社会開発調査部報告書

No. 04

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)

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

FINAL REPORT

QUANTITY CALCULATION REPORT

Civil Works (2/4)

OCTOBER 2002

NIPPON KOEI CO., LTD.

THE DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR
FINAL REPORT
QUANTITY CALCULATION REPORT
Civil Works (2/4)
OCTOBER 2002 NIPPON KOEI

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)

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

FINAL REPORT

QUANTITY CALCULATION REPORT

Civil Works (2/4)

OCTOBER 2002

NIPPON KOEI CO., LTD.

BOQ Item	Work Section Title	Quantity Item	Quantity	Unit	Remarks
	Multi-purpose Berth Work		220.0	m	
2C-0101	Rubble Mound of Caisson	Rubble	71,400	m3	10～250kg/pc
2C-0102		Leveling	16,400	m2	
2C-0103		Compaction	5,550	m2	
2C-02	Asphalt Matt		5,280	m2	
2C-0301	Armor Stone	Rubble	4,460	m3	200～300kg/pc
2C-0302		Leveling	9,090	m2	
2C-0401	Scaffolding	Outer	15,500	m2	1290m2 / 1caisson
2C-0402		Inner	6,290	m2	524m2 / 1caisson
2C-0403	Reinforcement of Caisson		2040 Incld. Lifting Bar 6.3t	t	per 1 Caisson D25 18.1t D22 48.8t D19 24.7t D16 52.0t D13 25.6t
2C-0404	Concrete of Caisson		13,400	m3	
2C-0405	Form of Caisson		69,800	m2	
2C-05	Temporary anchoring of Caisson		12	Nos	
2C-06	Placing of Caisson		12	Nos	
2C-07	Sand Filling into Caisson		59,700	m3	
2C-08	Cover Concrete of Caisson		1,960	m3	
2C-0901	Coping Concrete of Caisson	Concrete	6,430	m3	
2C-0902		Elas Tigh Board	276	m2	
2C-0903		Reinforcement	490	t	44.5t / 1block
2C-0904		Form	4,530	m2	
2C-0905		Corner Protection	220	m	
2C-0906		Concrete for Curb	10.9	m3	
2C-0907		Form for Curb	104	m2	
2C-0908		Reinforcement for Curb	3,130	kg	
2C-0909		Drain Pipe	2.03m x 26 2.0m x 12 1.72m x 1 0.55m x 3 0.50m x 12 Total 87.0m	m	
2C-10	Apron Concrete Pavement		1,980	m2	
2C-1001		Concrete	600	m3	t=30cm
2C-1002		Base Concrete	300	m3	t=15cm
2C-1003		Sub-Base Concrete	300	m3	t=15cm
2C-1004		Prime Coating	1,980	m2	
2C-1005		Sand	1,200	m3	
2C-1006		Reinforcement and joint bar	5,500	kg	
2C-1007		Elas Tigh Board	190	m2	
2C-1008		Joint filter	30	m2	
2C-1009		Iron mesh	1,980	m2	
2C-1101	Sand Protection Sheet	Sand Protection Sheet	280	m	
2C-1102		Steel Plate	1,100	kg	
2C-1201	Back Filling behind Caisson	Back filling stone	37,200	m3	
2C-1202		Leveling	7,180	m2	
2C-1203		Geotextile Sheet	10,600	m2	

BOQ Item	Work Section Title	Quantity Item	Quantity	Unit	Remarks
2C-1301	Steel Pipe Pile for Crane Rail Foundation	Steel Pipe Pile	L1=24.0m t=11 ; 29 L2=21.5m t=11 ; 9 L3=24.0m t=14 ; 6 Total 230t	Nos	ϕ 800 W1=5140kg W2=4610kg W3=6510kg
2C-1302		Steel Plate	4970	kg	112.8kg x 44sets
2C-1401	Concrete for Crane Rail Foundation	Concrete	750	m3	
2C-1402		Elas Tigh Board	33.0	m2	
2C-1403		Reinforcement	63.2	t	
2C-1404		Form	990	m2	
2C-1405		Crushed Stone	41.9	m3	t=10cm
2C-1406		Leveling of Crushed Stone	419	m2	
2C-1407		Lean Concrete	21.0	m3	t=5cm
2C-1408		Drain Pipe	0.85m x 31 1.76m x 2 0.31m x 4 Total 32.0m	m	
2C-1501	Crane Rail with Accessories	Crane Rail with Accessories	658	m	Rail Weight 73kg/m
2C-1502		Asphalt Mixture	32.9	m3	
2C-1503		Corner Angle	5,990	kg	
2C-1504		Re-Bar	1,640	kg	
2C-1601	Cable Trench	Corner Angle	5,990	kg	
2C-1602		Re-Bar	1,640	kg	
2C-17	End Stopper		2	Nos	
2C-1701		Sand	1.36	m3	0.68m3 / 1spot
2C-1702		Form for cover	6.72	m2	3.36m2 / 1spot
2C-1703		Concrete for cover	0.14	m3	0.07m3 / 1spot
2C-1704		Angle	58.60	kg	29.3kg / 1spot
2C-1705		Re-Bar	2.40	kg	1.2kg / 1spot
2C-18	Socket block		4	Nos	
2C-1801		Sand	0.48	m3	0.12m3 / 1spot
2C-1802		Form for cover	3.32	m2	0.83m2 / 1spot
2C-1803		Concrete for cover	0.12	m3	0.03m3 / 1spot
2C-1804		Angle	78.0	kg	19.5kg / 1spot
2C-1805		Re-Bar	3.40	kg	0.85kg / 1spot
2C-19	Crane anchoring frame		8	Nos	
2C-1901		Sand	6.48	m3	0.81m3 / 1spot
2C-1902		Form for cover	8.24	m2	1.03m2 / 1spot
2C-1903		Concrete for cover	0.32	m3	0.04m3 / 1spot
2C-1904		Angle	124.0	kg	15.5kg / 1spot
2C-1905		Re-Bar	7.2	kg	0.9kg / 1spot
2C-20	Fender	Type-A	17	Sets	
2C-21	Bollard	Bollard	8	Sets	
2C-22	Ladder		3	Sets	
	Passenger Berth Work		240.0	m	
2D-P10101	Platform 1	Steel Pipe Pile	L=31.0m t=12 ; 12 Total 75.9t	Nos	ϕ 700 W=6324kg
2D-P10102		Plate	1,150.0	kg	70.2kg x 12, 24.9kg x 12
2D-P10103		Ribband	190	kg	3.9kg x 24, 3.7kg x 24

BOQ Item	Work Section Title	Quantity Item	Quantity	Unit	Remarks
2D-P10201		Concrete for Coping	141	m3	
2D-P10202		Form for Coping	390	m2	
2D-P10203		Reinforcement for Coping	15.5	t	per Platform1 D22 5.7t D16 5.4t D13 4.5t
2D-P10204		Corner Protection	10.0	m	
2D-P10205		Concrete for Curb	2.5	m3	
2D-P10206		Form for Curb	23.8	m2	
2D-P10207		Reinforcement for Curb	720	kg	
2D-P20101	Platform 2	Steel Pipe Pile	L=31.5m t=14 ; 17 Total 146.0t	Nos	ϕ 800 W=8537kg
2D-P20102		Plate	1,780.0	kg	71.3kg x 17, 32.9kg x 17
2D-P20103		Ribband	395	kg	6.0kg x 34, 5.6kg x 34
2D-P20201		Concrete for Coping	305	m3	
2D-P20202		Form for Coping	850	m2	
2D-P20203		Reinforcement for Coping	49.4	t	per Platform2 D25 15.3t D19 26.8t D16 3.4t D13 4.0t
2D-P20204		Corner Protection	40.0	m	
2D-P20205		Concrete for Curb	2.7	m3	
2D-P20206		Form for Curb	25.9	m2	
2D-P20207		Reinforcement for Curb	760	kg	
2D-BD01	Bresting Dolphin		2	Nos	
2D-BD0101		Steel Pipe Pile	L=31.0m t=14 ; 8 Total 93.0t	Nos	ϕ 1100 W=11625kg
2D-BD0102		Plate	1,360.0	kg	105.5kg x 8, 63.5kg x 8
2D-BD0103		Ribband	256	kg	8.2kg x 16, 7.8kg x 16
2D-BD0201		Concrete	371	m3	
2D-BD0202		Form	298	m2	
2D-BD0203		Reinforcement	20.9	t	per 1 Bresting Dolphin D25 7.2t D19 3.0t D13 0.4t
2D-BD0204		Corner Protection	46.0	m	
2D-0301	Corrosion-proof	Aluminium Anode (3.0A x 20year)	31	pcs	
2D-0302		Aluminium Anode (3.5A x 20year)	12	pcs	
2D-0303		Mesuring Terminal	4	pcs	
2D-0304		FRP protection	414	m2	
2D-04	Cat Walk		2	Sets	
2D-0401		Base Steel	8,580	kg	
2D-0402		Pipe Rail	738	kg	
2D-0403		Grating	1,500	kg	
2D-0501	Fender	Type-B	2	Nos	
2D-0502		Type-C	16	Nos	
2D-0601	Bollard	Bollard 100t with anchor bolt	7	Sets	
2D-0602		Form	330	m2	
2D-0603		Concrete	585	m3	
2D-0604		Bitte 15t	10	Sets	

BOQ Item	Work Section Title	Quantity Item	Quantity	Unit	Remarks
2D-07	Access Bridge		10	Blocks	
2D-0701		Concrete	16.6	m3	
2D-0702		Form	27.8	m2	
2D-0703		Reinforcement	4,580	kg	
2D-0704		Lifting Bar & Plate	142.0	kg	
2D-0705		Corner Angle & Re-Bar	1,030	kg	
2D-0706		Rubber Shoe	40	m	
2D-08	Ladder		7	Nos	
	Revetment Work				
2E-01	West Revetment		400.0	m	Incld. Passenger Berth
2E-010101		Rubble Mound (Lower)	49,300	m3	10～250kg/pc
2E-010102		Rubble Mound (Upper)	30,100	m3	10～250kg/pc
2E-010103		Leveling of Rubble Mound	20,900	m2	
2E-010104		Geotextile Sheet	10,300	m2	
2E-010201		Armor Stone	10,200	m3	1.5t/pc
2E-010202		Leveling of Armor Stone	11,500	m2	
2E-010301		Concrete Block (A)	42.0	m3	3pieces
2E-010302		Concrete Block (B)	52.5	m3	3pieces
2E-010303		Concrete Block (C)	60.0	m3	4pieces
2E-010304		Form for (A)	87.0	m2	29m2 / pc
2E-010305		Form for (B)	98.4	m2	32.8m2 / pc
2E-010306		Form for (C)	118.0	m2	29.5m2 / pc
2E-010307		Lifting Bar for Concrete Block	446	kg	
2E-010401		Concrete Wall	1,170	m3	
2E-010402		Form of Concrete Wall	1,550	m2	
2E-010403		Elas Tigh Board	67.0	m2	
2E-015101	Tug boat & small craft	Rubble Mound	17,860	m3	10～250kg/pc
2E-010502		Leveling of Rubble Mound	1,020	m2	
2E-010503		Back filling	8,780	m3	
2E-010504		Geotextile Sheet	4,330	m2	
2E-010601		Concrete Block (D)	324.0	m3	27pieces
2E-010602		Concrete Block (E)	1,125.0	m3	60pieces
2E-010603		Concrete Block (F)	1,170.0	m3	52pieces
2E-010604		Form for (D)	702.0	m2	26m2 / pc
2E-010605		Form for (E)	2,100.0	m2	35m2 / pc
2E-010606		Form for (F)	2,030.0	m2	39m2 / pc
2E-010607		Lifting Bar for Concrete Block	7,776	kg	
2E-010701		Concrete Wall	141	m3	
2E-010702		Form of Concrete Wall	150	m2	
2E-010703		Elas Tigh Board	6.0	m2	
2E-010801		Rubble stone	12,600	m3	
2E-010802		Armor Stone	2,160	m2	
2E-02	East Revetment		250.0	m	
2E-020101		Rubble Mound (Lower)	22,900	m3	10～250kg/pc
2E-020102		Rubble Mound (Upper)	25,600	m3	10～250kg/pc
2E-020103		Leveling of Rubble Mound	12,700	m2	
2E-020104		Geotextile Sheet	7,940	m2	
2E-020201		Armor Stone	6,300	m3	1.5t/pc

BOQ Item	Work Section Title	Quantity Item	Quantity	Unit	Remarks
2E-020202		Leveling of Armor Stone	6,550	m2	
2E-020301		Concrete Wall	980	m3	
2E-020302		Form of Concrete Wall	1,220	m2	
2E-020303		Elas Tigh Board	47.0	m2	

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)**	2C-01 01
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 distances between sections (Excel)

References, Calculation Base and Revisions

References : Tender Drawings :

From DWJ - QW - 01 - 019 Multipurpose 01

To DW - QW - 01 - 026 Multipurpose 08

Rev	Prepared by	Prepared Date	No. of Pages	Checked by	Checked Date	Reviewed by	Reviewed Date	Superseded by Calc No.
0	Kenta Gonda			Mr. Inuma		Mr. Ando		
1								
2								
3								

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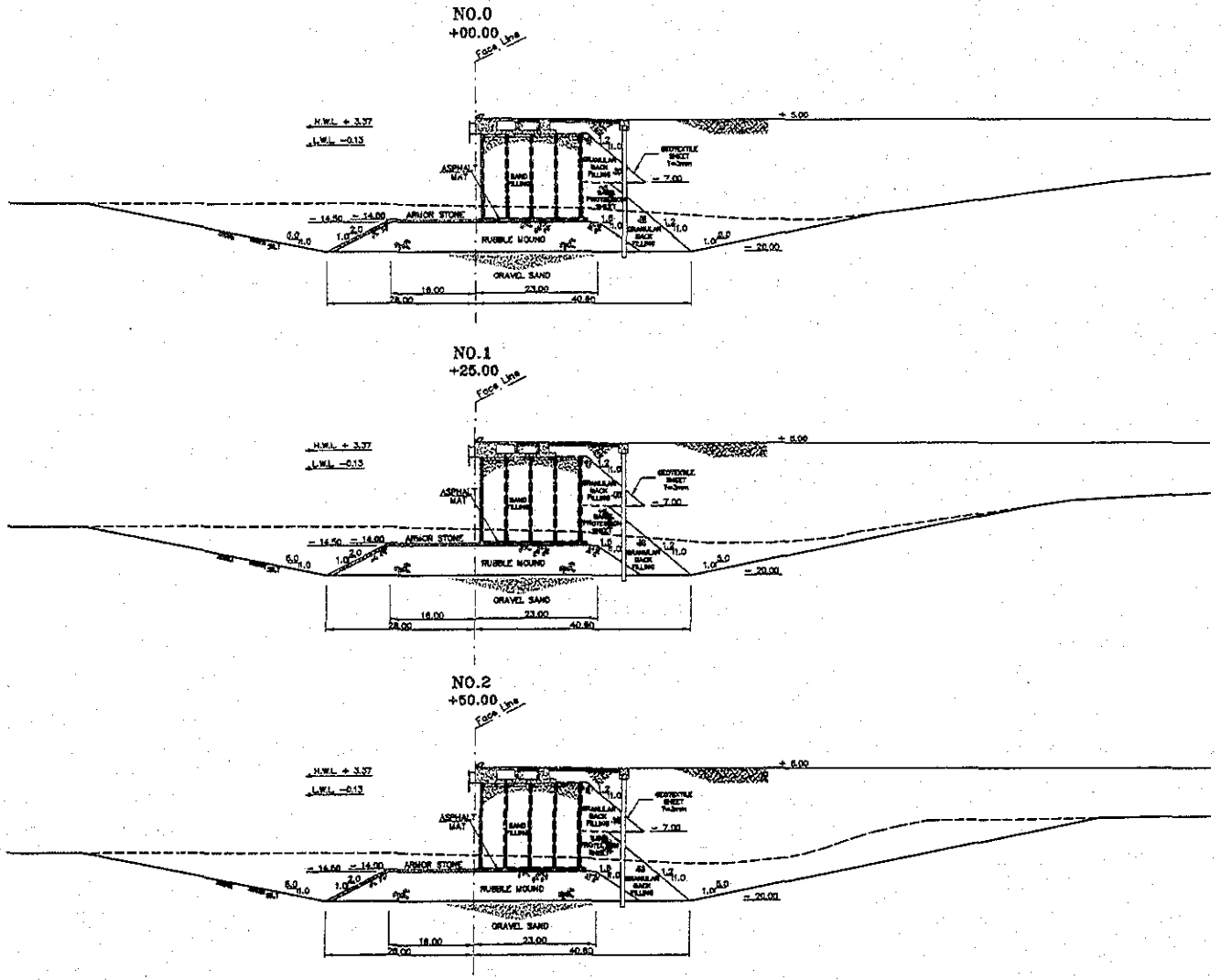


