2.250 | 24 | 4,028 | 97 | |
| B25 | | D13 | 1,780 | 0.995 | 20 | 1,791 | 36 | |
| B26 | | D19 | 3,000 | 2.250 | 38 | 6,750 | 243 | |
| B27 | | D13 | 3,000 | 0.995 | 50 | 2,985 | 90 | |

| | |
|---|---|
| D22 | 1,848 |
| D19 | 883 |
| D16 | 1,210 |
| D13 | 11,298 |
| Total | 15,338 kg |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S1 | 1 | D13 | 3,450 | 0.995 | 101 | 3,383 | 342 | |
| | 2 | D13 | 3,450 | 0.995 | 101 | 3,383 | 342 | |
| | 3 | D13 | 3,450 | 0.995 | 101 | 3,383 | 342 | |
| | 4 | D13 | 3,450 | 0.995 | 101 | 3,383 | 342 | |
| | 5 | D13 | 2,090 | 0.995 | 101 | 2,050 | 211 | |
| S2 | 1 | D13 | 3,450 | 0.995 | 101 | 3,383 | 342 | |
| | 2 | D13 | 3,450 | 0.995 | 101 | 3,383 | 342 | |
| | 3 | D13 | 3,450 | 0.995 | 101 | 3,383 | 342 | |
| | 4 | D13 | 3,450 | 0.995 | 101 | 3,383 | 342 | |
| | 5 | D13 | 1,700 | 0.995 | 101 | 1,682 | 171 | |
| S3 | 1 | D19 | 2,610 | 1.560 | 101 | 4,072 | 411 | |
| | 2 | D19 | 3,300 | 1.560 | 101 | 5,148 | 521 | |
| | 3 | D19 | 3,300 | 1.560 | 101 | 5,148 | 521 | |
| | 4 | D16 | 3,300 | 1.560 | 101 | 5,148 | 521 | |
| | 5 | D19 | 3,300 | 1.560 | 101 | 5,148 | 521 | |
| | 6 | D16 | 2,180 | 1.560 | 101 | 3,378 | 341 | |
| S4 | 1 | D16 | 3,410 | 1.560 | 101 | 5,320 | 537 | |
| | 2 | D19 | 3,300 | 1.560 | 101 | 5,148 | 521 | |
| | 3 | D19 | 3,300 | 1.560 | 101 | 5,148 | 521 | |
| | 4 | D16 | 3,300 | 1.560 | 101 | 5,148 | 521 | |
| | 5 | D16 | 3,300 | 1.560 | 101 | 5,148 | 521 | |
| | 6 | D19 | 1,600 | 1.560 | 101 | 2,496 | 253 | |
| S5 | | D13 | 3,540 | 0.995 | 100 | 14,487 | 1,449 | |
| S6 | | D19 | 3,340 | 1.560 | 84 | 5,210 | 438 | |
| S7 | 1 | D13 | 3,500 | 0.995 | 93 | 3,383 | 313 | |
| | 2 | D13 | 3,500 | 0.995 | 93 | 3,383 | 313 | |
| | 3 | D13 | 3,500 | 0.995 | 93 | 3,383 | 313 | |
| | 4 | D13 | 3,500 | 0.995 | 93 | 3,383 | 313 | |
| | 5 | D13 | 2,100 | 0.995 | 93 | 2,080 | 194 | |

| BAR No. | | DIA. | LENGTH (mm) | UNIT WT. (kg) | Q'TY. | WEIGHT (kg) | TOTAL WT. | SHAPE |
|---|---|---|---|---|---|---|---|---|
| S8 | 1 | D13 | 3,400 | 0.995 | 93 | 3,383 | 313 | |
| | 2 | D13 | 3,400 | 0.995 | 93 | 3,383 | 313 | |
| | 3 | D13 | 3,400 | 0.995 | 93 | 3,383 | 313 | |
| | 4 | D13 | 3,400 | 0.995 | 93 | 3,383 | 313 | |
| | 5 | D13 | 1,700 | 0.995 | 93 | 1,692 | 157 | |
| S9 | 1 | D16 | 2,890 | 1.560 | 91 | 4,508 | 410 | |
| | 2 | D19 | 3,500 | 1.560 | 91 | 5,460 | 497 | |
| | 3 | D19 | 3,500 | 1.560 | 91 | 5,460 | 497 | |
| | 4 | D19 | 3,500 | 1.560 | 91 | 5,460 | 497 | |
| | 5 | D19 | 3,500 | 1.560 | 91 | 5,460 | 497 | |
| | 6 | D16 | 3,100 | 1.560 | 91 | 3,378 | 298 | |
| S10 | 1 | D19 | 3,310 | 1.560 | 91 | 5,288 | 481 | |
| | 2 | D19 | 3,500 | 1.560 | 91 | 5,460 | 497 | |
| | 3 | D19 | 3,500 | 1.560 | 91 | 5,460 | 497 | |
| | 4 | D19 | 3,500 | 1.560 | 91 | 5,460 | 497 | |
| | 5 | D19 | 3,500 | 1.560 | 91 | 5,460 | 497 | |
| | 6 | D16 | 1,900 | 1.560 | 91 | 2,898 | 227 | |
| S11 | | D22 | 3,820 | 3.040 | 92 | 14,606 | 1,328 | |
| S12 | | D19 | 3,320 | 1.560 | 80 | 5,178 | 414 | |
| S13 | 1 | D33 | 9,400 | 3.040 | 168 | 28,576 | 4,278 | |
| | 2 | D22 | 10,000 | 3.040 | 168 | 30,400 | 5,068 | |
| | 3 | D22 | 8,500 | 3.040 | 168 | 25,840 | 4,288 | |
| S14 | 1 | D16 | 8,500 | 1.560 | 184 | 13,260 | 2,042 | |
| | 2 | D19 | 10,000 | 1.560 | 184 | 15,600 | 2,972 | |
| | 3 | D19 | 7,810 | 1.560 | 184 | 12,348 | 1,909 | |
| S15 | 1 | D22 | 1,970 | 3.040 | 184 | 21,483 | 3,310 | |
| | 2 | D22 | 10,000 | 3.040 | 184 | 30,400 | 4,967 | |
| | 3 | D22 | 4,800 | 3.040 | 184 | 13,690 | 2,107 | |
| S16 | 1 | D33 | 4,300 | 3.985 | 10 | 17,810 | 178 | |
| | 2 | D33 | 10,000 | 3.985 | 10 | 38,800 | 388 | |
| | 3 | D33 | 7,270 | 3.985 | 10 | 28,835 | 288 | |
| S17 | | D33 | 1,840 | 3.985 | 369 | 8,372 | 2,010 | |
| S18 | | D33 | 2,840 | 3.985 | 492 | 10,987 | 4,881 | |
| S19 | 1 | D22 | 10,000 | 3.040 | 184 | 30,400 | 5,068 | |
| | 2 | D22 | 8,000 | 3.040 | 184 | 18,208 | 2,833 | |
| S20 | 1 | D13 | 3,000 | 0.995 | 184 | 2,978 | 548 | |
| | 2 | D13 | 8,500 | 0.995 | 184 | 8,458 | 1,556 | |
| S21 | 1 | D33 | 4,330 | 3.985 | 184 | 18,900 | 2,885 | |
| | 2 | D22 | 10,000 | 3.040 | 184 | 30,400 | 4,967 | |
| | 3 | D22 | 4,800 | 3.040 | 184 | 13,690 | 2,107 | |
| S22 | 1 | D33 | 4,300 | 3.985 | 10 | 17,810 | 178 | |
| | 2 | D33 | 10,000 | 3.985 | 10 | 38,800 | 388 | |
| | 3 | D33 | 8,320 | 3.985 | 10 | 28,194 | 282 | |
| S23 | | D33 | 1,900 | 3.985 | 369 | 8,368 | 1,881 | |
| S24 | | D33 | 2,580 | 3.985 | 492 | 10,318 | 4,744 | |

| | |
|---|---|
| D33 | 18,078 |
| D22 | 48,809 |
| D19 | 18,873 |
| D13 | 6,211 |
| Total | 88,758 kg |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| P1 | 1 | D19 | 6,870 | 1.560 | 231 | 16,408 | 2,604 | |
| | 2 | D19 | 10,000 | 1.560 | 231 | 15,600 | 3,604 | |
| | 3 | D19 | 4,290 | 1.560 | 231 | 7,020 | 1,622 | |
| P2 | 1 | D19 | 4,960 | 1.560 | 248 | 19,123 | 2,951 | |
| | 2 | D19 | 10,000 | 2.250 | 248 | 22,500 | 5,579 | |
| | 3 | D19 | 6,870 | 2.250 | 248 | 15,458 | 3,803 | |
| P3 | 1 | D19 | 2,910 | 1.560 | 148 | 4,540 | 672 | |
| | 2 | D19 | 3,500 | 1.560 | 148 | 5,460 | 810 | |
| | 3 | D19 | 3,500 | 1.560 | 148 | 5,460 | 810 | |
| | 4 | D19 | 3,500 | 1.560 | 148 | 5,460 | 810 | |
| | 5 | D19 | 3,500 | 1.560 | 148 | 5,460 | 810 | |
| | 6 | D16 | 2,180 | 1.560 | 148 | 3,378 | 498 | |
| P4 | 1 | D16 | 3,410 | 1.560 | 148 | 5,320 | 787 | |
| | 2 | D19 | 3,300 | 1.560 | 148 | 5,148 | 808 | |
| | 3 | D19 | 3,300 | 1.560 | 148 | 5,148 | 808 | |
| | 4 | D19 | 3,300 | 1.560 | 148 | 5,148 | 808 | |
| | 5 | D19 | 3,300 | 1.560 | 148 | 5,148 | 808 | |
| | 6 | D19 | 1,600 | 1.560 | 148 | 2,496 | 369 | |
| P5 | | D22 | 3,700 | 3.040 | 276 | 11,248 | 3,104 | |

| BAR No. | | DIA. | LENGTH (mm) | UNIT WT. (kg) | Q'TY. | WEIGHT (kg) | TOTAL WT. | SHAPE |
|---|---|---|---|---|---|---|---|---|
| P6 | 1 | D19 | 8,220 | 1.560 | 231 | 9,703 | 2,241 | |
| | 2 | D19 | 10,000 | 1.560 | 231 | 15,600 | 3,604 | |
| | 3 | D19 | 4,000 | 1.560 | 231 | 6,240 | 1,441 | |
| P7 | 1 | D19 | 4,000 | 2.250 | 248 | 9,000 | 2,234 | |
| | 2 | D19 | 10,000 | 2.250 | 248 | 22,500 | 5,579 | |
| | 3 | D19 | 6,420 | 2.250 | 248 | 14,445 | 3,583 | |
| P8 | 1 | D19 | 3,890 | 1.560 | 132 | 6,068 | 801 | |
| | 2 | D19 | 3,500 | 1.560 | 132 | 5,460 | 721 | |
| | 3 | D19 | 3,500 | 1.560 | 132 | 5,460 | 721 | |
| | 4 | D19 | 3,500 | 1.560 | 132 | 5,460 | 721 | |
| | 5 | D19 | 3,500 | 1.560 | 132 | 5,460 | 721 | |
| | 6 | D19 | 2,100 | 1.560 | 132 | 3,276 | 432 | |
| P9 | 1 | D19 | 3,390 | 1.560 | 132 | 5,288 | 698 | |
| | 2 | D19 | 3,500 | 1.560 | 132 | 5,460 | 721 | |
| | 3 | D19 | 3,500 | 1.560 | 132 | 5,460 | 721 | |
| | 4 | D19 | 3,500 | 1.560 | 132 | 5,460 | 721 | |
| | 5 | D19 | 3,500 | 1.560 | 132 | 5,460 | 721 | |
| | 6 | D19 | 1,600 | 1.560 | 132 | 2,496 | 329 | |
| P10 | | D22 | 3,690 | 3.040 | 276 | 11,187 | 3,086 | |

| | |
|---|---|
| D22 | 5,990 |
| D19 | 23,131 |
| D16 | 31,548 |
| Total | 60,867 kg |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| H1 | | D13 | 1,810 | 0.995 | 178 | 1,800 | 282 | |
| H2 | | D13 | 1,620 | 0.995 | 178 | 1,602 | 285 | |
| H3 | | D13 | 1,340 | 0.995 | 284 | 1,330 | 377 | |
| H4 | | D13 | 1,370 | 0.995 | 284 | 1,363 | 380 | |
| H5 | | D13 | 1,380 | 0.995 | 318 | 1,372 | 434 | |
| H6 | | D13 | 1,080 | 0.995 | 972 | 1,075 | 1,045 | |
| H7 | | D13 | 780 | 0.995 | 1,456 | 0.788 | 1,146 | |

| | |
|---|---|
| D13 | 3,904 |
| Total | 3,904 kg |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| F1 | | D19 | 2,110 | 2.250 | 104 | 4,748 | 494 | |
| F2 | | D19 | 2,100 | 1.560 | 103 | 3,278 | 337 | |
| F3 | | D13 | 1,780 | 0.995 | 105 | 1,771 | 186 | |
| F4 | | D13 | 2,110 | 0.995 | 105 | 2,098 | 220 | |
| F5 | | D16 | 1,780 | 1.560 | 105 | 2,773 | 292 | |
| F6 | 1 | D13 | 9,720 | 0.995 | 12 | 9,577 | 79 | |
| | 2 | D13 | 10,000 | 0.995 | 12 | 9,950 | 119 | |
| | 3 | D13 | 4,000 | 0.995 | 12 | 3,980 | 48 | |

| | |
|---|---|
| D19 | 494 |
| D16 | 629 |
| D13 | 651 |
| Total | 1,774 kg |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| T1 | 1 | D13 | 830 | 0.995 | 108 | 0.926 | 148 | |
| | 2 | D13 | 890 | 0.995 | 108 | 0.886 | 91 | |
| | 3 | D13 | 850 | 0.995 | 108 | 0.846 | 89 | |

| | |
|---|---|
| D13 | 328 |
| Total | 328 kg |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| W1 | | D13 | 700 | 0.995 | 1,024 | 0.697 | 714 | |
| W2 | | D13 | 1,830 | 0.995 | 238 | 1.842 | 420 | |

| | |
|---|---|
| D13 | 1,134 |
| Total | 1,134 kg |

Weight of Reinforcing Bars by Diameter

(Type of steel reinforcement SD345)

| | |
|---|---|
| D33 | 18,078 |
| D22 | 48,733 |
| D19 | 24,815 |
| D16 | 31,966 |
| D13 | 25,814 |
| Grand Total | 148,980 kg |
| Concrete volume | 1,114.78 m³ |

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)

DETAILED DESIGN REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR

NIPPON KOEI CO., LTD

DESIGNED BY :

CHECKED BY :

APPROVED BY :

VERSION : QUAYWALL WORK

SUB-SECTION : CONTAINER AND MULTIPURPOSE BERTH

TITLE : REINFORCEMENT OF CAISSON (13)

DATE : MARCH/2002

SCALE : 1 : 100

DRAWING NO. Dw-C-M-01-020

| Project | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
|---|---|---|---|
| Section | REINFORCEMENT OF CAISSON | Calc. Index No. | |
| Subject | | Page No. | Rev. |

References/ Notes

Reinforcement of caisson

W = 169.0 t

169.0 × 17 = 2873 t

Lifting Bar

φ42 - 3000 W = 32.7 kg

32.7 × 16 = 523.2 kg

523.2 × 17 = 8894.4 kg

≒ 8.9 t

2873.0 + 8.9 = 2881.9

≒ 2890 t

| | Prepared by | Checked by |
|---|---|---|
| | / /200 | / /200 |

FN: Calculation_Sheet

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | CONCRETE OF CAISSON | **Pay Item No. (BOQ)** | 2B- 0404 |
| **Quantity Item** | | **Unit** | $m^3$ |

**Calculation Procedure Applied**

Caisson concrete volume was computed for a respective Caisson. Cross section area was computed using geometric formulas and multiplied to the section lenght of respective caisson. The volume was multiplied to the total of caissons.

