7. BRIDGE WORKS

BQ-ITEMS	UNIT	P1	P2	P3	P5	P6	P7	P9	P11	P13
AREA	m^2	579.6	728	401.8	285.6	81.6	367.2	652.8	652.8	652.8
PREPARATION WORKS										
Coffering and Dewatering	L.S.									
Clearing and Grubbing	m^2	560.00	1,140.00	1,056.00	700.00	248.00	680.00	600.00	450.00	420.00
Demolition and Removal of Existing Structure	L.S.									
EARTH WORKS										
Excavation (Common)	m^3	1,645.00	2,720.00	2,673.00	1,566.90	419.00	2,488.00	3,254.75	3,614.50	1,644.50
Embankment	m^3	3,927.00	4,290.00	2,710.00	782.30	735.00	750.00	1,483.00	1,868.50	884.50
Backfill with Selected Soil	m^3	820.00	750.00	882.00	514.00	294.00	995.00	1,301.90	1,445.80	657.80
Solid Sodding	m^2	550.00	580.00	275.00	262.00	132.00	96.80	321.00	246.00	270.00
PILE FOUNDATION WORKS FOR PIER AND ABUTMENT										
SP Test Pile, Dia.400 mm including Driving	m	18.50	17.00	28.00	24.00	24.00	24.00	27.00	27.00	25.00
PC Test Pile, Dia.400 mm, Type B including Driving	m	16.00	15.00							
Static Load Test	nos.	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
Supply and Driving of SP Test Pile, Dia.400 mm	m	994.00	476.00	1,878.00	1,536.00	288.00	1,476.00	3,132.00	2,808.00	2,600.00
Supply and Driving of PC Test Pile, Dia.400 mm, Type B	m	896.00	1,148.00							
Reinforcing Steel Bars	kg	12,066.25	8,183.25	17,378.00	13,794.38	2,586.45	15,518.00	26,563.30	22,515.60	23,815.50
Concrete, Type C1	m^3	48.25	28.50	77.90	57.70	11.20	67.20	115.65	109.12	103.06
CONCRETE WORKS FOR PIER, ABUTMENT AND APPROACH SLAB										
Concrete, Type C1	m^3	476.50	458.50	344.00	257.50	92.22	295.55	562.53	457.10	478.12
Concrete, Type E	m^3	20.84	20.84	14.42	10.32	1.28	12.38	24.20	20.73	21.86
Reinforcing Steel Bars	kg	62,435.00	59,634.50	43,440.50	29,612.50	11,527.50	39,943.58	76,222.82	61,937.05	64,785.26
Formwork FW1, less than 2.5m high	m^2	305.60	314.20	231.50	194.50	104.30	212.36	382.77	308.00	321.75
Formwork FW2, more than 2.5m high	m^2	418.50	372.15	299.40	237.65	156.47	259.55	467.85	376.45	390.25
Rubble Stone Bedding	m^3	41.68	41.68	18.41	20.64	2.56	24.76	46.12	41.45	43.72
CONCRETE WORKS FOR SUPER STRUCTURE										
Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.									
PC Diaphragm type - A	L.S.									
Prestressed Concrete Panel for Slab type - A	L.S.									
Concrete, Type B for Slab	m^3	177.92	209.75	117.06	99.26	19.36	97.92	191.94	170.98	180.46
Reinforcing Steel Bars	kg	30,392.00	37,880.00	21,071.09	14,714.07	3,291.88	17,964.00	37,590.80	33,868.03	32,121.35
Formwork FW2, more than 2.5m high	m^2	327.60	410.30	227.00	160.68	90.26	160.68	185.40	168.92	168.92
MISCELLANEOUS WORKS										
Expansion Joint, Steel Profile (75×75×6)	m	29.00	29.00	21.60	14.40	6.00	18.40	38.80	34.40	34.40
Elastomeric Bearing Pad for Abutment, 406×280×67 mm	nos.	10.00	10.00	11.00						
Elastomeric Bearing Pad for Pier, 406×280×67 mm	nos.	20.00								
Elastomeric Bearing Pad for Pier, 480×300×67 mm	nos.		22.00	11.00	12.00	2.00	14.00	24.00	24.00	24.00
PVC Pipe Drain, Dia.100 mm	m	60.20	73.60	42.00	29.00	28.84	29.00	30.80	30.80	30.80
Handrail, Galvanized Steel Pipe	kg	3,790.08	4,746.62	2,625.98	1,886.02	1,886.02	1,886.02	1,886.02	1,886.02	1,886.02
Concrete, Type C1 for Handrail Post, Curb and Footpass	m^3	62.40	78.25	55.85	30.55	4.47	30.55	33.25	32.90	33.86
Formwork FW1, less than 2.5m high	m^2	268.50	322.75	182.77	123.00	91.84	125.90	146.20	141.90	141.90
Name Plate	nos.	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD										
Backfill Gravel	m^3	95.50	215.00	310.00	272.50	24.60	282.00	460.00	467.50	657.80
Wet Stone Masonry (1:4)	m^3	1,085.00	450.00	421.00	259.00	44.00	252.60	338.40	285.50	285.50
Cement Mortar Plastering, 20 mm thick	m^2	900.00	690.00	520.00	250.00	98.75	230.00	308.00	173.25	170.00
Concrete, Type C	m^3	8.40	6.60	4.62	3.30	3.96	2.90	7.32	7.52	7.49
Concrete, Type E	m^3	4.20	5.00	3.50	2.50	3.00	2.20	1.20	1.15	1.13
Reinforcing Steel Bars	kg	966.00	759.00	530.00	380.00	455.40	333.50	841.80	161.00	861.35
Formwork FW1, less than 2.5m high	m^2	428.00	250.00	225.00	223.00	82.50	180.00	240.00	126.00	126.00
Weep Hole, 50 mm, including Filter Cloth	nos.	215.00	175.00	180.00	165.00	75.00	145.00	120.00	120.00	135.00
PAVEMENT (SUPERSTRUCTURE AND APPROACH ROAD : CLASS II)										
Sub-Base Course (Class B)	m^3	202.40	260.00	153.50	120.45		148.50	238.80	268.65	262.65
Base Course (Class A)	m^3	90.75	127.00	80.50	59.02		70.80	116.70	131.28	128.35
Asphalt Treatment Base (A.T.B.)	ton	137.20	176.50	114.30	81.65		105.80	176.60	155.00	194.00
Bituminous Prime Coat	liter	1,410.00	1,815.00	1,090.00	776.50		995.00	1,888.50	1,564.80	1,651.20
Bituminous Surface Course, 50 mm thick	ton	135.24	171.60	103.20	73.65		94.40	199.30	156.00	188.00
Gravel Pavement, 200 mm thick	m^3					59.40				

BQ-ITEMS	UNIT	F1	F2	F3	F4	F5	F6	F7	F8	
AREA	m^2									
PREPARATION WORKS										
Coffering and Dewatering	L.S.									
Clearing and Grubbing	m^2						208.00		240.00	
Demolition and Removal of Existing Structure	L.S.									
EARTH WORKS										
Excavation (Common)	m^3	1,638.00	4,850.00	3,118.10	3,300.00	7497.00	1,678.00	2,280.00	1,917.00	
Embankment	m^3	512.80	380.90	240.00	220.00	292.50	150.00		7,800.00	
Backfill with Selected Soil	m^3	655.00	1,940.00	1,247.20	1,350.00	2998.00	755.00	2,100.00	766.80	
Solid Sodding	m^2	184.80	95.20	76.80	55.00	90.00	80.00		2,400.00	
PILE FOUNDATION WORKS FOR PIER AND ABUTMENT										
SP Test Pile, Dia.400 mm including Driving	m	17.00	21.00		18.00					
PC Test Pile, Dia.400 mm, Type B including Driving	m			9.00		13.00	11.00		10.00	
Static Load Test	nos.	1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Supply and Driving of SP Test Pile, Dia.400 mm	m	952.00	1,344.00		864.00					
Supply and Driving of PC Test Pile, Dia.400 mm, Type B	m			576.00		2,080.00	132.00		240.00	
Reinforcing Steel Bars	kg	8,463.32	12,133.30	2,457.00	7,854.20	6,142.40	460.69		921.38	
Concrete, Type C1	m^3	35.90	52.40	3.14	33.58	18.08	0.60		2.35	
CONCRETE WORKS FOR PIER, ABUTMENT AND APPROACH SLAB										
Concrete, Type C1	m^3	235.60	341.50	299.85	189.54	700.88	94.50	302.00	191.29	
Concrete, Type E	m^3	10.40	12.46	12.46	5.46	35.58	2.56	8.00	5.11	
Reinforcing Steel Bars	kg	31,806.00	46,102.50	40,479.75	22,731.30	94,618.80	12,757.50	4,200.00	25,824.42	
Formwork FW1, less than 2.5m high	m^2	185.25	260.20	226.20	161.80	436.80	116.80	13.00	180.25	
Formwork FW2, more than 2.5m high	m^2	226.50	318.07	276.40	198.00	533.80	142.90	330.00	270.35	
Rubble Stone Bedding	m^3	20.80	24.90	24.91	10.95	71.20	5.11	15.00	10.22	
CONCRETE WORKS FOR SUPER STRUCTURE										
Precast Prestressed Concrete Beam including Tensioning and Erection	L.S.									
PC Diaphragm type - A	L.S.									
Prestressed Concrete Panel for Slab type - A	L.S.									
Concrete, Type B for Slab	m^3	50.12	75.83	75.83	42.14	175.05	19.32	19.00	36.78	
Reinforcing Steel Bars	kg	11,690.60	16,625.20	16,625.20	7,500.90	34.25	3,438.90	2,800.00	6,546.85	
Formwork FW2, more than 2.5m high	m^2	124.80	124.80	124.80	99.00	166.40	78.62	34.00	162.60	
MISCELLANEOUS WORKS										
Expansion Joint, Steel Profile (75×75×6)	m	14.40	18.40	18.40	7.20	46.40	6.00	11.40	12.00	
Elastomeric Bearing Pad , 406×280×67 mm	nos.	10.00	12.00	12.00	6.00	20.00	2.00	6.00	4.00	
PVC Pipe Drain, Dia.100 mm	m	23.80	23.80	23.80	23.80	23.80	23.80	7.00	2,707.20	
Handrail, Galvanized Steel Pipe	kg	1,443.90	1,443.90	1,443.90		1,443.90	1,443.84	870.00	6.50	
Concrete, Type C1 for Handrail Post, Curb and Footpass	m^3	23.75	23.75	23.75		34.86	3.50	3.00	6.50	
Formwork FW1, less than 2.5m high	m^2	99.88	102.80	102.89		125.95	71.15	40.00	163.50	
Name Plate	nos.	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	
DRAINAGE DITCH AND RETAINING WALL FOR APPROACH ROAD										
Backfill Gravel	m^3	177.40	204.40	195.00	127.10	426.00	46.70		38.80	
Wet Stone Masonry (1:4)	m^3	125.00	89.50	95.00	16.06	125.75	76.00		115.90	
Wet Stone Masonry (1:3)	m^3				8.28					
Cement Mortar Plastering, 20 mm thick	m^2	200.00	168.00	160.00	160.00	272.00	125.00		318.20	
Concrete, Type C	m^3	7.68	6.20	5.85	6.00	3.30	1.98		10.94	
Concrete, Type E	m^3	4.62	3.74	3.52	2.20	10.69	1.50		3.30	
Reinforcing Steel Bars	kg	872.00	705.00	664.00	690.00	1,220.50	13.50		1,263.85	
Formwork FW1, less than 2.5m high	m^2	109.00	88.40	83.20	104.00	78.00	65.00		84.60	
Weep Hole, 50 mm, including Filter Cloth	nos.	80.00	80.00	82.00	40.00	70.00	70.00		56.00	
PAVEMENT (SUPERSTRUCTURE AND APPROACH ROAD ; CLASS II)										
Sub-Base Course (Class B)	m^3	99.50	100.90	95.04		152.10				
Base Course (Class A)	m^3	46.90	48.20	45.30		74.50				
Asphalt Treatment Base (A.T.B.)	ton	69.00	71.90	67.70		111.78				
Bituminous Prime Coat	liter	621.60	712.80	691.20		1,860.00		77.00		
Bituminous Surface Course, 50 mm thick	ton	69.50	68.30	66.24		142.60		3.00		
Gravel Pavement, 200 mm thick	m^3						54.00		118.8	

BQ-ITEMS	UNIT	WB1	WB2	WB3	WB4					
AREA	m^2									
PREPARATION WORKS										
Coffering and Dewatering	L.S.									
Clearing and Grubbing	m^2	180.00	160.00		160.00					
Abatment,Pier and Connecting Channel Works										
Excavation (Common)	m^3	777.60	700.00	130.00	350.00					
Backfill with Gravel	m^3	4.69	4.78	2.00	6.70					
Backfill with Selected Soil	m^3	320.00	280.00	130.00	340.00					
Supply and Driving of RC Piles, 400 mm x 400 mm	m		140.00		360.00					
Supply and Driving of Piles,Dia 400mm Type AB	m	384.00								
Supply and Driving of PC Piles,Dia. 300 mm Type AB	m			48.00						
Log Piles, Dia. 150 mm	m			48.00						
Concrete, Type C1	m^3	25.00	20.66	16.2	62					
Concrete, Type E	m^3	2.35	2.35	48.00	3.40					
Sand Bedding	m^3			3.00						
Reinforcing Steel Bars	kg	4,828.00	3,892.50	1,600.00	5,880.00					
Formwork FW1, less than 2.5m high	m^2	58.75	36.80	45.00						
Formwork FW2				11.00						
Metal Works										
Supply and Installation of Water Pile, Dia.350 mm, including Air Valve,Joints and Pipe Supports	L.S.									
Supply and Installation of Water Pile, Dia.600 mm, including Air Valve,Joints and Pipe Supports	L.S.									
Steel Work for Truss Bridge	L.S.									

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	List of Bill Quantity BR P.1	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Deck

1	Quantity of concrete of Deck slab
2	Quantity of concrete of Panel slab
3	Quantity of concrete of cross beam
4	Quantity of Wooden Form Work
5	Quantity of Reinforcement steel Deck slab
6	Quantity of Reinforcement steel Cross beam
	Quantity of Haindrail
	Quantity of Expansion Joint

Girder

7	Quantity of concrete of Main Beam
8	Quantity of Reinforcement steel Main Beam
9	Quantity of Tendon
10	Quantity of Anchorage
11	Quantity of Bearing pad
12	

Abutment

13	Quantity of concrete of Abutment
14	Quantity of Reinforcing steel
15	Quantity of Wooden Form Work
16	Quantity of Inside pile Reinf.steel
17	Quantity of Concrte Inside pile
	Quantity of Lean Concrete & Rubble stone

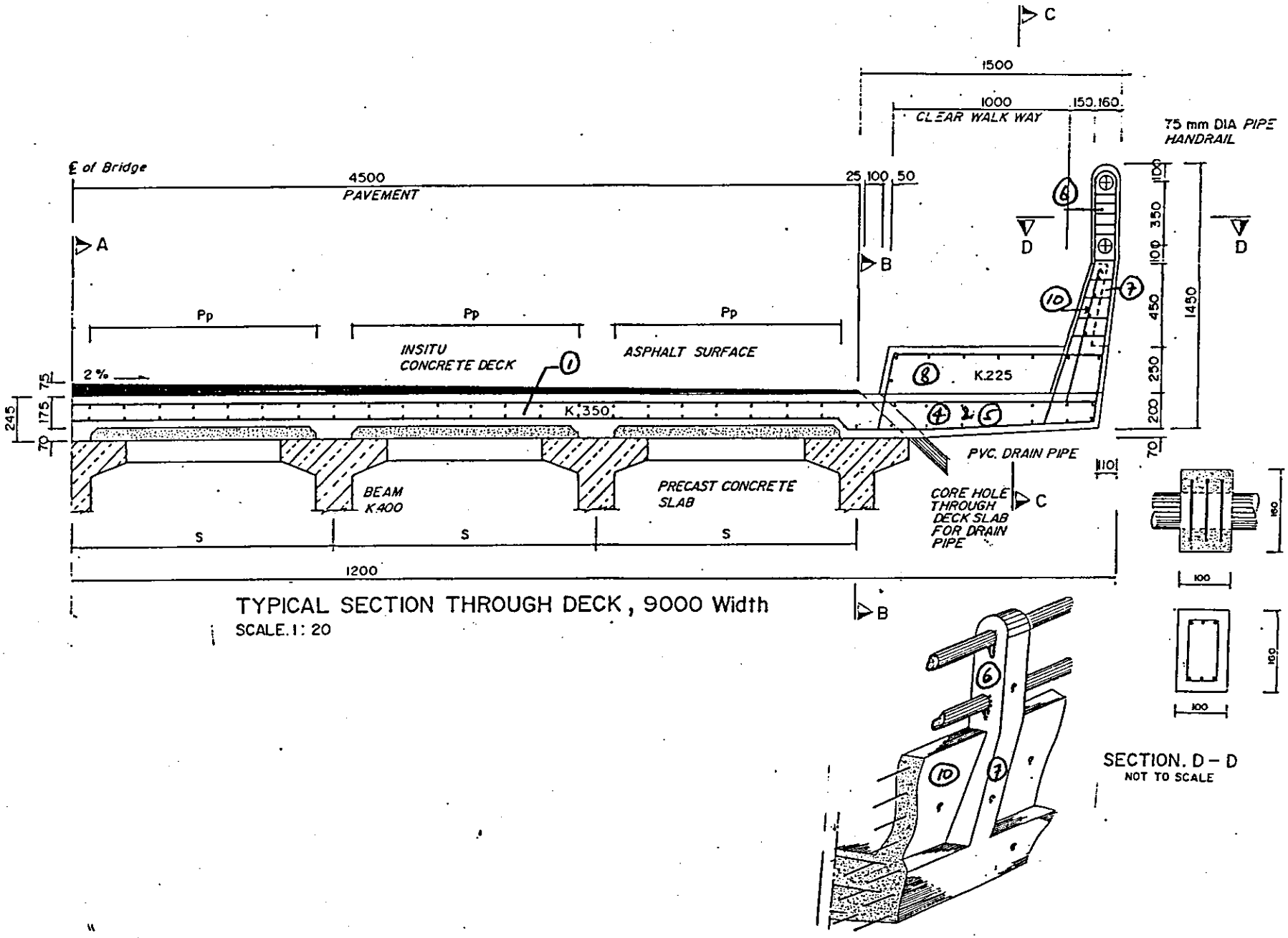
PIER

19	Quantity of concrete of Pier
20	Quantity of Reinforcing steel
21	Quantity of Wooden Form Work
22	Quantity of Inside pile Reinf.steel
23	Quantity of Concrte Inside pile

Br P1 PE 57 + 05 m

(Titi Besi Br)

NO	DESCRIPTION	UNIT	Quantity	Unit Price (Rp)	REMARKS
	BRIDGE				
	SUPERSTRUCTURE				
	CONCRETE				
	a. Deck Slab (Insitu)				
	Concrete (Type – B) Class K 350	Cu.m	167.77		
	Reinforcing Steel Deform	Kg	30,392.00		
	Wooden Form Work with Supporting Frame	Sq.m	596.07		
	b. Precast Prestressed Concrete Main Beam				
P1-1	Precast Prestressed Concrete Beam (Type – A) Class K 400	Cu.m	165.81		
P1-1	Reinforcing Steel Deform	Kg	21,565.71		
P1-1	Tendon [H.T.W] diameter 13 mm	Kg	11,835.68		
P1-1	Live end Anchorage	Nos	140.00		
	c. PC Panel Concrete				
	PC Panel Concrete, t = 7 cm (Type – A) Class K 400	Cu.m	35.83		
	Reinforcing Steel Deform	Kg	8,450.24		
	c. PC Diaphragm Concrete				
	PC Diaphragm Concrete (Type – A) Class K 400	Cu.m	12.96		
	Reinforcing Steel Deform	Kg	1,124.43		
	PRESTRESSING				
	Prestressing Tendon [H.T.W.] diameter 13 mm for Main Beam (incl. Diaphragm)	each	15.00		
	Grout Injection Main Beam (icl. Diaphragm)	m	2,000.00		
	ERECTING				
	Erection of Concrete Main Beam	Kg	414,522.75		
	(Incl.PC Diaphragm , PC Panel)				