REV. NO.	DATE	CORRECTIVE	BY	APPROVED	DATE

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

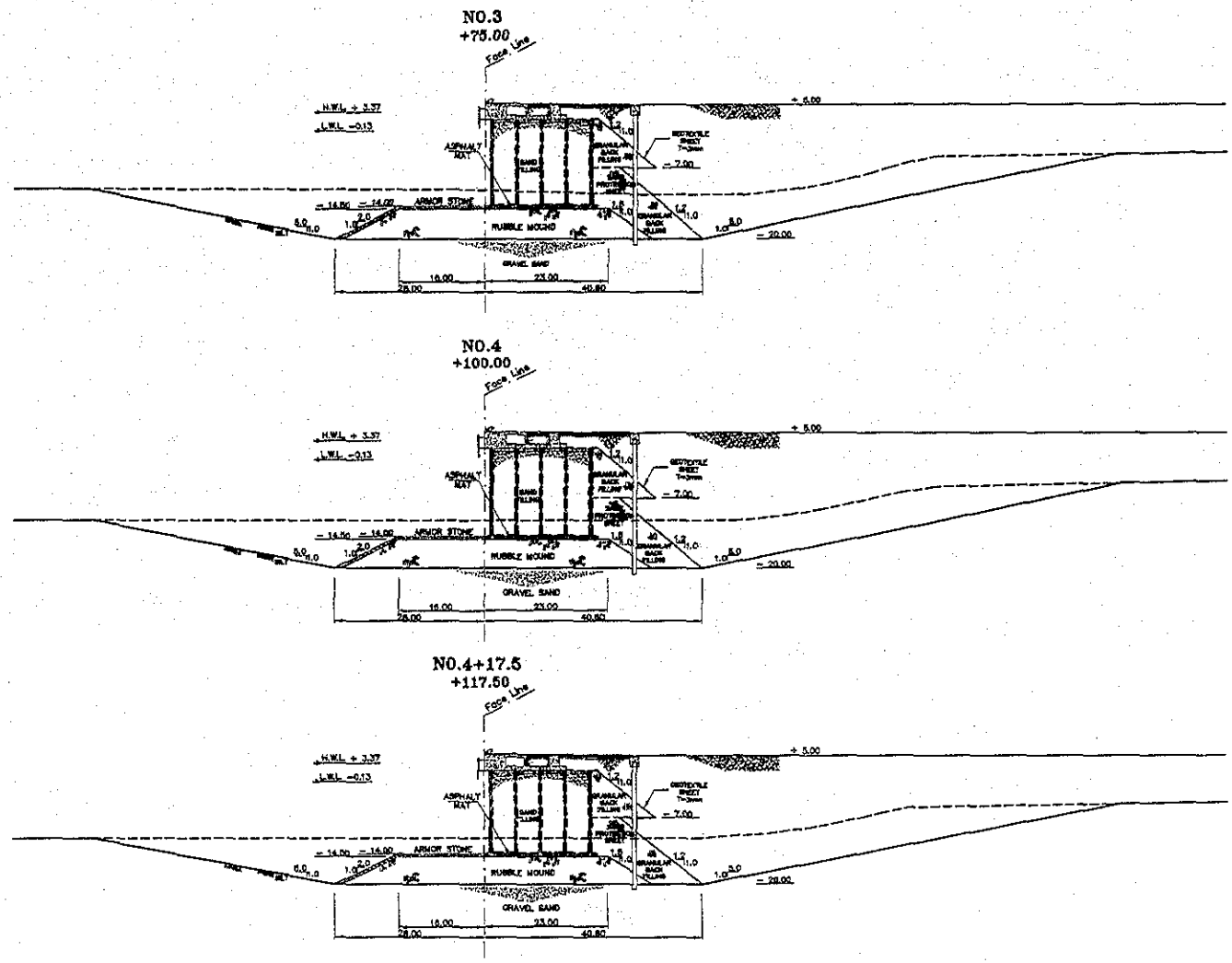
TITLE :

CROSS SECTION (1)
(MULTI-PURPOSE BERTH)

DATE : JULY/2002

SCALE : 1:800

DRAWING NO. DW-GW-01-019



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
COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)	NIPPON KOEI CO., LTD.	CHECKED BY :	SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH	SCALE : 1:500
		APPROVED BY :	TITLE : CROSS SECTION (2) (MULTI-PURPOSE BERTH)	DRAWING NO. DW-QW-01-020

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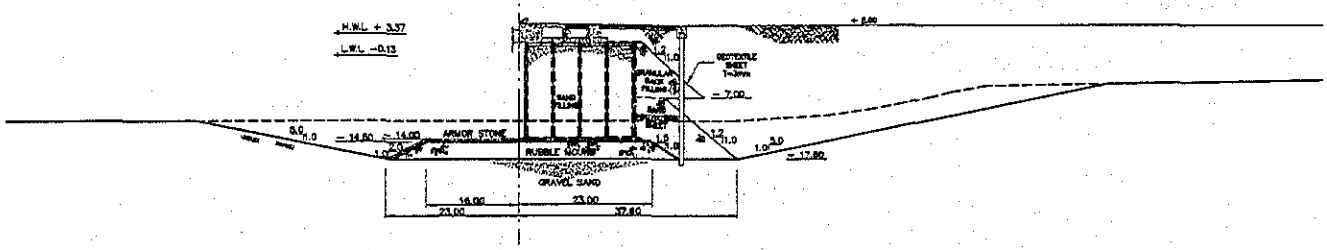

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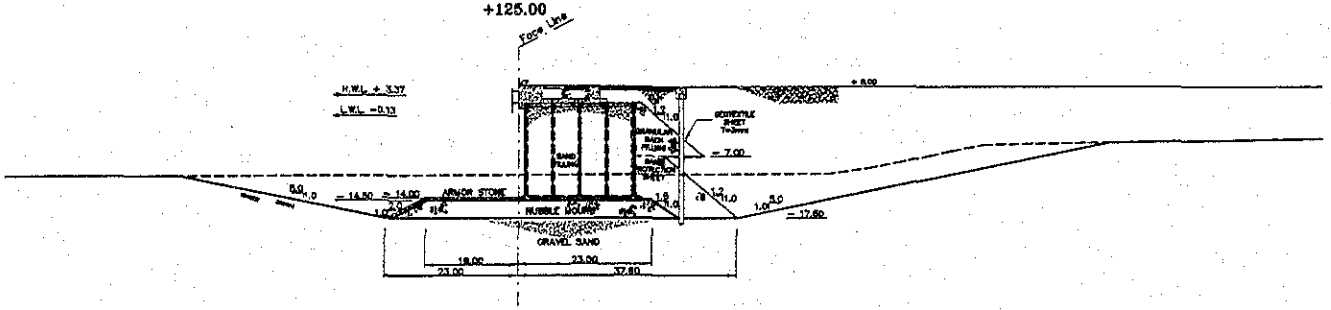

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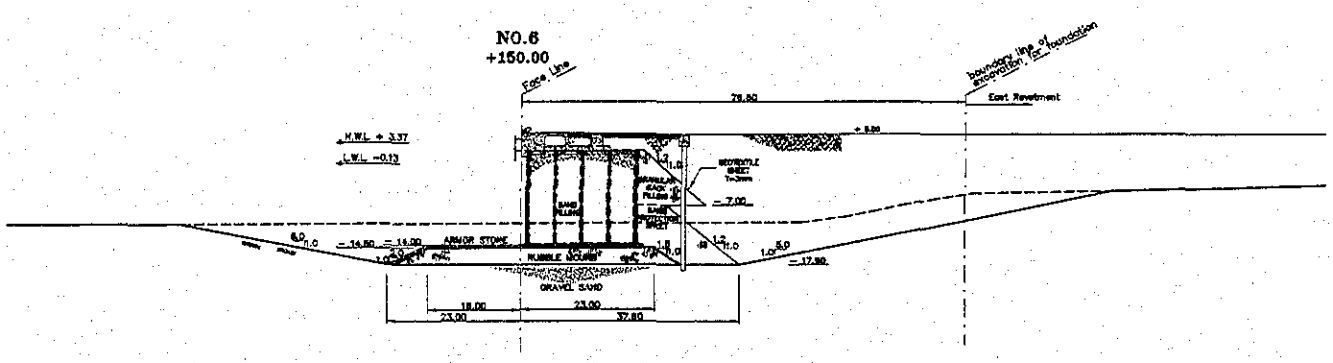


REV. NO.	DATE	DESCRIPTION	BY	APPROVED	DATE

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

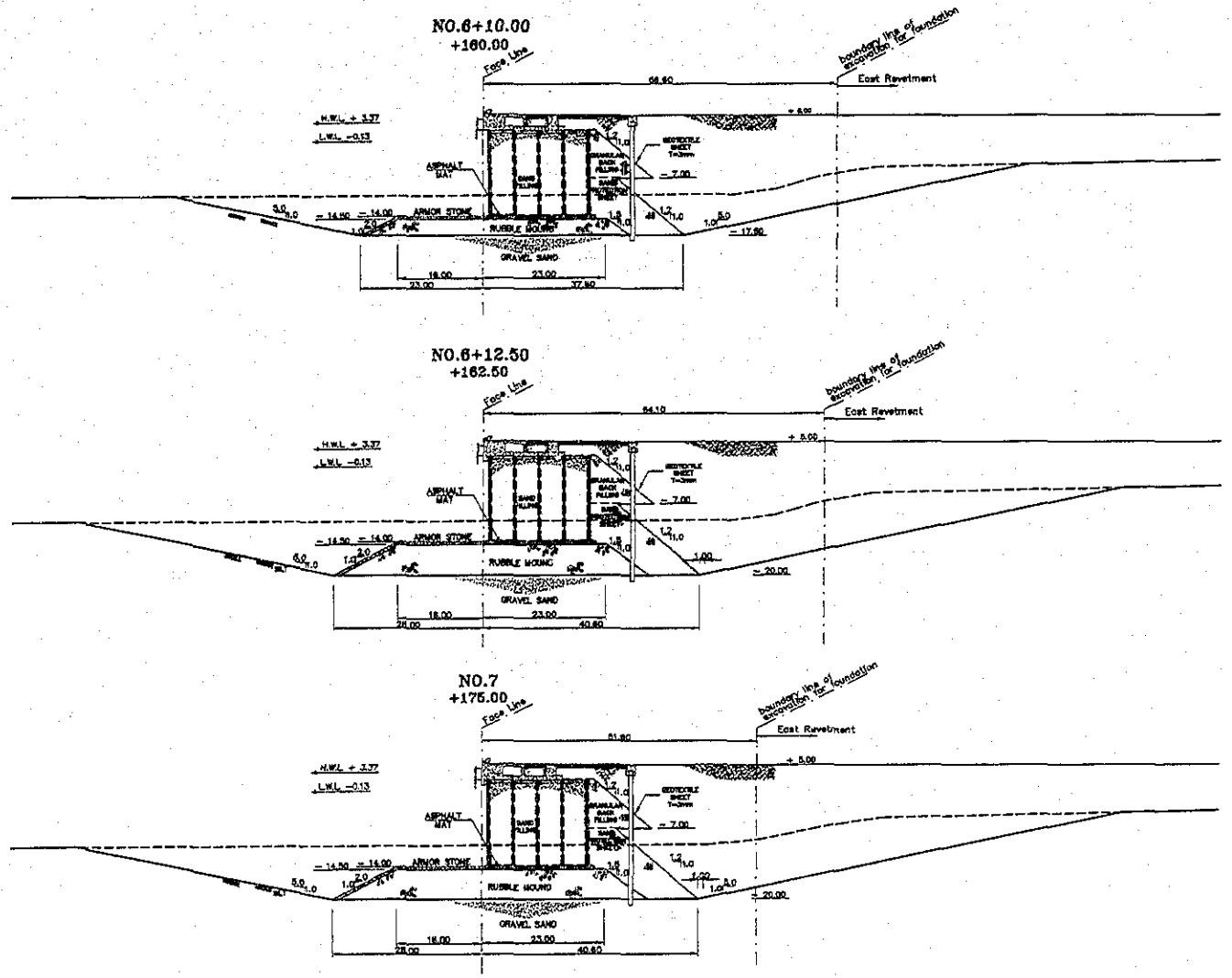
NIPPON KOEI CO., LTD.