The volume was computed with 2 decimal for section area and zero decimal for total
The result was verified in Intellicad.

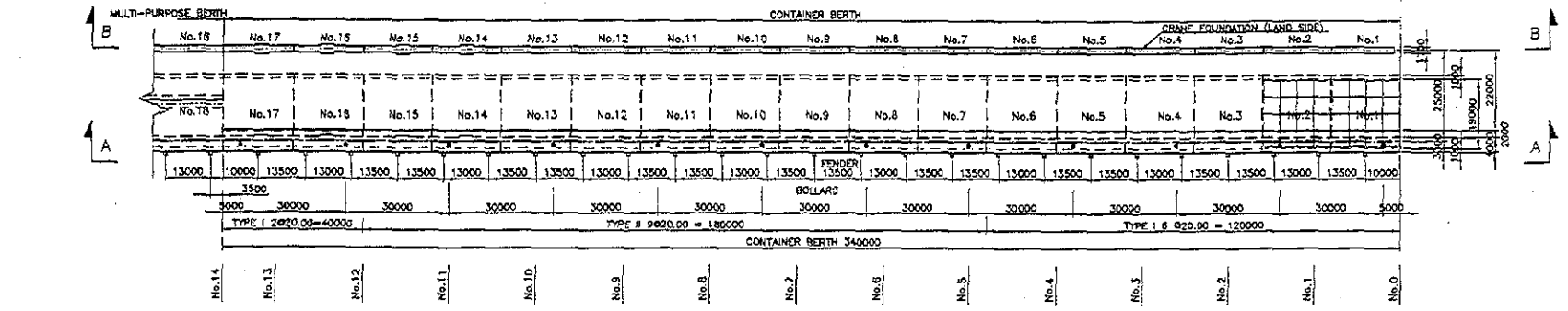
**References, Calculation Base and Revisions**

References : Tender Drawings :

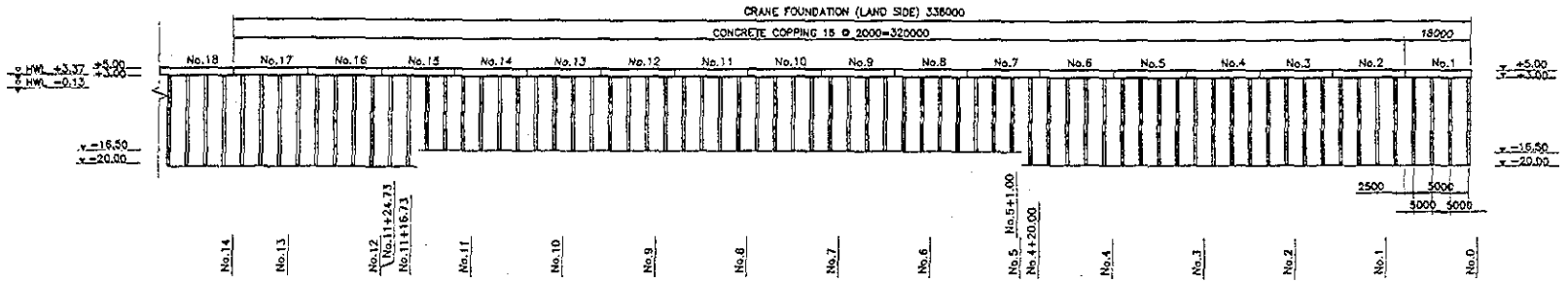
DW - QW - 01 - 001 Plan and Profile Container Berth.
DW - QW - 01 - 027 Details of Concrete Caisson.

| Rev | Prepared | | No. of Pages | Checked | | Reviewed | | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| | by | Date | | by | Date | by | Date | |
| 0 | E. Garcia | 21/May/2002 | | S. Garcia | 27 May/02 | Mr. Ando | | |
| 1 | | | | Mr. Inuma | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

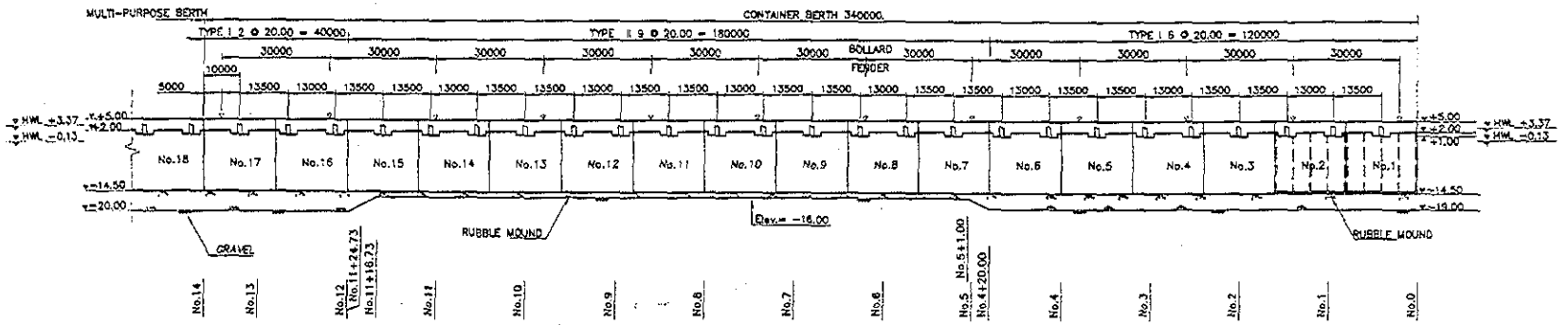
FN : Calculation_Cover_Sheet_020504_seg
cover




PLAN




PROFILE B–B

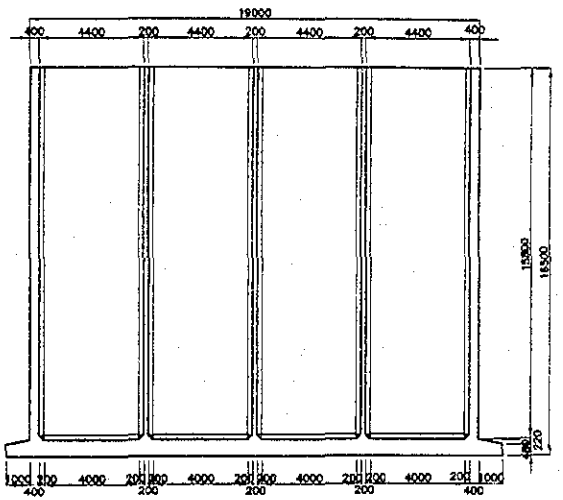



PROFILE A–A

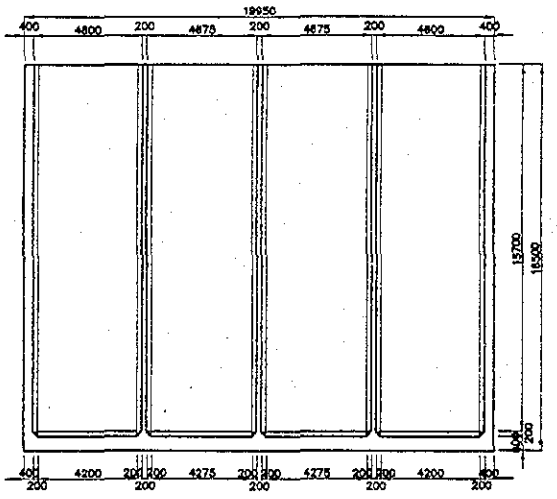
SCALE 1:1250

0 50 100

| | | | | |
|---|---|---|---|---|
| JICA JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) / CEPA COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA) | DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR / NIPPON KOEI CO., LTD. | DESIGNED BY : CHECKED BY : APPROVED BY | SECTION : QUAYWALL WORK<br>SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH<br>TITLE : PLAN AND PROFILE CONTAINER BERTH | DATE : JULY/2002<br>SCALE : 1 : 1250<br>DRAWING NO. |

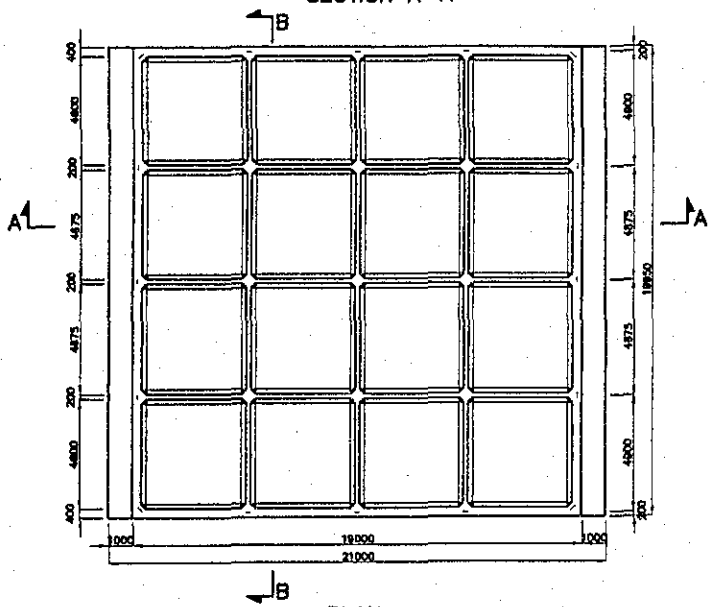



SECTION A–A




SECTION B–B

PLACING HEIGHT

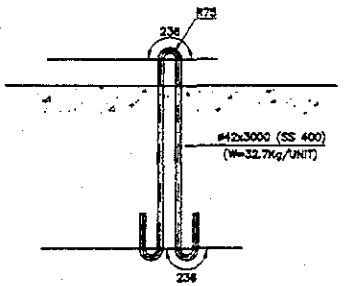



PLAN

| | | |
|---|---|---|
| Volume | V (m3) | 1113.03 |
| Weight | W (kN) | 26712.66 |
| Center of gravity | G (m) | 6.65 |
| Draught | D (m) | 6.91 |
| Center of Bouyancy | C (m) | 3.43 |
| Metacenter | M (m) | 4.31 |

NOTE:
WHERE HOLES ARE TO BE PROVIDED IN THE SIDE WALL OR PARTITION WALL FOR FLOODING THE CAISSON, THE POSITION OF THE WALL AROUND THE HOLE SHALL BE SUFFICIENTLY REINFORCED.

DETAIL OF PLACING BAR
(FOR REFERENCE)
SCALE 1:40




| REV. NO. | DATE | COORDINATE | BY | APPROVED | DATE |
|---|---|---|---|---|---|

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)

DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR

NIPPON KOEI CO., LTD.

DESIGNED BY :
CHECKED BY :
APPROVED BY :

SECTION : QUAYWALL WORK
SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH
TITLE :

DETAILS OF CONCRETE CAISSON

DATE : JULY/2002
SCALE : 1 : 200
DRAWING NO. DW-QW-01-027

| Project | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
|---|---|---|---|
| Section | CONCRETE OF CAISSON | Calc. Index No. | |
| Subject | | Page No. | Rev. |

References/ Notes

Volume per Caisson :

$L_1 = 19.00\,m$ ; $L_2 = 19.95\,m$ $h = 15.80\,m$ No holes = 16

$V_1 = (19.95\,m)(19.00\,m)(0.60\,m) = 227.43\,m^3$

$V_2 = (0.40\,m)[19.95\,m + (19.0\,m - (0.40\,m)(2)][16.50\,m - 0.60\,m](2) = 485.27\,m^3$

$V_3 = (0.20\,m)\left[\left[(19.95\,m - (0.40\,m)(2)\right](3) + (19.0\,m - (0.40\,m)(2) - (0.20\,m)(3)(3)\right]$

$(16.50\,m - 0.50\,m)$

$V_3 = 350.60\,m^3$

$V_4 = \left[\frac{(0.20\,m)(0.20\,m)}{2}(16.50\,m - 0.4\,m)\right](4)(16) = 20.35\,m^3$

$V_5 = \frac{(0.20\,m)(0.20\,m)}{2}\left[(1.0\,m + 4.20\,m)(2)(8) + (9.0\,m + 4.275\,m)(2)(8)\right]$

$V_5 = 5.27\,m^3$

$V_6 = \frac{(0.2\,m)(0.2\,m)(0.2\,m)}{3}(4)(16) = 9.17\,m^3$

$V_7 = (1.0\,m)(0.48\,m)(19.95\,m)(2) = 19.16\,m^3$

$V_8 = \frac{(0.22\,m)(1.0\,m)}{2}(19.95\,m)(2) = 4.39\,m^3$

$V = 1112.63\,m^3 \simeq 1,113\,m^3$

Container Berth : $V = (1,113\,m^3)(17) = 18,921\,m^3$ → 19,000 $m^3$

Multipurpose Berth : $V = (1,113\,m^3)(11) = 12,243\,m^3$

Transitional : $V = (1113\,m^3)(1) = 1,113\,m^3$ ) → 13,400 $m^3$

| | Prepared by | | Checked by | |
|---|---|---|---|---|
| | | / /200 | | / /200 |

FN: Calculation_Sheet

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | FORM OF CAISSON | **Pay Item No. (BOQ)** | 2B - 0405 |
| **Quantity Item** | | **Unit** | $m^2$ |

**Calculation Procedure Applied**

Caisson form area was computed for Container Berth.

Cross section area was computed by geometric formulas, multiplying the length to the width of sections of the caisson.
This area was multiplied by the total of caisson.

The volumen was computed with two decimal for section area and zero decimal for total.