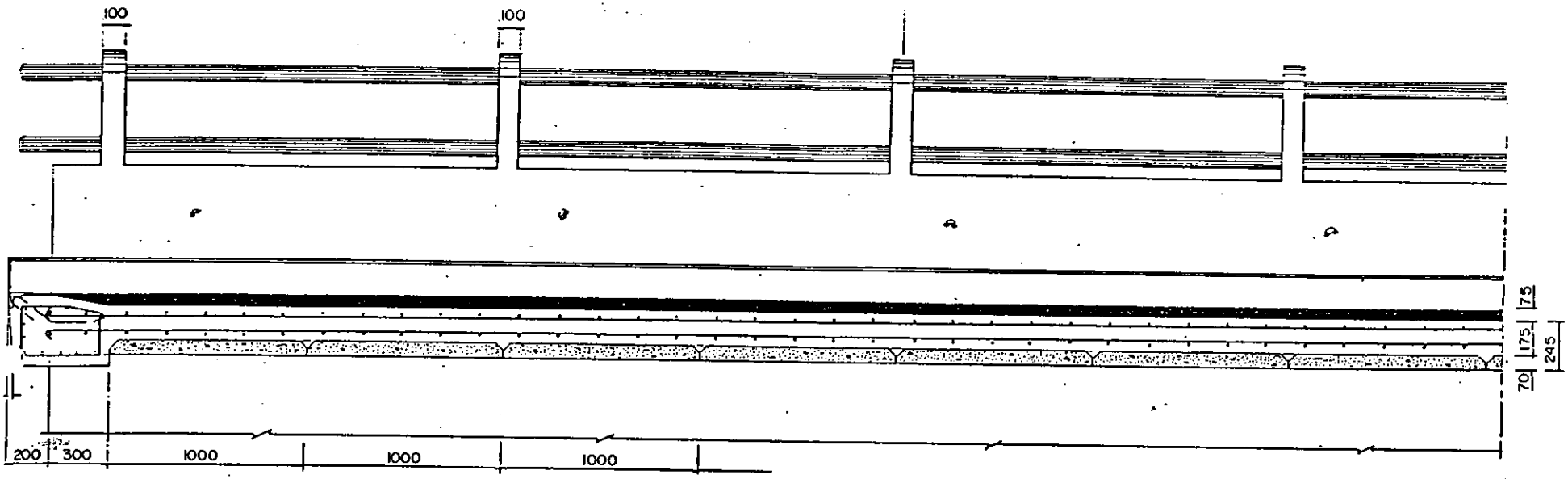


TYPICAL SECTION THROUGH DECK, 9000 Width

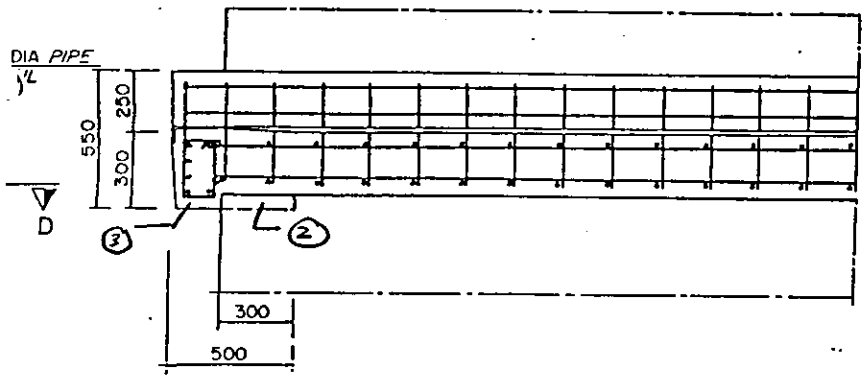
SCALE. 1: 20

SECTION. D – D

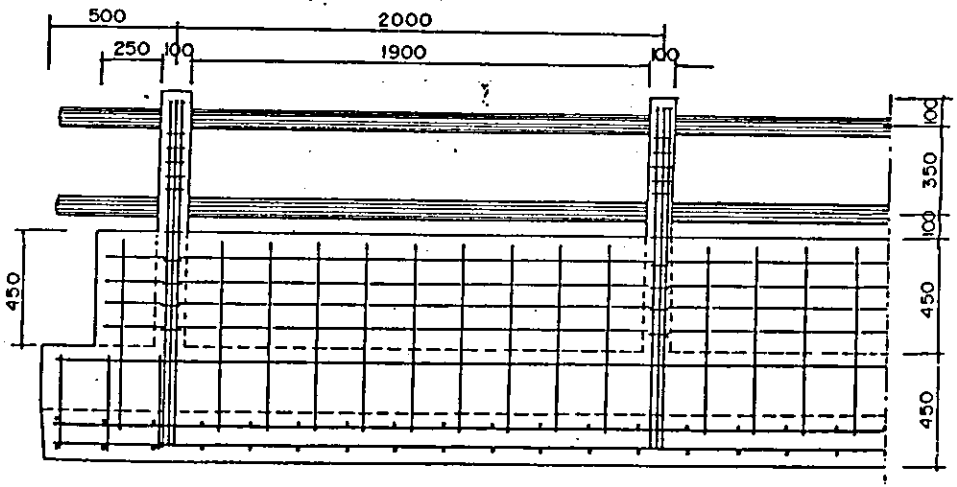
NOT TO SCALE



SECTION. A – A
SCALE. 1 : 20



SECTION. B – B
SCALE. 1 : 20



SECTION. C – C
SCALE. 1 : 20

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. P1 PE 57 + 05 m (Titi Besi)	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 Length = 31.60 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	7.000	1.715	1.000	1.715	32.000	54.880
End slab	(2)	0.055	0.500	0.027	2.000	0.055	4.800	0.264
End slab	(3)	0.300	0.200	0.060	2.000	0.120	7.200	0.864
							sum	**56.008**

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.223	1.500	0.334	1.000	0.334	32.000	10.680
Right Side slab	(5)	0.223	1.500	0.334	1.000	0.334	32.000	10.680
							sum	**21.360**

Total Volume K.350 = 56.008 + 21.360
= **77.368** m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	34.000	0.544	0.550	0.299
Railing post	(7)	0.165	0.160	0.026	34.000	0.898	0.470	0.422
slab side Walk	(8)	0.250	1.266	0.317	2.000	0.633	32.000	20.260
Wall	(9)	0.470	0.100	0.047	2.000	0.094	29.280	2.752
							sum	**23.733**

Total Volume K.225 = **23.733** m3

slb –br1

a.Slab deck K.350 **Length = 25.60 m**

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	7.000	1.715	1.000	1.715	26.000	44.590
	(2)	0.055	0.500	0.027	2.000	0.055	5.600	0.308
	(3)	0.300	0.200	0.060	2.000	0.120	7.200	0.864
							sum	**45.762**

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side	(4)	0.223	1.500	0.334	1.000	0.334	26.000	8.678
Right Side	(5)	0.223	1.500	0.334	1.000	0.334	26.000	8.678
							sum	**17.355**

Total Volume K.350	=	45.762	+	17.355	
	=	**63.117**	m3		
Total Volume K.350	=	**63.117**	+	**63.11**	
	=	**126.234**	**m3**		

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab side Walk	(6)	0.100	0.160	0.016	28.000	0.448	0.550	0.246
	(7)	0.165	0.160	0.026	28.000	0.739	0.470	0.347
	(8)	0.250	1.266	0.317	2.000	0.633	26.000	16.461
	(9)	0.470	0.100	0.047	2.000	0.094	23.760	2.233
							sum	**19.289**

Total Volume K.225	=	19.289	m3			
	=	19.289	+	19.289		
	=	**38.57702**	m3			
Grand Total K.350	=	**77.368**	+	**126.2**	**m3**	
	=	**203.602**	m3			
Reduced concrete panel	=	**35.8344**	m3			
Grand Total K.350 Place insitu	=	**167.768**	m3 ✓			
Grand Total K.225	=	**23.73339**	+	38.57	m3	
	=	**62.31042**	m3			

slb –br1

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF DECK SLAB AND HAND RAIL Br P1 PE 57 + 05 m (Titi Besi Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of deck slab per span (l = 25.60 m)

1 / 2

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
D1	16	6,980	150	0	150	260	7.540	85.00	640.90	1.560	999.80	main steel deck slab
D2	16	2,820	6,720	0	0	260	9.800	85.00	833.00	1.560	1,299.48	
D3	13	24,840	125	760	125	660	26.510	50.00	1,325.50	0.995	1,318.87	
D4	13	24,840	0	760	0	660	26.260	50.00	1,313.00	0.995	1,306.44	
D5.A	16	2,868.00	0	8,524.00	0	660	12.052	43.00	518.24	1.560	808.45	
D5.B	16	2,868.00	0	8,524.00	0	660	12.052	43.00	518.24	1.560	808.45	
D6	16	9,680	125	0	125	260	10.190	8.00	81.52	1.560	127.17	Reinf. steel Expansion Joint
D7	16	0	0	1300	0	260	1.560	16.00	24.96	1.560	38.94	
D8	16	450	250	450	200	150	1.500	48.00	72.00	1.560	112.32	
D9	16	150	250	150	200	260	1.010	22.00	22.22	1.560	34.66	
H1	13	100	1350	200	900	220	2.770	56.00	155.12	0.995	154.34	Reinf. steel haidrail
H2	13	110	50	110	50	220	0.540	168.00	90.72	0.995	90.27	
H3	13	200	50	200	50	220	0.720	112.00	80.64	0.995	80.24	
H4	13	0	0	700	0	220	0.920	260.00	239.20	0.995	238.00	
H5	13	24,580	0	920	0	220	25.720	8.00	205.76	0.995	204.73	Reinf. steel side Walk
P1	16	24,580	0	920	0	260	25.760	20.00	515.20	1.560	803.71	
P2	16	1,150	250	200	420	260	2.280	260.00	592.80	1.560	924.77	
										sum	9,350.64	

nos.of span = 2.00

sub total weigl = 2.00 x 9,350.64 = 18,701 kg

deck–br1

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF DECK SLAB AND HAND RAIL Br P1 PE 57 + 05 m (Titi Besi Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Quantities steel of deck slab per span (l = 31.60 m)

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
D1	16	6,980	150	0	150	260	7.540	105.00	791.70	1.560	1,235.05	main steel deck slab
D2	16	2,820	6,720	0	0	260	9.800	105.00	1,029.00	1.560	1,605.24	
D3	13	31,900	125	760	125	660	33.570	50.00	1,678.50	0.995	1,670.11	
D4	13	31,900	0	760	0	660	33.320	50.00	1,666.00	0.995	1,657.67	
D5.A	16	2,868.00	0	8,524.00	0	660	12.052	53.00	638.76	1.560	996.46	
D5.B	16	2,868.00	0	8,524.00	0	660	12.052	53.00	638.76	1.560	996.46	
D6	16	9,680	125	0	125	260	10.190	8.00	81.52	1.560	127.17	Reinf. steel Expantion Joint
D7	16	0	0	1300	0	260	1.560	16.00	24.96	1.560	38.94	
D8	16	450	250	450	200	150	1.500	48.00	72.00	1.560	112.32	
D9	16	150	250	150	200	260	1.010	22.00	22.22	1.560	34.66	
H1	13	100	1350	200	900	220	2.770	68.00	188.36	0.995	187.42	Reinf. steel haidrail
H2	13	110	50	110	50	220	0.540	170.00	91.80	0.995	91.34	
H3	13	200	50	200	50	220	0.720	320.00	230.40	0.995	229.25	
H4	13	0	0	700	0	220	0.920	320.00	294.40	0.995	292.93	
H5	13	31,450	0	920	0	220	32.590	8.00	260.72	0.995	259.42	Reinf. steel side Walk
P1	16	31,450	0	920	0	260	32.630	20.00	652.60	1.560	1,018.06	
P2	16	1,150	250	200	420	260	2.280	320.00	729.60	1.560	1,138.18	
										sum	11,690.66	

nos.of span	=	1.00					
sub total weight	=	1.00	x	11,690.66	=	11,690.66	kg
Grand Total	=	**18,701**	+	**11,691**	**kg**		
	=	**30,392**	**kg**	v			

deck-br1

Wooden form & scaffolding

Direktorat General Water Resources Development Direktorat General Medan Flood Control	DECK SLAB AND HAND RAIL Br P1 PE 57 + 05 m (Titi Besi Br)	japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 32.00 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	7.20	2.16	2.00	4.32
end slab	(2)	0.20	7.20	1.44	2.00	2.88
	(3)	0.35	4.80	1.68	2.00	3.36
	(4)	0.47	1.50	0.71	4.00	2.84
in side walk (curb)	(5)	0.25	32.00	8.00	2.00	16.00
in side walk	(6)	0.47	31.75	14.92	2.00	29.85
out side walk	(7)	0.47	30.30	14.24	2.00	28.48
Railing post	(8)	0.10	0.92	0.09	34.00	3.13
Railing post	(9)	0.16	0.45	0.07	68.00	4.90
Railing post	(10)	0.14	0.45	0.06	68.00	4.13
					sum	99.88
				numbers of span =		1.00
total	=	99.88	x	1.00	=	99.88

Scafolding (L = 32.00 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.50	32.00	48.00	2.00	96.00
end slab	(2)	0.45	32.00	14.400	2.00	28.80
					sum	124.80
				numbers of span =		1.00
total	=	124.80	x	1.00	=	124.80

Wooden form works with supporting frame (L = 26.00 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	7.20	2.16	2.00	4.32
end slab	(2)	0.20	7.20	1.44	2.00	2.88
	(3)	0.35	5.60	1.96	2.00	3.92
	(4)	0.47	1.50	0.71	4.00	2.84
in side walk (curb)	(5)	0.25	26.00	6.50	2.00	13.00
in side walk	(6)	0.47	25.75	12.10	2.00	24.21
out side walk	(7)	0.47	24.60	11.56	2.00	23.12
Railing post	(8)	0.10	0.92	0.09	28.00	2.58
Railing post	(9)	0.16	0.45	0.07	56.00	4.03
Railing post	(10)	0.14	0.45	0.06	56.00	3.40
					sum	84.29
				numbers of span =		2.00
total	=	84.29	x	2.00	=	168.59
	=	168.59	m2			

Scafolding (L = 26.00 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.50	26.00	39.00	2.00	78.00
end slab	(2)	0.45	26.00	11.700	2.00	23.40
					sum	101.40
				numbers of span =		2.00
total	=	101.40	x	2.00	=	202.80
	=	202.80	m2			

Grand total form Work	=	168.59	+	99.88	=	268.47	m2
Grand total Scafolding	=	202.80	+	124.80	=	327.60	m2

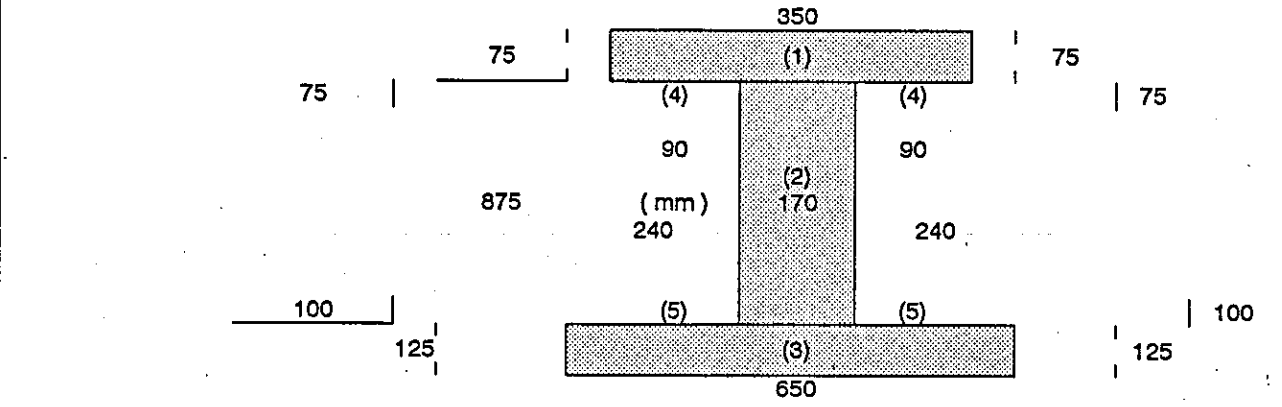
596.07 m²

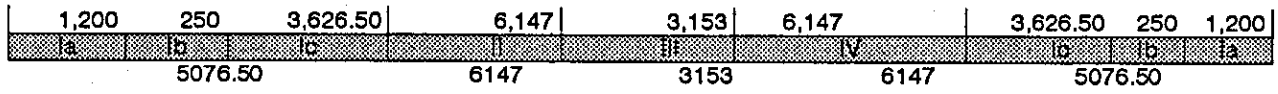
f-wrkbr1

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br1 PE 57 + 05 m (Titi Besi)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K–400,l = 25.60 m

Main Beam Section





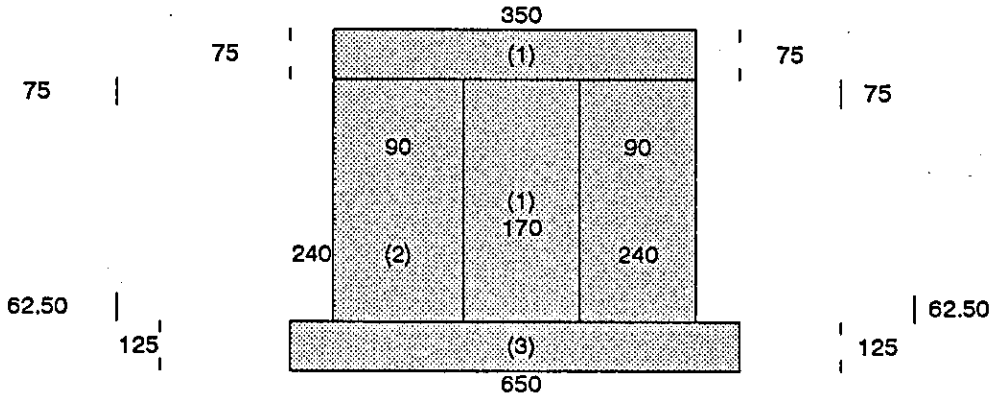
Total length = 25.60 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.350	0.075	1.000	0.026
(2)	0.170	1.050	1.000	0.179
(3)	0.650	0.125	1.000	0.081
(4)	0.090	0.075	2.000	0.007
(5)	0.240	0.100	2.000	0.024
			sum	
	area section main beam		=	0.31675

Volume 1 = area x length
= 0.31675 x 25.60
= 8.109 m3

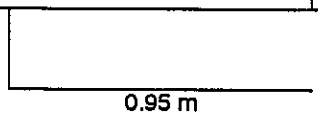
End Block Section L = 1.200 m



2. Bearing Block Area

piece	width m	depth m	nos	total area m2	
(1)	0.350	1.063	1.000	0.372	1025
(2)	0.350	0.063	1.000	0.022	
(3)	0.650	0.125	1.000	0.081	100
		1.250	sum	0.4750	1125