DESIGNED BY :
CHECKED BY :
APPROVED BY :

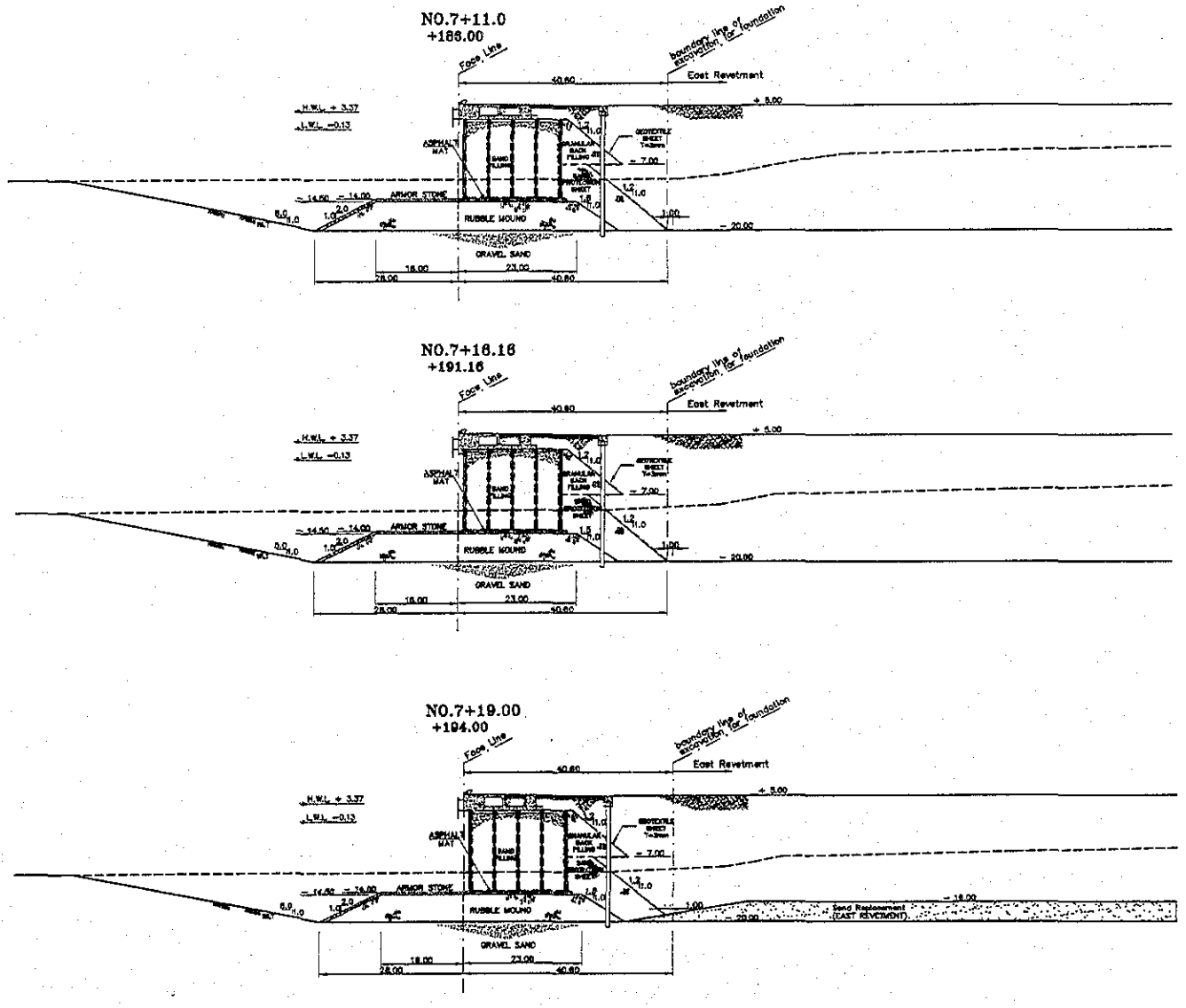
SECTION : QUAYWALL WORK
SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH
TITLE :

CROSS SECTION (3)
(MULTI-PURPOSE BERTH)

DATE : JULY/2002
SCALE : 1:600
DRAWING NO. : DW-QW-01-021



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 : CROSS SECTION (4) (MULTI-PURPOSE BERTH)	DATE : JULY/2002 SCALE : 1:800 DRAWING NO. : DW-QW-01-022



REV. NO.	DATE	COORDINATE	BY	APPROVED	DATE

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)

DETAILED DESIGN ON POST REACTIVATION PROJECT IN LA UNION PROTECH 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

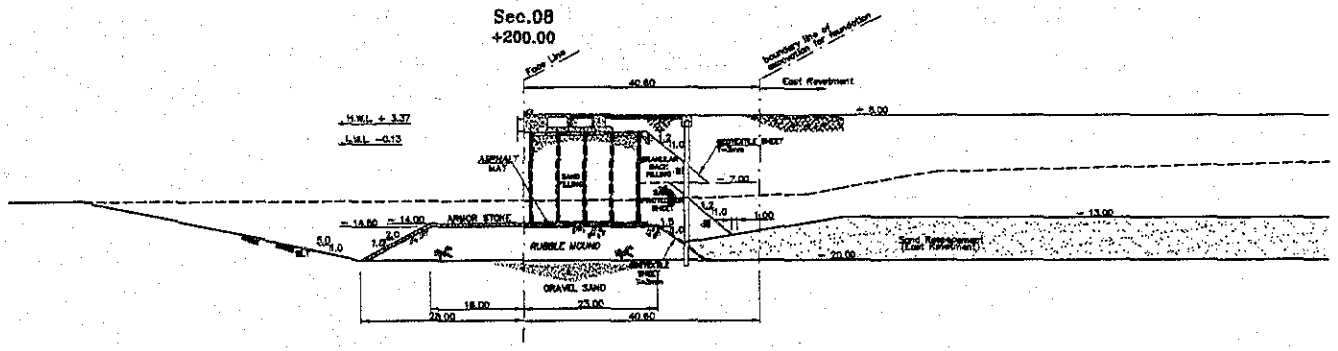
TITLE :

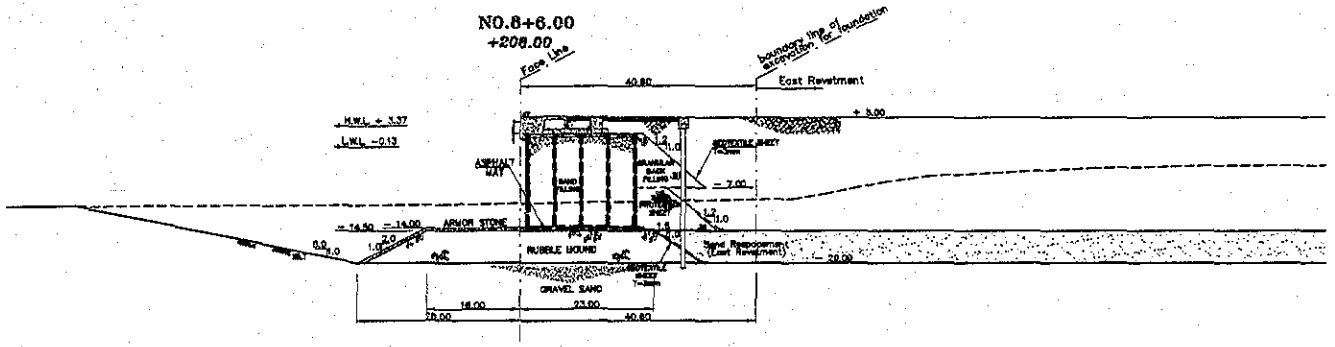
CROSS SECTION (5)
(MULTI-PURPOSE BERTH)

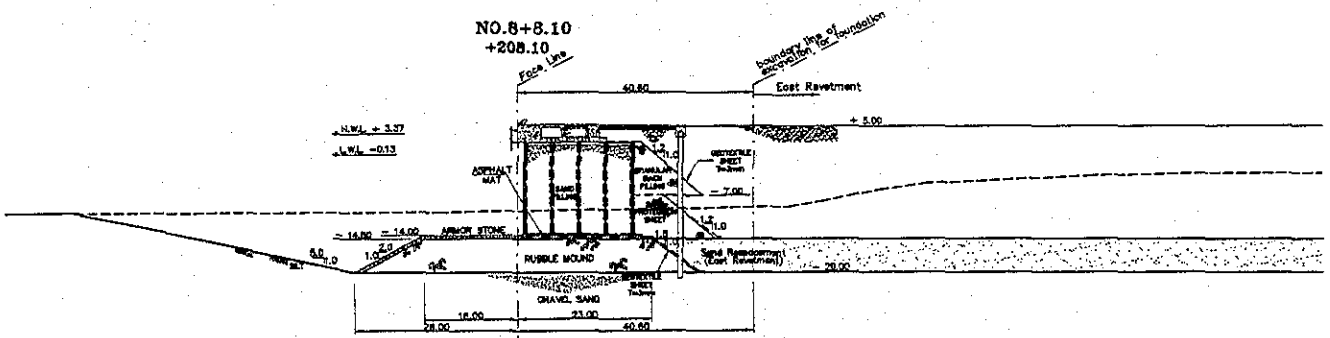
DATE : JULY/2002

SCALE : 1:500

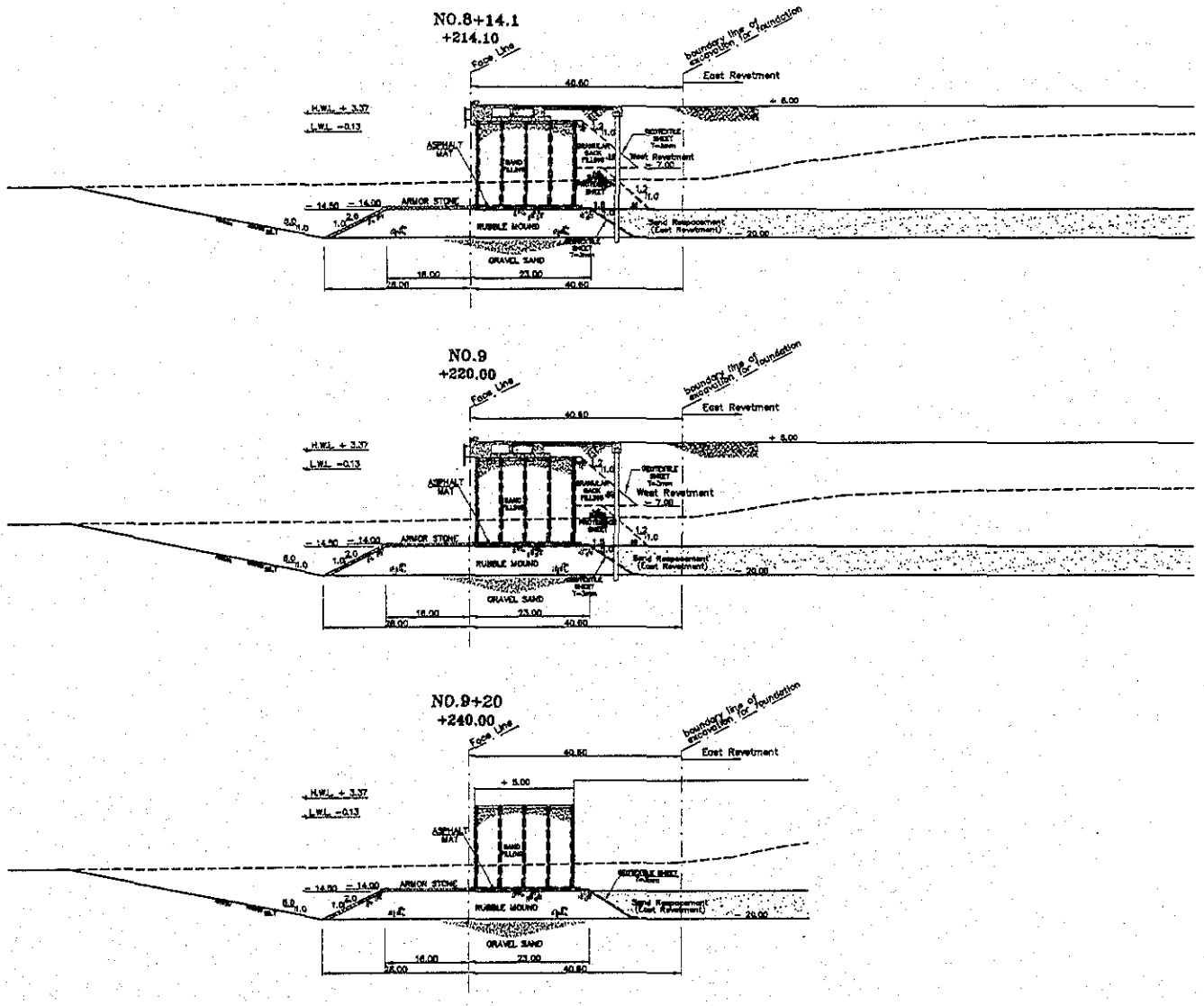
DRAWING NO. : DW-QW-01-023







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 : CROSS SECTION (6) (MULTI-PURPOSE BERTH)	DATE : JULY/2002 SCALE : 1:600 DRAWING NO. : DW-QW-01-024		



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 :

CROSS SECTION (7)
(MULTI-PURPOSE BERTH)

DATE : JULY/2002

SCALE : 1:800

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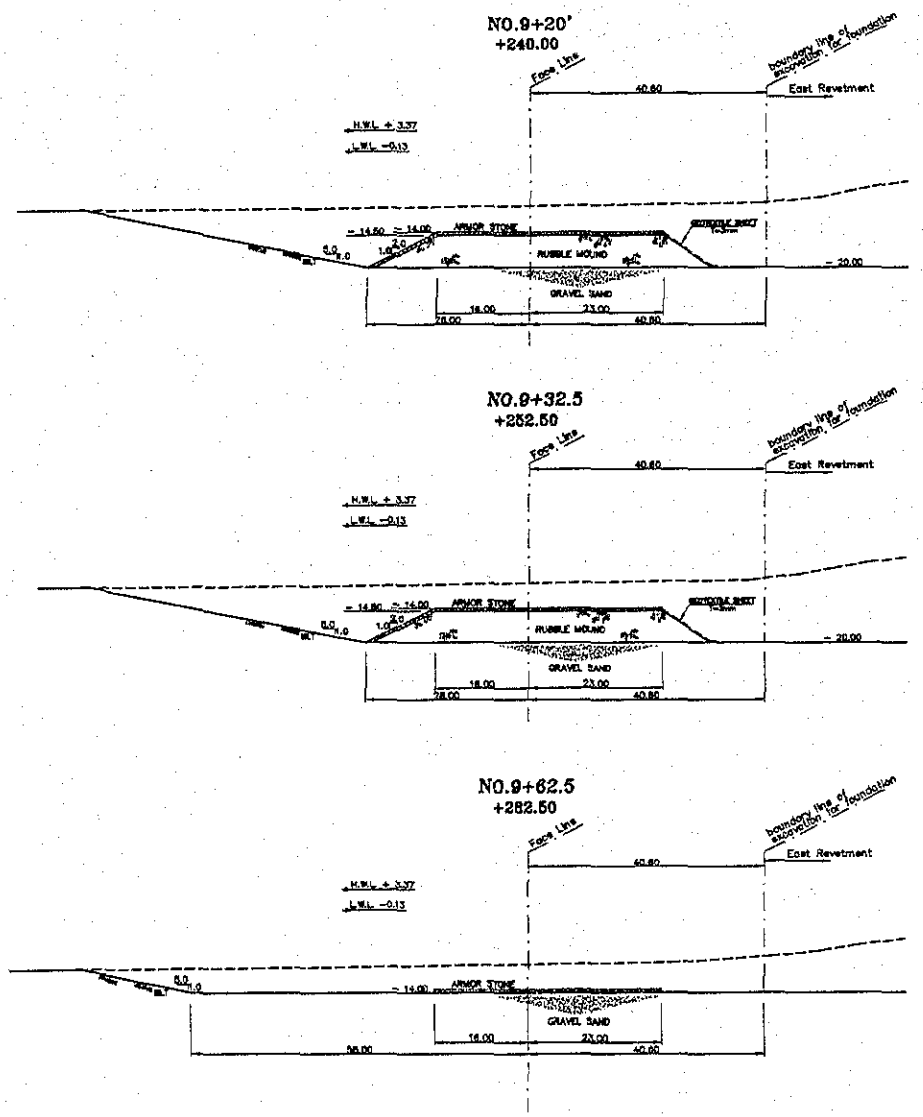


REV. NO.	DATE	COORDINATE	BY	APPROVED	DATE

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 :

CROSS SECTION (8)
(MULTI-PURPOSE BERTH)

DATE : JULY/2002

SCALE : 1:800

DRAWING NO. DW-QW-01-026

OMulti-Purpose Berth

3. Rubble Mound (harbor side)

Section No.	Area (m^2)	Average Area of 2 Sections (m^2)	Distance Between Sections (m)	Volume (m^3)
No.0	149.19			
		149.19	25.00	3,729.75
No.1	149.19			
		149.19	25.00	3,729.75
No.2	149.19			
		149.19	25.00	3,729.75
No.3	149.19			
		149.19	25.00	3,729.75
No.4	149.19			
		149.19	25.00	3,729.75
No.5	149.19			
		149.19	25.00	3,729.75
No.6	149.19			
		149.19	25.00	3,729.75
No.7	149.19			
		149.19	25.00	3,729.75
No.8	149.19			
		149.19	20.00	2,983.80
No.9	149.19			
		149.19	20.00	2,983.80
No.9+20.00	149.19			
		149.19	0.00	0.00
No.9+20.00'	149.19			
		149.19	12.50	1,864.88
No.9+32.50	149.19			
		74.60	30.00	2,237.85
No.9+62.50	0.00			
Total		1,864.88	282.50	39,908.33

○Multi-Purpose Berth

4. Rubble Mound (Sea side)

Section No.	Area (m^2)	Average Area of 2 Sections (m^2)	Distance Between Sections (m)	Volume (m^3)
No.0	117.60			
		117.60	25.00	2,940.00
No.1	117.60			
		117.60	25.00	2,940.00
No.2	117.60			
		117.60	25.00	2,940.00
No.3	117.60			
		117.60	25.00	2,940.00
No.4	117.60			
		117.60	25.00	2,940.00
No.5	117.60			
		117.60	25.00	2,940.00
No.6	117.60			
		117.60	25.00	2,940.00
No.7	117.60			
		117.60	25.00	2,940.00
No.8	117.60			
		117.60	20.00	2,352.00
No.9	117.60			
		117.60	20.00	2,352.00
No.9+20.00	117.60			
		117.60	0.00	0.00
No.9+20.00'	117.60			
		117.60	12.50	1,470.00
No.9+32.50	117.60			
		58.80	30.00	1,764.00
No.9+62.50	0.00			
Total		1,470.00	282.50	31,458.00

NIPPON KOEI CO.,LTD.