**References, Calculation Base and Revisions**

References: Tender Drawings:
DW-QW-01 – 027 Details of Concrete Caisson

| Rev | Prepared by | Prepared Date | No. of Pages | Checked by | Checked Date | Reviewed by | Reviewed Date | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| 0 | K. García | 23/11/01/02 | | S. García | May 29/02 | Mr. Ando | | |
| 1 | | | | Mr. Iwina | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

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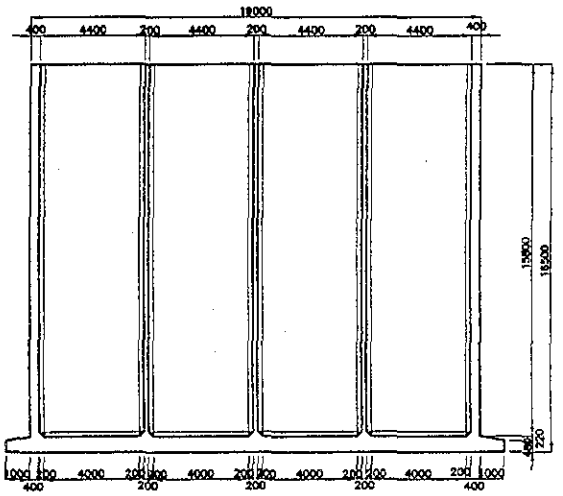
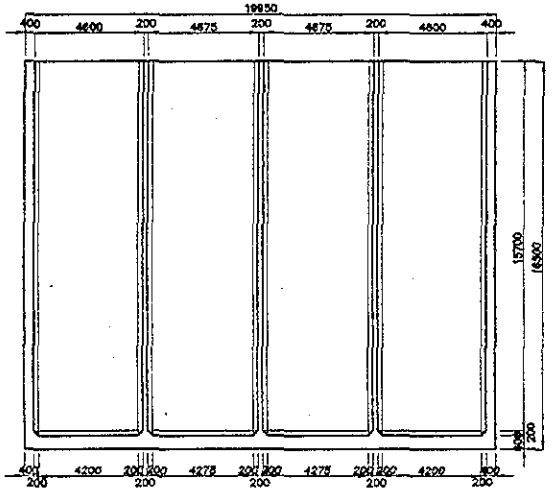
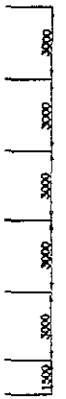


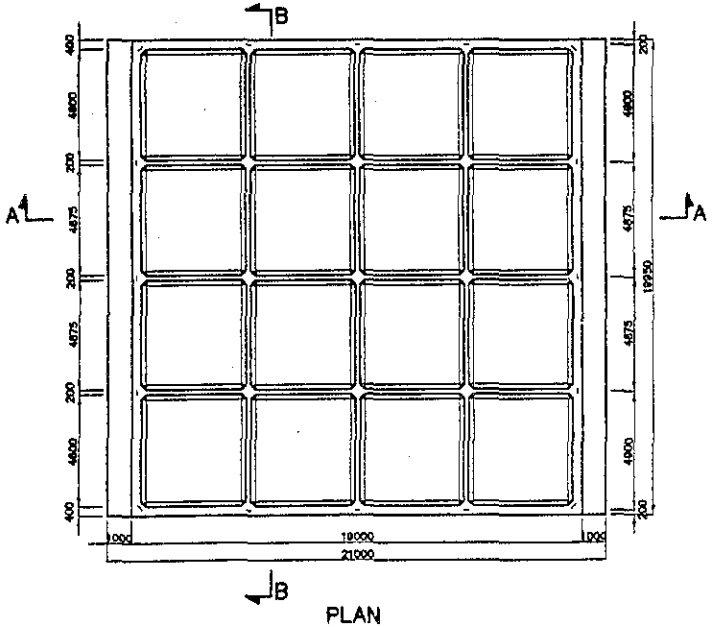

SECTION A–A




SECTION B–B

PLACING HEIGHT



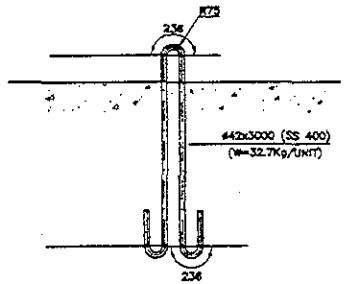




PLAN

| | | |
|---|---|---|
| Volume | V (m3) | 1113.03 |
| Weight | W (kN) | 28712.68 |
| Center of gravity | G (m) | 8.85 |
| Draught | D (m) | 8.91 |
| Center of Boujancy | C (m) | 3.43 |
| Metocenter | M (m) | 4.31 |

NOTE:
WHERE HOLES ARE TO BE PROVIDED IN THE SIDE WALL OR PARTITION WALL FOR FLOODING THE CAISSON, THE POSITION OF THE WALL AROUND THE HOLE SHALL BE SUFFICIENTLY REINFORCED.

DETAIL OF PLACING BAR
(FOR REFERENCE)
SCALE 1:40

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| REV. NO. | DATE | CODEMARK | BY | APPROVED | DATE |

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)

DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR

NIPPON KOEI CO., LTD.

DESIGNED BY :
CHECKED BY :
APPROVED BY :

SECTION : QUAYWALL WORK
SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH
TITLE :

DETAILS OF CONCRETE CAISSON

DATE : JULY/2002
SCALE : 1 : 200
DRAWING NO. DW-CW-01-027

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
| **Section** | FORM OF CAISSON | Calc. Index No. | |
| **Subject** | | Page No. | Rev. |

References/ Notes

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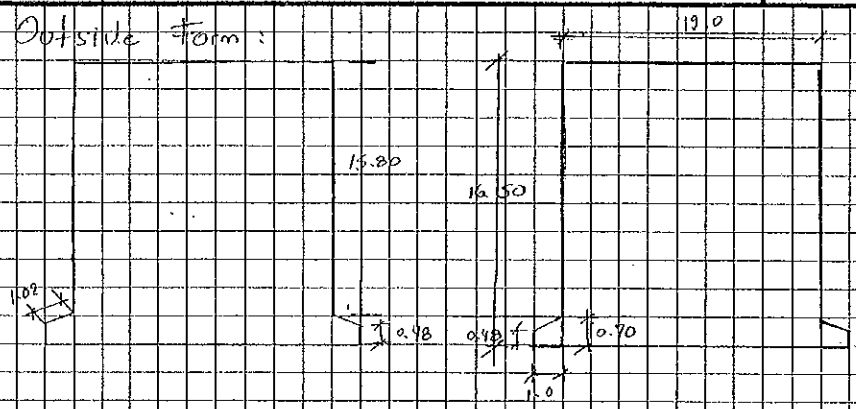
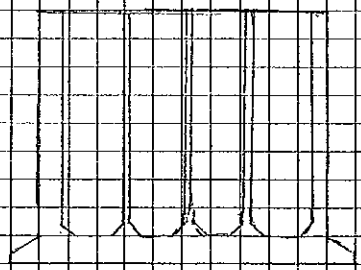



$A_1 = (19.80m + 1.02m + 0.48m)(2)(19.95m) = 690.27\ m^2$

$A_1 = \left[(16.50m)(18.0m) - \left(\frac{0.48m + 0.7m}{2}\right)(1.0m)(2m)\right](2) = 629.34\ m^2$

$A = 1,319.68\ m^2$

Chamber :



$A_2 = \left[(4.0m + 4.20m)(2)(15.37m)\right](8) + \left[(4.0m + 4.275m)(2)(15.7m)\right](8) + (15.70m)(0.28m)(4)(16) = 4419.86\ m^2$

$A_2 = \left(\frac{4.0m + 1.28m}{2}\right)(0.28m)(2)(16) + \left(\frac{4.20m + 1.48m}{2}\right)(0.28m)(2)(8) + \left(\frac{4.275m + 4.555m}{2}\right)(0.28m)(2)(8)$

$A = 76.32\ m^2$

$A_T = 5,815.81\ m^2 \approx 5,816\ m^2$

| | | | | | |
|---|---|---|---|---|---|
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| | | | / /200 | | / /200 |

FN: Calculation_Sheet

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
| **Section** | FORM OF CAISSON | Calc. Index No. | |
| **Subject** | | Page No. | Rev. |

References/ Notes

Container Berth:

$V = (5,816\ m^2)(17) = 98,872\ m^2$ — $\boxed{98,900}\ m^2$

Multipurpose Berth:

$V = (5,816\ m^2)(11) = 63,976\ m^2$

Transitional:

$V = (5,816\ m^2)(1) = 5,816\ m^2$

$69,792$ — $69,800\ m^2$

| | | | | | |
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| | | | / /200 | | / /200 |

FN: Calculation_Sheet

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | TEMPORARY ANCHORING OF CAISSON | **Pay Item No. (BOQ)** | 2B - 05 |
| **Quantity Item** | | **Unit** | Nos |

**Calculation Procedure Applied**

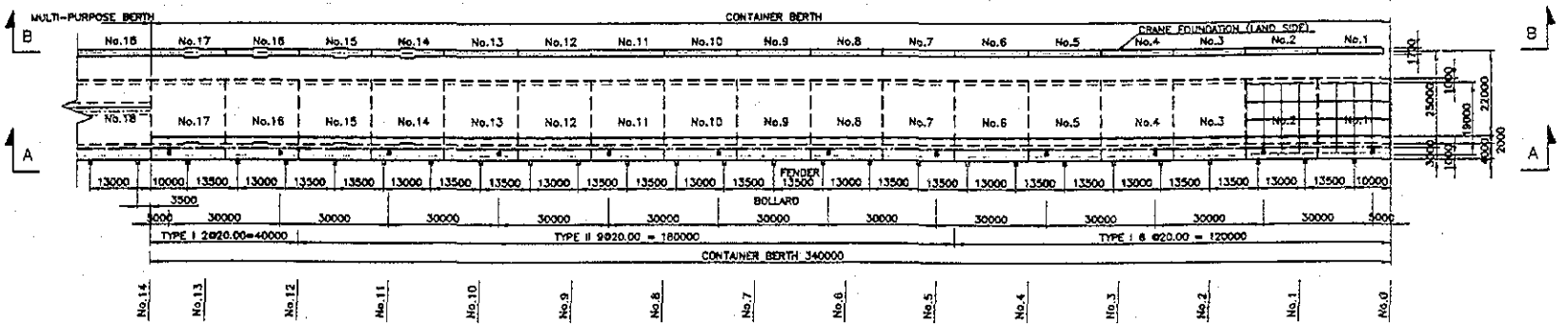
Caissons will be built in caisson yard. After that, they will be anchored in relevant place until they will be placed on the mound.

**References, Calculation Base and Revisions**

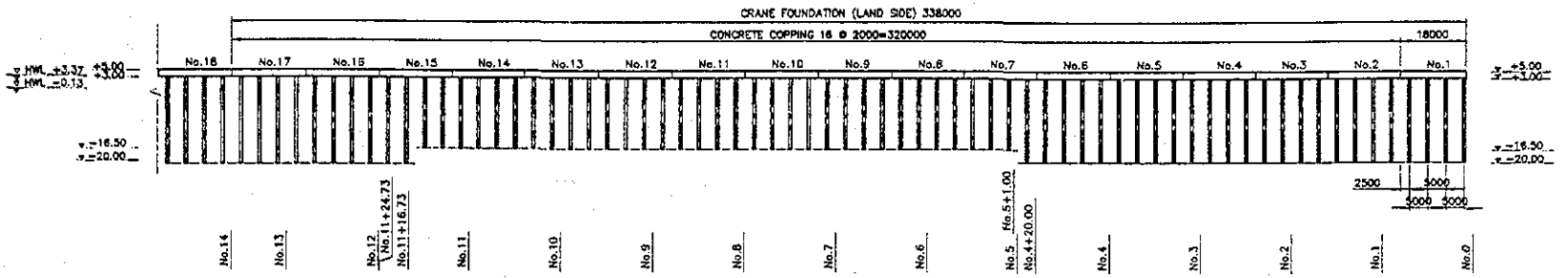
References : Tender Drawings :

DW - QW - 01 - 001 Plan and Profile
Container Berth

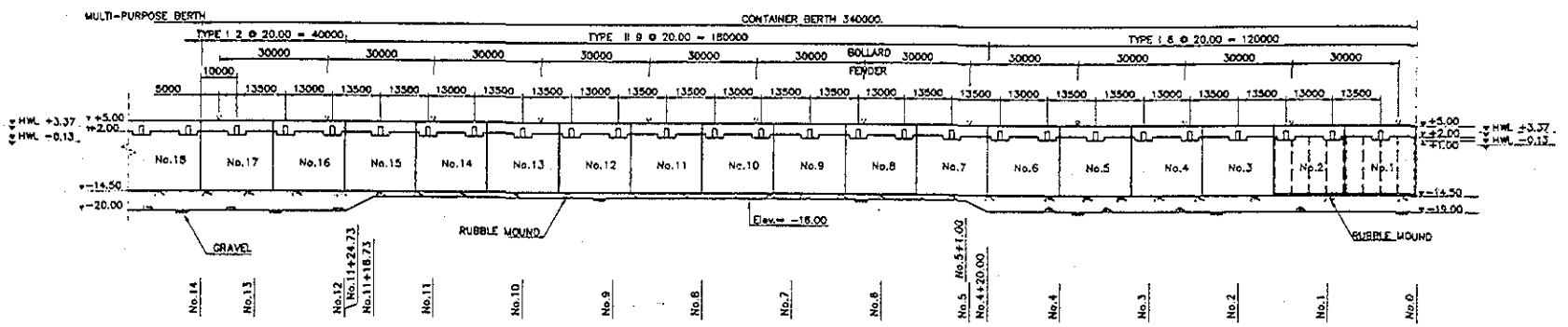
| Rev | Prepared by | Prepared Date | No. of Pages | Checked by | Checked Date | Reviewed by | Reviewed Date | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| 0 | [signature] | | | Mr. Inuma | | Mr. Ando | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |




PLAN




PROFILE B–B




PROFILE A–A

SCALE 1:1250

0 50 100

| | | | | |
|---|---|---|---|---|
| JICA / CEPA | JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)<br>COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA) | DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR | DESIGNED BY :<br>CHECKED BY :<br>APPROVED BY : | SECTION : QUAYWALL WORK<br>SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH<br>TITLE : PLAN AND PROFILE CONTAINER BERTH |
| | | NIPPON KOEI CO., LTD. | | DATE : JULY/2002<br>SCALE : 1 : 1250<br>DRAWING NO. : A-CA-01 |

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
| **Section** | TEMPORARY ANCHORING OF CAISSON | Calc. Index No. | |
| **Subject** | | Page No. | Rev. |

References/ Notes

Container berth $\boxed{17}$ Nos

| | | | | | |
|---|---|---|---|---|---|
| | | Prepared by | | Checked by | |
| | | | / /200 | | / /200 |

FN: Calculation_Sheet

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | PLACING OF CAISSON | **Pay Item No. (BOQ)** | 2B-06 |
| **Quantity Item** | | **Unit** | Nos |

**Calculation Procedure Applied**

Caissons will be built in caisson yard, and then, they will be towed into relevant place.