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br1 PE 57 + 05 m (Titi Besi)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (0.875 + 1.025) : 2
= 0.95 m

area = width x depth
= 0.09 x 0.95
= 0.0855 m2

section	area	length	nos	volume
	m2	m		m3
Ia	0.47500	1.200	1.00	0.570
Ib	0.08550	0.250	1.00	0.021
Ic	0.31675	3.627	1.00	1.149
II	0.31675	6.147	1.00	1.947
III	0.31675	3.153	1.00	0.999
IV	0.31675	6.147	1.00	1.947
Ic	0.31675	3.627	1.00	1.149
Ib	0.08550	0.250	1.00	0.021
Ia	0.47500	1.200	1.00	0.570
	sum	25.60		8.373

Total volume = 8.373 m3

Total volume (10 beam) = 10 x 8.373 m3

= 83.72975 m3

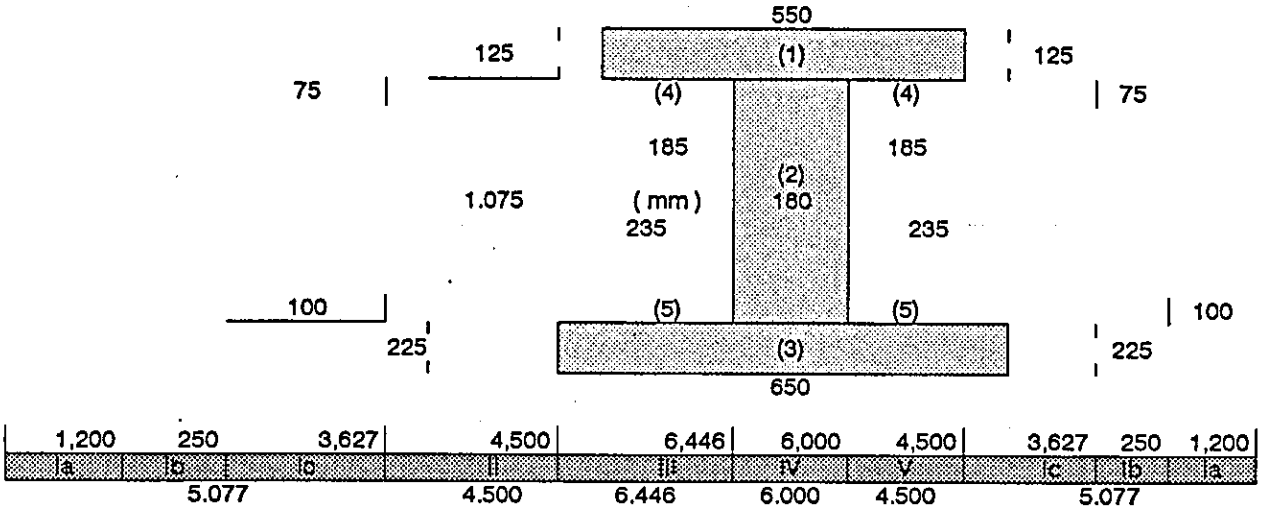
br1–L25

2/2

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br1 PE 57 + 05 m (Titi Besi)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K–400,l = 31.60 m

Main Beam Section



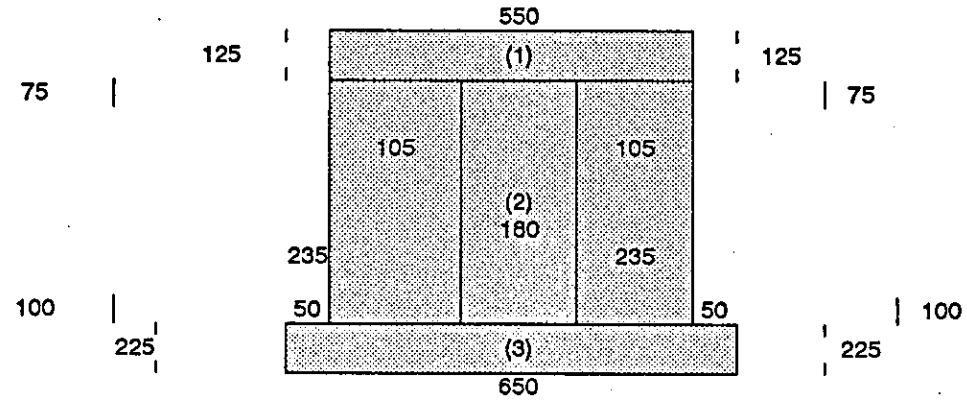
Total length = 31.60 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.180	1.250	1.000	0.225
(3)	0.650	0.225	1.000	0.146
(4)	0.185	0.075	2.000	0.014
(5)	0.235	0.100	2.000	0.024
			sum	
	area section main beam		=	0.4774

Volume 1 = area x length
= 0.477 x 31.60
= 15.09 m3

End Block Section L = 1.200 m



2. Bearing Block Area

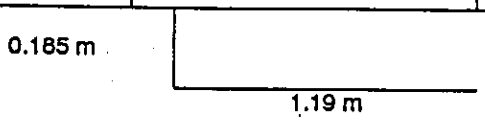
1075
1250

piece	width m	depth m	nos	total area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.550	1.250	1.000	0.688
(3)	0.650	0.225	1.000	0.146
		1.600	sum	0.903

1/2

beam–br1

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br1 PE 57 + 05 m (Titi Besi)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.075 + 1.30) : 2
= 1.19 m

area = width x depth
= 0.185 x 1.19
= 0.220 m2

section	area	length	nos	volume
	m2	m		m3
Ia	0.9025	1.200	1.00	1.083
Ib	0.2197	0.250	1.00	0.055
Ic	0.4774	3.627	1.00	1.731
II	0.4774	4.500	1.00	2.148
III	0.4774	6.446	1.00	3.077
IV	0.4774	6.000	1.00	2.864
V	0.4774	4.500	1.00	2.148
Ic	0.4774	3.627	1.00	1.731
Ib	0.2197	0.250	1.00	0.055
Ia	0.9025	1.200	1.00	1.083
	sum	31.60		15.9765

Block out Cross beam

width		depth	area	length	nos	volume
top	bottom					
m	m	m	m2	m	m	m3
0.400	0.60	0.185	0.0925	1.1875	4	0.439

volume per beam = 15.9765 + 0.439 = 16.416 m3

Total volume = 16.416 m3

Total volume (5 Beam) = 5.00 x 16.416 m3

= 82.07940 m3 ✓

Grand Total = **82.07940** + **83.7297** m3

= **165.8091** m3 ✓

beam–br1

2/2

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	MAIN BEAM Br P1 PE 57 + 05 m (Titi Besi Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(1)	13	1.45		1.45	0.50		3.40	4	13.60	0.995	13.532	outer Beam
(l = 5.077 m)	(2)	16	0.45	0.70		0.70		1.85	7	12.95	1.560	20.202	and end Block
2 nos	(3)	13	1.32		1.32	0.55	0.40	3.59	4	14.36	0.995	14.288	
	(4)	13	1.80					1.80	2	3.60	0.995	3.582	
	(5)	13		0.30	0.55	0.30		1.15	3	3.45	0.995	3.433	
	(6)	16	1.45		1.45	1.50		4.40	2	8.80	1.560	13.728	
	(7)	13		0.46	0.55	0.46	0.30	1.77	7	12.39	0.995	12.328	
	(8)	16		1.75	0.55	1.75		4.05	7	28.35	1.560	44.226	
	(9)	13	4.98					4.98	6	29.86	0.995	29.713	
(I)	(10)	16		0.10	0.45	0.10	0.10	0.75	70	52.50	1.560	81.900	
	(11)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(12)	13		1.75	0.08	1.75		3.58	15	53.70	0.995	53.432	
	(13)	13	4.78					4.78	14	66.88	0.995	66.544	
	(14)	13		0.46	0.55	0.46	0.30	1.77	8	14.16	0.995	14.089	
	(15)	13	0.45	0.40		0.40	0.30	1.55	8	12.40	0.995	12.338	
	(16)	16	1.15	0.20	1.15	0.20	0.26	2.96	2	5.92	1.560	9.235	
	(17)	13		0.30		0.30		0.60	8	4.80	0.995	4.776	
											sum	410.449	
						sub total	:	410.449	x	2.000	=	820.898	

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(18)	13		1.75	0.08	1.75		3.58	10	35.80	0.995	35.621	
(l = 4.500 m)	(19)	13	4.40					4.40	20	88.00	0.995	87.560	
2 nos	(20)	13	0.45	0.40		0.40	0.30	1.55	10	15.50	0.995	15.423	
	(21)	13		0.46	0.55	0.46	0.30	1.77	10	17.70	0.995	17.612	
(II)	(22)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(23)	13		0.30		0.30		0.60	10	6.00	0.995	5.970	
											sum	175.289	
						sub total	:	175.289	x	2.000	=	350.578	
Inner Beams	(24)	13		1.75	0.08	1.75		3.58	14	50.12	0.995	49.869	
(l = 6,466 m)	(25)	13	6.35					6.35	20	126.92	0.995	126.285	
1 nos	(26)	13	0.45	0.40		0.40	0.30	1.55	14	21.70	0.995	21.592	
(III)	(27)	13		0.46	0.55	0.46	0.30	1.77	14	24.78	0.995	24.656	
	(28)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(29)	16		0.30		0.30		0.60	14	8.40	0.995	8.358	
											sum	243.864	
						sub total	:	243.864	x	1.000	=	243.864	
	(30)	13		1.75	0.08	1.75		3.58	13	46.54	0.995	46.307	
Inner Beams	(31)	13	5.90					5.90	20	118.00	0.995	117.410	
(l = 6,000 m)	(32)	16	0.45	0.40		0.40	0.30	1.55	13	20.15	0.995	20.049	
1 nos	(33)	13		0.46	0.55	0.46	0.30	1.77	13	23.01	0.995	22.895	
(IV)	(34)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(35)	13		0.30		0.30		0.60	13	7.80	0.995	7.761	
											sum	227.527	
						sub total	:	227.527	x	1.000	=	227.527	
Exterior Beam	(36)	16	1.15	0.20	1.15		0.26	2.76	2	5.52	1.560	8.611	
(V)	(37)	16	0.55	0.15	0.55		0.26	1.51	5	7.55	0.995	7.512	
2 nos	(38)	13	0.75		0.75	0.08	0.16	1.74	5	8.70	0.995	8.657	
											sum	24.780	
						sub total	:	24.780	x	2.000	=	49.560	

Total 1 pcs (31.60 Span)	=	1,692.427	Kg	
Total 5 pcs (31.60 Span)	=	5.00	x	1,692.43 Kg
	=	8,462.14	Kg	

mb-br1

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	MAIN BEAM Br P1 PE 57 + 05 m (Titi Besi Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Segment	B1	13	0.700	1.170	0.120	1.170		3.160	18	56.88	0.995	56.596	outer Beam
(l = 5.0765 m)	B2	13		0.150	0.270	0.150		0.570	6	3.42	0.995	3.403	and end Block
2 nos	B3	13		1.170	0.570	1.170		2.910	6	17.46	0.995	17.373	
	B4	13		0.600	0.270			0.870	18	15.66	0.995	15.582	
	B5	13		0.680	0.570	0.300		1.550	18	27.90	0.995	27.761	
	B6	16	3.058	0.400		0.420		3.878	4	15.51	1.560	24.199	
	B7	16	5.026					5.026	9	45.23	1.560	70.565	
	B8	16	1.000			0.120		1.120	8	8.96	1.560	13.978	
	B9	13	0.990			0.500		1.490	2	2.98	0.995	2.965	
											sum	232.41	
				Sub to	:	2.00	x	232.420			=	464.840	Kg
Segment	B10	13	0.700	1.170	0.120	1.170		3.160	26	82.16	0.995	81.749	Inner of Beam
(l = 6.147 m)	B11	13		0.600	0.270			0.870	26	22.62	0.995	22.507	
2 nos	B12	13		0.680	0.570	0.300		1.550	26	40.30	0.995	40.099	
	B13	16	6.067					6.067	17	103.14	1.560	160.897	
	B14	13	1.000			0.120		1.120	16	17.92	0.995	17.830	
	B15	16		0.500		0.200		0.700	4	2.80	1.560	4.368	
	B16	13		0.550		0.220		0.770	4	3.08	0.995	3.065	
											sum	330.514	
				Sub to	:	2.00	x	330.514			=	661.029	Kg

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	tatal weigl kg	Remark
Segment	B17	13	0.700	1.170	0.120	1.170		3.160	14	44.24	0.995	44.019	Inner of Beam
(l = 3.153 m)	B18	13		0.600	0.270			0.870	14	12.18	0.995	12.119	
1 nos	B19	13		0.680	0.570	0.300		1.550	14	21.70	0.995	21.592	
	B20	16	3.073					3.073	17	52.24	1.560	81.496	
	B21	13	1.000			0.120		1.120	16	17.92	0.995	17.830	
	B22	16		0.500	0.200			0.700	4	2.80	1.560	4.368	
	B23	13		0.550	0.220			0.770	4	3.08	0.995	3.065	
											sum	184.488	
				Sub to	:	1.00	x	184.488			=	184.488	Kg

total for 1pcs (25.60 Span)	=		1,310.36		Kg			
total for 10 pcs	=	10.00	x	1,310.36	=	13,103.57		Kg
Grand total	=	13,103.57	+	8,462.14	=	21,565.71		Kg

mb-br1a

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	M A I N B E A M BR P1 PE 57 + 05 m (Titi Besi Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

$$S = -1^2/8.f \times [\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}] - [\{2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$$

(a) = $1^2/8.f$
(b) = $2.f/l$
(c) = $4.f/l$
(d) = $(4.f/l)^2$
(e) = $(4.f/l)^2 + 1$

(f) = $@sqrt((4.f/l)^2 + 1)$ = $@sqrt(e)$
(g) = $-2.f/l.@sqrt((4.f/l)^2+1)$ = $-(b) \times (f)$
(h) = $-4f/l+@sqrt(4f/l)^2+1$ = $(-c) + (f)$
(i) = $1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = $1/2xln\ (h)$
S1 = $[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = (g) + (i)

(k) = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\}$ = $(b) \times (f)$
(l) = $[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = (c) + (f)
(m) = $1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = $1/2 \times ln(l)$
S2 = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = (k) + (m)

S = $(-a) \times [(S1) - (S2)]$

S is length of parabola curve

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	**M A I N B E A M** **BR P1 PE 57 + 05 m** **(Titi Besi Br)**	**Japan International Cooperartion Agency** **Date** **Nos of Sheet** **Preparated by**

Tendom (H.T.W) diameter 13 mm
Tendom (H.T.W) diameter 13 mm (L = 31.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
2	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
3	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
4	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
5	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
6	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
					total										sum		201.742

f = Average

nos wire per tendon	=	7	nos					
sum of tendon length	=	7	x	201.742	=	1,412.20	m	
Total per beam	=	0.8	x	1,412	=	1,129.76	kg	
Grand Total (5 Beam)	=	5.00	x	1,129.76	=	5,648.79	kg	

te-br1

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	**M A I N B E A M** **BR P1 PE 57 + 05 m** **(Titi Besi Br)**	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 25.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.456	27.600	208.816	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	27.620
2	0.456	27.600	208.816	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	27.620
3	0.456	27.600	208.816	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	27.620
4	0.456	27.600	208.816	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	27.620
					total										sum		110.480

f = Average

nos wire per tendon	=	7	nos				
sum of tendon length	=	7	x	110.480	=	773.36	m
Total per beam	=	0.8	x	773	=	618.69	kg
Grand Total (5 Beam)	=	5.00	x	618.69	=	3,093.45	kg
Grand Total (10 Beam)	=	2.00	x	3,093.45	=	6,186.90	kg
Grand Total	=	5,648.79	+	6,186.90	=	11,835.684	kg

te-br1

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	PANEL SLAB Br1 PE 57 + 5 m (Titi Besi Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K–400 (L = 31.60 m)

	volume panel slab								
section	width w	depth d	area (m 2)	thick t	nos	volume			
	m	m		m		m3			
(1)	1.000	1.580	1.58	0.070	1.00	0.1106			
	sum volume per pcs				=	0.1106			
	nose per row				=	4.0000	row	x	0.1106
					=	0.4424	m3		
	nos of per span				=	4.00		x	31
					=	124	nos		
	Total volume per span				=	**13.7144**	m3		

Structure Concrete Class K–400 (L = 25.60 m)

	volume panel slab								
section	width w	depth d	area (m 2)	thick t	nos	volume			
	m	m		m		m3			
(1)	1.000	1.580	1.58000	0.070	1.00	0.111			
	sum volume per pcs				=	0.1106			
	Volume nos per row				=	4	x	0.1106	
	nose per row				=	0.4424	m3		
	nos of per span				=	4.00		x	25
					=	100	nos		
	nos for (2 span)				=	200	nos		
	Total volume per span				=	22.1200	m3		
	Grand Total				=	13.7144		+	22.12
					=	35.8344	m3		

pl–br1

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL ~~OF DECK SLAB AND HAND RAIL~~ Br P1 PE 57 + 05 m PANEL DECK (Titi Besi Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Quantities steel of panel deck slab per span (l = 25.60 m) 2 / 2

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
P3	16	1,520	150	1,520	150	150	3.490	2.00	6.98	1.560	10.889	main steel
P4	16	1,520	200	1,520	200	150	3.590	1.00	3.59	1.560	5.600	
P5	12	450	0	0	0	110	0.560	6.00	3.36	0.995	3.343	tranverse steel
P6	12	950	0	0	0	220	1.170	4.00	4.68	0.995	4.657	
P7	12	400	0	0	0	0	0.400	4.00	1.60	0.995	1.592	
										sum	26.081	

nos of span	=	2.00						
nos of panel slab per span	=	25	x	2.00	=	50.00	nos	
total nos of span	=	4.00	x	50.00	=	200.00	nos	
sub total weight	=	200.00	x	26.081	=	**5,216.20**	kg	

Quantities steel of panel deck slab per span (l = 31.60 m)

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
P3	16	1,520	150	1,520	150	150	3.490	2.00	6.98	1.560	10.889	main steel
P4	16	1,520	200	1,520	200	150	3.590	1.00	3.59	1.560	5.600	
P5	12	450	0	0	0	110	0.560	6.00	3.36	0.995	3.343	tranverse steel
P6	12	950	0	0	0	220	1.170	4.00	4.68	0.995	4.657	
P7	12	400	0	0	0	0	0.400	4.00	1.60	0.995	1.592	
										sum	26.08	

nos of span	=	1.00						
nos of panel slab per span	=	31.00	x	1.00	=	31.00	nos	
total nos of span	=	4.00	x	31.00	=	124.00	nos	
sub total weight	=	26.08	x	124.00	=	3,234	kg	
Grand total for panel	=	**5,216.20**	+	**3,234**	=	**8,450.24**	kg	

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	CROSS BEAM Br1 PE 57 + 05 m (Perkebunan Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K–400 (L = 31.60 m)

section	volume cross beam width w	depth d	area (m 2)	thick t	nos	volume
	m	m		m		m3
(1)	1.390	1.050	1.4595	0.200	1.00	0.2919
	sum volume per pcs				=	0.2919
	nose per row				=	4.0000 nos
	volume per row				=	4.0000 x 0.2919
					=	1.1676 m3
	nose per span				=	4.00 row
					=	4.0000 x 1.1676
	Total volume per span				=	4.6704 m3
	Total volume (2) span				=	**1 x 4.6704**
					=	**4.6704 m3**