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

References/ Notes

Harbor Side = 36,787.13 m^3

Sea Side = 28,867.63 m^3

65,654.76 m^3

≒ 65,700 m^3

harbor side 39,908.32 m^3

sea side 31,458.0 m^3

71,366.32 m^3

≒ 71,400 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	RUBBLE MOUND OF CAISSON	**Pay Item No. (BOQ)**	2C-0102
Quantity Item	LEYEUNG	**Unit**	m2

Calculation Procedure Applied

1. Calculation of lenghts of sections
2. Average of lenghts of sections
3. Calculations of area : Average of Lenghts of sections times distances between sections.

(Excel)

References, Calculation Base and Revisions

References : Tinder Drawings :

From DWI - QW - 01 - 019 Multipurpose Berth 01

To DWI - QW - 01 - 026 Multipurpose Berth 08

(Same as Rubble)

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

FN : Calculation_Cover_Sheet_020504_seg cover

○Multi-Purpose 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	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	17.50	402.50
No.4+17.50	23.00			
		23.00	2.50	57.50
No.4+20.00	23.00			
		23.00	5.00	115.00
No.5	23.00			
		23.00	25.00	575.00
No.6	23.00			
		23.00	10.00	230.00
No.6+10.00	23.00			
		23.00	2.50	57.50
No.6+12.50	23.00			
		23.00	12.50	287.50
No.7	23.00			
		23.00	25.00	575.00
No.8	23.00			
		23.00	20.00	460.00
No.9	23.00			
		23.00	20.00	460.00
No.9+20.00	23.00			
		23.00	1.00	23.00
No.9+21.00	23.00			
Total		345.00	241.00	5,543.00

○Multi-Purpose 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	38.10			
		38.10	25.00	952.50
No.1	38.10			
		38.10	25.00	952.50
No.2	38.10			
		38.10	25.00	952.50
No.3	38.10			
		38.10	25.00	952.50
No.4	38.10			
		38.10	25.00	952.50
No.5	38.10			
		38.10	25.00	952.50
No.6	38.10			
		38.10	25.00	952.50
No.7	38.10			
		38.10	25.00	952.50
No.8	38.10			
		38.10	20.00	762.00
No.9	38.10			
		38.10	20.00	762.00
No.9+20.00	38.10			
		49.60	0.00	0.00
No.9+20.00'	61.10			
		61.10	12.50	763.75
No.9+32.50	61.10			
		30.55	30.00	916.50
No.9+62.50	0.00			
Total		522.25	282.50	10,824.25

NIPPON KOEI CO.,LTD.

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 = 5,543.00 m^2

Rough = 10,395.00 m^2

15,938.00 m^2

≃ 16,000 m^2

Final 5543.0

Rough 10,824.25

16,367.25

≃ 16,400 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	RUBBLE MOUND OF CAISSON	**Pay Item No. (BOQ)**	2C - 0103
Quantity Item	COMPACTION	**Unit**	m2

Calculation Procedure Applied

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

References, Calculation Base and Revisions

References : Tender Drawings :

From DWG - GW - 01 - 019 Multipurpose Berth 01

To DWG - GW - 01 - 026 Multipurpose Berth 08

(Same as Rubble)

Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
0	Karla Gora			Mr. Inoma		Mr. Ando		
1								
2								
3								

○Multi-Purpose 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	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	17.50	402.50
No.4+17.50	23.00			
		23.00	2.50	57.50
No.4+20.00	23.00			
		23.00	5.00	115.00
No.5	23.00			
		23.00	25.00	575.00
No.6	23.00			
		23.00	10.00	230.00
No.6+10.00	23.00			
		23.00	2.50	57.50
No.6+12.50	23.00			
		23.00	12.50	287.50
No.7	23.00			
		23.00	25.00	575.00
No.8	23.00			
		23.00	20.00	460.00
No.9	23.00			
		23.00	20.00	460.00
No.9+20.00	23.00			
		23.00	1.00	23.00
No.9+21.00	23.00			
Total		*345.00*	*241.00*	*5,543.00*

≈ 5,550 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	ASPHALT MAT	**Pay Item No. (BOQ)**	2C-02
Quantity Item		**Unit**	m^2

Calculation Procedure Applied

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

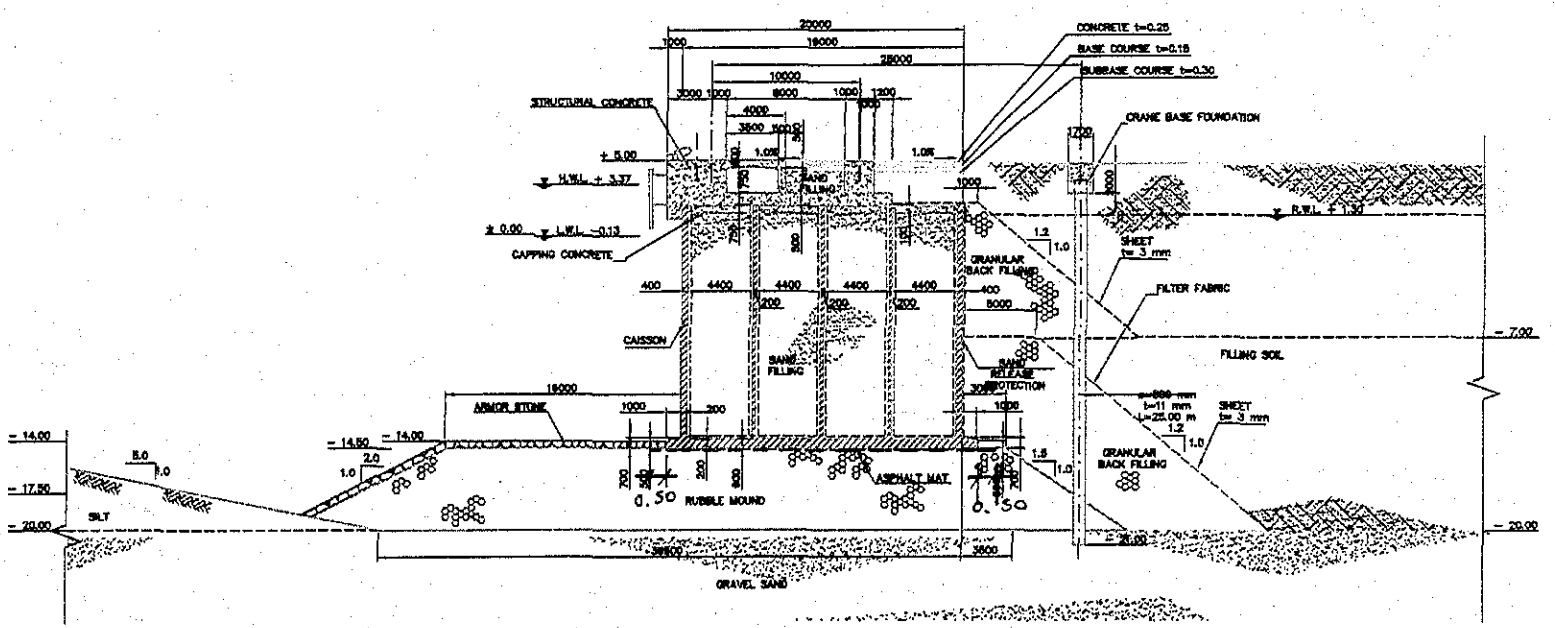
References, Calculation Base and Revisions

References: Tender Drawings:

DW-QW-01-005 Typical Cross Section Type III

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

FN : Calculation_Cover_Sheet_020504_seg cover

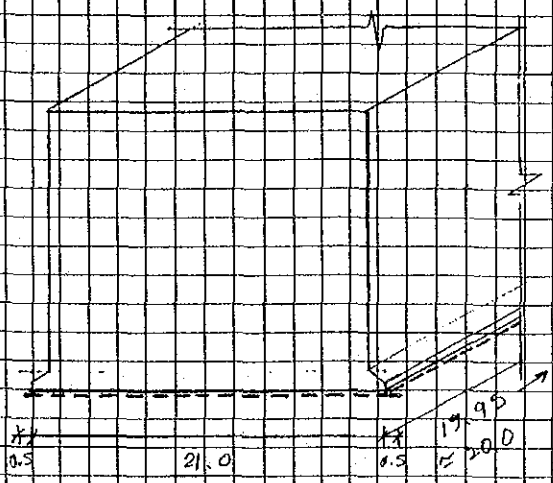


TYPICAL CROSS SECTION TYPE III
MULTI-PURPOSE BERTH (-14.0m)

SCALE 1:300 0 5.0 10.0 15.0 20.0 25.0 30.0

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section		Calc. Index No.	
Subject	ASPHALT MAT	Page No.	Rev.

References/ Notes



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

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

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

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

$V_T = 12,760\,m^2$

Multi-purpose $= 4,840\,m^2 + 440\,m^2$

$= \boxed{5,280\,m^2}$

	Prepared by		Checked by	
	Karla García	28 / May / 2002	S. García	28 / 05 / 2002

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)**	2C-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

References : Tender Drawings :

From : DW-QW-01-019 Multipurpose Berth 01

To : DW-QW-01-026 Multipurpose Berth 08

(Same as "Rubble Mound of Caisson").

Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
0	Maila Gozo			M. Inoma		M. Ando		
1								
2								
3								

FN : Calculation_Cover_Sheet_020504_seg cover

○Multi-Purpose 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	14.40			
		14.40	25.00	360.00
No.1	14.40			
		14.40	25.00	360.00
No.2	14.40			
		14.40	25.00	360.00
No.3	14.40			
		14.40	25.00	360.00
No.4	14.40			
		14.40	25.00	360.00
No.5	14.40			
		14.40	25.00	360.00
No.6	14.40			
		14.40	25.00	360.00
No.7	14.40			
		14.40	25.00	360.00
No.8	14.40			
		14.40	20.00	288.00
No.9	14.40			
		14.40	20.00	288.00
No.9+20.00	14.40			
		20.12	0.00	0.00
No.9+20.00'	25.84			
		25.84	12.50	323.00
No.9+32.50	25.84			
		22.67	30.00	680.10
No.9+62.50	19.50			
Total		212.63	282.50	4,459.10

≃ 4460 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)**	EC-0302
Quantity Item	LEVELING	**Unit**	m²

Calculation Procedure Applied

1. Calculation of lenghts of sections
2. Average of lenghts of sections
3. Calculation of Area : Average of lenghts of sections times distance between sections.

(Excel).

References, Calculation Base and Revisions

References : Tender Drawings :

From : SW-QW-01-019 Multipurpose 01

To : SW-QW-01-026 Multipurpose 08

(Same drawings as "Rubble Mound of Caisson")

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

FN : Calculation_Cover_Sheet_020504_seg cover

○Multi-Purpose 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	29.42			
		29.42	25.00	735.50
No.1	29.42			
		29.42	25.00	735.50
No.2	29.42			
		29.42	25.00	735.50
No.3	29.42			
		29.42	25.00	735.50
No.4	29.42			
		29.42	25.00	735.50
No.5	29.42			
		29.42	25.00	735.50
No.6	29.42			
		29.42	25.00	735.50
No.7	29.42			
		29.42	25.00	735.50
No.8	29.42			
		29.42	20.00	588.40
No.9	29.42			
		29.42	20.00	588.40
No.9+20.00	29.42			
		40.92	0.00	0.00
No.9+20.00'	52.42			
		52.42	12.50	655.25
No.9+32.50	52.42			
		45.71	30.00	1,371.30
No.9+62.50	39.00			
Total		433.25	282.50	9,087.35

≒ 9,090 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)**	2C-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

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	Kota Gondo			M. Iwama		M. Ando		
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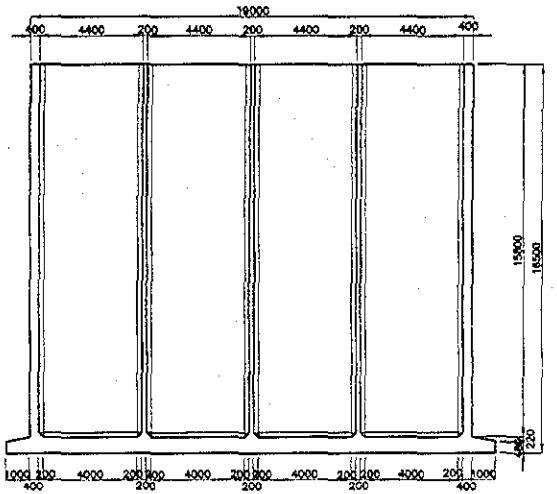
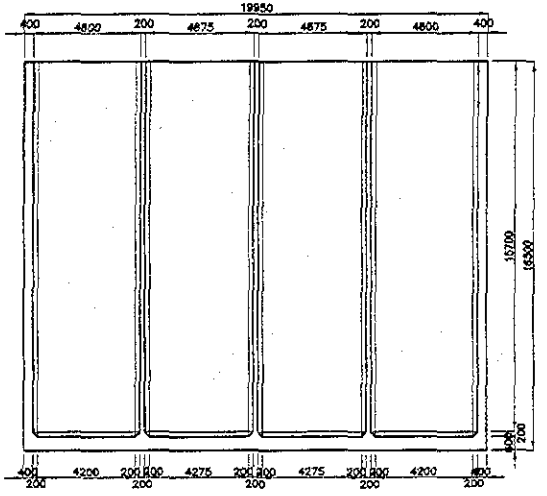
2								
3								