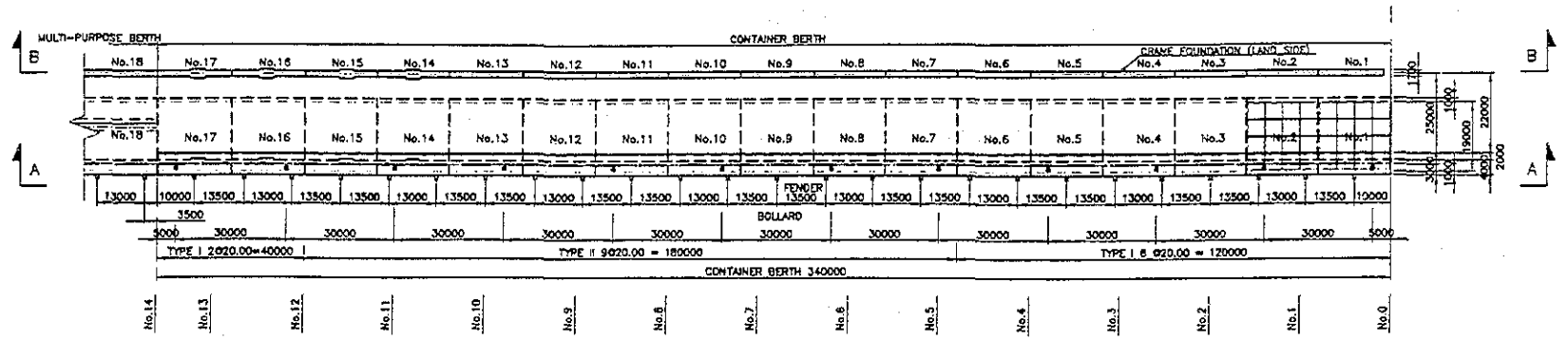
**References, Calculation Base and Revisions**

Reference : Tender Drawings :

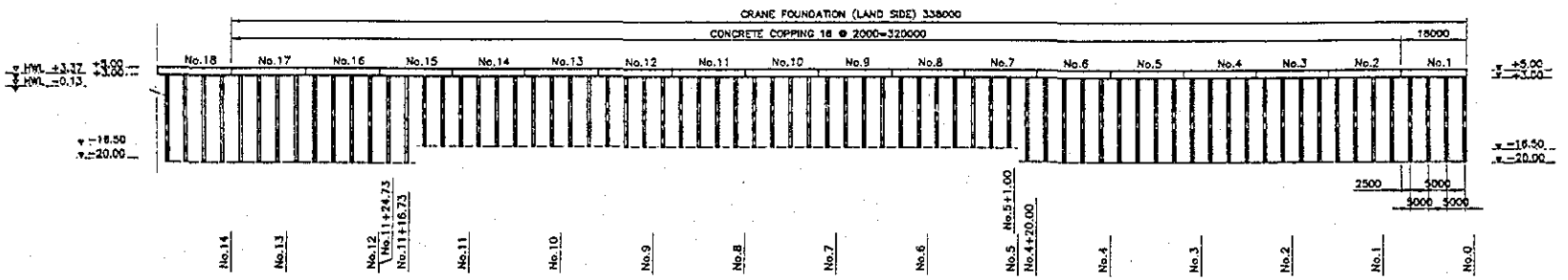
DW-GW-01-001 Plan and Profile Container Berth

| Rev | Prepared by | Prepared Date | No. of Pages | Checked by | Checked Date | Reviewed by | Reviewed Date | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| 0 | Kado G. | | | M. Inuma | | M. Ando | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

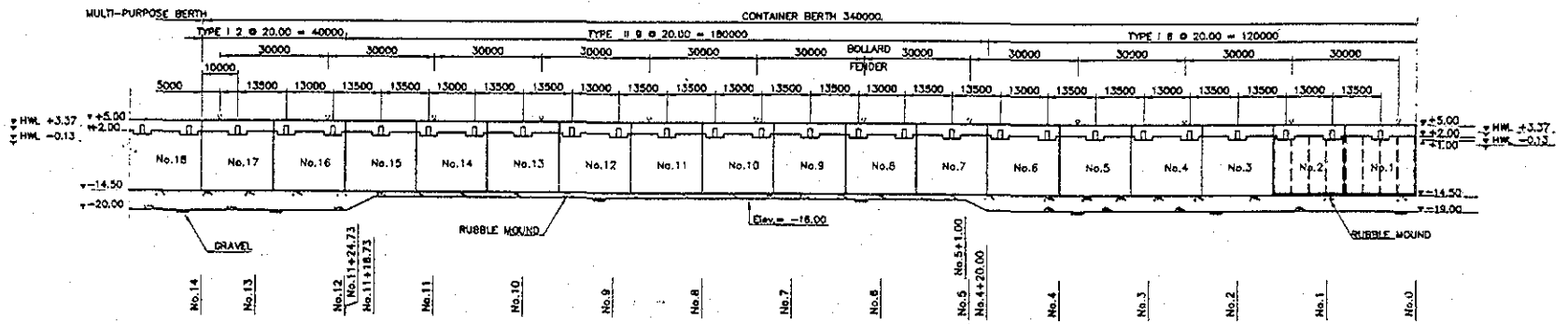
FN : Calculation_Cover_Sheet_020504_seg cover




PLAN




PROFILE B–B




PROFILE A–A

SCALE 1:1250

0 50 100

| | | | | |
|---|---|---|---|---|
| JICA / JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) | DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR | DESIGNED BY : | SECTION : QUAYWALL WORK | DATE : JULY/2002 |
| CEPA / COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA) | NIPPON KOEI CO., LTD. | CHECKED BY : | SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH | SCALE : 1 : 1250 |
| | | APPROVED BY : | TITLE : PLAN AND PROFILE CONTAINER BERTH | DRAWING NO. |

NIPPON KOEI CO.,LTD.

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
| **Section** | PLACING OF CAISSON | Calc. Index No. | |
| **Subject** | | Page No. | Rev. |

References/ Notes

Container Berth $\boxed{17}$ Nos

| | | | | | |
|---|---|---|---|---|---|
| | | Prepared by | | Checked by | |
| | | | / /200 | | / /200 |

FN: Calculation_Sheet

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | SAND FILLING INTO CAISSON | **Pay Item No. (BOQ)** | 28-07 |
| **Quantity Item** | | **Unit** | $m^3$ |

**Calculation Procedure Applied**

Caisson sand filling volume was computed for a respective caisson. Cross section area computed by geometric formula and multiplied to the section lenght of respective caisson. The volume was multiplied to the total of caissons.
The volume was computed with 2 decimal for section area and zero decimal for total.
The result was verified in Intellicad.

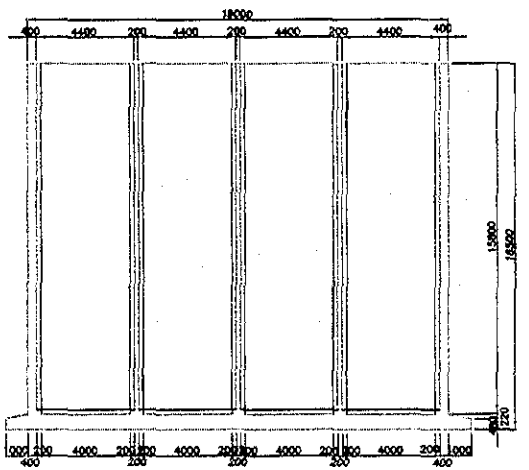
**References, Calculation Base and Revisions**

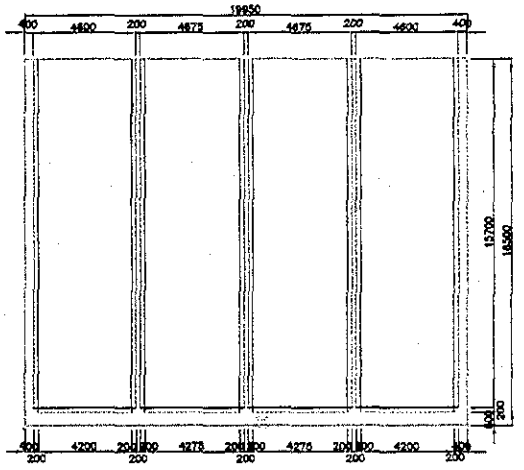
References: Tender Drawings:

DW-GW-01-027 Details of Concrete Caisson.

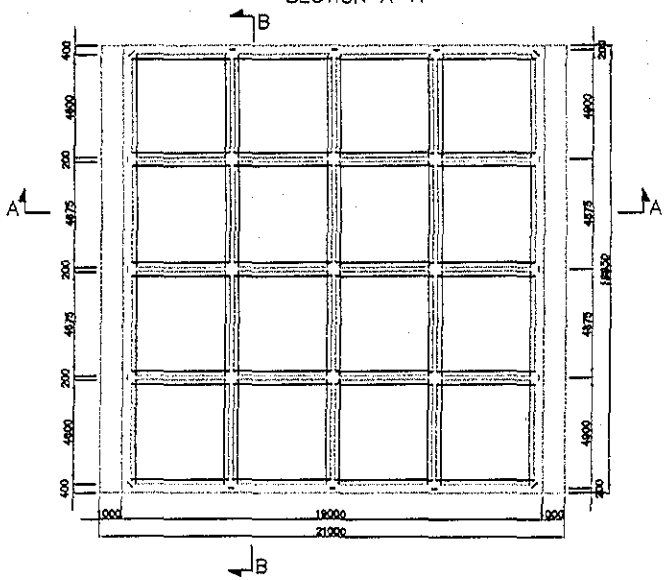
| Rev | Prepared | | No. of Pages | Checked | | Reviewed | | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| | by | Date | | by | Date | by | Date | |
| 0 | Karla Garcia | 01/05/2003 | | Mr. Inuma | | Mr. Ando | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

FN : Calculation_Cover_Sheet_020504_seg cover



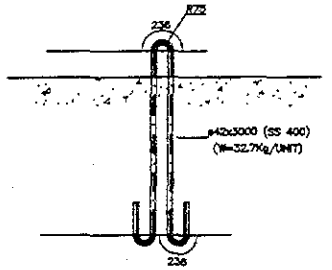

PLACING HEIGHT




| | | |
|---|---|---|
| Volume | V (m3) | 1113.03 |
| Weight | W (ton) | 28712.68 |
| Center of gravity | G (m) | 6.82 |
| Draught | D (m) | 6.81 |
| Center of Bouyancy | C (m) | 3.43 |
| Metacenter | M (m) | 4.31 |

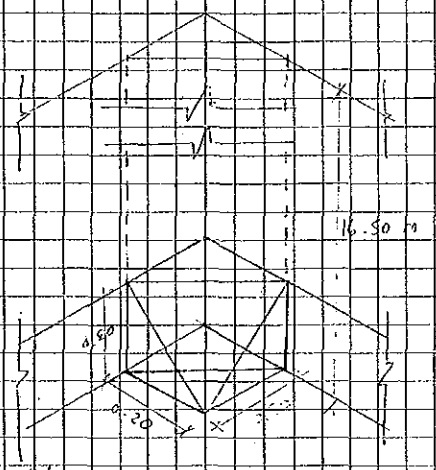
NOTE:
WHERE HOLES ARE TO BE PROVIDED IN THE SIDE WALL OR PARTITION WALL FOR FLOODING THE CAISSON, THE POSITION OF THE WALL AROUND THE HOLE SHALL BE SUFFICIENTLY REINFORCED.

DETAIL OF PLACING BAR
(FOR REFERENCE)
SCALE 1:40



| Project | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
|---|---|---|---|
| Section | SAND FILLING INTO CAISSON | Calc. Index No. | |
| Subject | | Page No. | Rev. |

References/ Notes




ESC. 1 : 150

Sand Filling Volume :

$$V_1 = \left[ (4.4m)(4.6m)(16.50 - 0.6m) - \left(\frac{(0.2m)(0.2m)}{2}\right)(16.50m - 0.6m)(4) - \frac{(0.2m)(0.2m)(0.2m)}{3}(4) - \frac{(0.20m)(0.20m)}{2}(4m + 4.20m)(2) \right](8)$$

$V = 2,561.69\ m^3$

$$V_2 = \left[ (4.4m)(4.675m)(16.50m - 0.6m) - \left(\frac{(0.2m)(0.2m)}{2}\right)(16.5m - 0.6m)(4) - \frac{(0.2m)(0.2m)(0.2m)}{3}(4) - \frac{(0.20m)(0.20m)}{2}(4m + 4.275m)(2) \right](8)$$

$V_2 = 2,603.59\ m^3$

$V_T = 5,165.28\ m^3$

Capping Concrete Volume $= (325.20m^2)(0.5m + 0.1m) = 195.12\ m^3$

$V_T = 5,165.28\ m^3 - 195.12\ m^3 = 4,970.16\ m^3 \simeq 4,970\ m^3$

Container Berth : $V = (4,970\ m^3)(17) = 84,490\ m^3$ $\boxed{84,500}\ m^3$

Multipurpose Berth : $V = (4,970\ m^3)(11) = 54,670\ m^3$

Transitional : $V = (4,970\ m^3)(1) = 4,970\ m^3$

$59,700\ m^3$

| | Prepared by | | Checked by | |
|---|---|---|---|---|
| | Kato Gaito | 21 / May /2002 | | / /200 |

FN: Calculation_Sheet

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | COVER CONCRETE OF CAISSON | **Pay Item No. (BOQ)** | 2B-08 |
| **Quantity Item** | | **Unit** | $m^3$ |

**Calculation Procedure Applied**

Cover concrete of caisson was computed using geometric formulas. The area was multiplied by the height of the cover. The result was multiplied by the total of caissons.

The volume was computed with two decimal for section area and zero decimal for total.

The result was verified in Intellicad.