Structure Concrete Class K–400 (L = 25.60 m)

section	volume cross beam per span width w	depth d	area (m 2)	thick t	nos	volume
	m	m		m		m3
(1)	1.390	1.050	1.45950	0.200	1.00	0.292
(2)	0.200	0.065	0.00650	0.200	2.00	(0.005)
	sum volume per pcs				=	0.2867
	Volume nose per row				=	4 x 0.2867
					=	1.1468
	nose per span				=	2 row
	Total volume per span				=	2 x 1.1468
					=	**2.2936 m3**

Cross Beam End

Structure Concrete Class K–400 (L = 25.60 m)

section	volume cross beam per span width w	depth d	area (m 2)	thick t	nos	volume
	m	m		m		m3
(1)	1.520	1.050	1.59600	0.150	1.00	0.239
(2)	0.280	0.065	0.00910	0.150	2.00	(0.005)
(3)	0.100	0.100	0.00500	0.150	2.00	(0.003)
	sum volume per pcs				=	0.2309
	Volume per row				=	4 x 0.23094
					=	0.9238
	nose per span				=	2 row
					=	2 x 0.9237
	Total volume per span				=	1.84752 m3
	Total volume per span				=	2.2936 + 1.84752 m3
					=	4.14112 m3
	Total volume (2) span				=	2 x 4.14112 m3
					=	8.282 m3
	Grand Total				=	**8.282 + 4.670 m3**
					=	**12.9526 m3**

Cross Beam Central

cb–br1

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF CROSS BEAM Br P1 PE 57 + 05 m (Titi Besi Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of Cross beam (l = 31.60 m) 1 / 1

Type	Bar Shape dia.	a	b	c	d	2 x e	lenght/ each	nos	total lenght	weight per m'	total weight	description
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
C.1	13	1,090	0	0	0	200	1.290	10.00	12.90	0.995	12.836	End & Center
C.2	13	1,090	140	1,090	140	140	2.600	7.00	18.20	0.995	18.109	
										sum	30.94	

Nos per row	=	4.00		
sub total per span	=	16.00	x	30.94
	=	**495.11**	Kg	

Quantities steel of Cross beam (l = 25.60 m)

C.1	13	1,290	140	1,290	140	140	3.000	3.00	9.00	0.995	8.955	End
C.2	13	1,000	140	1,000	140	140	2.420	4.00	9.68	0.995	9.632	
										sum	18.59	

Nos per row	=	4.00		
sub total per span	=	16.00	x	18.59
	=	**297.39**	Kg	

C.1	13	1,290	140	1,290	140	140	3.000	3.00	9.00	0.995	8.955	Center
C.2	13	975	140	975	140	140	2.370	5.00	11.85	0.995	11.791	
										sum	20.75	

Nos per row	=	4.00		
sub total per span	=	16.00	x	20.75
	=	331.93	Kg	
Grand total	=	**1,124.430**	Kg	

cr-br1

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Pier BR – P1 (Titi Besi Br) STA : 57 + 05 (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles
dia. = 0.406 m
area = 0.129 m2

describtion	part	width m	depth m	area m2	length m	nos	volume m3
~~footing~~ Cap	1	0.000	0.000	0.000	0.000	0.000	8.565
cap	2	0.000	0.000	0.000	0.000	0.000	5.600
footing	3	5.100	1.000	5.100	10.000	1.000	51.000
column	4	1.200	4.650	5.580	5.600	1.000	31.248
column	5	0.000	4.650	0.581	0.000	2.000	5.405
cap	6	0.000	1.350	1.272	0.000	2.000	3.435
cap	7	1.600	1.350	2.160	8.200	1.000	17.712
block out	8	0.250	0.250	0.063	1.100	4.000	0.275
block out	9	0.250	0.250	0.063	1.100	4.000	0.275
cap	10	0.600	0.300	0.180	10.000	1.000	(1.800)
pipe reducing		area	x	nos pipe	x	depth	
		0.129	x	28.000	x	0.100	(0.362)
						sum	121.353
		Grand Total	2.00	x	121.3529		242.706

Ref. See Drawing

co-pie1

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – P1 (Titi Besi Br) STA : 57 + 05 (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.406	m
area	=	0.129	m2
H	=	6.300	m ✓
W	=	5.100	m
L	=	10.00	m

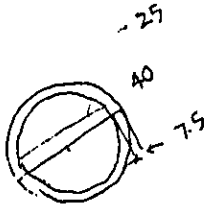
describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	1.595	0.48	10.00	1.00	4.79
stem	2	0.55	0.500	0.28	9.20	1.00	2.53
stem	3	0.55	0.500	0.14	9.20	1.00	1.27
stem	4	0.20	0.500	0.10	10.00	1.00	1.00
stem	5	0.20	0.250	0.03	10.00	1.00	0.25
stem	6	1.00	3.705	3.71	10.00	1.00	37.05
stem	7	1.80	0.300	0.27	10.00	1.00	2.70
footing	8	2.30	0.300	0.35	10.00	1.00	3.45
footing	9	5.10	1.000	5.10	10.00	1.00	51.00
wingwall	10	3.00	1.595	4.79	0.40	2.00	3.83
wingwall	11	3.30	1.405	2.32	0.40	2.00	1.85
wingwall	12	2.30	2.000	4.60	0.40	2.00	3.68
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	1.595	2.00	0.14
App.Slab	16	3.00	0.200	0.30	9.200	1.00	2.76
	17	0.275	0.05	0.01	9.200	1.00	0.13
inside blockout	lbo	0.30	0.250	0.08	1.10	4.00	0.330
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	28.00	x	0.10	(0.362)
						sum	117.07

concrete filling in piles

thick of pipe	=	0.01036	m					
inner diameter	=	0.406	–	0.021				
	=	0.385	m					
area	=	0.250	x	3.142	x	0.148		
	=	0.1165	m2					
depth	=	6.500		--->	0.333	x	18.500	m
nos	=	28.000						
volume	=	0.117	x	6.500	x	28.00		
	=	21.22	m3					
sub total	=	117.06	+	21.22				
	=	138.28	+	138.28	m3			
Total								
	=	276.56	m3					

abr1 – co

Direktorat General of Water Resources Development Direktorat of River Medan Flood Contral	Concrete Inside Pipe Br P1 (Titi Besi) Sta 57 + 5 m	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

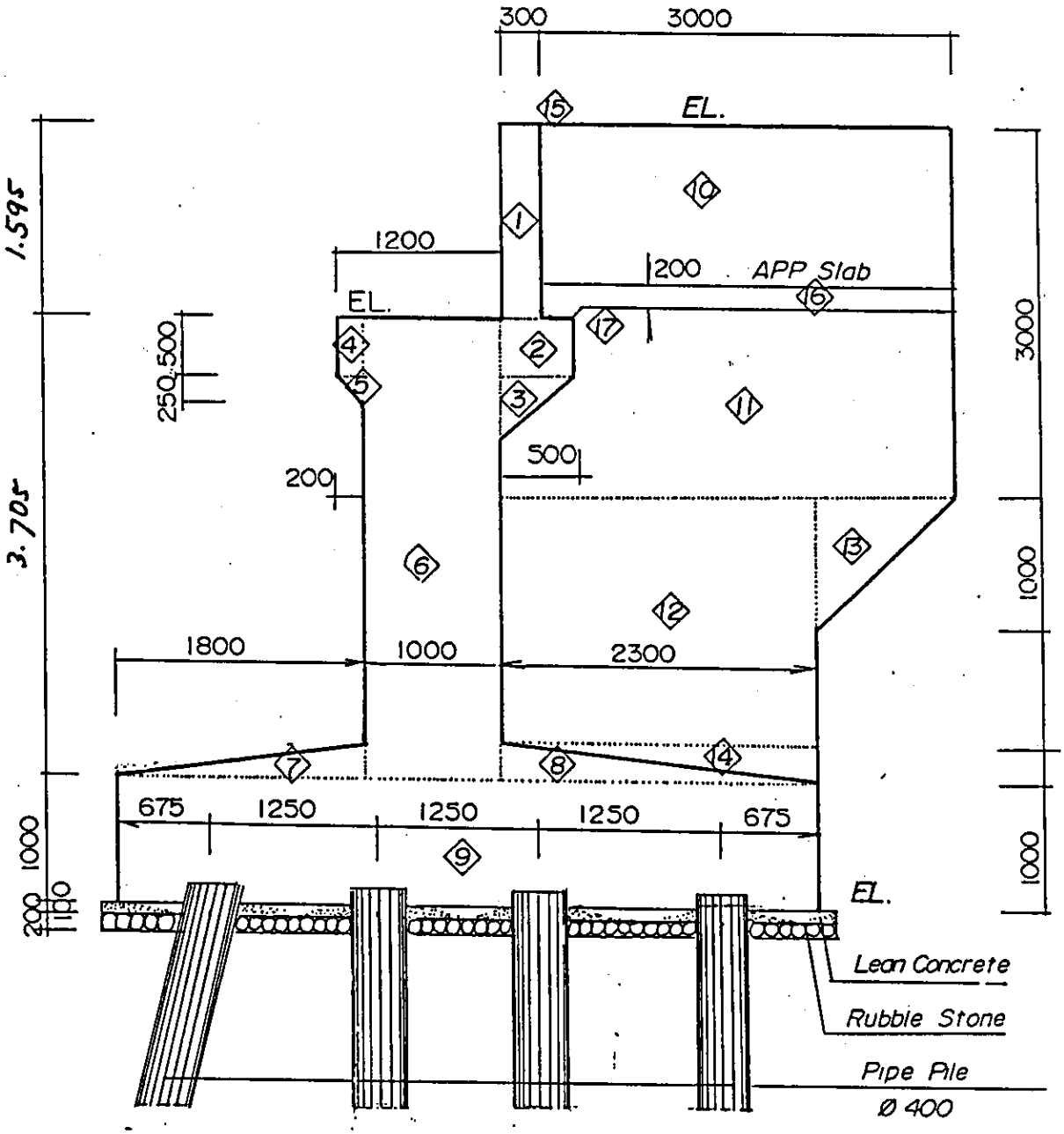


Structural concrete class K225 (m3)

diameter of concrete pile		=	0.40	m		
	area	=	0.126	m2		
thick of pipe	=	0.075	m			
inner diameter	=	0.400	–	0.150		
	=	0.250	m			
area	=	0.250	x	3.142	x	0.063
	=	0.0490	m2			
depth	=	2.100	m			
nos	=	28.000				
volume	=	0.049	x	2.100	x	28.00
	=	2.89	m3			
Volume inside pipe (R & L)	=	2.89	+	2.89	m3	
	=	5.77	m3			

Description	Nos	Side	Depth (m)	total (m)	Remark
Supply and Driving of SPP dia.400 mm for Abutment	28.00	L/S	18.50	518.00	
	28.00	R/S	17.00	476.00	
			sum	994.00	
Supply and Driving of PC dia.400 mm for Pier	28.00	L/S	16.00	448.00	
	28.00	R/S	16.00	448.00	
			sum	896.00	

inc-br1


300
3000
EL.
1.595
1200
200
APP Slab
EL.
250
500
3000
3.705
500
200
1000
1800
1000
2300
675
1250
1250
1250
675
1000
200
1100
EL.
Lean Concrete
Rubble Stone
Pipe Pile
Ø 400

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br P1 (Ttiti Besi) Sta : 57 + 5 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	1.595	2.00	0.96
wall	1a	1.595	10.000	1.00	15.95
wall	1b	1.595	9.200	1.00	14.67
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	9.200	1.00	4.60
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	9.200	1.00	6.90
stem	4	0.200	0.500	2.00	0.20
	4a	0.500	10.000	1.00	5.00
stem	5	0.200	0.250	2.00	0.05
	5a	0.320	10.000	1.00	3.20
stem	6	1.000	3.705	2.00	7.41
stem	6a	2.655	10.000	1.00	26.55
stem	6b	9.200	2.405	1.00	22.13
footing	7	1.800	0.300	2.00	0.54
footing	8	2.300	0.300	2.00	1.38
footing	9	5.100	1.000	2.00	10.20
footing	10	1.000	10.000	2.00	20.00
wingwall	11	1.595	3.000	4.00	19.14
wingwall	11a	0.400	1.595	2.00	1.28
wingwall	12	3.300	1.405	4.00	17.72
wingwall	13	0.400	1.405	2.00	1.12
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	2.300	2.000	4.000	18.400
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	202.40

Total = 2.00 x 202.40

= 404.81 sq.m

abr1-fw

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Pier Br P1 (Ttiti Besi) Sta : 57 + 5 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
footing	1	5.100	1.000	2.00	10.20
footing	2	10.000	1.000	2.00	20.00
column	3	1.200	4.650	2.00	11.16
column	4	7.000	4.650	2.00	65.10
bottom cap	5	0.600	7.000	2.00	8.40
bottom cap	6	1.300	1.500	2.00	3.90
cap	7	1.000	1.350	2.00	2.70
cap	8	10.000	1.350	1.00	13.50
cap	9	1.350	10.000	1.00	13.50
cap	10	0.600	1.000	2.00	1.20
cap	11	10.000	1.000	1.00	10.00
			sum =		159.66

85

Total = 2.00 x 159.66

= 319.32 sq.m

pier1-fw

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P1 PE 57 + 05 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steil inside pile (kg)

Diameter of pipe = dp	=	40	cm					
thick of pipe = t	=	1.031	cm					
Diameter of spiral = ds	=	1.30	cm					
covering of concrete = d'	=	5	cm					
dc	=	40 − 2 x (1.031 + 5)						
	=	27.938	cm					
(dc − ds)	=	27.938	−	5				
	=	22.938	cm					
Ag	=	0.25 x @pi x dp ^ 2						
	=	1,256.64	cm2					
Ac	=	0.25 x @pi x dc ^ 2						
	=	613.028	cm2					
f'c	=	225	kg/cm2					
fsy	=	4,000	kg/cm2					
Ag/Ac	=	2.050						
f'c/fsy	=	0.056						
ps	=	0.45 x (Ag/Ac − 1) x f'c/fsy						
ps	=	0.027						
Area of spiral = as	=	0.25*@pi x ds ^ 2						
	=	1.327	cm2					
spacing of spiral = s	=	as x @pi x (dc−ds) / ps x @pi x dc ^ 2/4						
s	=	1.327 x 3.142 x 22.938 / 0.027 x 3.142 x 195.133						
	=	95.649 / 16.291	cm					
	=	5.87	cm					
say	=	7.00	cm					
Length of spiral per picth	=	@sqrt((@pi x dc) ^ 2 + s ^ 2)						
	=	88.05	cm					
length of culumn	=	650	cm					
nos of pitch	=	92.86						
length of spiral	=	88.05	x	92.86				
	=	8,175.93	cm					
	=	81.76	m					
Radius of steel ring								
Outer diameter of pile	=	40.64	cm					
Thick of pile	=	1.031	cm					
Inner diameter of pile	=	40.64	−	2.062				
	=	38.578	cm					
Concrete covering	=	5	cm					
Diameter of steel bar	=	1.6	cm					
Diameter of ring	=	1.3	cm					
Inner diameter of pile	=	38.578						
Distance outside to ring	=	5	+	0.65	+	1.6	+	0.65
	=	7.90	cm					
Inner diameter of ring	=	38.578	−	7.90				
	=	30.678	cm					
Radius of ring steel	=	30.678	:	2				
	=	15.339	cm					
	=	0.153	m					

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P1 PE 57 + 05 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

Length of each = 2 x @pi x r
= 2 x 3.1415 x 0.153 m
= 0.964 m

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	6.50		0.36	7.21	28.00	8	57.68	1.56	89.98
2.	R1	13									81.76	1.00	81.35
3.	Ring	13						0.964		6	5.78	1.00	5.75
												sum	177.09

Total weight = 28.00 x 177.08 = 4,958.38 kg

Grand total = 2.00 x 4,958.38 = **9,916.77** kg

inb-br1

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P1 PE 57 + 05 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

REINFORCING STEEL
FOR INSIDE PILE PC

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.25	2.30			2.55	28.00	8	20.40	1.560	31.824
2.	R1	13		0.55				0.55		12	6.60	0.995	6.567
3.	Ring	13											
												sum	38.39

Total weight	=	28.00	x	38.391	=	1,074.95	kg
Grand total	=	2.00	x	1,074.95	=	2,149.90	kg
						- 9,916.77	
						12,066.67	

Quantity of Reinforcing bar for Abutment Br P1

br–ap1

NO.	TYPE	DIMENSION					Diam. D. (m m)	LENGTH (m)	QUANTITY (Pcs)	TOTAL LENGTH	WEIGHT (m) (Kg)	TOTAL WEIGHT (Kg)	DESCRIPTION
		a	b	c	d	e							
1	F.1	9,800				240	20.00	10.04	55.00	552	2.250	1,242.45	Right & left side
2	F.2	9,800				240	20.00	10.04	27.00	271	2.250	609.93	
3	F.3	4,900	800			300	25.00	6.00	79.00	474	3.980	1,886.52	
4	F.4		150	4,800	800	300	25.00	6.05	79.00	478	3.980	1,902.24	
5	F.5				4,605	240	20.00	4.85	6.00	29	2.250	65.41	
6	F.6				950	156	13.00	1.11	242.00	268	0.995	266.31	
7	F.7	1,050				156	13.00	1.21	330.00	398	0.995	395.99	
8	F.8	1,800		4,565		260	22.00	6.63	79.00	523	3.040	1,591.06	
9	F.9	2,700		4,565		260	22.00	7.53	79.00	594	3.040	1,807.20	
10	F.10	9,800				192	16.00	9.99	59.00	590	1.560	919.66	
11	F.11	900				156	13.00	1.06	367.00	388	0.995	385.61	
12	F.12	1,100	800	1,200		260	22.00	3.36	79.00	265	3.040	806.94	
13	F.13	1,100				156	13.00	1.26	65.00	82	0.995	81.23	
14	F.14	4,900				196	16.00	5.10	50.00	255	1.560	397.49	
15	P.1	9,900				156	13.00	10.06	50.00	503	0.995	500.29	
16	P.2	200	3,500			192	16.00	3.89	50.00	195	1.560	303.58	
17	S.1	200	900			192	16.00	1.29	16.00	21	1.560	32.25	
18	S.2	1,000				156	13.00	1.16	16.00	18	0.995	18.40	
19	W.1	2,300	2,900	3,200		192	16.00	8.59	4.00	34	1.560	53.61	
20	W.2	3,200	300	3,200	300	156	13.00	7.16	12.00	86	0.995	85.44	
21	W.3	3,500	300	3,500	300	156	13.00	7.76	4.00	31	0.995	30.87	
22	W.4	4,200	300	4,200	300	156	13.00	9.16	10.00	92	0.995	91.10	
23	W.5	3,700	300	3,700	300	156	13.00	8.16	8.00	65	0.995	64.92	
24	W.6	6,400	300	6,400	300	156	13.00	13.56	14.00	190	0.995	188.84	
25	W.7	6,600	3,200	300	3,200	156	13.00	13.46	18.00	242	0.995	241.00	
26	A.1	9,200				156	13.00	9.36	32.00	299	0.995	297.90	
27	A.2	350	100	2,900	150	156	13.00	3.66	46.00	168	0.995	167.34	
28	A.3	2,900				156	13.00	3.06	46.00	141	0.995	139.87	
											SUM	*14,573*	
				Grand Total			2.00	x	14,573.45			*29,146.90*	