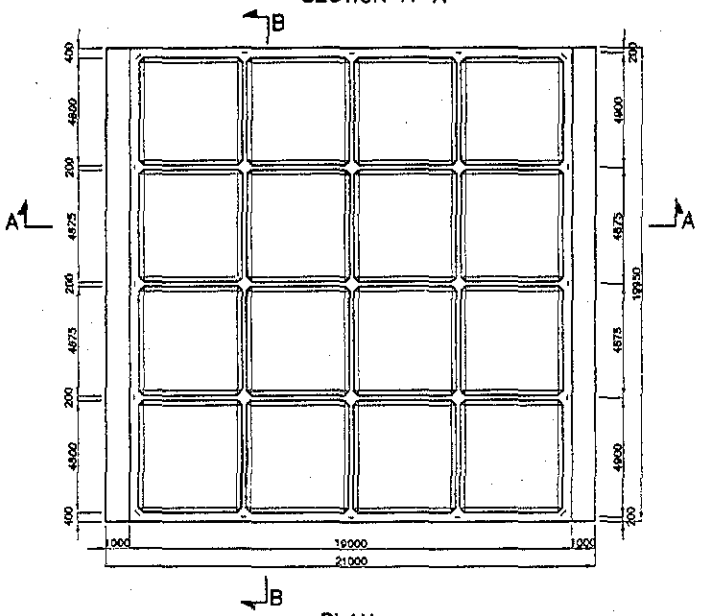


SECTION A–A



SECTION B–B

PLACING HEIGHT

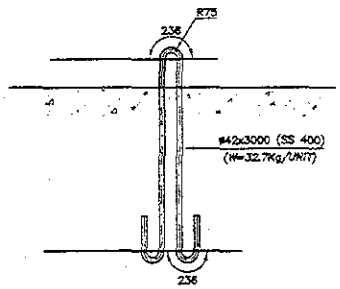


PLAN

Volume	V (m3)	1113.03
Weight	W (kN)	26712.66
Center of gravity	G (m)	6.65
Draught	D (m)	6.91
Center of Boyancy	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 :

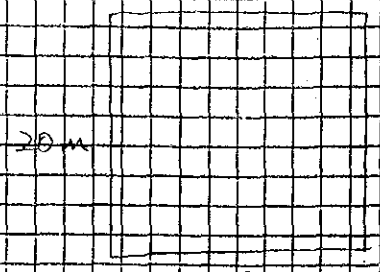
SECTION : QUAYWALL WORK
SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH
TITLE :

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

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

$= 1287$

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

Container Berth:

$1290 \times 17 = 21,930$

$\fallingdotseq 22,000\ m^2$

Multi-purpose Berth:

$1290 \times 12 = 15,480$

$\fallingdotseq \boxed{15,500\ m^2}$

	Prepared by		Checked by	
		/ /200		/ /200

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)**	2c-0902
Quantity Item	Inner	**Unit**	m^2

Calculation Procedure Applied

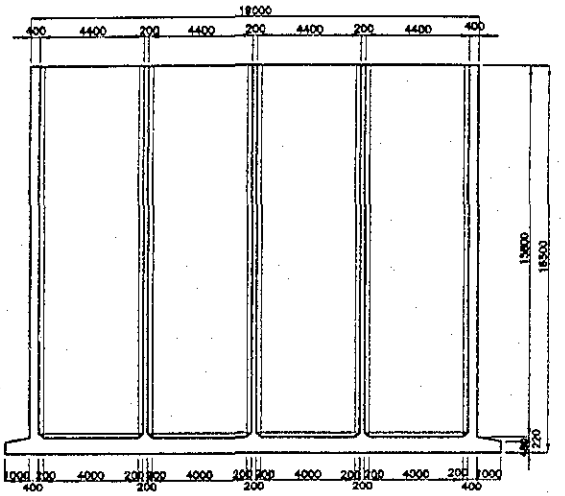
Inner Scaffolding can be moved up with the progress of placing concrete. So, the height of Inner Scaffolding is computed as 1.6 m.

References, Calculation Base and Revisions

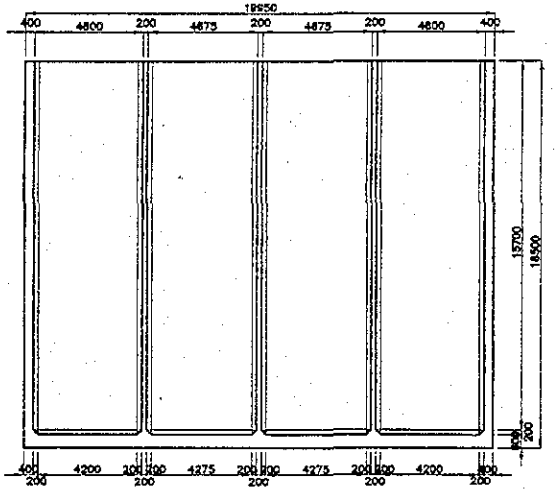
References: Tender Drawings :

CW-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	Karla Garcia			Mr. Inuma		Mr. Ando		
1								
2								
3								

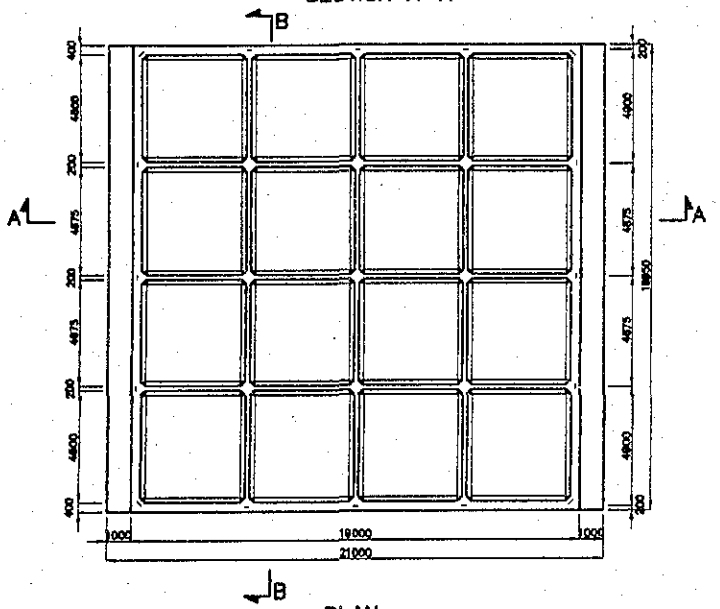


SECTION A–A



SECTION B–B

PLACING HEIGHT

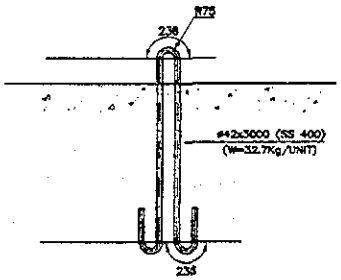


PLAN

Volume	V (m3)	1113.03
Weight	W (kN)	28712.88
Center of gravity	G (m)	8.65
Draught	D (m)	8.91
Center of Bouyancy	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



REV. NO.	DATE	CONTENTS	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 :

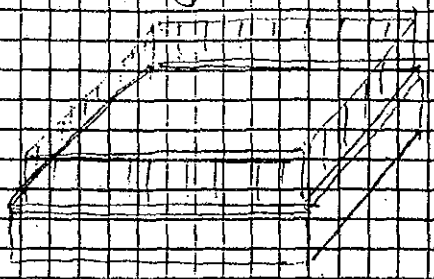
DETAILS OF CONCRETE CAISSON

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



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

$= 534\ m^2$/caisson

Container Berth

$534 \times 17 = 9078$

$\simeq 9080\ m^2$

Multi-purpose Berth

$528 \times 12 = 6288$

$\simeq \boxed{6290\ m^2}$

	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	REINFORCEMENT OF CAISSON	**Pay Item No. (BOQ)**	2C - 0403
Quantity Item		**Unit**	t

Calculation Procedure Applied

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

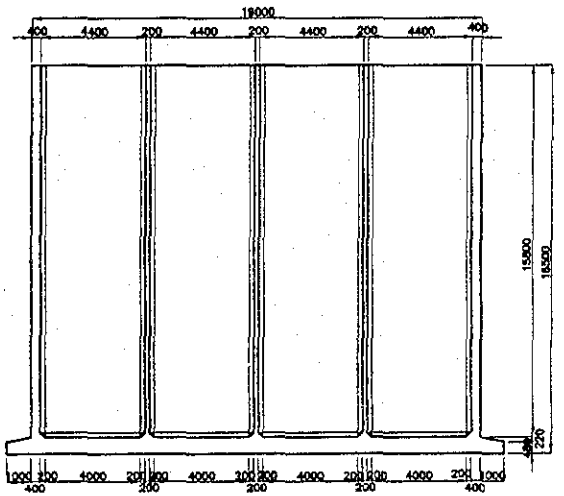
References, Calculation Base and Revisions

References : Tender Drawings :

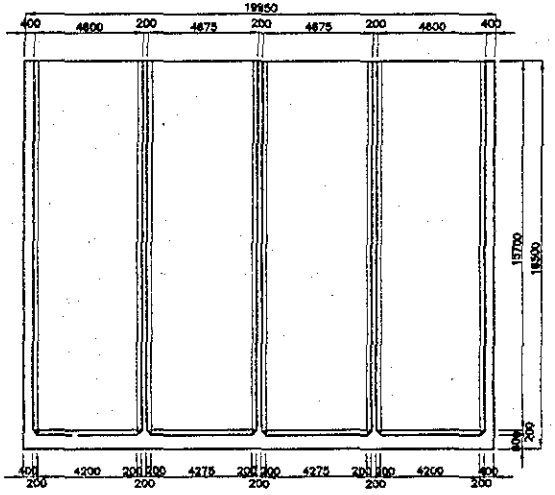
DW - GN - 01 - 027 Details of Concrete Caisson

Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
0	Karla Garcia			Mr. Truong		Mr. Ando		
1								
2								
3								

FN : Calculation_Cover_Sheet_020504_seg cover

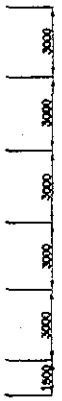


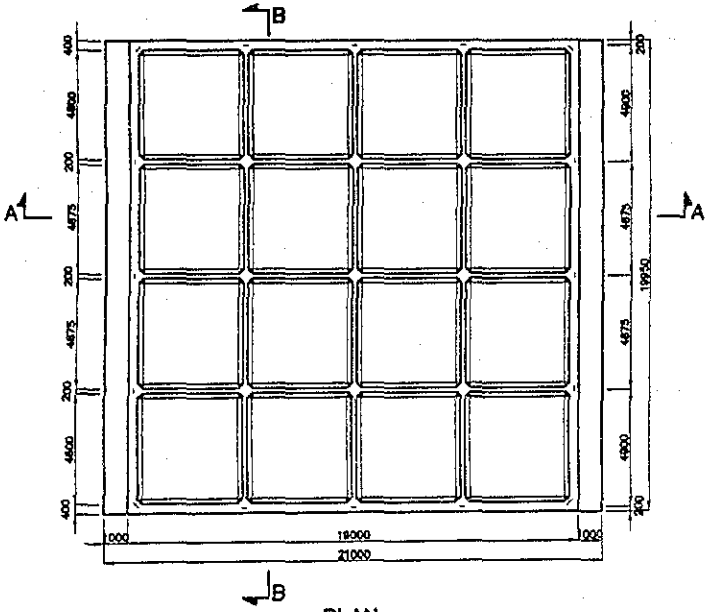
SECTION A–A



SECTION B–B

PLACING HEIGHT



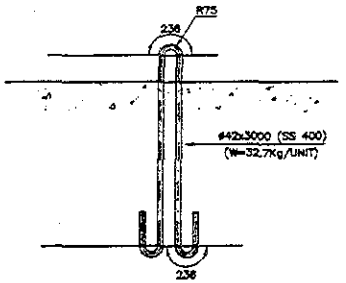


PLAN

Volume	V (m3)	1113.03
Weight	W (kN)	26712.68
Center of gravity	G (m)	6.65
Drought	D (m)	5.91
Center of Bouyancy	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



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

REINFORCEMENT OF CAISSON (13)
BAR SCHEDULE

BAR No.		DIA.	LENGTH (mm)	UNIT WT. (kg)	Q.T.Y.	WEIGHT (kg)	TOTAL WT.	SHAPE
B1	1	D13	8,520	0.995	101	8.477	856	
	2	D13	9,500	0.995	101	9.453	955	
	3	D13	7,000	0.995	101	6.965	703	
B2		D22	4,790	3.040	50	14.562	728	
B3		D16	4,590	1.560	42	7.160	301	
B4		D22	2,900	3.040	50	8.816	441	
B5		D16	2,900	1.560	50	4.524	226	
B6		D13	2,900	0.995	42	2.886	121	
B7		D13	9,190	0.995	50	9.144	457	
B8	1	D13	8,930	0.995	93	8.885	826	
	2	D13	10,000	0.995	93	9.950	925	
	3	D13	7,000	0.995	93	6.965	648	
B9		D22	4,820	3.040	24	14.653	352	
B10		D19	4,720	2.250	22	10.620	234	
B11		D16	4,620	1.560	42	7.207	303	
B12		D13	4,520	0.995	84	4.497	378	
B13		D22	3,000	3.040	36	9.120	328	
B14		D19	3,000	2.250	33	6.750	223	
B15		D16	3,000	1.560	33	4.680	154	
B16		D13	3,000	0.995	66	2.985	197	
B17	1	D13	3,980	0.995	101	3.960	401	
	2	D13	10,000	0.995	101	9.950	1,005	
	3	D13	4,000	0.995	101	3.980	402	
B18		D13	9,590	0.995	50	9.542	477	
B19		D16	2,900	1.560	50	4.524	226	
B20		D13	2,900	0.995	42	2.886	121	
B21		D19	1,740	2.250	50	3.915	196	
B22		D13	1,740	0.995	42	1.731	73	
B23	1	D13	6,430	0.995	116	6.398	742	
	2	D13	10,000	0.995	116	9.950	1,154	
	3	D13	4,500	0.995	116	4.478	519	
B24		D19	1,790	2.250	24	4.028	97	
B25		D13	1,790	0.995	20	1.781	36	
B26		D19	3,000	2.250	36	6.750	243	
B27		D13	3,000	0.995	30	2.985	90	