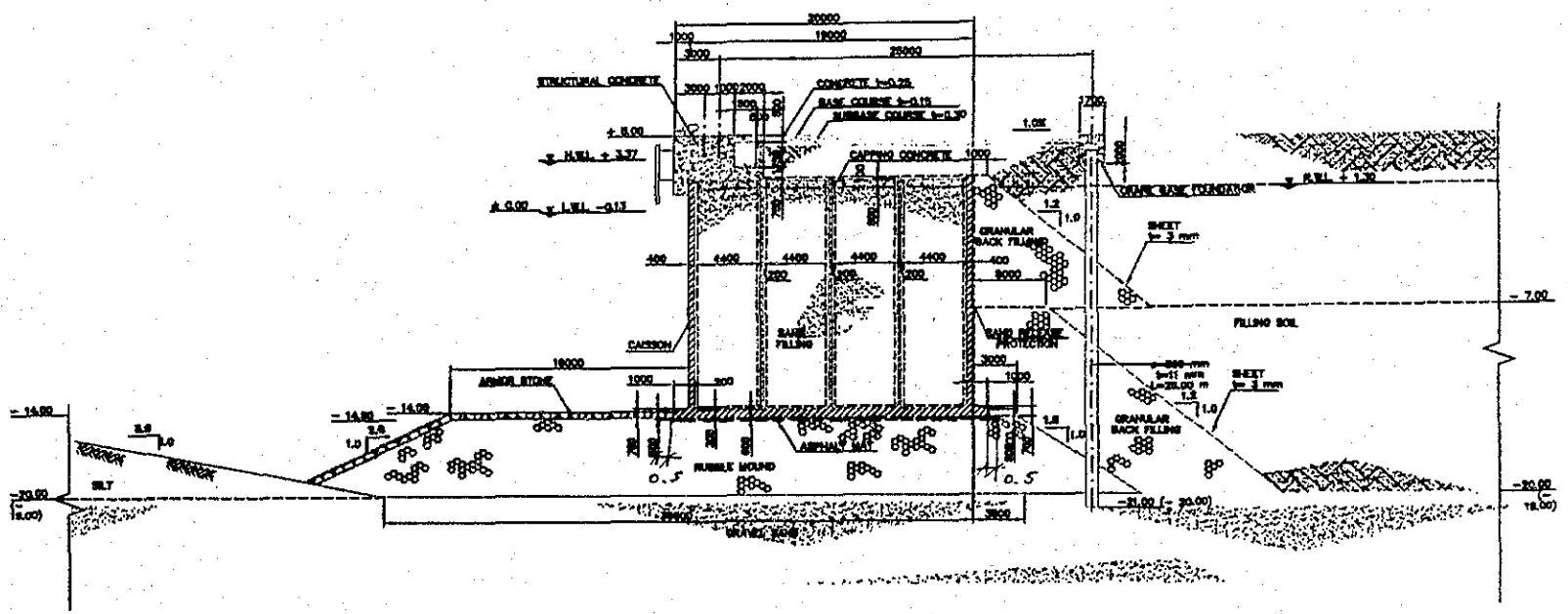
**References, Calculation Base and Revisions**

References: Tender Drawings:

DW-GW-01-003 Typical Cross Section Type I

| Rev | Prepared | | No. of | Checked | | Reviewed | | Superseded |
|---|---|---|---|---|---|---|---|---|
| | by | Date | Pages | by | Date | by | Date | by Calc No. |
| 0 | K. García | 28 May/2002 | | S. García | 28 Mayo/02 | Mr. Ando | | |
| 1 | | | | Mr. Iwuma | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

FN : Calculation_Cover_Sheet_020504_seg cover




TYPICAL CROSS SECTION TYPE I
CONTAINER BERTH (−14.0 m)

SCALE 1:300 0 5.0 10.0 15.0 20.0 25.0 30.0

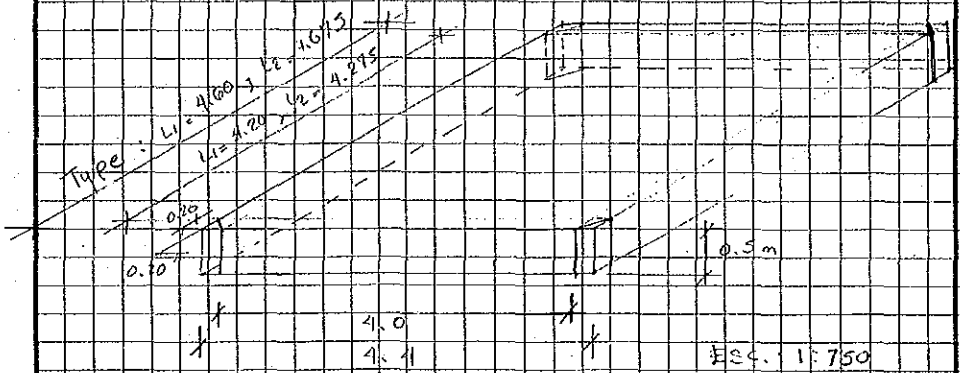
JEA
Gpa

DW-QW-01-003

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
| **Section** | COVER CONCRETE OF CAISSON | Calc. Index No. | |
| **Subject** | | Page No. | Rev. |

References/ Notes

CONCRETE VOLUME PER CAISSON




$A_1 = (4.4\,m)(4.6\,m) - \frac{(0.2\,m)(0.2\,m)}{2}(4) = 20.16\,m^2$

$V_1 = (20.16\,m^2)(0.5\,m)(8) = 80.64\,m^3$

$A_2 = (4.4\,m)(4.675\,m) - \frac{(0.2\,m)(0.2\,m)}{2}(4) = 20.99\,m^2$

$V_2 = (20.99\,m^2)(0.5\,m)(8) = 81.96\,m^3$

$V = 162.60\,m^3 \approx 163\,m^3$

Container Berth : $V = (163\,m^3)(17) = 2,771\,m^3$

Multipurpose Berth : $V = (163\,m^3)(11) = 1,793\,m^3$

Transitional area : $V = (163\,m^3)(1) = 163\,m^3$

$2,780\,m^3$

$1,960\,m^3$

| | Prepared by | | Checked by | |
|---|---|---|---|---|
| | Kate García | 28 / May / 200 | S. García | 28 / 05 / 200 |

FN: Calculation_Sheet

Cont. 9

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | Coping Concrete of Caisson | **Pay Item No. (BOQ)** | 2B-0901 |
| **Quantity Item** | Concrete | **Unit** | $m^3$ |

**Calculation Procedure Applied**

Concrete volume was computed for each type of coping. On the coping are there crane accessaries, utility pits and so on. Concrete volume needs to be reduced by them.

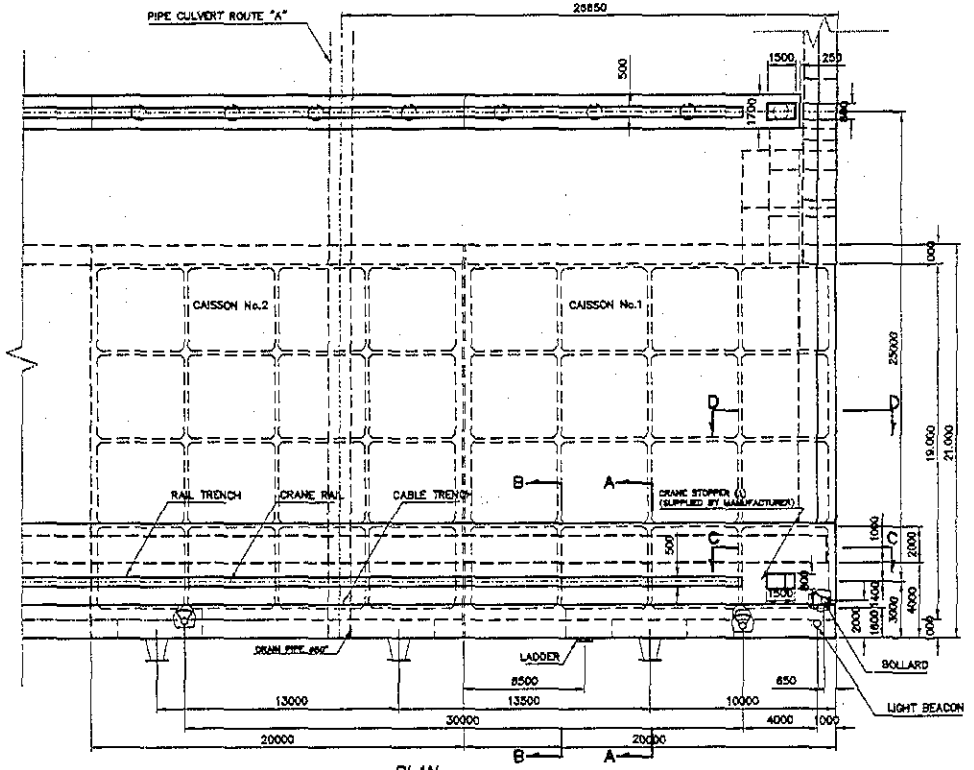
**References, Calculation Base and Revisions**

References: Tender Drawings:

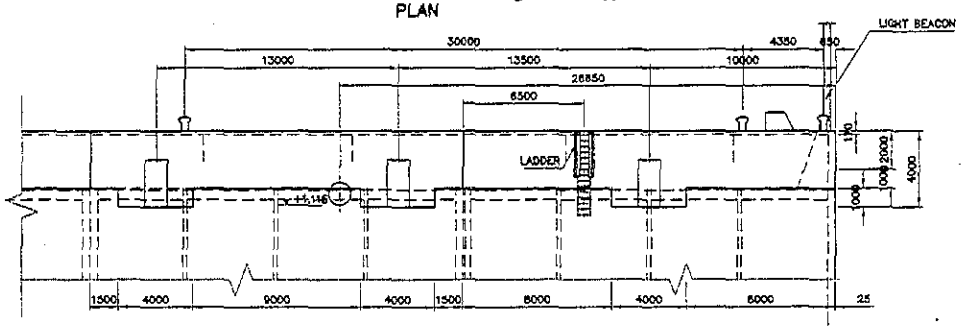
DW-QW-01-042 Detail of Coping (1)
DW-QW-01-043 Detail of Coping (4)
DW-QW-01-059 Detail of Anchor-Jackup Plate
DW-QW-01-060 Detail of Conc End Stopper

| Rev | Prepared by | Prepared Date | No. of Pages | Checked by | Checked Date | Reviewed by | Reviewed Date | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| 0 | Kato G. | | | Mr. Iwama | | Mr. Ando | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

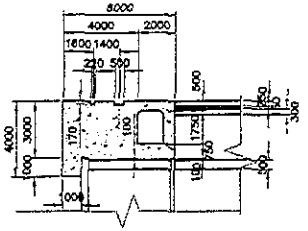
FN : Calculation_Cover_Sheet_020504_seg cover



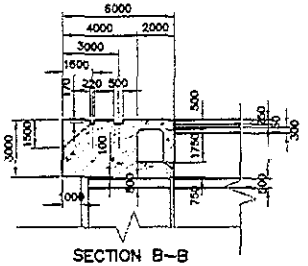

PLAN



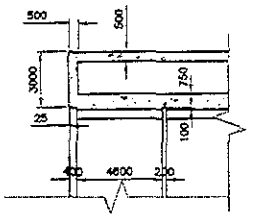

FRONT VIEW



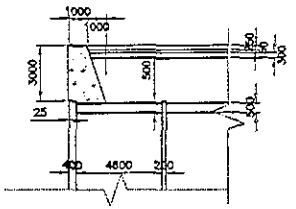
SECTION A–A



SECTION B–B



SECTION C–C

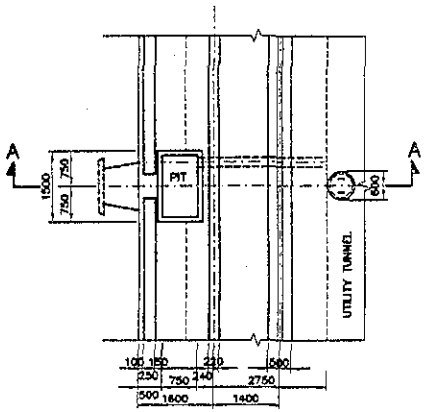


SECTION D–D

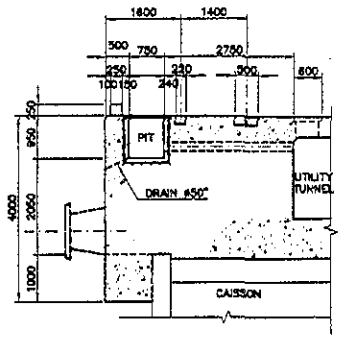
NOTES: ALL DIMENSIONS ARE IN MILLIMETER

| | | | | |
|---|---|---|---|---|
| JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)<br>COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA) | DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR<br>NIPPON KOEI CO., LTD. | DESIGNED BY :<br>CHECKED BY :<br>APPROVED BY : | SECTION : QUAYWALL WORK<br>SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH<br>TITLE : DETAIL OF COPING (1) | DATE : JULY/2002<br>SCALE : 1 : 250<br>DRAWING NO. DW-QW-01-042 |

WATER HAIDLANT & FIRE FITING PIT CAISSON
No.3 No.7 No.11 No.15 No.19 No.23 No.27

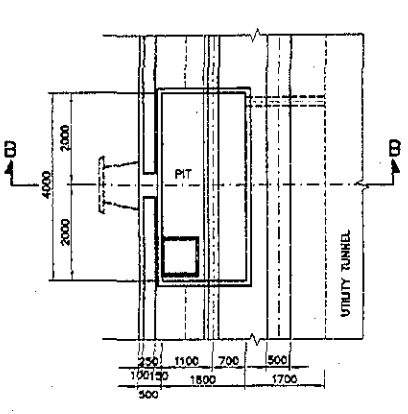



PLAN




SECTION A–A

ELECTRIC CABLEJUNCTION PIT
CAISSON No.12 No.20

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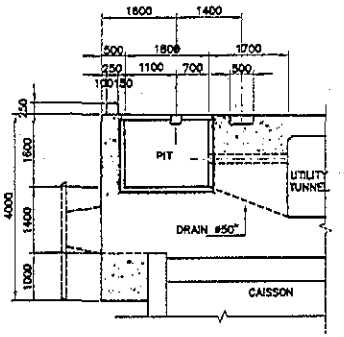
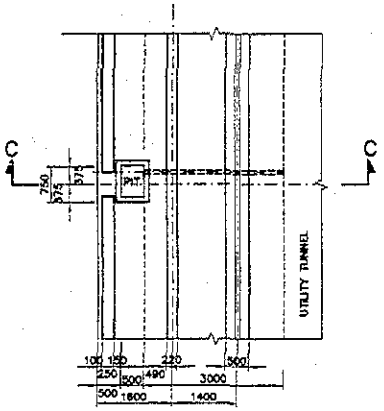
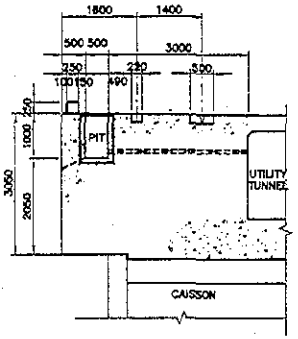



SECTION B–B

ELECTRIC SERVICE PIT CAISSON
No.2 No.14 No.16 No.26 No.28

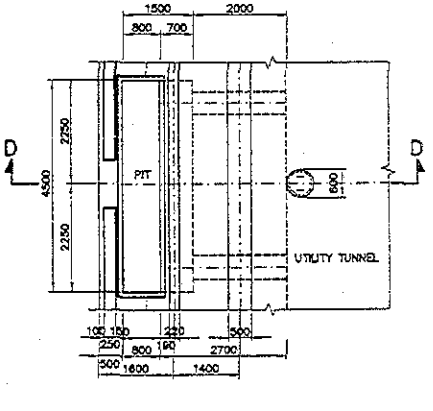



PLAN

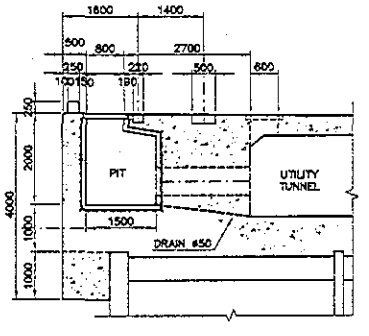



SECTION C–C

LOADING PIT (MULTI–PURPOSE BERTH)
CAISSON No.21 No.22 No.23 No.24 No.25




PLAN

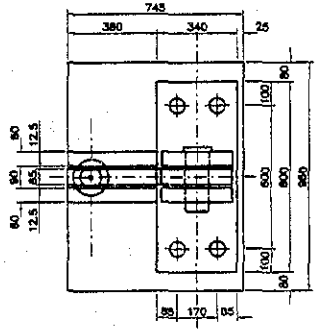


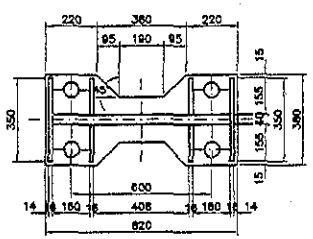

SECTION D–D

NOTE:
–DETAIL OF ELECTRIC SERVICE PIT IS SHOWN IN DW–??
–DETAIL OF ELECTRIC CABLE JUNCTION IS SHOWN IN DW–??
–DETAIL OF WATER HYDRANT FIREFIGHTING IS SHOWN IN DW–??