Quantity of Reinforcing Bar for Pier Br P1

pbr1–rb

NO.	TYPE	DIMENSION					Diam. D. (m m)	LENGTH (m)	QUANTITY (Pcs)	TOTAL LENGTH (m)	WEIGHT (m) (Kg)	TOTAL WEIGHT (Kg)	DESCRIPTION
		a	b	c	d	e							
1	P.1	9,800				240	20	10.040	55	552.20	2.250	1,242.45	
2	P.2	9,800				240	20	10.040	27	271.08	2.250	609.93	only left side Pier
3	P.3	4,900	800			300	25	6.000	79	474.00	3.980	1,886.52	
4	P.4		150	4,940	800	300	25	6.190	79	489.01	3.980	1,946.26	
5	P.5		800	6,060	800	240	20	7.900	4	31.60	2.250	71.10	
6	P.6	3,250				240	20	3.490	30	104.70	2.250	235.58	
7	P.7				7,000	300	25	7.300	15	109.50	3.980	435.81	
8	P.8				1,000	156	13	1.156	504	582.62	0.995	579.71	
9	P.9	6,900				192	16	7.092	58	411.34	1.560	641.68	
10	P.10	1,200			7,000	300	25	8.500	112	952.00	3.980	3,788.96	
11	P.11	1,500	900	1,100		300	25	3.800	79	300.20	3.980	1,194.80	
12	P.12	900	1,300	1,100	300	300	25	3.900	79	308.10	3.980	1,226.24	
13	P.13	1,200				156	13	1.356	435	589.86	0.995	586.91	
14	P.14	350	400	1,000		156	13	1.906	15	28.59	0.995	28.45	
15	P.15	500				156	13	0.656	20	13.12	0.995	13.05	
16	P.16	1,600				156	13	1.756	133	233.55	0.995	232.38	
17	P.17	8,200				192	16	8.392	32	268.54	1.560	418.93	
18	R.1	2,076				192	16	2.268	54	122.47	1.560	191.06	
19	R.2	3,020				192	16	3.212	30	96.36	1.560	150.32	
20	S.1	200	500	500		156	13	1.356	40	54.24	0.995	53.97	
21	S.2	825				156	13	0.981	36	35.32	0.995	35.14	
22	H.1	250	2,300				16	2.550	224	571.20	1.560	891.07	
23	H.2	550					13	0.550	336	184.80	0.995	183.88	28 Nos
											Sum	16,644.19	

Grand Total 2.000 x 16,644 = 33,288.378 Kg

+ 29,146.90

62,435.28 ✓

pbr1–rb

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Lean Concrte and Rubble Stone Br P1 PE 57 + 05 m Titi Besi Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Lean concrete (m3)

diameter of concrete pile = 0.40 m

area = 0.126 m2

Lean Concrete 0.10

5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	10.30	55.62	0.10	5.56

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.10	m			
nos	=	28				
volume	=	0.126	x	0.10	x	28
	=	0.352	m3			
net volume	=	5.56	−	0.352		
	=	5.21	m3			
nos	=	2.00				
Total volume	=	2.00	x	5.21		
	=	10.42	m3		(Abutment L & R)	
Total volume	=	10.42	m3		(for Pier L & R)	
Grand Total	=	10.42	+	10.42	m3	
	=	20.84	m3			

Rubble stone (m3)

diameter of concrete pile = 0.40 m

area = 0.126 m2

Rubble Stone 0.200

5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	10.30	55.62	0.20	11.12

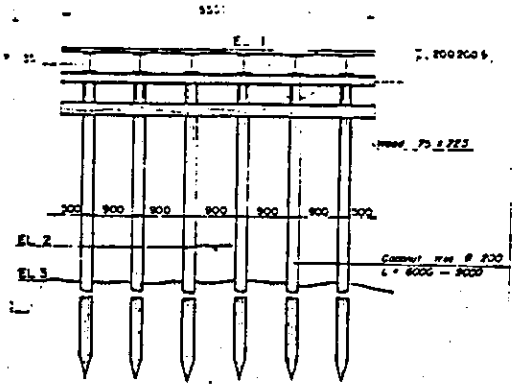
reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.20	m			
nos	=	28				
volume	=	0.126	x	0.20	x	28
	=	0.704	m3			
net volume	=	11.12	−	0.704		
	=	10.42	m3			
nos	=	2.00				
Total volume	=	2.00	x	10.42		
	=	20.84	m3		(Abutment L & R)	
Total volume	=	20.84	m3		(for Pier L & R)	
Grand Total	=	20.84	+	20.84	m3	
	=	41.68	m3			

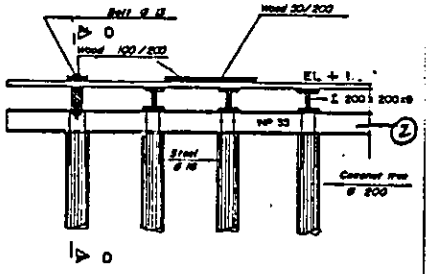
lc-br1

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	TEMPORARY BR. BRI PE 57 + 5 m.	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

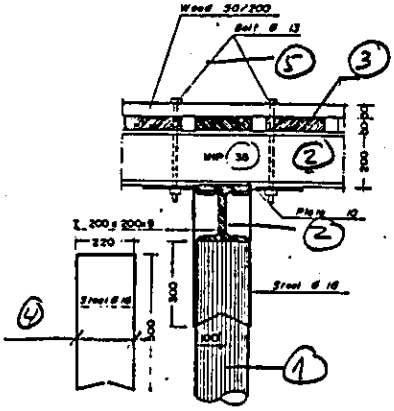
Calculation sheet



SECTION, A — A



SECTION, C — C



SECTION, D — D

1. Coconut tree ϕ 200 (l = 10 m)

Volume = $\frac{1}{4}\pi (d)^2 . l = \frac{1}{4}.\pi (0,20)^2 . 10$

= 0,314 m^3 per pcs

Volume (78 pcs) = 78 x 0,314

= 24.50 m^3.

2. Steel for Timber INP 200 x 200 x 9. (13pcs

= 5.5 x 13 x 64.9 = 4,640 kg.

Steel for Girder INP 35 x 200. (42 pcs)

= 42 x 6 x 68.1 = 17.161.20 kg.

3. Word for deck slab.

= 0.20 x 0.10 x 5.5 x 175

= 19.25 m^3.

Timber = 0,05 x 0.225 x 5 x 13

= 1.20 m^3.

4. Bar steel : 2,80 x 78 = 218.40 m^1

= 218.40 x 1.56 = 340 kg.

5. Bolt : 130 nos.

Rekapitulasi :

1. Coconut tree Volume = 24.50 kg.
2. Steel profile = 21,801.20 kg.
3. Wood = 20.45 m^3.
4. Steel bar = 340 kg.
5. Bolt = 130 nos.

form

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	COFFERING & DEWATERING BR. PI. PE 57+5 M	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Calculation sheet

1. Wooden pole : $\frac{25}{1.5} + 1 = 18$ pcs

Volume $= \frac{1}{4}\pi (d)^2 . l \times 18$ pcs

$= \frac{1}{4}\pi (0.1)^2 . 2 \times 18$

$= 0,282$ m³.

Log $= \frac{1}{4}\pi (d)^2 . 25$

$= \frac{1}{4}\pi (0.1)^2 . 25 = 0.175$ m³

2. Sand bag. $= 1.00 \times 0,5 \times 25$

$= 12.5$ m³.

3. Wooden pole $\frac{35}{0.35} + 1 = 98$ pcs

$= 96$ pcs.

Volume $= \frac{1}{4}\pi (d)^2 . 4 \times 96 . = 300$ m³.

Log $= \frac{1}{4}\pi (0.1)^2 . 35 \times 6 .$

$= 1.65$ m³.

4. Sand bag : $1.5 \times 1.2 \times 35 = 63$ m³

Rekapitulasi

1. Wooden pole $= 5.057$ m³.

2. Sand bag $= 75.50$ m³.

3. Wire

form

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	COFFERING & DEWATERING BR. PI. PE 57 + 5 m	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Calculation sheet

1. Wooden pole : $\frac{25}{1.5} + 1 = 18$ pcs

Volume $= \frac{1}{4} \pi (d)^2 . l \times 18$ pcs

$= \frac{1}{4} \pi (0.1)^2 . 2 \times 18$

$= 0,282$ m³.

Log $= \frac{1}{4} \pi (d)^2 . 25$

$= \frac{1}{4} \pi (0.1)^2 . 25 = 0.125$ m³

2. Sand bag. $= 1.00 \times 0.15 \times 25$

$= 12.5$ m³.

3. Wooden pole $\frac{35}{0.35} + 1 = 98$ pcs

$= 96$ pcs.

Volume $= \frac{1}{4} \pi (d)^2 . 4 \times 96 . = 300$ m³.

Log $= \frac{1}{4} \pi (0.1)^2 . 35 \times 6 .$

$= 1.65$ m³.

4. Sand bag : $1.5 \times 1.2 \times 35 = 63$ m³

Retapitulasi

1. Wooden pole $= 5.057$ m³.

2. Sand bag $= 75.50$ m³.

3. Wire

form

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	TEMPORARY BR. BR. PE 57 + 5 m.	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Calculation sheet

1. Coconut tree ϕ 200 (ℓ = 10 m)

Volume = $\frac{1}{4}\pi(d)^2 \cdot \ell = \frac{1}{4}.\pi(0,20)^2.10$

= 0,314 m^3 per pcs

Volume (78 pcs) = 78 x 0,314

= 24.50 m^3.

2. Steel for Timber INP 200 x 200 x 9. (13pcs

= 5.5 x 13 x 64.9 = 4,640 kg.

Steel for Girder INP 35 x 200 (42 pcs)

= 42 x 6 x 68.1 = 17.161.20 kg.

3. Wood for deck slab.

= 0.20 x 0.10 x 5.5 x 175

= 19.25 m^3.

Timber = 0,05 x 0.225 x 5 x 13

= 1.20 m^3.

4. Bar steel : 2,80 x 78 = 218.40 m'

= 218.40 x 1.56 = 340 kg.

5. Bolt : 130 nos.

Rekapitulasi :

1. Coconut tree Volume = 24.50 kg.
2. Steel propile = 21,801.20 kg.
3. Wood = 20.45 m^3.
4. Steel bar = 340 kg.
5. Bolt = 130 nos.

form

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	List of Bill Quantity BR P.2.	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Deck

1	Quantity of concrete of Deck slab
2	Quantity of concrete of Panel slab
3	Quantity of concrete of cross beam
4	Quantity of Wooden Form Work
5	Quantity of Reinforcement steel Deck slab
6	Quantity of Reinforcement steel Cross beam
	Quantity of Haindrail
	Quantity of Expansion Joint

Girder

7	Quantity of concrete of Main Beam
8	Quantity of Reinforcement steel Main Beam
9	Quantity of Tendon
10	Quantity of Anchorage
11	Quantity of Bearing pad
12	

Abutment

13	Quantity of concrete of Abutment
14	Quantity of Reinforcing steel
15	Quantity of Wooden Form Work
16	Quantity of Inside pile Reinf.steel
17	Quantity of Concrte Inside pile
	Quantity of Lean Concrete & Rubble stone

PIER

19	Quantity of concrete of Pier
20	Quantity of Reinforcing steel
21	Quantity of Wooden Form Work
22	Quantity of Inside pile Reinf.steel
23	Quantity of Concrte Inside pile
24	Quantity of Driving

list– br1

Br P2 PE 84 + 28 m

(Perkebunan Br)

NO	DESCRIPTION	UNIT	Quantity	Unit Price (Rp)	REMARKS
	BRIDGE				
	SUPERSTRUCTURE				
	CONCRETE				
	a. Deck Slab (Insitu)				
	Concrete (Type – B) Class K 350	Cu.m	209.75		
	Reinforcing Steel Deform	Kg	37,880.00		
	Wooden Form Work with Supporting Frame	Sq.m	410.30		
	b. Precast Prestressed Concrete Main Beam				
	Precast Prestressed Concrete Beam (Type – A) Class K 400	Cu.m	343.90		
	Reinforcing Steel Deform	Kg	40,227.47		
	Tendon [H.T.W] diameter 13 mm	Kg	24,044.17		
	Live end Anchorage	Nos	168.00		
	c. PC Panel Concrete				
	PC Panel Concrete, t = 7 cm (Type – A) Class K 400	Cu.m	44.23		
	Reinforcing Steel Deform	Kg	10,430.80		
	c. PC Diaphragm Concrete				
	PC Diaphragm Concrete (Type – A) Class K 400	Cu.m	12.71		
	Reinforcing Steel Deform	Kg	1,265.00		
	PRESTRESSING				
	Prestressing Tendon [H.T.W.] diameter 13 mm for Main Beam (incl. Diaphragm)	each	16.00		
	Grout Injection Main Beam (icl. Diaphragm)	m	2,908.80		
	ERECTING				
	Erection of Concrete Main Beam	Kg	859,750.00		
	(Incl.PC Diaphragm , PC Panel)				

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. P2 PE 84 + 28 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 Length = 40.80 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	7.000	1.715	1.000	1.715	41.200	70.658
End slab	(2)	0.055	0.500	0.027	2.000	0.055	4.250	0.234
End slab	(3)	0.300	0.200	0.060	2.000	0.120	7.200	0.864
							sum	71.756

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.223	1.500	0.334	1.000	0.334	41.200	13.751
Right Side slab	(5)	0.223	1.500	0.334	1.000	0.334	41.200	13.751
							sum	27.501

Total Volume K.350 = 71.756 + 27.501
= 99.257 m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	43.000	0.688	0.550	0.378
Railing post	(7)	0.165	0.160	0.026	43.000	1.135	0.470	0.534
slab side Walk	(8)	0.250	1.266	0.317	2.000	0.633	41.200	26.085
Wall	(9)	0.470	0.100	0.047	2.000	0.094	37.840	3.557
							sum	30.554

Total Volume K.225 = 30.554 m3

slab –br2

a.Slab deck K.350 Length = 31.60 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	7.000	1.715	1.000	1.715	32.000	54.880
	(2)	0.055	0.500	0.027	2.000	0.055	4.800	0.264
	(3)	0.300	0.200	0.060	2.000	0.120	7.200	0.864
							sum	56.008

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side	(4)	0.223	1.500	0.334	1.000	0.334	32.000	10.680
Right Side	(5)	0.223	1.500	0.334	1.000	0.334	32.000	10.680
							sum	21.360

Total Volume K.350 = 56.008 + 21.360
= 77.368 m3

Total Volume K.350 = 77.368 + 77.36
= 154.736 m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab side Walk	(6)	0.100	0.160	0.016	34.000	0.544	0.550	0.299
	(7)	0.165	0.160	0.026	34.000	0.898	0.470	0.422
	(8)	0.250	1.266	0.317	2.000	0.633	32.000	20.260
	(9)	0.470	0.100	0.047	2.000	0.094	29.280	2.752
							sum	23.733

Total Volume K.225 = 23.733 m3
= 23.733 + 23.733
= 47.46678 m3

Grand Total K.350 = 99.25675 + 154.7 m3
= 253.9927 m3 ✓

Grand Total K.225 = 30.55365 + 47.46 m3
= 78.02043 m3

slab –br2

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	REINFORCING STEEL OF DECK SLAB AND HAND RAIL Br P2 PE 84 + 28 m (Perkebunan Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Quantities steel of deck slab per span (l = 40.8 m)

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
D1	16	6,980	150	0	150	260	7.540	136.00	1,025.44	1.560	1,599.69	main steel deck slab
D2	16	2,820	6,720	0	0	260	9.800	136.00	1,332.80	1.560	2,079.17	
D3	13	39,660	125	1,140	125	880	41.930	50.00	2,096.50	0.995	2,086.02	
D4	13	39,660	0	1,140	0	880	41.680	50.00	2,084.00	0.995	2,073.58	
D5.A	16	2,868.00	0	8,524.00	0	660	12.052	68.00	819.54	1.560	1,278.48	
D5.B	16	2,868.00	0	8,524.00	0	660	12.052	68.00	819.54	1.560	1,278.48	
D6	16	9,680	125	0	125	260	10.190	8.00	81.52	1.560	127.17	Reinf. steel Expantion Joint
D7	16	0	0	1150	0	260	1.410	20.00	28.20	1.560	43.99	
D8	16	450	250	450	200	150	1.500	48.00	72.00	1.560	112.32	
D9	16	150	250	150	200	260	1.010	22.00	22.22	1.560	34.66	
H1	13	100	1350	200	900	220	2.770	88.00	243.76	0.995	242.54	Reinf. steel haidrail and side Walk
H2	13	110	50	110	50	220	0.540	264.00	142.56	0.995	141.85	
H3	13	200	50	200	50	220	0.720	220.00	158.40	0.995	157.61	
H4	13	0	0	700	0	220	0.920	408.00	375.36	0.995	373.48	
H5	13	40,750	0	920	0	220	41.890	8.00	335.12	0.995	333.44	
P1	16	40,750	0	920	0	260	41.930	20.00	838.60	1.560	1,308.22	
P2	16	1,150	250	200	420	260	2.280	408.00	930.24	1.560	1,451.17	
										sum	14,721.87	

nos.of span = 1.00

sub total weight = 1.00 x 14,721.87 = **14,721.87** kg

Grand Total = 23,159 + 14,722 kg

= 37,881 kg

deck-br2

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	REINFORCING STEEL OF DECK SLAB AND HAND RAIL Br P2 PE 84 + 28 m (Perkebunan Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

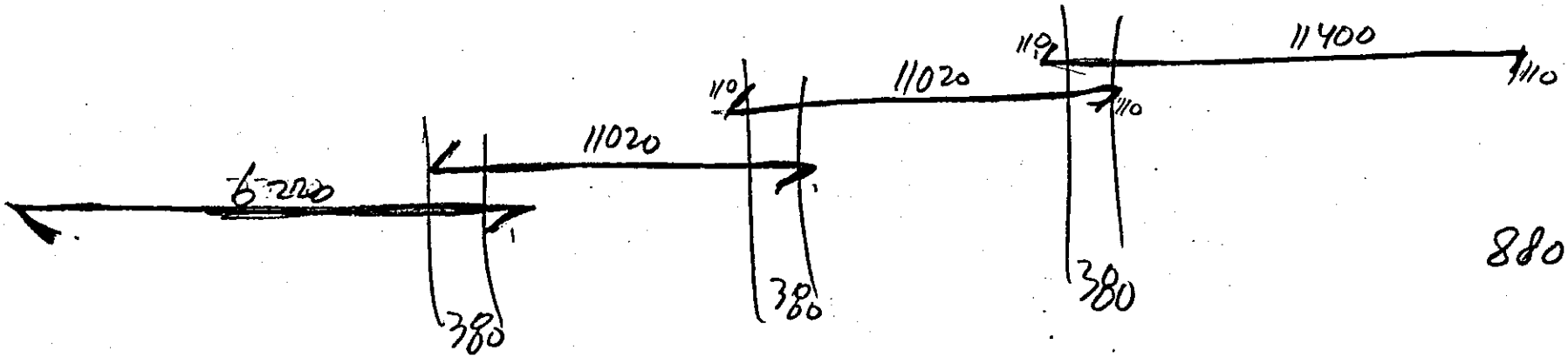
Quantities steel of deck slab per span (l = 31.60 m) 1 / 2