D22 1,849
D19 983
D16 1,210
D13 11,296
Total 15,338 kg

BAR No.		DIA.	LENGTH (mm)	UNIT WT. (kg)	Q.T.Y.	WEIGHT (kg)	TOTAL WT.	SHAPE
S1	1	D13	3,400	0.995	101	3.383	342	
	2	D13	3,400	0.995	101	3.383	342	
	3	D13	3,400	0.995	101	3.383	342	
	4	D13	3,400	0.995	101	3.383	342	
	5	D13	2,100	0.995	101	2.090	211	
S2	1	D13	3,400	0.995	101	3.383	342	
	2	D13	3,400	0.995	101	3.383	342	
	3	D13	3,400	0.995	101	3.383	342	
	4	D13	3,400	0.995	101	3.383	342	
	5	D13	1,700	0.995	101	1.692	171	
S3	1	D16	2,910	1.560	101	4.540	459	
	2	D16	3,500	1.560	101	5.460	551	
	3	D16	3,500	1.560	101	5.460	551	
	4	D16	3,500	1.560	101	5.460	551	
	5	D16	3,500	1.560	101	5.460	551	
	6	D16	2,100	1.560	101	3.276	331	
S4	1	D16	3,410	1.560	101	5.320	537	
	2	D16	3,500	1.560	101	5.460	551	
	3	D16	3,500	1.560	101	5.460	551	
	4	D16	3,500	1.560	101	5.460	551	
	5	D16	3,500	1.560	101	5.460	551	
	6	D16	1,600	1.560	101	2.496	252	
S5		D25	3,640	3.980	100	14.487	1,449	
S6		D16	3,340	1.560	84	5.210	438	
S7	1	D13	3,400	0.995	93	3.383	315	
	2	D13	3,400	0.995	93	3.383	315	
	3	D13	3,400	0.995	93	3.383	315	
	4	D13	3,400	0.995	93	3.383	315	
	5	D13	2,100	0.995	93	2.090	194	
S8	1	D13	3,400	0.995	93	3.383	315	
	2	D13	3,400	0.995	93	3.383	315	
	3	D13	3,400	0.995	93	3.383	315	
	4	D13	3,400	0.995	93	3.383	315	
	5	D13	1,700	0.995	93	1.692	157	
S9	1	D16	2,890	1.560	91	4.508	410	
	2	D16	3,500	1.560	91	5.460	497	
	3	D16	3,500	1.560	91	5.460	497	
	4	D16	3,500	1.560	91	5.460	497	
	5	D16	3,500	1.560	91	5.460	497	
	6	D16	2,100	1.560	91	3.276	298	
S10	1	D16	3,390	1.560	91	5.288	481	
	2	D16	3,500	1.560	91	5.460	497	
	3	D16	3,500	1.560	91	5.460	497	
	4	D16	3,500	1.560	91	5.460	497	
	5	D16	3,500	1.560	91	5.460	497	
	6	D16	1,600	1.560	91	2.496	227	
S11		D25	3,620	3.980	92	14.408	1,326	
S12		D16	3,320	1.560	80	5.179	414	
S13	1	D22	7,740	3.040	186	23.534	4,238	
	2	D22	10,000	3.040	186	30.400	5,654	
	3	D22	7,550	3.040	186	22.952	4,269	
S14	1	D16	8,500	1.560	154	13.260	2,042	
	2	D16	10,000	1.560	154	15.600	2,402	
	3	D16	7,910	1.560	154	12.340	1,900	
S15	1	D22	7,070	3.040	154	21.493	3,310	
	2	D22	10,000	3.040	154	30.400	4,682	
	3	D22	4,500	3.040	154	13.680	2,107	
S16	1	D25	4,500	3.980	10	17.910	179	
	2	D25	10,000	3.980	10	39.800	398	
	3	D25	7,270	3.980	10	28.935	289	
S17		D25	1,640	3.980	308	6.527	2,010	
S18		D25	2,660	3.980	462	10.587	4,891	
S19	1	D22	10,000	3.040	166	30.400	5,046	
	2	D22	5,000	3.040	166	15.200	2,523	
S20	1	D13	5,000	0.995	154	4.975	766	
	2	D13	9,500	0.995	154	9.453	1,456	
S21	1	D22	6,120	3.040	154	18.605	2,865	
	2	D22	10,000	3.040	154	30.400	4,682	
	3	D22	4,500	3.040	154	13.680	2,107	
S22	1	D25	4,500	3.980	10	17.910	179	
	2	D25	10,000	3.980	10	39.800	398	
	3	D25	6,320	3.980	10	25.154	252	
S23		D25	1,600	3.980	308	6.368	1,961	
S24		D25	2,580	3.980	462	10.268	4,744	

D25 18,076
D22 40,896
D16 18,575
D13 8,211
Total 85,758 kg

BAR No.		DIA.	LENGTH (mm)	UNIT WT. (kg)	Q.T.Y.	WEIGHT (kg)	TOTAL WT.	SHAPE
P1	1	D16	6,670	1.560	231	10.405	2,404	
	2	D16	10,000	1.560	231	15.600	3,604	
	3	D16	4,500	1.560	231	7.020	1,622	
P2	1	D19	4,500	2.250	246	10.125	2,481	
	2	D19	10,000	2.250	246	22.500	5,533	
	3	D19	6,420	2.250	246	14.445	3,553	
P3	1	D16	2,910	1.560	149	4.540	676	
	2	D16	3,500	1.560	149	5.460	814	
	3	D16	3,500	1.560	149	5.460	814	
	4	D16	3,500	1.560	149	5.460	814	
	5	D16	3,500	1.560	149	5.460	814	
	6	D16	2,100	1.560	149	3.276	488	
P4	1	D16	3,410	1.560	148	5.320	787	
	2	D16	3,500	1.560	148	5.460	808	
	3	D16	3,500	1.560	148	5.460	808	
	4	D16	3,500	1.560	148	5.460	808	
	5	D16	3,500	1.560	148	5.460	808	
	6	D16	1,600	1.560	148	2.496	369	
P5		D22	3,700	3.040	276	11.248	3,104	
P6	1	D16	6,220	1.560	231	9.703	2,241	
	2	D16	10,000	1.560	231	15.600	3,604	
	3	D16	4,000	1.560	231	6.240	1,441	
P7	1	D19	4,000	2.250	246	9.000	2,214	
	2	D19	10,000	2.250	246	22.500	5,535	
	3	D19	6,420	2.250	246	14.445	3,553	
P8	1	D16	2,890	1.560	132	4.508	595	
	2	D16	3,500	1.560	132	5.460	721	
	3	D16	3,500	1.560	132	5.460	721	
	4	D16	3,500	1.560	132	5.460	721	
	5	D16	3,500	1.560	132	5.460	721	
	6	D16	2,100	1.560	132	3.276	432	
P9	1	D16	3,390	1.560	132	5.288	698	
	2	D16	3,500	1.560	132	5.460	721	
	3	D16	3,500	1.560	132	5.460	721	
	4	D16	3,500	1.560	132	5.460	721	
	5	D16	3,500	1.560	132	5.460	721	
	6	D16	1,600	1.560	132	2.496	329	
P10		D22	3,680	3.040	250	11.187	2,886	

D22 5,990
D19 23,131
D16 31,546
Total 60,667 kg

BAR No.		DIA.	LENGTH (mm)	UNIT WT. (kg)	Q.T.Y.	WEIGHT (kg)	TOTAL WT.	SHAPE
H1		D13	1,610	0.995	178	1.602	282	
H2		D13	1,630	0.995	178	1.622	285	
H3		D13	1,340	0.995	264	1.333	352	
H4		D13	1,370	0.995	264	1.363	360	
H5		D13	1,380	0.995	316	1.373	434	
H6		D13	1,080	0.995	972	1.075	1,045	
H7		D13	790	0.995	1,458	0.786	1,146	

D13 3,904
Total 3,904 kg

BAR No.		DIA.	LENGTH (mm)	UNIT WT. (kg)	Q.T.Y.	WEIGHT (kg)	TOTAL WT.	SHAPE
F1		D19	2,110	2.250	104	4.748	494	
F2		D16	2,100	1.560	103	3.276	337	
F3		D13	1,780	0.995	105	1.771	186	
F4		D13	2,110	0.995	105	2.099	220	
F5		D16	1,780	1.560	105	2.777	292	
F6	1	D13	6,570	0.995	12	6.537	78	
	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

BAR No.		DIA.	LENGTH (mm)	UNIT WT. (kg)	Q.T.Y.	WEIGHT (kg)	TOTAL WT.	SHAPE
T1	1	D13	930	0.995	158	0.925	146	
	2	D13	890	0.995	105	0.886	93	
	3	D13	850	0.995	105	0.846	89	

D13 328
Total 328 kg

BAR No.		DIA.	LENGTH (mm)	UNIT WT. (kg)	Q.T.Y.	WEIGHT (kg)	TOTAL WT.	SHAPE
W1		D13	700	0.995	1,024	0.697	714	
W2		D13	1,650	0.995	256	1.642	420	

D13 1,134
Total 1,134 kg

Weight of Reinforcing Bars by Diameter

(Type of steel reinforcement SD345)

D25	18,076
D22	46,735
D19	24,618
D16	51,960
D13	25,514
Grand Total	166,903 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 :	SECTION : QUAYWALL WORK SUB-SECTION : CONTAINER AND MULTIPURPOSE BERTH TITLE : REINFORCEMENT OF CAISSON (13)
DATE : MARCH/2002	SCALE : 1 : 100	DRAWING NO. DW-CW-01-020	

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

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 / 1 caisson

W = 169.00 ton

169.00 ton x 12 = 2,028 ton

Lifting Bar

ϕ 12 - 3000 W = 32.70 kg

32.70 kg x 16 = 523.20 kg

523.20 kg x 12 = 6,278.40 kg

≒ 6.30 ton

2,028 ton + 6.30 ton = 2,034.30 ton

≒ **2,040 ton**

	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)**	2C-0404
Quantity Item		**Unit**	m3

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.

References, Calculation Base and Revisions

References: Tender Drawings:

CW-QW1-00-002 Plan and Profile Multipurpose Berth

CW-QW1-05-027 Details of Concrete Caisson

Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
0	Kenia Garcia			Mr. Inuma		Mr. Ando		
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2								
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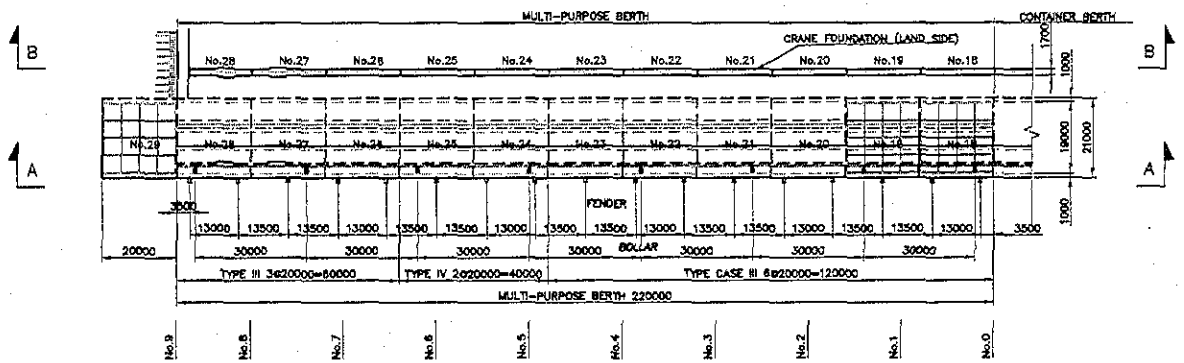
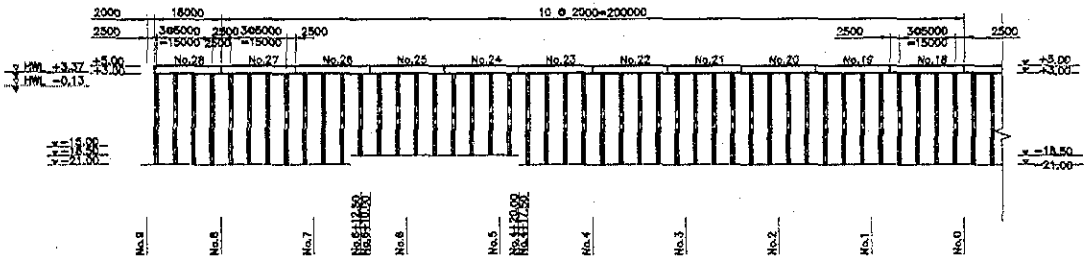
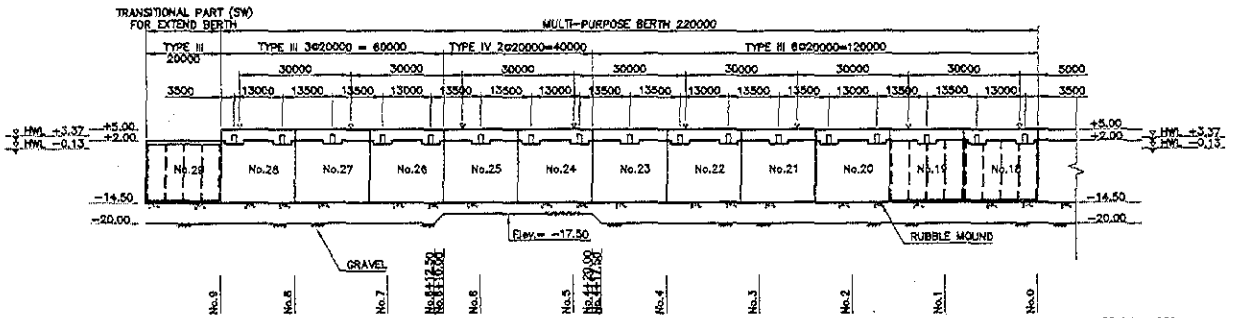


PLAN



PROFILE B-B



PROFILE A-A

SCALE 1:1250

0 50 100

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

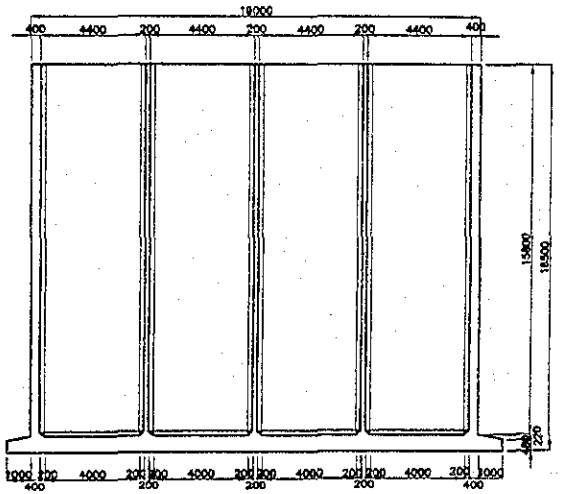
NIPPON KOEI CO., LTD.

DESIGNED BY :
CHECKED BY :
APPROVED BY :

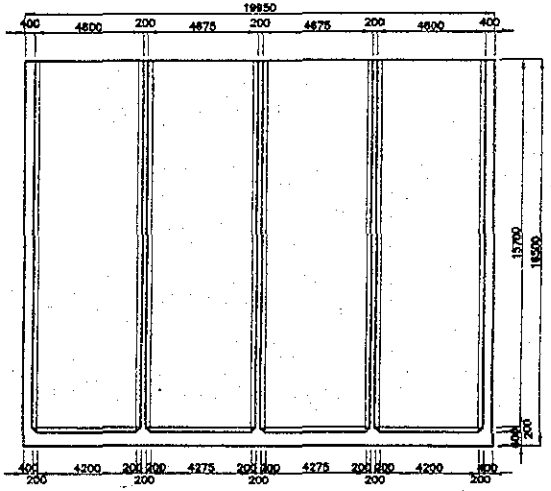
SECTION : QUAYWALL WORK
SUB-SECTION : CONTAINER AND MULTI-PURPOSE BERTH
TITLE :

PLAN AND PROFILE
MULTI-PURPOSE BERTH

DATE : JULY/2002
SCALE : 1 : 1250
DRAWING NO. DW-QW-01-002

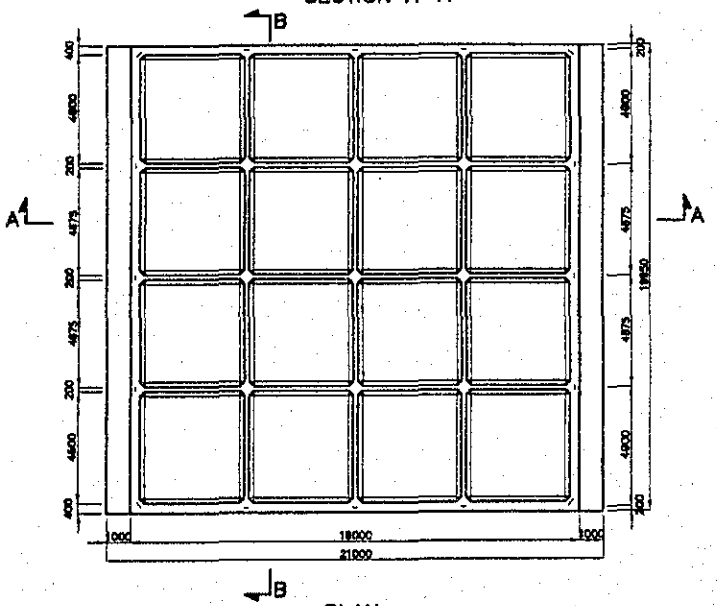


SECTION A–A



SECTION B–B

PLACING HEIGHT

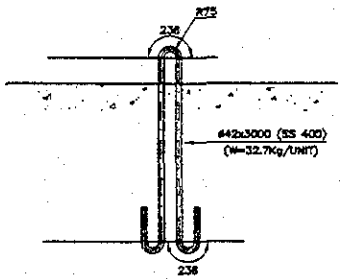


PLAN

Volume	V (m3)	1113.03
Weight	W (tf)	28712.66
Center of gravity	G (m)	8.65
Draught	D (m)	8.91
Center of Bouyancy	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



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	CONCRETE OF CAISSON	Calc. Index No.	
Subject	CAISSON CONCRETE	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

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

$V_2 = (0.40\,m)[19.95\,m + (19.0\,m - (0.40\,m)(2)][16.50\,m - 0.60\,m)(2) = 485.29\,m^3$

$V_3 = (0.80\,m)[(19.95\,m - (0.40\,m)(2))(3) + (19.0\,m - (0.40\,m)(2) - (0.20\,m)(3))(3)]$

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

$V_3 = 350.60\,m^3$

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

$V_5 = \left[\frac{(0.20\,m)(0.20\,m)}{2}\right][(4.0\,m + 4.90\,m)(2)(8) + (9.0\,m + 4.275\,m)(2)(8)]$

$V_5 = 5.27\,m^3$

$V_6 = \frac{(0.2\,m)(0.2\,m)(0.2\,m)}{3}(4)(16) = 0.17\,m^3$

$V_7 = (1.0\,m)(0.48\,m)(19.95\,m)(2) = 19.15\,m^3$

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

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

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

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

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

19,000 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)**	2C-0405
Quantity Item		**Unit**	m2

Calculation Procedure Applied

Caisson form area was computed for Multi-purpose Berth.
Cross section area was computed by geometric formulas, multiplying the height to the width of sections of caissons.
This area was multiplied to the total of caissons.