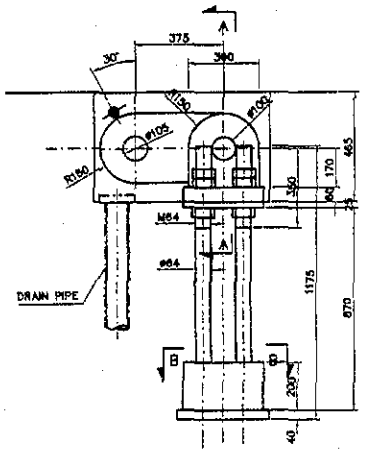
| | | | | |
|---|---|---|---|---|
| JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)<br>COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA) | DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR<br>NIPPON KOEI CO., LTD. | DESIGNED BY :<br>CHECKED BY :<br>APPROVED BY : | SECTION : QUAYWALL WORK<br>SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH<br>TITLE :<br>DETAIL OF COPING (4) | DATE : JULY/2002<br>SCALE : 1 : 100<br>DRAWING NO. : DW-QW-01-045 |

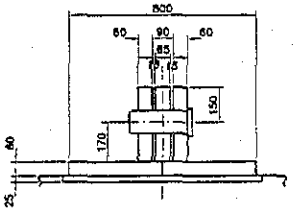
## DETAIL OF ANCHORING FRAME
SCALE 1:20





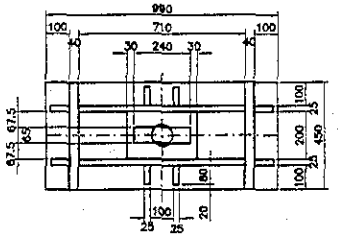
SECTION B–B



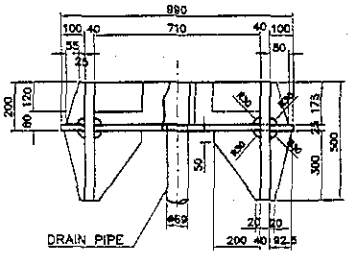



SECTION A–A

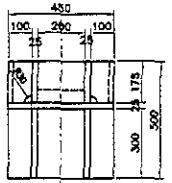
## DETAIL OF SOCKET BLOCK
SCALE 1:20



PLAN

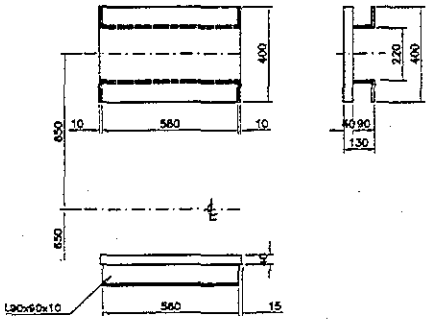



FRONT VIEW

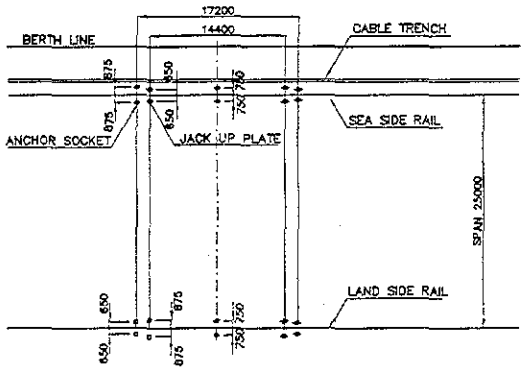


LATERAL VIEW

## DETAIL OF JACK UP PLATE
SCALE 1:20




## PLAN OF ANCHOR AND JACK UP PLATE
SCALE 1:500

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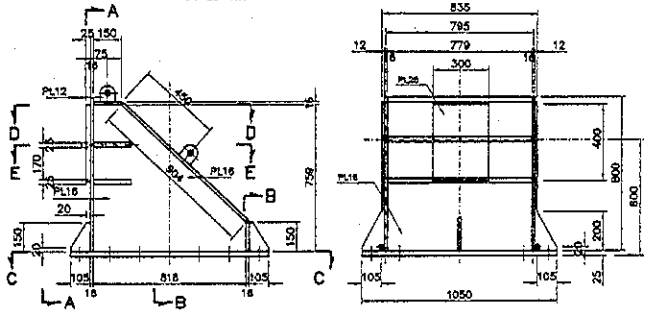
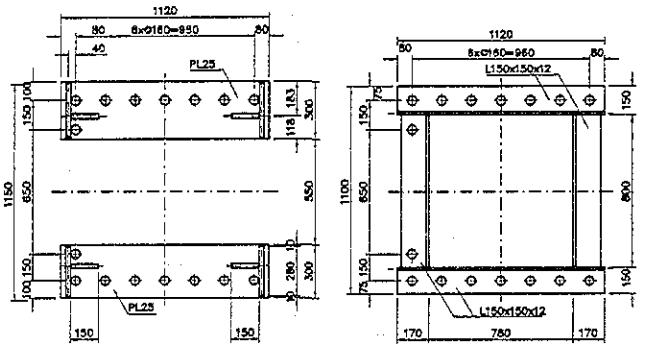
|---|---|---|---|---|---|
| REV. NO. / DATE / COORDINATE / BY / APPROVED / DATE | JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)<br>COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA) | DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR<br>NIPPON KOEI CO., LTD. | DESIGNED BY :<br>CHECKED BY :<br>APPROVED BY : | SECTION : QUAYWALL WORK<br>SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH<br>TITLE : DETAIL OF ANCHOR-JACK UP PLATE & SOCKET BLOCK | DATE : JULY/2002<br>SCALE : INDICATED<br>DRAWING NO. DW-QW-01-059 |

# DETAIL OF CRANE END STOPPER EAST SIDE (CONTAINER)

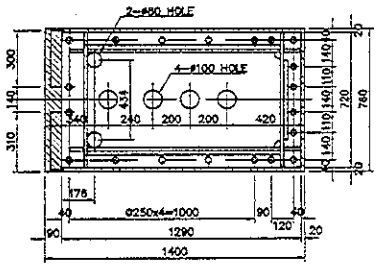
## CRANE END STOPPER
SCALE 1:25

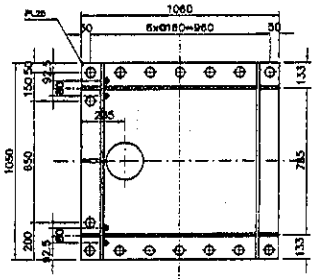


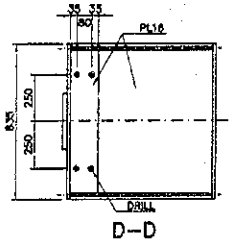

## STOPPER BASE
SCALE 1:25

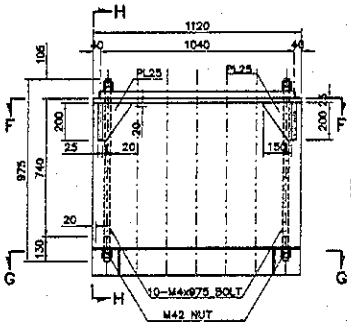


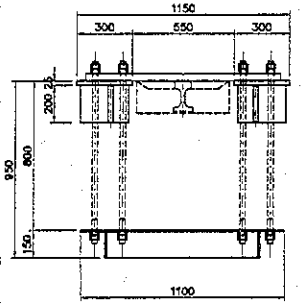

## DETAILS OF CRANE END STOPPER WEST SIDE (CONTAINER)
SCALE 1:25

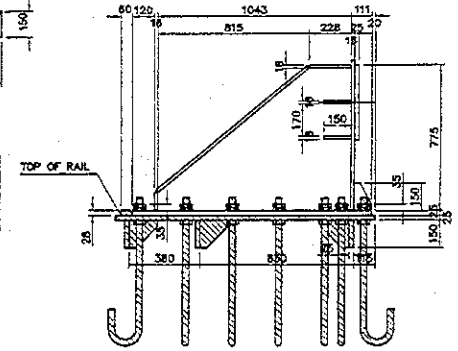


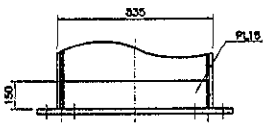



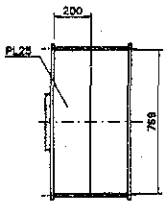



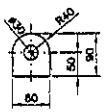



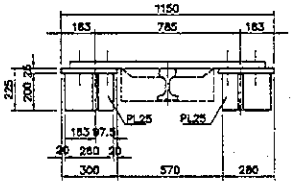



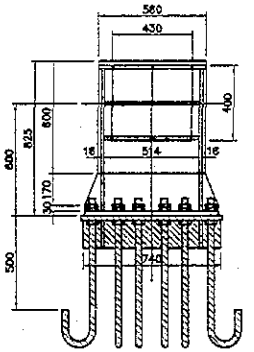




SCALE 1:10

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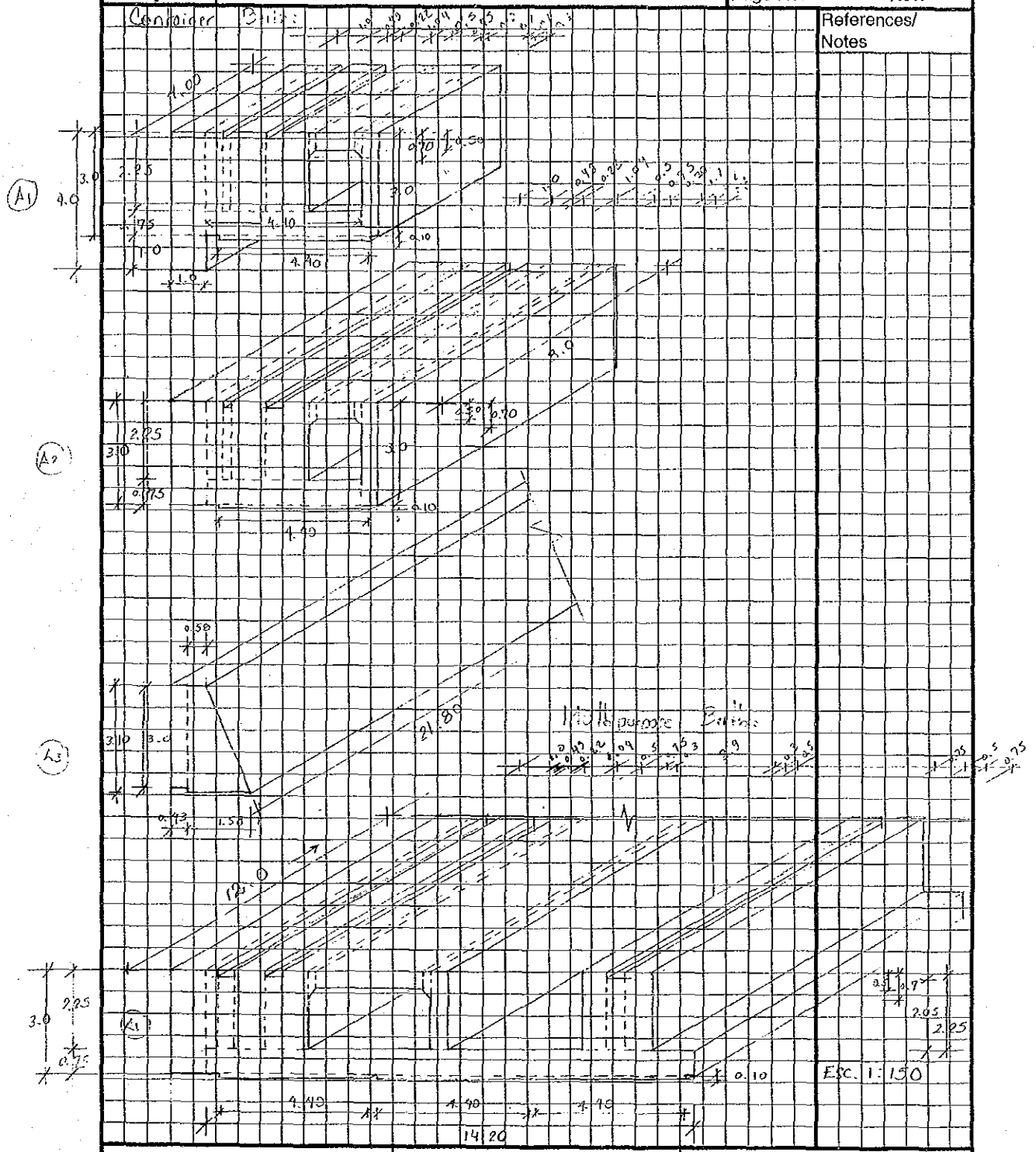
|---|---|---|---|---|---|
| REV. NO. / DATE / COORDINATE / BY / APPROVED / DATE | JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)<br>COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA) | DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR<br>NIPPON KOEI CO., LTD. | DESIGNED BY :<br>CHECKED BY :<br>APPROVED BY : | SECTION : QUAYWALL WORK<br>SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH<br>TITLE : DETAILS OF CRANE END STOPPER | DATE : JULY/2002<br>SCALE : INDICATED<br>DRAWING NO. DW-QW-01-060 |

NIPPON KOEI CO.,LTD.