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
D1	16	6,980	150	0	150	260	7.540	105.00	791.70	1.560	1,235.05	main steel deck slab
D2	16	2,820	6,720	0	0	260	9.800	105.00	1,029.00	1.560	1,605.24	
D3	13	31,900	125	760	125	660	33.570	50.00	1,678.50	0.995	1,670.11	
D4	13	31,900	0	760	0	660	33.320	50.00	1,666.00	0.995	1,657.67	
D5.A	16	2,868.00	0	8,524.00	0	660	12.052	53.00	638.76	1.560	996.46	
D5.B	16	2,868.00	0	8,524.00	0	660	12.052	53.00	638.76	1.560	996.46	
D6	16	9,680	125	0	125	260	10.190	8.00	81.52	1.560	127.17	Reinf. steel Expansion Joint
D7	16	0	0	1150	0	260	1.410	16.00	22.56	1.560	35.19	
D8	16	450	250	450	200	150	1.500	48.00	72.00	1.560	112.32	
D9	16	150	250	150	200	260	1.010	22.00	22.22	1.560	34.66	
H1	13	100	1350	200	900	220	2.770	68.00	188.36	0.995	187.42	Reinf. steel haidrail and side Walk
H2	13	110	50	110	50	220	0.540	170.00	91.80	0.995	91.34	
H3	13	200	50	200	50	220	0.720	170.00	122.40	0.995	121.79	
H4	13	0	0	700	0	220	0.920	320.00	294.40	0.995	292.93	
H5	13	31,450	0	920	0	220	32.590	8.00	260.72	0.995	259.42	
P1	16	31,450	0	920	0	260	32.630	20.00	652.60	1.560	1,018.06	
P2	16	1,150	250	200	420	260	2.280	320.00	729.60	1.560	1,138.18	
										sum	11,579.46	

nos.of span = 2.00

sub total weigt = 2.00 x 11,579.46 = 23,159 kg

deck-br1



$q = 39.66.$

$\ell = 1140$

$40,80.$

Direktorat General Water Resources Development Direktorat General Medan Flood Control	DECK SLAB AND HAND RAIL Br P2 PE 84 + 28 m (Perkebunan Br)	japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 32.00 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	7.20	2.16	2.00	4.32
end slab	(2)	0.20	7.20	1.44	2.00	2.88
	(3)	0.35	4.80	1.68	2.00	3.36
	(4)	0.47	1.50	0.71	4.00	2.84
In side walk (curb)	(5)	0.25	32.00	8.00	2.00	16.00
In side walk	(6)	0.47	31.75	14.92	2.00	29.85
out side walk	(7)	0.47	30.30	14.24	2.00	28.48
Railing post	(8)	0.10	0.92	0.09	34.00	3.13
Railing post	(9)	0.16	0.45	0.07	68.00	4.90
Railing post	(10)	0.14	0.45	0.06	68.00	4.13
					sum	99.88
					numbers of span =	2.00
total	=	99.88	x	2.00	=	199.75

Scafolding (L = 32.00 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.50	32.00	48.00	2.00	96.00
end slab	(2)	0.45	32.00	14.400	2.00	28.80
					sum	124.80
					numbers of span =	2.00
total	=	124.80	x	2.00	=	249.60

Wooden form works with supporting frame (L = 41.20 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	7.20	2.16	2.00	4.32
end slab	(2)	0.20	7.20	1.44	2.00	2.88
	(3)	0.35	3.00	1.05	2.00	2.10
	(4)	0.47	1.50	0.71	4.00	2.84
In side walk (curb)	(5)	0.25	41.20	10.30	2.00	20.60
In side walk	(6)	0.47	40.95	19.25	2.00	38.49
out side walk	(7)	0.47	39.10	18.38	2.00	36.75
Railing post	(8)	0.10	0.92	0.09	42.00	3.86
Railing post	(9)	0.16	0.45	0.07	84.00	6.05
Railing post	(10)	0.14	0.45	0.06	84.00	5.10
					sum	123.00
					numbers of span =	1.00
total	=	123.00	x	1.00	=	123.00
	=	123.00	m2			

Scafolding (L = 41.20 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.50	41.20	61.80	2.00	123.60
end slab	(2)	0.45	41.20	18.540	2.00	37.08
					sum	160.68
					numbers of span =	1.00
total	=	160.68	x	1.00	=	160.68
	=	160.68	m2			

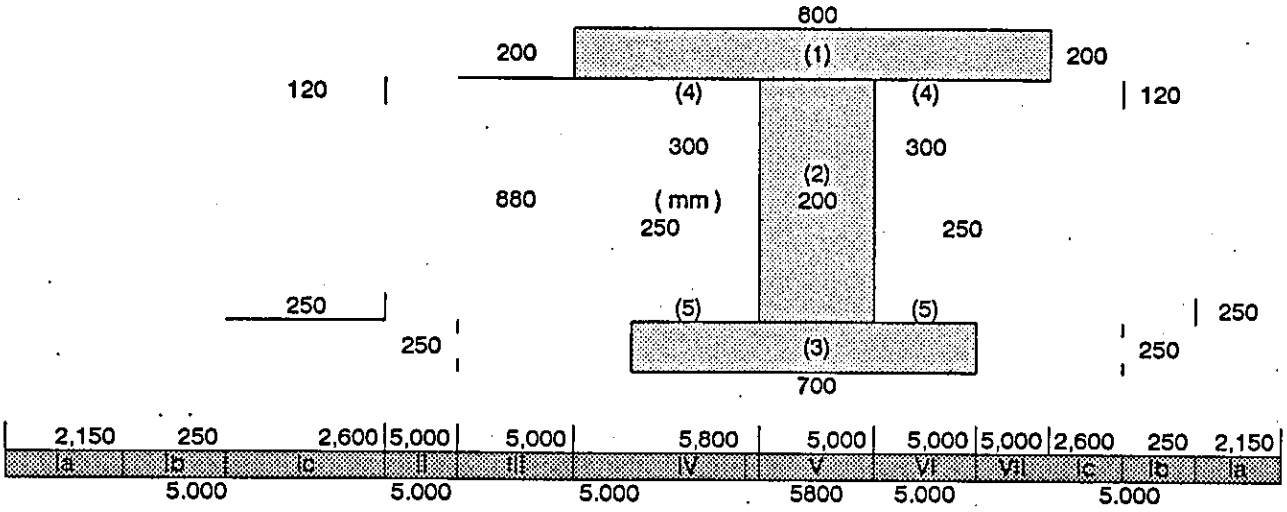
Grand total form Work	=	123.00	+	199.75	=	322.75	m2
Grand total Scafolding	=	160.68	+	249.60	=	410.28	m2

f-wrkbr2

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br2 PE 84 + 28 m (Perkebunan br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K–400,l = 40.80 m

Main Beam Section



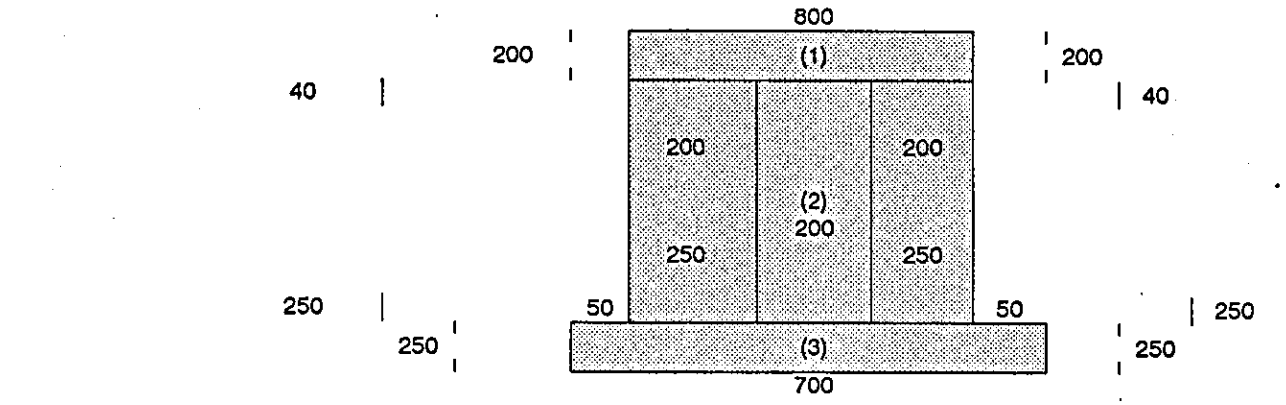
Total length = **40,800** m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.200	1.250	1.000	0.250
(3)	0.700	0.250	1.000	0.175
(4)	0.300	0.120	2.000	0.036
(5)	0.250	0.250	2.000	0.062
			sum	
area section main beam			=	0.6835

Volume 1 = area x length
= 0.6835 x 40,800
= 27,886.80 m3

End Block Section L = 2.150 m



2. Bearing Block Area

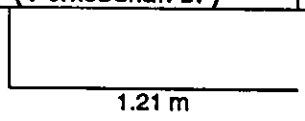
piece	width m	depth m	nos	total area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.700	1.250	1.000	0.875
(3)	0.700	0.250	1.000	0.175
		1.700	sum	1.210

1075
1250

1/2

br2–l40

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br2 PE 84 + 28 m (Perkebunan br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.16 + 1.25) : 2
= 1.21 m

area = width x depth
= 0.25 x 1.21
= 0.301 m2

section	area	length	nos	volume
	m2	m		m3
Ia	1.2100	2.150	1.00	2.601
Ib	0.3012	0.250	1.00	0.075
Ic	0.6835	2.600	1.00	1.777
II	0.6835	5.000	1.00	3.418
III	0.6835	5.000	1.00	3.418
IV	0.6835	5.800	1.00	3.964
V	0.6835	5.000	1.00	3.418
VI	0.6835	5.000	1.00	3.418
VII	0.6835	5.000	1.00	3.418
Ic	0.6835	2.600	1.00	1.777
Ib	0.3012	0.250	1.00	0.075
Ia	1.2100	2.150	1.00	2.601
	sum	40.80		29.959

Total volume = 29.960 m3

Grand Total volume (6 Beam) = 6.00 x 29.960 m3

= 179.758 m3

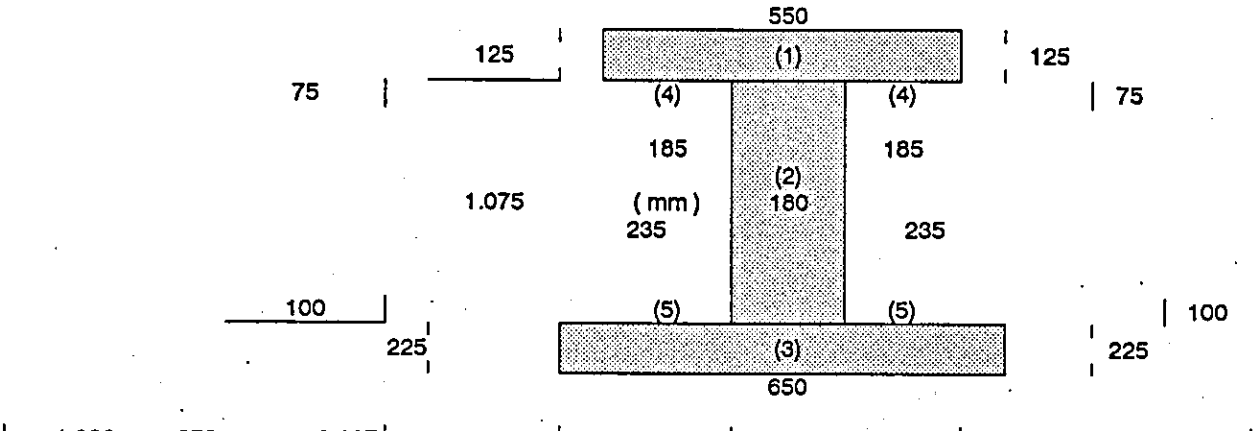
br2–I40

2/2

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br2 PE 84 + 28 m (Perkebunan Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K–400,l = 31.60 m

Main Beam Section



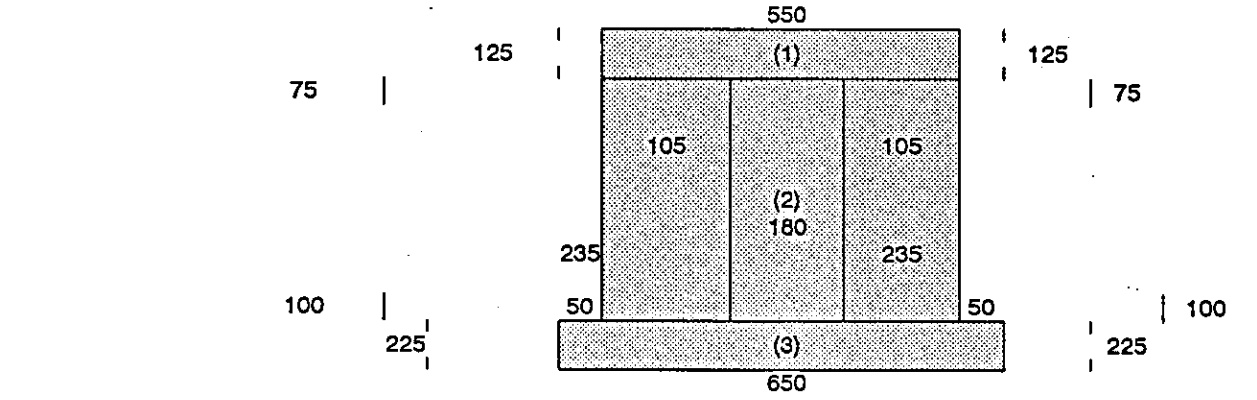
Total length = 31.60 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.180	1.250	1.000	0.225
(3)	0.650	0.225	1.000	0.146
(4)	0.185	0.075	2.000	0.014
(5)	0.235	0.100	2.000	0.024
			sum	
	area section main beam		=	0.4774

Volume 1 = area x length
= 0.477 x 31.60
= 15.09 m3

End Block Section L = 1.200 m

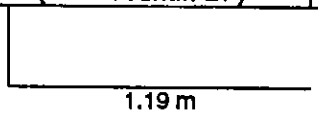


2. Bearing Block Area

1075
1250

piece	width m	depth m	nos	total area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.550	1.250	1.000	0.688
(3)	0.650	0.225	1.000	0.146
		1.600	sum	0.903

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br2 PE 84 + 28 m (Perkebunan Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.075 + 1.30) : 2
= 1.19 m

area = width x depth
= 0.185 x 1.19
= 0.220 m2

section	area	length	nos	volume
	m2	m		m3
Ia	0.9025	1.200	1.00	1.083
Ib	0.2197	0.250	1.00	0.055
Ic	0.4774	3.627	1.00	1.731
II	0.4774	4.500	1.00	2.148
III	0.4774	6.446	1.00	3.077
IV	0.4774	6.000	1.00	2.864
V	0.4774	4.500	1.00	2.148
Ic	0.4774	3.627	1.00	1.731
Ib	0.2197	0.250	1.00	0.055
Ia	0.9025	1.200	1.00	1.083
	sum	31.60		15.9765

Block out Cross beam

width		depth	area	length	nos	volume
top	bottom					
m	m	m	m2	m	m	m3
0.400	0.60	0.185	0.0925	1.1875	4	0.439

volume per beam = 15.9765 + 0.439 = 16.416 m3

Total volume = **16.416** m3

Total volume (10 beam) = **10** x 16.4158 m3

= **164.159** m3

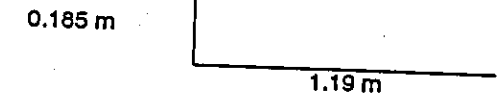
Grand Total volume = **164.1588** + **179.758** m3

= **343.9168** m3

beam–br2

2/2

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br2 PE 64 + 28 m (Perkebunan Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.075 + 1.30) : 2
= 1.19 m

area = width x depth
= 0.185 x 1.19
= 0.220 m2

section	area	length	nos	volume
	m2	m		m3
Ia	0.9025	1.200	1.00	1.083
Ib	0.2197	0.250	1.00	0.055
Ic	0.4774	3.627	1.00	1.731
II	0.4774	4.500	1.00	2.148
III	0.4774	6.446	1.00	3.077
IV	0.4774	6.000	1.00	2.864
V	0.4774	4.500	1.00	2.148
Ic	0.4774	3.627	1.00	1.731
Ib	0.2197	0.250	1.00	0.055
Ia	0.9025	1.200	1.00	1.083
	sum	31.60		15.9765

Block out Cross beam

width		depth	area	length	nos	volume
top	bottom					
m	m	m	m2	m	m	m3
0.400	0.60	0.185	0.0925	1.1875	4	0.439

volume per beam = 15.9765 + 0.439 = 16.416 m3

Total volume = 16.416 m3

Total volume (10 beam) = 10 x 16.4158 m3

= 164.159 m3

Grand Total volume = 164.1588 + 179.758 m3

= 343.9168 m3

beam-br2

2/2

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	MAIN BEAM Br P2 PE 84 + 28 m (Perkebunan Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(1)	13	1.45		1.45	0.50		3.40	4	13.60	0.995	13.532	outer Beam
(l = 5.077 m)	(2)	16	0.45	0.70		0.70		1.85	7	12.95	1.560	20.202	and end Block
2 nos	(3)	13	1.32		1.32	0.55	0.40	3.59	4	14.36	0.995	14.288	
	(4)	13	1.80					1.80	2	3.60	0.995	3.582	
	(5)	13		0.30	0.55	0.30		1.15	3	3.45	0.995	3.433	
	(6)	16	1.45		1.45	1.50		4.40	2	8.80	1.560	13.728	
	(7)	13		0.46	0.55	0.46	0.30	1.77	7	12.39	0.995	12.328	
	(8)	16		1.75	0.55	1.75		4.05	7	28.35	1.560	44.226	
	(9)	13	4.98					4.98	6	29.86	0.995	29.713	
(I)	(10)	16		0.10	0.45	0.10	0.10	0.75	70	52.50	1.560	81.900	
	(11)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(12)	13		1.75	0.08	1.75		3.58	15	53.70	0.995	53.432	
	(13)	13	4.78					4.78	14	66.88	0.995	66.544	
	(14)	13		0.46	0.55	0.46	0.30	1.77	8	14.16	0.995	14.089	
	(15)	13	0.45	0.40		0.40	0.30	1.55	8	12.40	0.995	12.338	
	(16)	16	1.15	0.20	1.15	0.20	0.26	2.96	2	5.92	1.560	9.235	
	(17)	13		0.30		0.30		0.60	8	4.80	0.995	4.776	
											sum	410.449	
						sub total	:	410.449	x	2.000	=	820.898	

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(18)	13		1.75	0.08	1.75		3.58	10	35.80	0.995	35.621	
(l = 4.500 m)	(19)	13	4.40					4.40	20	88.00	0.995	87.560	
2 nos	(20)	13	0.45	0.40		0.40	0.30	1.55	10	15.50	0.995	15.423	
	(21)	13		0.46	0.55	0.46	0.30	1.77	10	17.70	0.995	17.612	
(II)	(22)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(23)	13		0.30		0.30		0.60	10	6.00	0.995	5.970	
											sum	175.289	
						sub total	:	175.289	x	2.000	=	350.578	
Inner Beams	(24)	13		1.75	0.08	1.75		3.58	14	50.12	0.995	49.869	
(l = 6,466 m)	(25)	13	6.35					6.35	20	126.92	0.995	126.285	
1 nos	(26)	13	0.45	0.40		0.40	0.30	1.55	14	21.70	0.995	21.592	
(III)	(27)	13		0.46	0.55	0.46	0.30	1.77	14	24.78	0.995	24.656	
	(28)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(29)	16		0.30		0.30		0.60	14	8.40	0.995	8.358	
											sum	243.864	
						sub total	:	243.864	x	1.000	=	243.864	
	(30)	13		1.75	0.08	1.75		3.58	13	46.54	0.995	46.307	
Inner Beams	(31)	13	5.90					5.90	20	118.00	0.995	117.410	
(l = 6,000 m)	(32)	16	0.45	0.40		0.40	0.30	1.55	13	20.15	0.995	20.049	
1 nos	(33)	13		0.46	0.55	0.46	0.30	1.77	13	23.01	0.995	22.895	
(IV)	(34)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(35)	13		0.30		0.30		0.60	13	7.80	0.995	7.761	
											sum	227.527	
						sub total	:	227.527	x	1.000	=	227.527	
Exterior Beam	(36)	16	1.15	0.20	1.15		0.26	2.76	2	5.52	1.560	8.611	
(V)	(37)	16	0.55	0.15	0.55		0.26	1.51	5	7.55	0.995	7.512	
2 nos	(38)	13	0.75		0.75	0.08	0.16	1.74	5	8.70	0.995	8.657	
											sum	24.780	
						sub total	:	24.780	x	2.000	=	49.560	