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		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
0	Karla Garcia			Mr. Inuma		Mr. Ando		
1								
2								
3								

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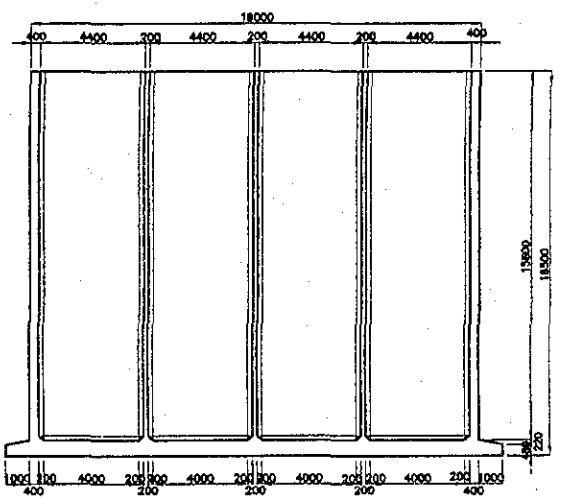
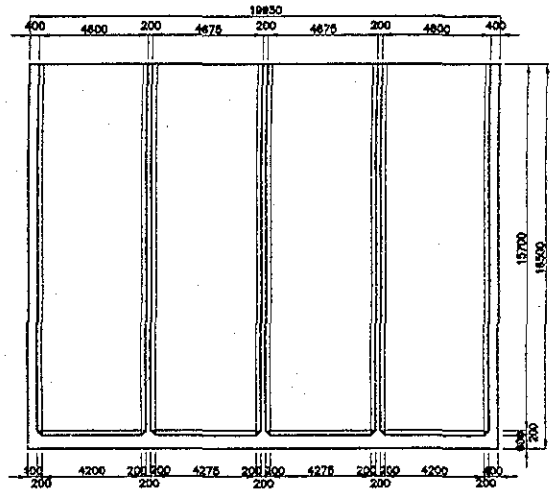
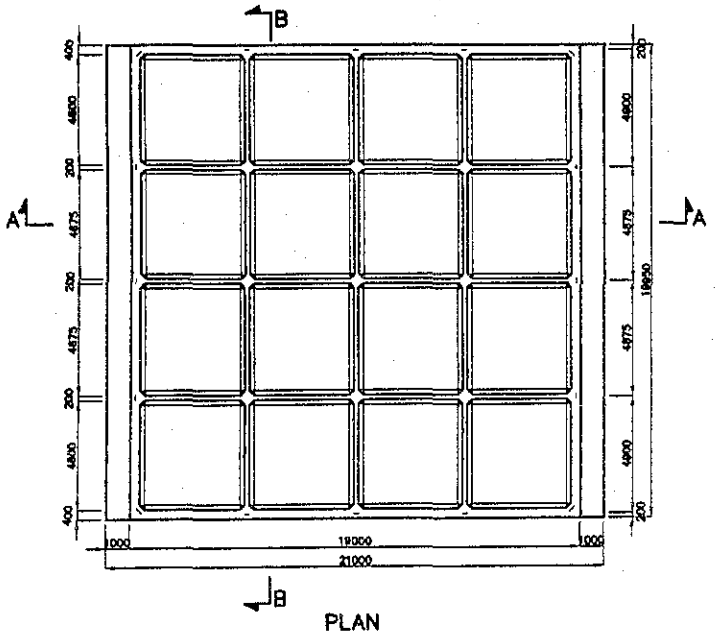


SECTION A–A



SECTION B–B

PLACING HEIGHT

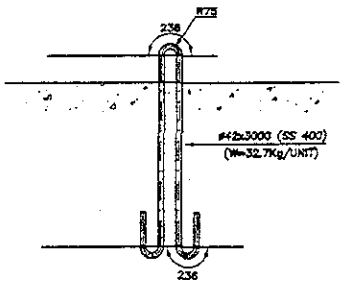


PLAN

Volume	V (m3)	1113.03
Weight	W (tol)	28712.68
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	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 :

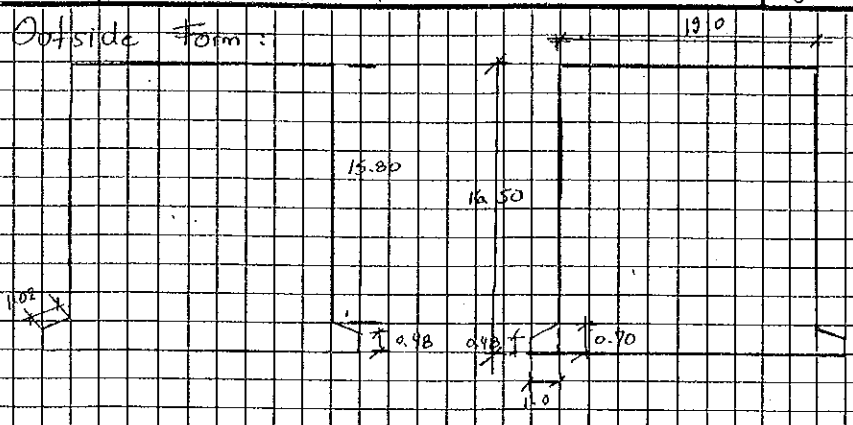
DETAILS OF CONCRETE CAISSON

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	Multi-purpose Berth	Calc. Index No.	
Subject	CAISSON FORM	Page No. /	Rev.

References/ Notes

Outside Form :

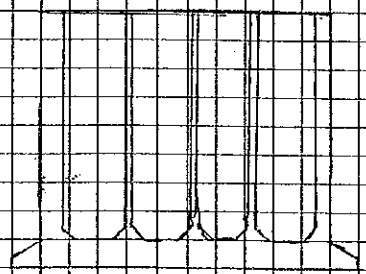


$A_1 = (15.80\text{m} + 1.02\text{m} + 0.48\text{m})(4)(19.95\text{m}) = 690.27\ \text{m}^2$

$A_1 = \left[(16.50\text{m})(16.0\text{m}) - \left(\frac{0.48\text{m} + 0.7\text{m}}{2}\right)(1.0\text{m})(2\text{m})\right](2) = 629.36\ \text{m}^2$

$A = 1,319.68\ \text{m}^2$

Chamber :



$A_2 = \left[(4.0\text{m} + 4.20\text{m})(2)(15.7\text{m})\right](8) + \left[(4.0\text{m} + 4.275\text{m})(2)(15.7\text{m})\right](8) + (13.70\text{m})(0.28\text{m})(4)(16) = 4419.86\ \text{m}^2$

$A_2 = \left(\frac{4.0\text{m} + 1.28\text{m}}{2}\right)(0.28\text{m})(2)(16) + \left(\frac{4.20\text{m} + 4.48\text{m}}{2}\right)(0.28\text{m})(2)(8) + \left(\frac{4.275\text{m} + 4.555\text{m}}{2}\right)(0.28\text{m})(2)(8)$

$A = 76.32\ \text{m}^2$

$A_T = 5,819.81\ \text{m}^2 \approx 5,816\ \text{m}^2$

	Prepared by		Checked by	
		/ /200		/ /200

FN: Calculation_Sheet

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	Multi-purpose Berth	Calc. Index No.	
Subject	CAISSON FOR M	Page No. 2	Rev.

References/ Notes

Container Berth:

$V = (5,816\ m^2)(17) = 98,872\ m^2$ → 98,900 m^2

Multipurpose Berth:

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

Transitional:

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

$63,976 + 5,816 = 69,792$ → [69,800] m^2

Prepared by		Checked by	
	/ /200		/ /200

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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)**	2C - 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 - 002 Plan and Profile Multi purpose Built

Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
0	KorlaGarcia			Mr. Inoma		Mr. Ando		
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2								
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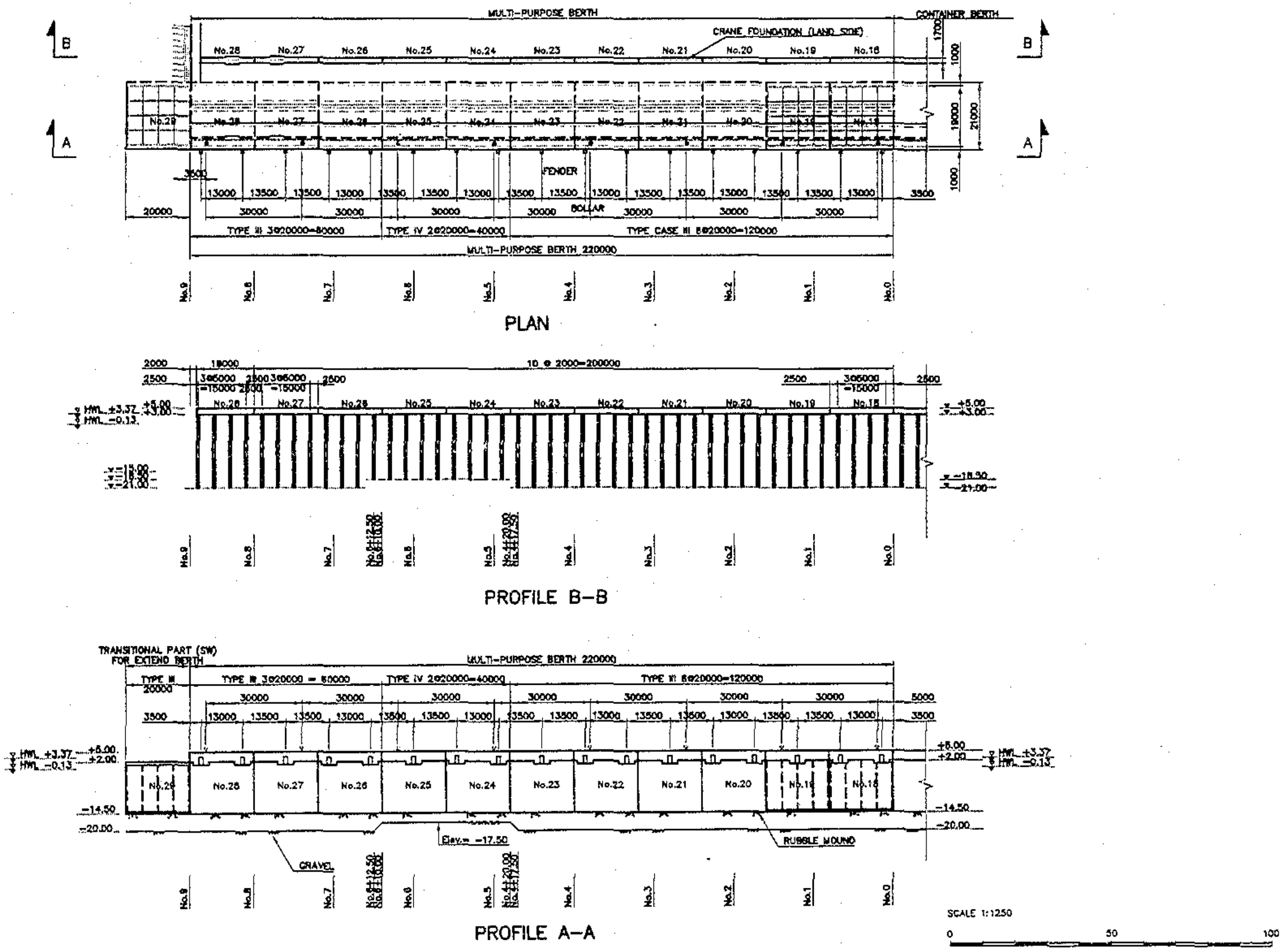

JICA — JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	DETAILED DESIGN ON PORT REACTIVATION PROJECT IN LA UNION PROVINCE OF THE REPUBLIC OF EL SALVADOR	SECTION: QUAYWALL WORK
CEPA — COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)	NIPPON KOEI CO., LTD.	SUB-SECTION: CONTAINER AND MULTI-PURPOSE BERTH
DESIGNED BY: / CHECKED BY: / APPROVED BY:		TITLE: PLAN AND PROFILE MULTI-PURPOSE BERTH
DATE: JULY/2002	SCALE: 1 : 1250	DRAWING NO: DW-QW-01-302

REV. NO.	DATE	DESCRIPTION	BY	APPROVED	DATE

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

Multi-Purpose Berth = 12 Nos

	Prepared by	Checked by
	/ /200	/ /200

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)**	2C-06
Quantity Item		**Unit**	No 5

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:

DWG-QY-01-002 Plan and Profile Multipurpose Berth

Rev	Prepared		No. of Pages	Checked		Reviewed		Superseded by Calc No.
	by	Date		by	Date	by	Date	
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3								