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
| **Section** | COPING CONCRETE OF CAISSON | Calc. Index No. | |
| **Subject** | CONCRETE | Page No. | Rev. |

References/ Notes

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|---|---|---|---|---|---|
| | | Prepared by | | Checked by | |
| | | | / /200 | | / /200 |

FN: Calculation_Sheet

Concrete Volume of Coping of Caisson

| | | | Crane | Pit | Other | Volume | |
|---|---|---|---|---|---|---|---|
| Container Berth | No.1 | 316.8 | 0.73 | | 0.69 | 316.76 | |
| | No.2 | 320.8 | | | | 320.8 | |
| | No.3 | 316.8 | | 1.07 | | 315.73 | |
| | No.4 | 320.8 | | | | 320.8 | |
| | No.5 | 316.8 | | | | 316.8 | |
| | No.6 | 320.8 | | | | 320.8 | |
| | No.7 | 316.8 | | 1.07 | | 315.73 | |
| | No.8 | 320.8 | | | | 320.8 | |
| | No.9 | 316.8 | | | | 316.8 | |
| | No.10 | 320.8 | | | | 320.8 | |
| | No.11 | 316.8 | | 1.07 | | 315.73 | |
| | No.12 | 320.8 | | 11.52 | | 309.28 | |
| | No.13 | 316.8 | | | | 316.8 | |
| | No.14 | 320.8 | 1.82 | | | 318.98 | |
| | No.15 | 316.8 | 1.82 | 1.07 | | 313.91 | |
| | No.16 | 320.8 | 1.82 | | | 318.98 | |
| | No.17 | 316.8 | 2.55 | | | 314.25 | |
| | End Block | 64.6 | | | | 64.6 | |
| | Total | | | | | 5,460 | m3 |
| Multi-purpose Berth | No.18 | 586.8 | | | | 586.8 | |
| | No.19 | 582.8 | | 1.07 | | 581.73 | |
| | No.20 | 586.8 | | 16.2 | | 570.6 | |
| | No.21 | 582.8 | | | | 582.8 | |
| | No.22 | 586.8 | | 12.08 | | 574.72 | |
| | No.23 | 582.8 | | 13.15 | | 569.65 | |
| | No.24 | 586.8 | | 12.08 | | 574.72 | |
| | No.25 | 582.8 | | | | 582.8 | |
| | No.26 | 586.8 | | | | 586.8 | |
| | No.27 | 582.8 | 1.82 | 1.07 | | 579.91 | |
| | No.28 | 586.8 | 2.55 | | | 584.25 | |
| | End Block | 50.8 | | | | 50.8 | |
| | Total | | | | | 6,430 | m3 |

| Project | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
|---|---|---|---|
| Section | COPING CONCRETE OF CAISSON | Calc. Index No. | |
| Subject | CONCRETE | Page No. | Rev. |

References/ Notes

$A_1 = 3\times1 + 1\times1 + 4.4\times0.1 + 0.25\times4.4 + 0.49\times2.25 + 0.22\times2.07 + 1.04\times2.25 + 0.5\times2.05 + 2.25\times0.95 + \left(\frac{0.5+2.1}{2}\right)\times0.2\times2 + 1.1\times0.5 + 0.5\times3$

$= 16.64\ m^2$

$A_2 = 16.64 - 1\times1 = 15.64$

$V_1 = 16.64\times4 + 15.64\times16 = 316.8\ m^3$

$V_2 = 16.64\times8 + 15.64\times12 = 320.8\ m^3$

No. 1

Cable pit

$0.22\times0.17\times5 = 0.187$

Crane rail pit

$0.5\times0.2\times5 = 0.5$

$0.187 + 0.5 = 0.687 \rightarrow 0.69\ m^3$

| Prepared by | | Checked by | |
|---|---|---|---|
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FN: Calculation_Sheet

| Project | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
|---|---|---|---|
| Section | Coping Concrete of caisson | Calc. Index No. | |
| Subject | CONCRETE (CRANE ACCESORIES) | Page No. | Rev. |

References/ Notes

Socket block (1 hole)

0.15 * 1.0 * 0.9 = 0.135

Crane anchoring frame (2 holes)

0.8 x 0.35 x 1.4 x 2 = 1.68

1.68 + 0.135 = 1.82 m³

End Stopper

0.8 x 1.4 x 0.65 = 0.73 m³

| | Prepared by | | Checked by | |
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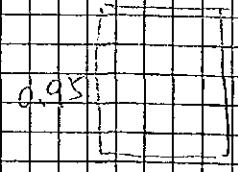
FN: Calculation_Sheet

| Project | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
|---|---|---|---|
| Section | Coping Concrete of caisson | Calc. Index No. | |
| Subject | CONCRETE (PIT AND END BLOCK) | Page No. | Rev. |

References/ Notes

Water Pit

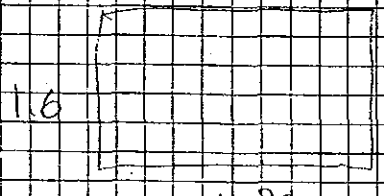



$0.95 \times 0.95 \times 1.5$

$= 1.0687.5$

$\simeq 1.07\ m^3$

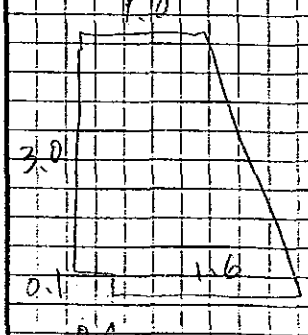
Electrical Pit (small)




$1.6 \times 1.8 \times 4.0$

$= 11.52\ m^3$

End Block (No.1)




$A = 3.0 \times 0.4 + (0.6 + 1.6) \times 3.1 \div 2$

$= 4.61$

$V = 4.61 \times 14_m = 64.54$

$\simeq 64.6\ m^3$

| | Prepared by | | Checked by | |
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FN: Calculation_Sheet

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | Coping Concrete of Caisson | **Pay Item No. (BOQ)** | 2B-0902 |
| **Quantity Item** | Elas Tigh Board | **Unit** | $m^2$ |

**Calculation Procedure Applied**

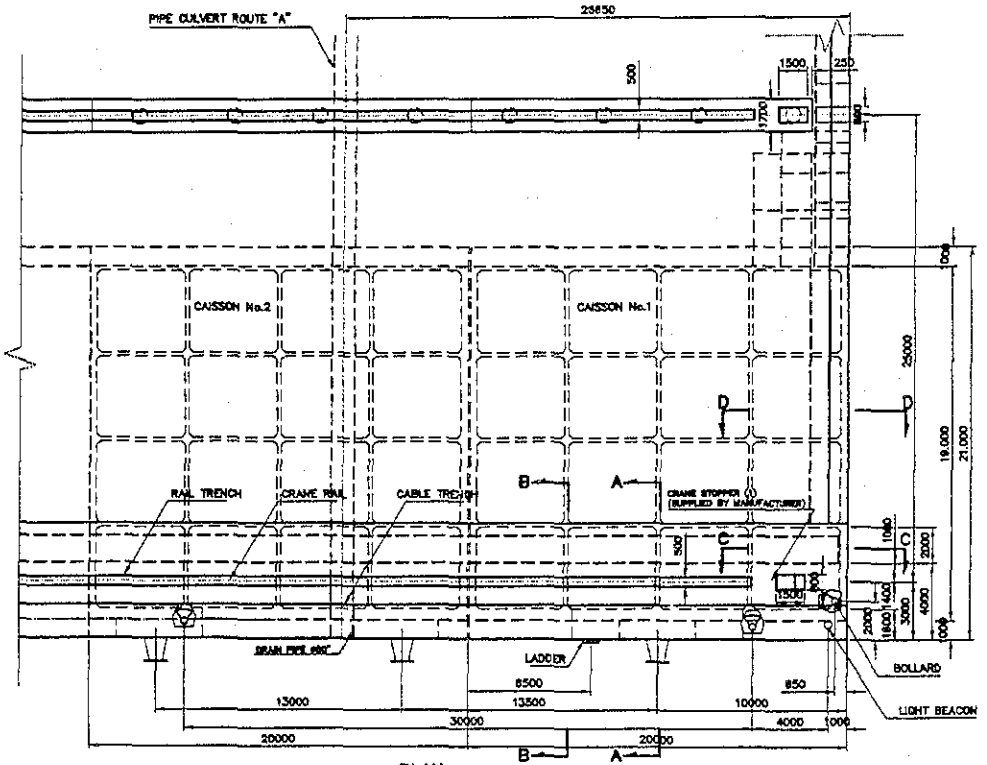
Elas tigh board will be used on every 20 m as a joint.

**References, Calculation Base and Revisions**

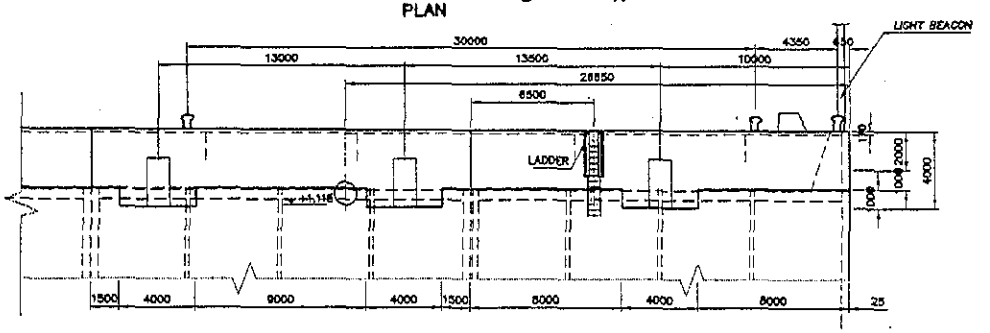
References : Tender Drawings :

DW-QW-01-042 Detail of Coping (1)

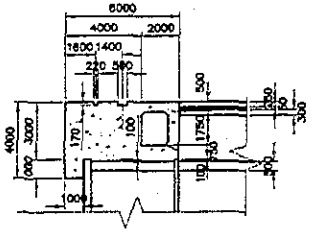
| Rev | Prepared | | No. of Pages | Checked | | Reviewed | | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| | by | Date | | by | Date | by | Date | |
| 0 | Karla G. | | | Mr. Inuma | | Mr. Ando | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |



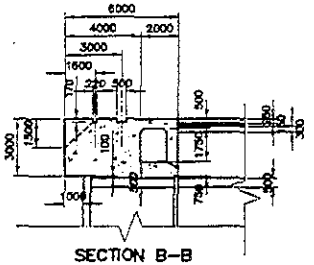

PLAN



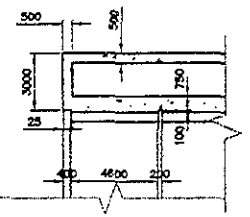

FRONT VIEW



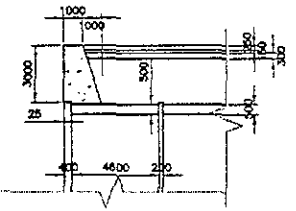
SECTION A–A



SECTION B–B



SECTION C–C



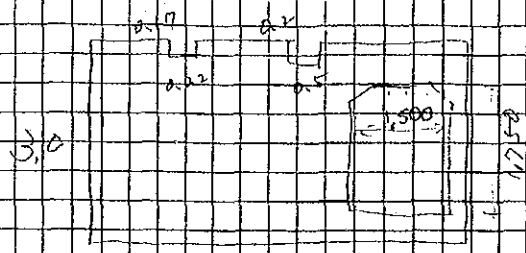
SECTION D–D

NOTES: ALL DIMENSIONS ARE IN MILLIMETER

| | | | | | |
|---|---|---|---|---|---|
| REV. NO. / DATE / COORDINATE / BY / APPROVED / DATE | JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)<br>COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA) | DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR<br>NIPPON KOEI CO., LTD. | DESIGNED BY :<br>CHECKED BY :<br>APPROVED BY : | SECTION : QUAYWALL WORK<br>SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH<br>TITLE : DETAIL OF COPING (1) | DATE : JULY/2002<br>SCALE : 1 : 250<br>DRAWING NO. DW-QW-01-042 |

| Project | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
|---|---|---|---|
| Section | COPING CONCRETE OF CAISSON | Calc. Index No. | |
| Subject | Elastigh board. | Page No. | Rev. |

References/ Notes




6.0

$A = 3.0 \times 6.0 - 0.17 \times 0.22 - 0.2 \times 0.5$

$+ 1.5 \times 1.75 + 0.2 \times 0.2$

$= 15.2 \text{ m}^2$

$15.2 \times 17 = 258.4 \text{ m}^2$

$\fallingdotseq 259 \text{ m}^2$

| | Prepared by | | Checked by | |
|---|---|---|---|---|
| | | / /200 | | / /200 |

FN: Calculation_Sheet

NIPPON KOEI CO.,LTD.

# QUANTITY CALCULATION COVER SHEET

| | | | |
|---|---|---|---|
| **Project** | Detailed Design on Port Reactivation Project in La Union Province | **Project Code** | JC1N004/2N001 |
| **Work Section Title** | Coping Concrete & Caisson | **Pay Item No. (BOQ)** | 2B - 0903 |
| **Quantity Item** | Reinforcement | **Unit** | t |

**Calculation Procedure Applied**

Total weight of reinforcement was carried out by using Excel.