Total 1 pcs (31.60 Span) = 1,692.427 Kg ↓

Total 10 pcs (31.60 Span) = 10.00 x 1,692.43 Kg

= 16,924.27 Kg

mb-br2

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	MAIN BEAM Br P2 PB 84 + 28 m (Perkebunan Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

		Shape steel						length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Section	Type	ø	a	b	c	d	2 x e						
Segment	B1	13	600	1,660	150	1,660		4.070	30	122.10	0.995	121.490	outer Beam
(l = 5.000 m)	B2	13		300	720	300		1.320	16	21.12	0.995	21.014	and end Block
2 nos	B3	13	1,600	620	1,600			3.820	16	61.12	0.995	60.814	
	B4	13		886	650	310		1.846	30	55.38	0.995	55.103	
	B5	13		1,045	650	310		2.005	30	60.15	0.995	59.849	
	B6	16	4,300	675		750		5.725	5	28.63	1.560	44.655	
	B7	16	4,950					4.950	24	118.80	1.560	185.328	
	B8	16	1,000			150		1.150	16	18.40	1.560	28.704	
	B9	13		1,000		750		1.750	2	3.50	0.995	3.483	
											sum	580.4401	1,160.880
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	887.077

		Shape steel						length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Section	Type	ø	a	b	c	d	2 x e						
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	887.077
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
1 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	443.538
Segment	B1	13	600	1,660	150	1,660		4.070	33	134.31	0.995	133.638	Inner of Beam
(l = 5.800 m)	B2	13		886	720	310		1.916	33	63.23	0.995	62.912	
1 nos	B3	13		1,045	650	310		2.005	33	66.16	0.995	65.834	
	B4	16	5,720					5.720	24	137.28	1.560	214.157	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	505.295	505.295

Main Beam l = 5.000 m (2 Segment)	=	1,160.880	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (1 Segment)	=	443.538	Kg
Main Beam l = 5.800 m (1 Segment)	=	505.295	Kg
Grand total (1 pcs)	=	**3,883.867**	**Kg**

total (6 pcs) l = 40.80 m	=	**6.000**	**x**	**3,883.867**	**kg**
	=	**23,303.201**	**kg**		
total (10 pcs) l = 31.60 m	=	**16,924.27**	**kg**		
Grand total	=	**23,303.20**	**+**	**16,924.27**	**kg**
	=	**40,227.47**	**kg**		

mb-br2a

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	MAIN BEAM BR P2 PB 84 + 28 M (Perkebunan Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

$$S = -l^2/8.f \times [\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}] - [\{2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$$

(a)	=	$l^2 / 8.f$		
(b)	=	$2.f/l$		
(c)	=	$4.f/l$		
(d)	=	$(4.f/l)^2$		
(e)	=	$(4.f/l)^2 + 1$		
(f)	=	$@sqrt((4.f/l)^2 + 1)$	= $@sqrt (e)	
(g)	=	$-2.f/l.@sqrt((4.f/l)^2+1)$	= $-(b) \times (f)$	
(h)	=	$-4f/l+@sqrt(4f/l)^2+1$	= $(-c) + (f)$	
(i)	=	$1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$	= $1/2 \times ln\ (h)$	
S1	=	$[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$		= (g) + (i)
(k)	=	$-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\}$	= (b) x (f)	
(l)	=	$[\{4.f/l)+@sqrt(4.f/l)^2+1)$	= (c) + (f)	
(m)	=	$1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$	= $1/2 \times ln(l)$	
S2	=	$-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$		= (k) + (m)

$$S = (-a) \times [\ (S1) - (S2)]$$

S is length of parabola curve

te-br2

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	MAIN BEAM BR P2 PE 84 + 28 M (Perkebunan Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 40.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
2	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66
3	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
4	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66

f = Average

nos wire per tendon = 19 nos

sum of tendon length = 19 x 85.6625 = 1,627.59 m

nos wire per tendon = 12 nos

sum of tendon length = 12 x 85.6625 = 1,027.95 m

sum 2,655.54 m

Total = 0.80 x 2,655.54 x 6.00 = 12,746.59 kg

te-br2

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	MAIN BEAM BR P2 PE 84 + 28 M (Perkebunan Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 31.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
2	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
3	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
4	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
5	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
6	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
					total												201.742

f = Average

nos wire per tendon	=	7	nos				
sum of tendon length	=	7	x	201.742	=	1,412.20	m
Total per beam	=	0.8	x	1,412	=	1,129.76	kg
Grand Total (5 Beam)	=	5.00	x	1,129.76	=	5,648.79	kg
Grand Total (10 Beam)	=	2.00	x	5,648.79	=	11,297.57	kg
Grand Total	=	12,746.59	+	11,297.57	=	24,044.168	kg

te-br2

2/2

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	CROSS BEAM Br2 PE 84 + 28 m (Perkebunan Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K–400 (L = 31.60 m)

section	volume cross beam width w	depth d	area (m 2)	thick t	nos	volume
	m	m		m		m3
(1)	1.390	1.050	1.4595	0.200	1.00	0.2919
	sum volume per pcs				=	0.2919
	nose per row				=	4.0000 nos
	volume per row				=	4.0000 x 0.2919
					=	1.1676 m3
	nose per span				=	4.00 row
					=	4.0000 x 1.1676
	Total volume per span				=	4.6704 m3
	Total volume (2) span				=	2 x 4.6704
					=	9.3408 m3

Structure Concrete Class K–400 (L = 40.80 m)

section	volume cross beam per span width w	depth d	area (m 2)	thick t	nos	volume	
	m	m		m		m3	
(1)	0.620	1.250	0.77500	0.200	1.00	0.155	Cross Beam End
(2)	0.060	0.050	0.00150	0.200	4.00	(0.002)	
	sum volume per pcs				=	0.1526	
	Volume nose per row				=	5 x 0.1526	
					=	0.763	
	nose per span				=	2 row	
	Total volume per span				=	2 x 0.763	
					=	1.526 m3	

Structure Concrete Class K–400 (L = 40.80 m)

section	volume cross beam per span width w	depth d	area (m 2)	thick t	nos	volume			
	m	m		m		m3			
(1)	1.140	1.250	1.42500	0.150	1.00	0.214	Cross Beam Central		
(2)	0.300	0.120	0.01800	0.150	2.00	(0.011)			
(3)	0.250	0.250	0.03125	0.150	2.00	(0.019)			
	sum volume per pcs				=	0.1842			
	Volume per row				=	5	x	0.1842	
					=	0.9210			
	nose per span				=	2	row		
					=	2		x	0.921
	Total volume per span				=	1.842	m3		
	Total volume per span				=	1.526	+	1.842	m3
					=	3.368	m3		
	Grand Total				=	3.368	+	9.341	m3
					=	12.709	m3		

cb–br2

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	PANEL SLAB Br2 PE 84 + 28 m (Perkebunan Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K–400 (L = 31.60 m)

section	volume panel slab width w	depth d	area (m 2)	thick t	nos	volume			
	m	m		m		m3			
(1)	1.000	1.580	1.58	0.070	1.00	0.1106			
	sum volume per pcs				=	0.1106			
	nose per row				=	4.0000	row	x	0.1106
					=	0.4424	m3		
	nos of per span				=	4.00		x	31
					=	124	nos		
	Total volume per span				=	13.7144	m3		
	Total volume (2) Span				=	2.000	x	13.714	m3
					=	27.429	m3		

Structure Concrete Class K–400 (L = 40.80 m)

section	volume panel slab width w	depth d	area (m 2)	thick t	nos	volume			
	m	m		m		m3			
(1)	1.000	1.200	1.20000	0.070	1.00	0.084			
	sum volume per pcs				=	0.0840			
	Volume nos per row				=	5	x	0.0840	
	nose per row				=	0.4200	m3		
	nos of per span				=	5.00		x	40
					=	200	nos		
	Total volume per span				=	0.084	x	200	
					=	16.800	m3		
	Grand Total				=	27.429	+	16.800	
					=	44.2288	m3		

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Pier BR – P2 (Perkebunan Br) STA : 84 + 28 (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles dia. = 0.400 m
area = 0.126 m2

description	part	width m	depth m	area m2	length m	nos	volume m3
footing	1	0.000	0.000	0.000	0.000	0.000	8.565
cap	2	0.000	0.000	0.000	0.000	0.000	5.600
footing	3	5.100	1.000	5.100	10.000	1.000	51.000
column	4	1.200	3.900	4.680	5.600	1.000	26.208
column	5	0.000	3.900	0.581	0.000	2.000	4.533
cap	6	0.000	1.100	1.272	0.000	2.000	2.799
cap	7	1.800	1.100	1.980	8.200	1.000	16.236
block out	8	0.250	0.250	0.063	1.100	4.000	0.275
block out	9	0.250	0.250	0.063	0.650	4.000	0.163
cap	10	0.800	0.100	0.080	10.000	1.000	(0.800)
pipe reducing		area	x	nos pipe	x	depth	
		0.126	x	28.000	x	0.100	(0.352)
						sum	114.227

thick of pipe = 0.0750 m
inner diameter = 0.4000 – 0.15
= 0.2500 m
area = 0.250 x 3.142 x 0.063
= 0.0494 m
depth = 2.1000 m
nos = 28.00
volume = 0.05 x 2.10 x 28.00
= 2.9020 m3
sub total = 114.22 + 2.9020
= 117.12 m3

Grand Total = **2.00 x 117.12 m3**

= **234.25 m3**

co–pie2

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – P2 (Perkebunan) STA : 84 + 28 (L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.406	m
area	=	0.129	m2
H	=	6.300	m ✓
W	=	5.100	m
L	=	10.00	m

description	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	1.945	0.58	10.00	1.00	5.84
stem	2	0.55	0.500	0.28	9.20	1.00	2.53
stem	3	0.55	0.500	0.14	9.20	1.00	1.27
stem	4	0.20	0.500	0.10	10.00	1.00	1.00
stem	5	0.20	0.250	0.03	10.00	1.00	0.25
stem	6	1.00	3.355	3.36	10.00	1.00	33.55
stem	7	1.80	0.300	0.27	10.00	1.00	2.70
footing	8	2.30	0.300	0.35	10.00	1.00	3.45
footing	9	5.10	1.000	5.10	10.00	1.00	51.00
wingwall	10	3.00	1.945	5.84	0.40	2.00	4.67
wingwall	11	3.30	1.055	1.74	0.40	2.00	1.39
wingwall	12	2.30	2.000	4.60	0.40	2.00	3.68
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	1.945	2.00	0.18
App.Slab	16	3.00	0.200	0.30	9.200	1.00	2.76
	17	0.275	0.05	0.01	9.200	1.00	0.13
inside blockout	lbo	0.30	0.250	0.08	1.10	4.00	0.330
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	28.00	x	0.10	(0.362)
						sum	115.03

concrete filling in piles

thick of pipe	=	0.01036	m					
inner diameter	=	0.406	–	0.021				
	=	0.385	m					
area	=	0.250	x	3.142	x	0.148		
	=	0.11658	m2					
depth	=	6.000	m	--->	0.333	x	17.000	m
nos	=	28.000						
volume	=	0.117	x	6.000	x	28.00		
	=	19.59	m3 ✓					
sub total	=	115.025	+	19.59				
	=	134.611	m3					
Total	=	**134.611**	m3					
Grand Total (R & L)	=	**134.611**	+	117.27 m3				
	=	**251.882**	m3					

description	nos	side	depth (m)	Total (m)	Remark
Supply and Driving of SPP dia.400 mm for Abutment	28	L / S	17	476.00	
Supply and Driving of PC dia.400 mm for Abutment	28	R / S	15	420.00	
Supply and Driving of PC dia.400 mm for Pier	28	L / S	14	392.00	
	28	R / S	12	336.00	

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – P2 (Perkebunan) STA : 84 + 28 (R)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

diameter of PC pipe piles

Structural concrete class K225 (m3)

dia.	=	0.400	m
area	=	0.126	m2
H	=	6.300	m
W	=	5.100	m
L	=	10.00	m

description	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	1.945	0.58	10.00	1.00	5.84
stem	2	0.55	0.500	0.28	9.20	1.00	2.53
stem	3	0.55	0.500	0.14	9.20	1.00	1.27
stem	4	0.20	0.500	0.10	10.00	1.00	1.00
stem	5	0.20	0.250	0.03	10.00	1.00	0.25
stem	6	1.00	3.355	3.36	10.00	1.00	33.55
stem	7	1.80	0.300	0.27	10.00	1.00	2.70
footing	8	2.30	0.300	0.35	10.00	1.00	3.45
footing	9	5.10	1.000	5.10	10.00	1.00	51.00
wingwall	10	3.00	1.945	5.84	0.40	2.00	4.67
wingwall	11	3.30	1.055	1.74	0.40	2.00	1.39
wingwall	12	2.30	2.000	4.60	0.40	2.00	3.68
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	1.945	2.00	0.18
App.Slab	16	3.00	0.200	0.30	9.200	1.00	2.76
	17	0.275	0.05	0.01	9.200	1.00	0.13
inside blockout	Ibo	0.30	0.250	0.08	1.10	4.00	0.330
rear blockout	Rbo			0.00			0.000
bearing pad	Bp			0.00			0.000
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.126	x	28.00	x	0.10	(0.352)
						sum	115.04

concrete filling in piles

thick of pipe	=	0.07500	m			
inner diameter	=	0.400	–	0.150		
	=	0.250	m			
area	=	0.250	x	3.142	x	0.063
	=	0.0490	m2			
depth	=	2.100	m			
nos	=	28.000				
volume	=	0.049	x	2.100	x	28.00
	=	2.89	m3			
sub total	=	115.03	+	2.89		
	=	117.92	m3			
Total	=	117.92	m3			

abr2r-co

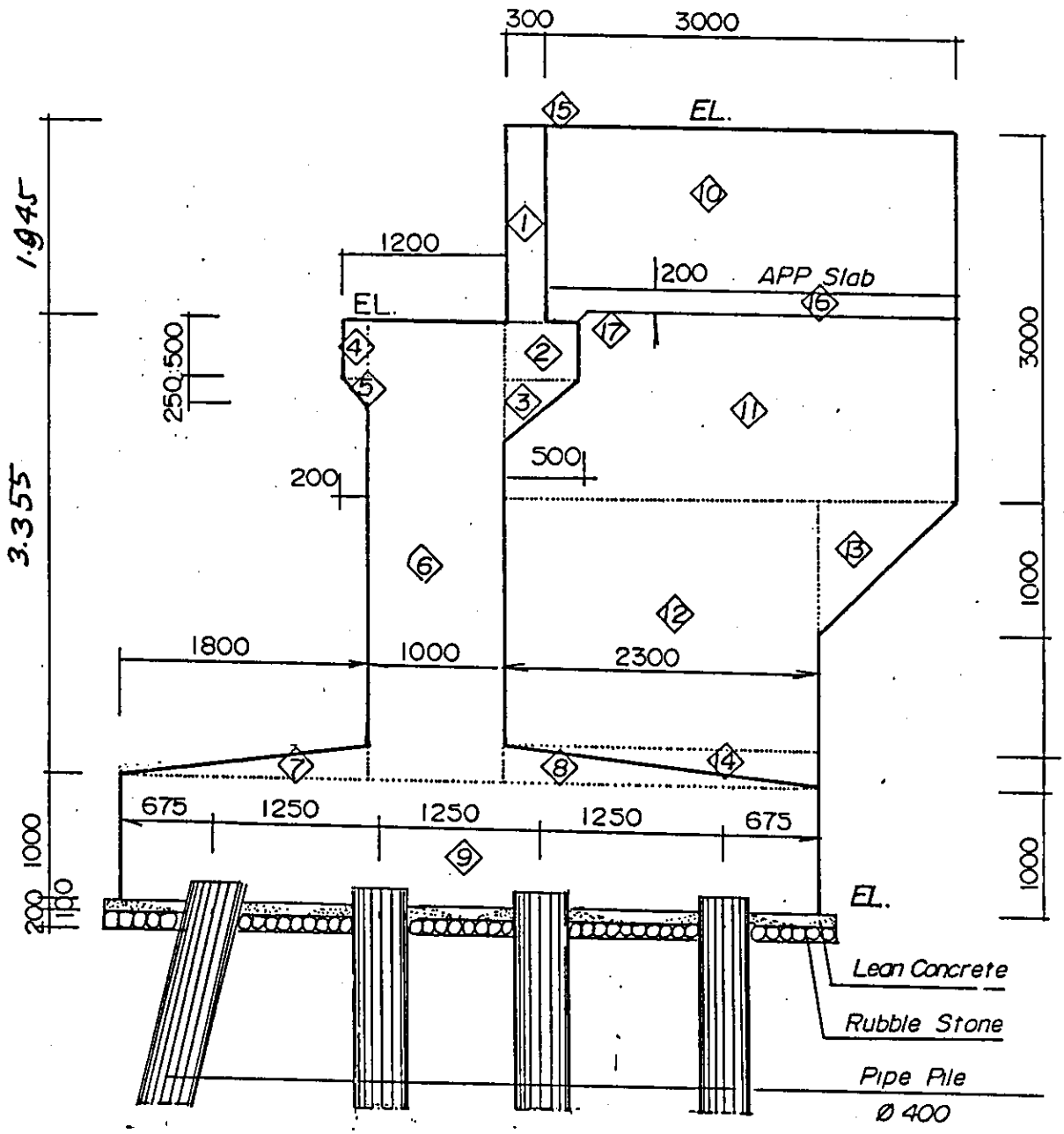
Direktorat General of Water Resources Development Direktorat of River Medan Flood Contral	Concrete Inside Pipe of Pier Br P2 PE 84 + 28 m (Perkebunan Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of concrete pile	=	0.40	m			
area	=	0.126	m2			
thick of pipe	=	0.075	m			
inner diameter	=	0.400	–	0.150		
	=	0.250	m			
area	=	0.250	x	3.142	x	0.063
	=	0.0490	m2			
depth	=	2.100	m			
nos	=	28.000				
volume	=	0.049	x	2.100	x	28.00
	=	2.89	m3			
Volume inside pipe (R & L)	=	2.89	+	2.89	m3	
	=	5.77	m3			

Description	Nos	Side	Depth (m)	total (m)	Remark
Supply and Driving of SPP dia.400 mm for Abutment	28.00	L/S	17.00	476.00	
Supply and Driving of PC dia.400 mm for Abutment	28.00	R/S	15.00	420.00	
Supply and Driving of PC dia.400 mm for Pier	28.00	L/S	14.00	392.00	
	28.00	R/S	12.00	336.00	
			sum	1,148.00	

inc-br2


300
3000
EL.
1.945
1200
200
APP Slab
EL.
250
500
3.355
200
500
3000
1000
1800
1000
2300
675
1250
1250
1250
675
1000
200
100
EL.
Lean Concrete
Rubble Stone
Pipe Pile
Ø 400