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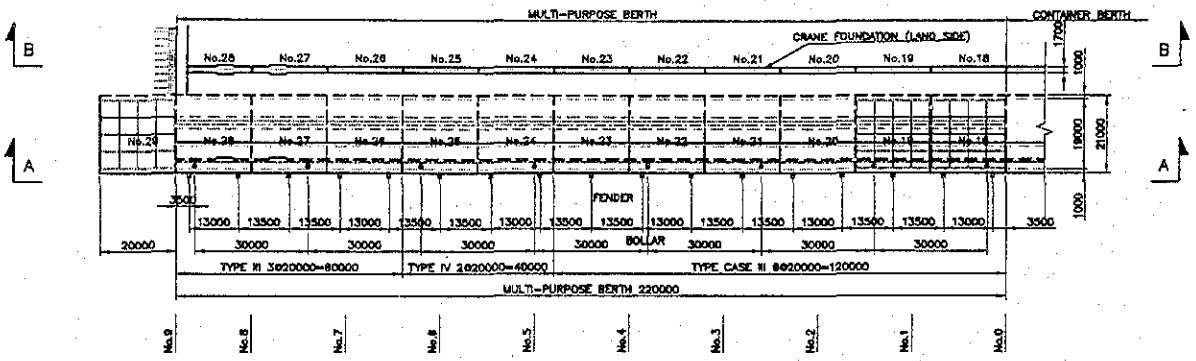
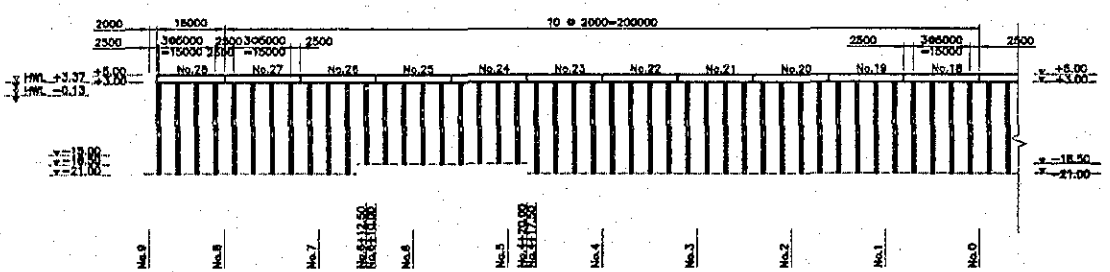
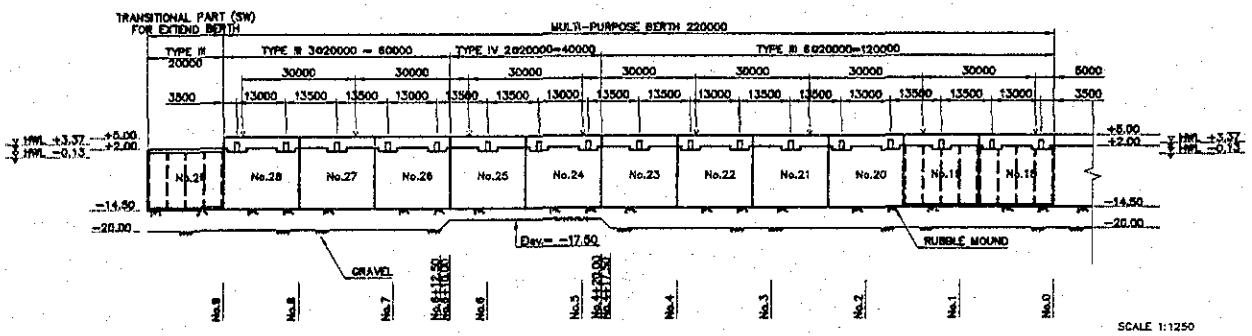


PLAN



PROFILE B-B



PROFILE A-A

SCALE 1:1250

0 50 100

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 :

PLAN AND PROFILE MULTI-PURPOSE BERTH

DATE : JULY/2002
SCALE : 1 : 1250
DRAWING NO. DW-QW-01-002

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

Multi-Purpose Berth : [12] Nos

	Prepared by	Checked by
	/ /200	/ /200

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)**	2C-07
Quantity Item		**Unit**	m3

Calculation Procedure Applied

Caisson sand filling volume was computed for a respective caisson. Cross section area was computed by geometric formulas and multiplied to the section height of respective caisson. The volume was multiplied to the total of caissons.
The volume was computed with two decimal for section area and zero decimal for total.

References, Calculation Base and Revisions

References: Tender Drawings:
DN-QW-01-027 Details of Breakic Caisson

Rev	Prepared by	Prepared Date	No. of Pages	Checked by	Checked Date	Reviewed by	Reviewed Date	Superseded by Calc No.
0	Karla Garcia			Mr. Inuma		Mr. Ando		
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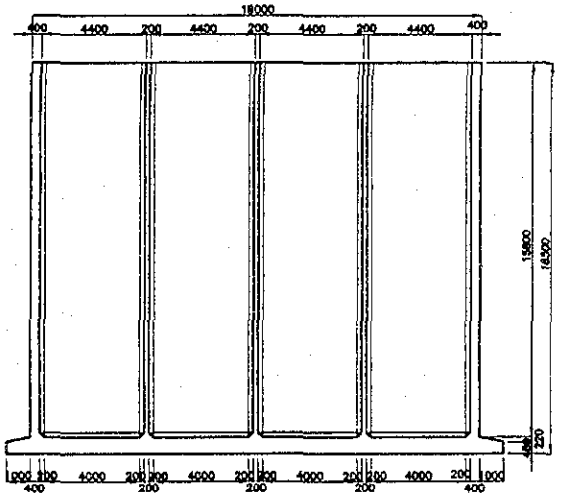
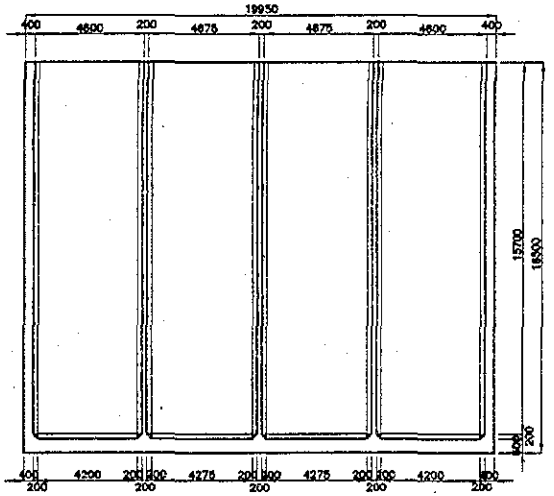
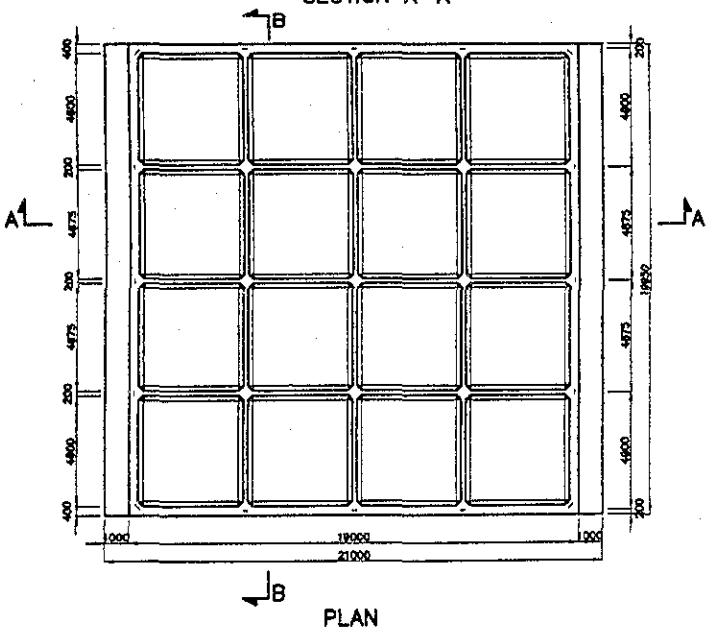




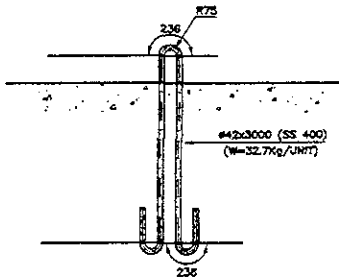
PLACING HEIGHT



Volume	V (m3)	1113.03
Weight	W (kN)	28712.86
Center of gravity	G (m)	6.85
Drought	D (m)	6.91
Center of Bouyancy	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



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.

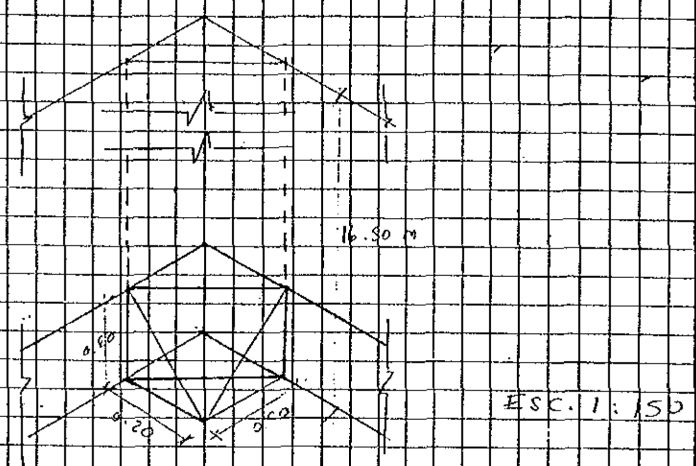
DESIGNED BY :
CHECKED BY :
APPROVED BY :

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

NIPPON KOEI CO.,LTD.

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



Sand Filling Volume :

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

$$V_1 = 2,561.09 \, m^3$$

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

$$V_2 = 2,603.59 \, m^3$$

$$V_T = 5,165.28 \, m^3$$

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

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

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

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

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

(Multipurpose + Transitional) 59,700 m^3

		Prepared by		Checked by	
		Yolo Go...	21 / May / 2002		/ /200

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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	Multi-purpose Berth	**Pay Item No. (BOQ)**	20-08
Quantity Item	Cover Concrete of Caisson	**Unit**	m^3

Calculation Procedure Applied

Capping concrete volume was computed using geometric formulas multiplied to the lenght of the capping. The result was multiplied for 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-01-005 Typical Cross section Type II

~~Dw-Gw-01-004~~

Rev	Prepared by	Prepared Date	No. of Pages	Checked by	Checked Date	Reviewed by	Reviewed Date	Superseded by Calc No.
0	K. Garcia	28 May/2002		S. Garcia	28 May/02	Mr. Ando		
1				Mr. Inuma				
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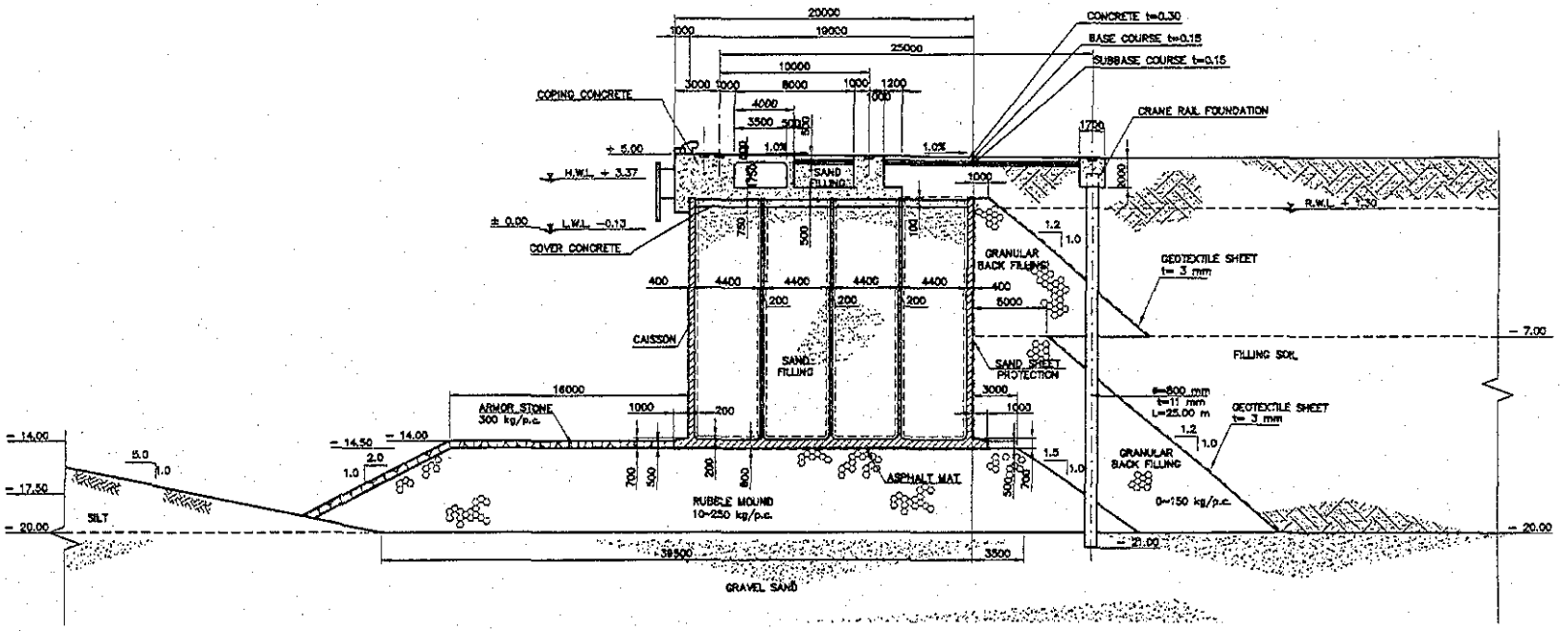


TYPICAL CROSS SECTION TYPE III
MULTI-PURPOSE BERTH (−14.0m)

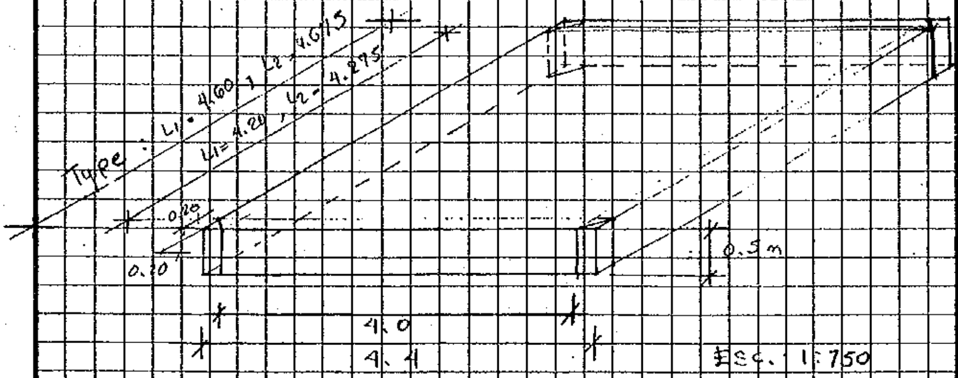
SCALE 1:300 0 5.0 10.0 15.0 20.0 25.0 30.0

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 : TYPICAL CROSS SECTION TYPE III MULTI-PURPOSE BERTH (−14.0m)	DATE : JULY/2002 SCALE : 1:300 DRAWING NO. : DW-GW-01-005	

Project	Detailed Design on Port Reactivation Project in La Union	Calc. File No.	
Section	Multi-purpose Berth	Calc. Index No.	
Subject	Cover Concrete of Caisson	Page No.	Rev.

References/ Notes

CONCRETE VOLUME PER CAISSON



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

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

$A_2 = (4.4\,m)(4.675\,m) - \frac{(0.2\,m)(0.2\,m)}{2}(4) = 20.49\,m^2$

$V_2 = (20.49\,m^2)(0.5\,m)(8) = 81.96\,m^3$

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

Container Berth: $V = (163\,m^3)(17) = 2{,}771\,m^3$ — $2{,}780\,m^3$

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

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

$1{,}960\,m^3$

	Prepared by		Checked by	
	Karla García	26 / May/200	S. García	28 / 05/200

FN: Calculation_Sheet