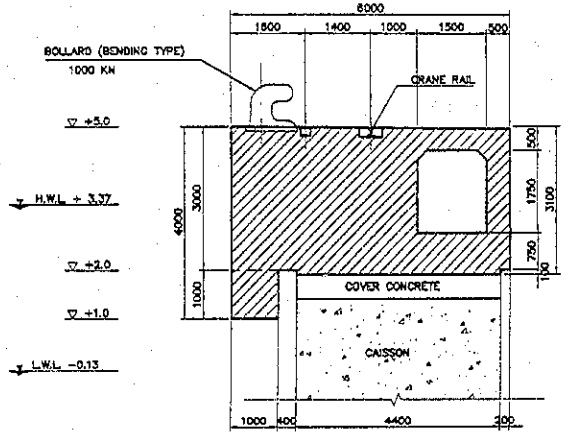
**References, Calculation Base and Revisions**

References: Tender Drawings :

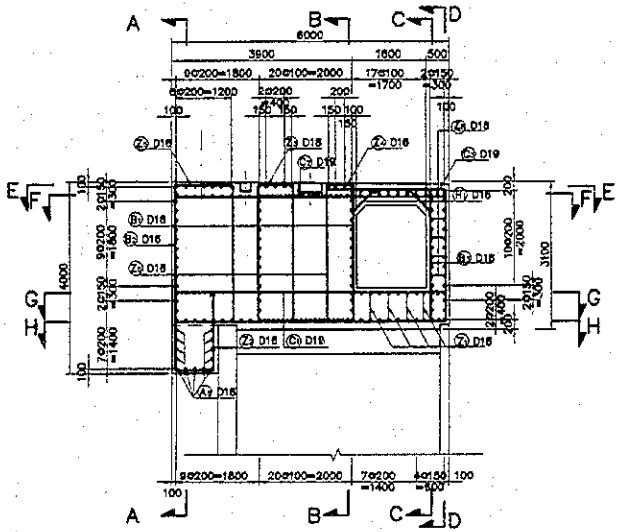
DW - QW - 01 - 047 Reinforcement of Coping Concrete (1)
DW - QW - 01 - 048 " " (2)
DW - QW - 01 - 049 " " (3)

| Rev | Prepared | | No. of Pages | Checked | | Reviewed | | Superseded by Calc No. |
|---|---|---|---|---|---|---|---|---|
| | by | Date | | by | Date | by | Date | |
| 0 | Karla G. | | | H. Inuma | | Mr. Ando | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |

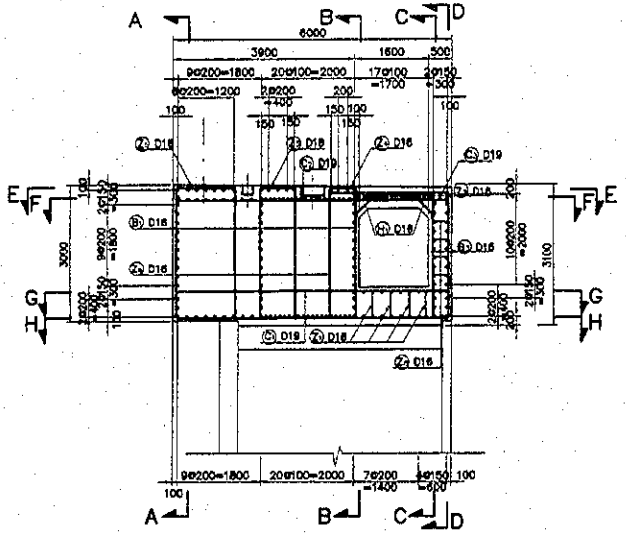
FN : Calculation_Cover_Sheet_020504_seg
cover



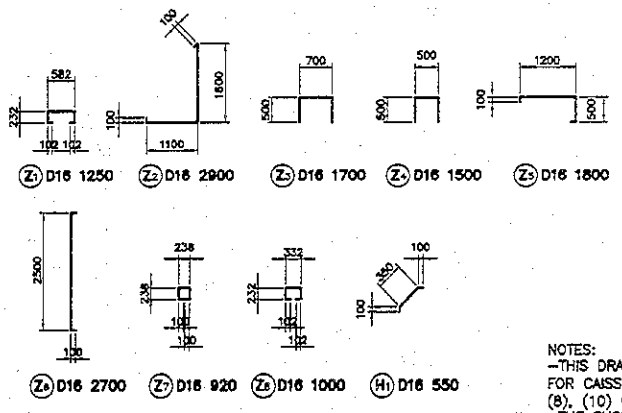

TYPICAL SECTION



SECTION J–J

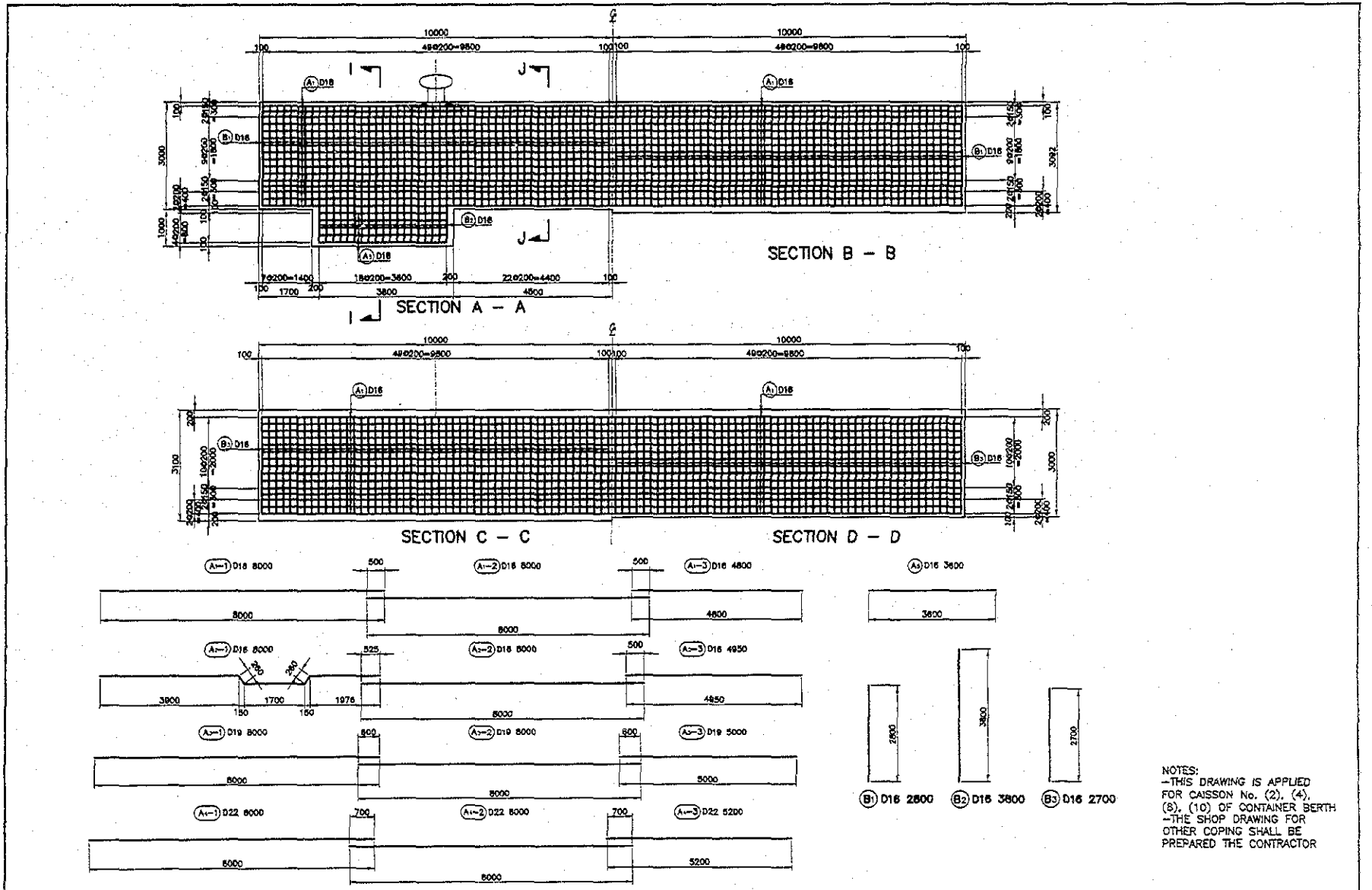


SECTION I–I



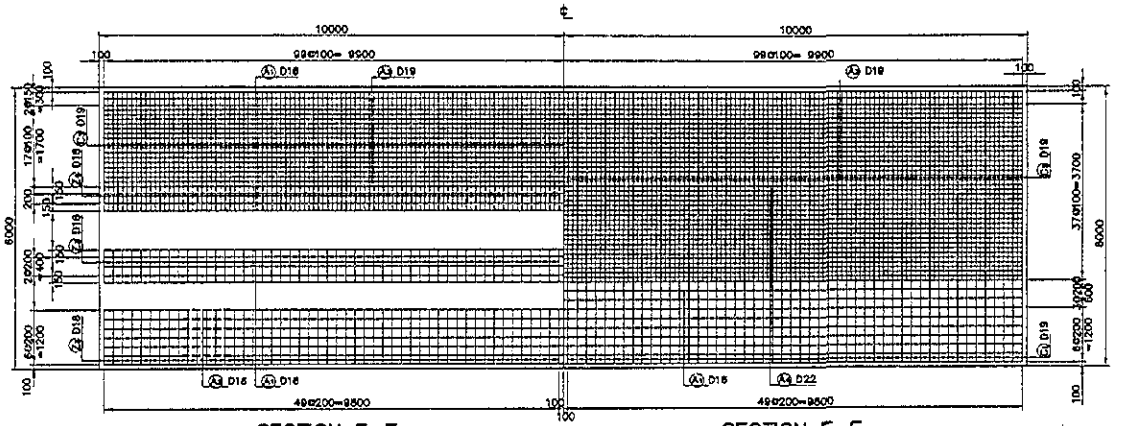

NOTES:
–THIS DRAWING IS APPLIED FOR CAISSON No. (2), (4), (8), (10) OF CONTAINER BERTH
–THE SHOP DRAWING FOR OTHER COPING SHALL BE PREPARED THE CONTRACTOR

| | | | | |
|---|---|---|---|---|
| JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) / COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA) | DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR | NIPPON KOEI CO., LTD. | SECTION : QUAYWALL WORK<br>SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH<br>TITLE : REINFORCEMENT OF COPING CONCRETE (1) (CONTAINER) | DATE : JULY/2002<br>SCALE : 1 : 100<br>DRAWING NO. DW–QW–01–047 |

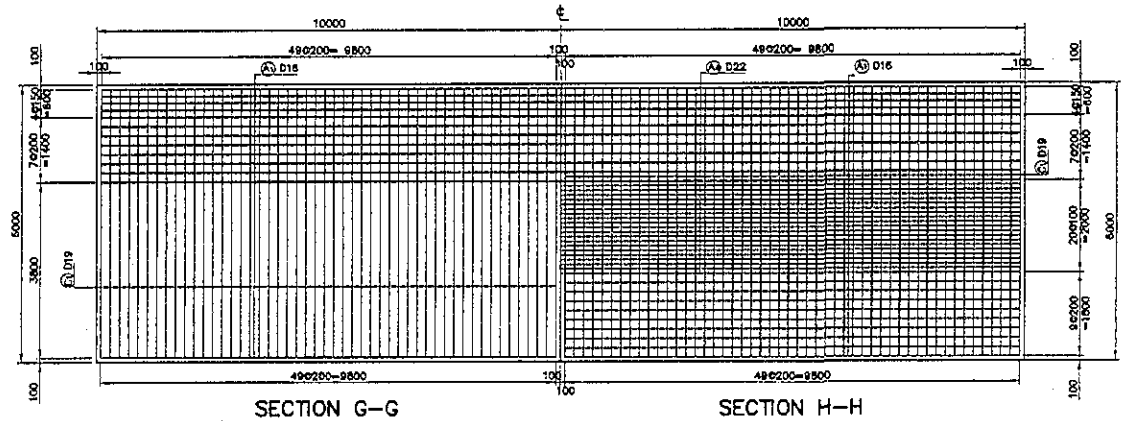



NOTES:
–THIS DRAWING IS APPLIED FOR CAISSON No. (2), (4), (8), (10) OF CONTAINER BERTH
–THE SHOP DRAWING FOR OTHER COPING SHALL BE PREPARED THE CONTRACTOR

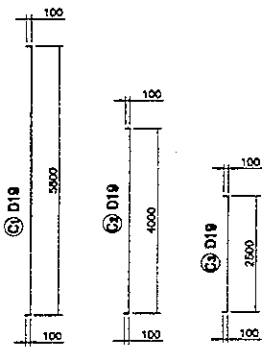
| | | | |
|---|---|---|---|
| JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) / COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA) | DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR | NIPPON KOEI CO., LTD. | SECTION : QUAYWALL WORK<br>SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH<br>TITLE : REINFORCEMENT OF COPING CONCRETE (2) (CONTAINER) | DATE : JULY/2002<br>SCALE : 1 : 100<br>DRAWING NO. : DW-CW-01-048 |




SECTION E-E SECTION F-F




SECTION G-G SECTION H-H




NOTES:
-THIS DRAWING IS APPLIED FOR CAISSON No. (2), (4), (8), (10) OF CONTAINER BERTH
-THE SHOP DRAWING FOR OTHER COPING SHALL BE PREPARED THE CONTRACTOR

| | | | | |
|---|---|---|---|---|
| REV. NO. / DATE / COORDINATE / BY / APPROVED / DATE | JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)<br>COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA) | DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR<br>NIPPON KOEI CO., LTD. | DESIGNED BY :<br>CHECKED BY :<br>APPROVED BY : | SECTION : QUAYWALL WORK<br>SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH<br>TITLE : REINFORCEMENT OF COPING CONCRETE (3) (CONTAINER) | DATE : JULY/2002<br>SCALE : 1 : 100<br>DRAWING NO. : DW-CW-01-049 |

TABLE OF REINFORCEMENT (Container Berth Coping)

| | D | L (m) | Qty | W/bar (kg) | W (kg) | Remarks |
|---|---|---|---|---|---|---|
| A1-1 | D16 | 8.00 | 108 | 12.48 | 1347.84 | |
| A1-2 | D16 | 8.00 | 108 | 12.48 | 1347.84 | |
| A1-3 | D16 | 4.80 | 108 | 7.488 | 808.704 | |
| A2-1 | D16 | 8.00 | 6 | 12.48 | 74.88 | |
| A2-2 | D16 | 8.00 | 6 | 12.48 | 74.88 | |
| A2-3 | D16 | 4.95 | 6 | 7.722 | 46.332 | |
| A3-1 | D19 | 8.00 | 35 | 18 | 630 | |
| A3-2 | D19 | 8.00 | 35 | 18 | 630 | |
| A3-3 | D19 | 5.00 | 35 | 11.25 | 393.75 | |
| A4-1 | D22 | 8.00 | 42 | 24.32 | 1021.44 | |
| A4-2 | D22 | 8.00 | 42 | 24.32 | 1021.44 | |
| A4-3 | D22 | 5.20 | 42 | 15.808 | 663.936 | |
| A-5 | D16 | 3.60 | 26 | 5.616 | 146.016 | |
| B1 | D16 | 2.80 | 162 | 4.368 | 707.616 | |
| B2 | D16 | 3.80 | 38 | 5.928 | 225.264 | |
| B3 | D16 | 2.70 | 200 | 4.212 | 842.4 | |
| C1 | D19 | 6.00 | 300 | 13.5 | 4050 | |
| C2 | D19 | 6.00 | 100 | 13.5 | 1350 | |
| C3 | D19 | 2.70 | 200 | 6.075 | 1215 | |
| Z1 | D16 | 1.25 | 400 | 1.95 | 780 | |
| Z2 | D16 | 2.90 | 38 | 4.524 | 171.912 | |
| Z3 | D16 | 1.70 | 100 | 2.652 | 265.2 | |
| Z4 | D16 | 1.50 | 100 | 2.34 | 234 | |
| Z5 | D16 | 1.80 | 100 | 2.808 | 280.8 | |
| Z6 | D16 | 2.70 | 300 | 4.212 | 1263.6 | |
| Z7 | D16 | 0.92 | 800 | 1.4352 | 1148.16 | |
| Z8 | D16 | 1.00 | 400 | 1.56 | 624 | |
| H1 | D16 | 0.55 | 200 | 0.858 | 171.6 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Sub Total | 21536.6 kg | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| Project | Detailed Design on Port Reactivation Project in La Union | Calc. File No. | |
|---|---|---|---|
| Section | Casting Concrete of Caisson | Calc. Index No. | |
| Subject | Reinforcement | Page No. | Rev. |

References/ Notes

21.6 t × 17 = 367 t

= 368 t

| | Prepared by | | Checked by | |
|---|---|---|---|---|
| | | / /200 | | / /200 |

FN: Calculation_Sheet