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br P2 (Perkebunan Br) Sta : 84 + 28 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	1.945	2.00	1.17
wall	1a	1.945	10.000	1.00	19.45
wall	1b	1.945	9.200	1.00	17.89
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	9.200	1.00	4.60
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	9.200	1.00	6.90 ✓
stem	4	0.200	0.500	2.00	0.20 ✓
	4a	0.500	10.000	1.00	5.00 ✓
stem	5	0.200	0.250	2.00	0.05 ✓
	5a	0.320	10.000	1.00	3.20 ✓
stem	6	1.000	3.300	2.00	6.60
stem	6a	2.250	10.000	1.00	22.50
stem	6b	9.200	2.000	1.00	18.40
footing ✓	7	1.800	0.300	2.00	0.54 ✓
footing ✓	8	2.300	0.300	2.00	1.38 ✓
footing ✓	9	5.100	1.000	2.00	10.20 ✓
footing ✓	10	1.000	10.000	2.00	20.00 ✓
wingwall	11	1.945	3.000	4.00	23.34
wingwall	11a	0.400	1.945	2.00	1.56 ✓
wingwall	12	3.300	1.055	4.00	13.10 ✓
wingwall	13	0.400	1.055	2.00	0.84 ✓
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	2.300	2.000	4.000	18.400
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	200.33

Total = 2.00 x 200.33

= 400.65 sq.m

180.297 FW1

62.97 m² FW.1 (baras[illegible]

137.40 m² FW2 (55 [illegible]

abr2-fw

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Pier Br P2 (Perkebunan Besi) Sta : 84 + 28 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
footing	1	5.100	1.000	2.00	10.20
footing	2	10.000	1.000	2.00	20.00
column	3	1.200	3.900	2.00	9.36
column	4	7.000	3.900	2.00	54.60
bottom cap	5	0.600	7.000	2.00	8.40
bottom cap	6	1.400	1.600	2.00	4.48
cap	7	1.000	1.100	2.00	2.20
cap	8	10.000	1.100	1.00	11.00
cap	9	1.100	10.000	1.00	11.00
cap	10	0.800	1.000	2.00	1.60
cap	11	10.000	1.000	1.00	10.00
			sum	=	142.84

66,90 Fw.1

54.94 Fw.2

Total = 2.00 x 142.84

= 285.68 sq.m

pier2-fw

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P2 PE 84 + 28 m Perkebunan Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

Diameter of pipe = dp	=	40	cm					
thick of pipe = t	=	1.031	cm					
Diameter of spiral = ds	=	1.30	cm					
covering of concrete = d'	=	5	cm					
dc	=	40 − 2 x (1.031 + 5)						
	=	27.938	cm					
(dc − ds)	=	27.938	−	5				
	=	22.938	cm					
Ag	=	0.25 x @pi x dp^2						
	=	1,256.64	cm2					
Ac	=	0.25 x @pi x dc^2						
	=	613.028	cm2					
f'c	=	225	kg/cm2					
fsy	=	4,000	kg/cm2					
Ag/Ac	=	2.050						
f'c/fsy	=	0.056						
ps	=	0.45 x (Ag/Ac − 1) x f'c/fsy						
ps	=	0.027						
Area of spiral = as	=	0.25*@pi x ds^2						
	=	1.327	cm2					
spacing of spiral = s	=	as x @pi x (dc−ds) / ps x @pi x dc^2/4						
s	=	1.327 x 3.142 x 22.938 / 0.027 x 3.142 x 195.133						
	=	95.649 / 16.291	cm					
	=	5.87	cm					
say	=	7.00	cm					
Length of spiral per picth	=	@sqrt((@pi x dc)^2 + s^2)						
	=	88.05	cm					
length of culumn	=	650	cm					
nos of pitch	=	92.86						
length of spiral	=	88.05	x	92.86				
	=	8,175.93	cm					
	=	81.76	m					
Radius of steel ring								
Outer diameter of pile	=	40.64	cm					
Thick of pile	=	1.031	cm					
Inner diameter of pile	=	40.64	−	2.062				
	=	38.578	cm					
Concrete covering	=	5	cm					
Diameter of steel bar	=	1.6	cm					
Diameter of ring	=	1.3	cm					
Inner diameter of pile	=	38.578						
Distance outside to ring	=	5	+	0.65	+	1.6	+	0.65
	=	7.90	cm					
Inner diameter of ring	=	38.578	−	7.90				
	=	30.678	cm					
Radius of ring steel	=	30.678	:	2				
	=	15.339	cm					
	=	0.153	m					

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P2 PE 84 + 28 m Perkebunan Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

Length of each = 2 x @pi x r
= 2 x 3.141592 x 0.153 m
= 0.964 m

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	6.50		0.36	7.21	28.00	8	57.68	1.56	89.98
2.	R1	13									81.76	1.00	81.35
3.	Ring	13						0.964		6	5.78	1.00	5.75
												sum	177.09

Total weight = 28.00 x 177.0850 = 4,958.38 kg

total = 1.00 x 4,958.38 = 4,958.38 kg ✓

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.25	2.30			2.55	28.00	8	20.40	1.560	31.824
2.	R1	13		0.55				0.55		12	6.60	0.995	6.567
3.	Ring	13											
												sum	38.391

Total weight = 28.00 x 38.391 = 1,074.95 kg
total = 2.00 x 1,074.95 = 2,149.90 kg
Grand total = 4,958.383 + 2,149.896 = 7,108.28 kg

inb-br2

Note :- Reinf. steel Pipe Abutment(L) h = 6.5 4.958.383.
- Reinf. steel Pipe Pier h = 2.55 (R/C) 2.149.90
- Reinf. steel pipe Abutment(R) 1,074.95

8,183.25

Quantity of Reinforcing Bar for Pier Br P2

pbr2–rb

NO.	TYPE	DIMENSION					Diam. D. (m m)	LENGTH (m)	QUANTITY (Pcs)	TOTAL LENGTH (m)	WEIGHT (m) (Kg)	TOTAL WEIGHT (Kg)	DESCRIPTION
		a	b	c	d	e							
1	P.1	9,800				240	20	10.040	55.00	552.20	2.250	1,242.45	
2	P.2	9,800				240	20	10.040	27.00	271.08	2.250	609.93	
3	P.3	4,900	800			300	25	6.000	79.00	474.00	3.980	1,886.52	
4	P.4		150	4,940	800	300	25	6.190	79.00	489.01	3.980	1,946.26	
5	P.5		800	6,060	800	240	20	7.900	4.00	31.60	2.250	71.10	
6	P.6	3,250				240	20	3.490	30.00	104.70	2.250	235.58	
7	P.7				6,550	300	25	6.850	15.00	102.75	3.980	408.95	
8	P.8				1,000	156	13	1.156	504.00	582.62	0.995	579.71	
9	P.9	6,900				192	16	7.092	52.00	368.78	1.560	575.30	
10	P.10	1,200			6,550	300	25	8.050	112.00	901.60	3.980	3,588.37	
11	P.11	1,700	900	1,100		300	25	4.000	79.00	316.00	3.980	1,257.68	
12	P.12	900	1,050	1,100	150	300	25	3.500	79.00	276.50	3.980	1,100.47	
13	P.13	1,200				156	13	1.356	360.00	488.16	0.995	485.72	
14	P.14	350	400	400		156	13	1.306	36.00	47.02	0.995	46.78	
15	P.15	6,900				156	13	7.056	20	141.12	0.995	140.41	
16	P.16	1,700				156	13	1.856	133.00	246.85	0.995	245.61	
17	P.17	8,200				192	16	8.392	30.00	251.76	1.560	392.75	
18	R.1	2,076				192	16	2.268	54.00	122.47	1.560	191.06	
19	R.2	3,020				192	16	3.212	30.00	96.36	1.560	150.32	
20	S.1	200	500	500		156	13	1.356	40.00	54.24	0.995	53.97	
19	S.2	825				156	13	0.981	36.00	35.32	0.995	35.14	
20	H.1	250	2,300			192	16	2.742	224.00	614.21	1.560	958.16	PC Pipe Pile
21	H.2	550				156	13	0.706	336.00	237.22	0.995	236.03	28 Nos
											Sum	16,438	

Grand Total 2 x 16,438 = 32,876.53 Kg

pbr2–rb

Lean concrete (m3)

diameter of concrete pile = 0.40 m

area = 0.126 m2

Lean Concrete 0.10

5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	10.30	55.62	0.10	5.56

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.10	m			
nos	=	28				
volume	=	0.126	x	0.10	x	28
	=	0.352	m3			
net volume	=	5.56	–	0.352		
	=	5.21	m3			
nos	=	2.00				
Total volume	=	2.00	x	5.21		
	=	10.42	m3		(Abutment L & R)	
Total volume	=	10.42	m3		(for Pier L & R)	
Grand Total	=	10.42	+	10.42	m3	
	=	20.84	m3			

Rubble stone (m3)

diameter of concrete pile = 0.40 m

area = 0.126 m2

Rubble Stone 0.200

5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	10.30	55.62	0.20	11.12

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.20	m			
nos	=	28				
volume	=	0.126	x	0.20	x	28
	=	0.704	m3			
net volume	=	11.12	–	0.704		
	=	10.42	m3			
nos	=	2.00				
Total volume	=	2.00	x	10.42		
	=	20.84	m3		(Abutment L & R)	
Total volume	=	20.84	m3		(for Pier L & R)	
Grand Total	=	20.84	+	20.84	m3	
	=	41.68	m3			

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	List of Bill Quantity BR P.3	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Deck

1	Quantity of concrete of Deck slab ✓
2	Quantity of concrete of Panel slab
3	Quantity of concrete of cross beam
4	Quantity of Wooden Form Work ✓
5	Quantity of Reinforcement steel Deck slab
6	Quantity of Reinforcement steel Cross beam
	Quantity of Haindrail
	Quantity of Expansion Joint

Girder

7	Quantity of concrete of Main Beam ✓
8	Quantity of Reinforcement steel Main Beam ✓
9	Quantity of Tendon ✓
10	Quantity of Anchorage
11	Quantity of Bearing pad
12	

Abutment

13	Quantity of concrete of Abutment ✓
14	Quantity of Reinforcing steel
15	Quantity of Wooden Form Work ✓
16	Quantity of Inside pile Reinf.steel ✓
17	Quantity of Concrte Inside pile ✓
	Quantity of Lean Concrete & Rubble stone ✓

PIER

19	Quantity of concrete of Pier ✓
20	Quantity of Reinforcing steel
21	Quantity of Wooden Form Work ✓
22	Quantity of Inside pile Reinf.steel
23	Quantity of Concrte Inside pile ✓

Abutment の Reinforcing Bar の数量は Br. P1 の場合の単位 volume 当 concrete の為定.

list- br1

Br P3 PE 115 + 06 m

(Titi Besi Br)

NO	DESCRIPTION	UNIT	Quantity	Unit Price (Rp)	REMARKS
	BRIDGE				
	SUPERSTRUCTURE				
	CONCRETE				
	a. Deck Slab (Insitu)				
	Concrete (Type – B) Class K 350	Cu.m	117.06		
	Reinforcing Steel Deform	Kg	21,071.09		
	Wooden Form Work with Supporting Frame	Sq.m	227.00		
	b. Precast Prestressed Concrete Main Beam				
	Precast Prestressed Concrete Beam (Type – A) Class K 400	Cu.m	195.26		
	Reinforcing Steel Deform	Kg	27,173.59		
	Tendon [H.T.W] diameter 13 mm	Kg	14,086.58		
	Live end Anchorage	Nos	78.00		
	c. PC Panel Concrete				
	PC Panel Concrete, t = 7 cm (Type – A) Class K 400	Cu.m	23.88		
	Reinforcing Steel Deform	Kg	6,989.71		
	c. PC Diaphragm Concrete				
	PC Diaphragm Concrete (Type – A) Class K 400	Cu.m	5.70		
	Reinforcing Steel Deform	Kg	1,070.66		
	PRESTRESSING				
	Prestressing Tendon [H.T.W.] diameter 13 mm for Main Beam (incl. Diaphragm)	each	11.00		
	Grout Injection Main Beam (icl. Diaphragm)	m	1,243.80		
	ERECTING				
	Erection of Concrete Main Beam	Kg	488,142.50		
	(Incl.PC Diaphragm , PC Panel)				

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. P3 PE 115 + 06 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 Length = 40.80 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	7.000	1.715	1.000	1.715	41.200	70.658
End slab	(2)	0.055	0.500	0.027	2.000	0.055	4.250	0.234
End slab	(3)	0.300	0.200	0.060	2.000	0.120	7.200	0.864
							sum	71.756

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.223	1.500	0.334	1.000	0.334	41.200	13.751
Right Side slab	(5)	0.223	1.500	0.334	1.000	0.334	41.200	13.751
							sum	27.501

Total Volume K.350 = 71.756 + 27.501
= 99.257 m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	43.000	0.688	0.550	0.378
Railing post	(7)	0.165	0.160	0.026	43.000	1.135	0.470	0.534
slab side Walk	(8)	0.250	1.266	0.317	2.000	0.633	41.200	26.085
Wall	(9)	0.470	0.100	0.047	2.000	0.094	37.840	3.557
							sum	30.554

Total Volume K.225 = 30.554 m3 ✓

slab –br3

a.Slab deck K.350 Length = 16.60 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	7.000	1.715	1.000	1.715	17.000	29.155
	(2)	0.055	0.500	0.027	2.000	0.055	5.600	0.308
	(3)	0.300	0.200	0.060	2.000	0.120	7.200	0.864
							sum	30.327

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side	(4)	0.223	1.500	0.334	1.000	0.334	17.000	5.674
Right Side	(5)	0.223	1.500	0.334	1.000	0.334	17.000	5.674
							sum	11.348

Total Volume K.350 = 30.327 + 11.348
= 41.675 m3
Total Volume K.350 = 41.6745
= **41.675 m3**

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab side Walk	(6)	0.100	0.160	0.016	19.000	0.304	0.550	0.167
	(7)	0.165	0.160	0.026	19.000	0.502	0.470	0.236
	(8)	0.250	1.266	0.317	2.000	0.633	17.000	10.763
	(9)	0.470	0.100	0.047	2.000	0.094	15.560	1.463
							sum	12.629

Total Volume K.225 = 12.629 m3
= 12.629 + 12.629
= 25.25743 m3
Grand Total K.350 = 99.25675 + 41.67 m3
= 140.9312 m3

Grand Total K.225 = 30.55365 + 25.26 m3
= 55.81108 m3

slab –br3

Direktorat General Water Resources Development Direktorat General Medan Flood Control	DECK SLAB AND HAND RAIL Br P3 PE 115 + 06 m (Titi Gantung Br)	japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 41.20 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	7.20	2.16	2.00	4.32
end slab	(2)	0.20	7.20	1.44	2.00	2.88
	(3)	0.35	3.00	1.05	2.00	2.10
	(4)	0.47	1.50	0.71	4.00	2.84
In side walk (curb)	(5)	0.25	41.20	10.30	2.00	20.60
In side walk	(6)	0.47	40.95	19.25	2.00	38.49
out side walk	(7)	0.47	39.10	18.38	2.00	36.75
Railing post	(8)	0.10	0.92	0.09	42.00	3.86
Railing post	(9)	0.16	0.45	0.07	84.00	6.05
Railing post	(10)	0.14	0.45	0.06	84.00	5.10
					sum	123.00
				numbers of span =		1.00
total	=	123.00	x	1.00	=	**123.00**
	=	**123.00**	m2			

Scafolding (L = 41.20 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.50	41.20	61.80	2.00	123.60
end slab	(2)	0.45	41.20	18.540	2.00	37.08
					sum	160.68
				numbers of span =		1.00
total	=	160.68	x	1.00	=	**160.68**

Wooden form works with supporting frame (L = 17.00 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	7.20	2.16	2.00	4.32
end slab	(2)	0.20	7.20	1.44	2.00	2.88
	(3)	0.35	5.60	1.96	2.00	3.92
	(4)	0.47	1.50	0.71	4.00	2.84
In side walk (curb)	(5)	0.25	17.00	4.25	2.00	8.50
In side walk	(6)	0.47	16.75	7.87	2.00	15.75
out side walk	(7)	0.47	16.10	7.57	2.00	15.13
Railing post	(8)	0.10	0.92	0.09	18.00	1.66
Railing post	(9)	0.16	0.45	0.07	36.00	2.59
Railing post	(10)	0.14	0.45	0.06	36.00	2.19
					sum	59.77
				numbers of span =		1.00
total	=	59.77	x	1.00	=	59.77
	=	**59.77**	m2			

Scafolding (L = 17.00 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.50	17.00	25.50	2.00	51.00
end slab	(2)	0.45	17.00	7.650	2.00	15.30
					sum	66.30
				numbers of span =		1.00
total	=	66.30	x	1.00	=	66.30
	=	**66.30**	m2			

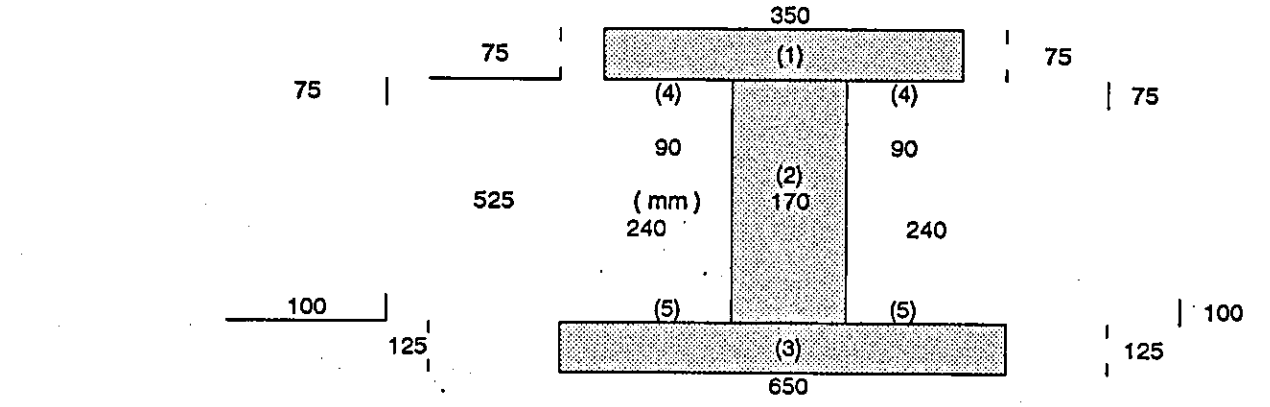
Grand total form Work	=	**59.77**	+	**123.00**	=	**182.77**	**m2**
Grand total Scafolding	=	**66.30**	+	**160.68**	=	**226.98**	**m2**

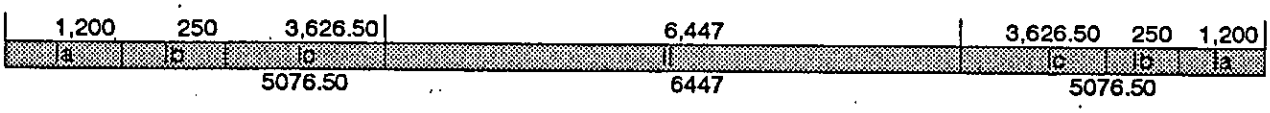
f-wrkbr3

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br P3 PE 114 + 76 m (Titi Gantung)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K-400,l = 16.60 m

Main Beam Section





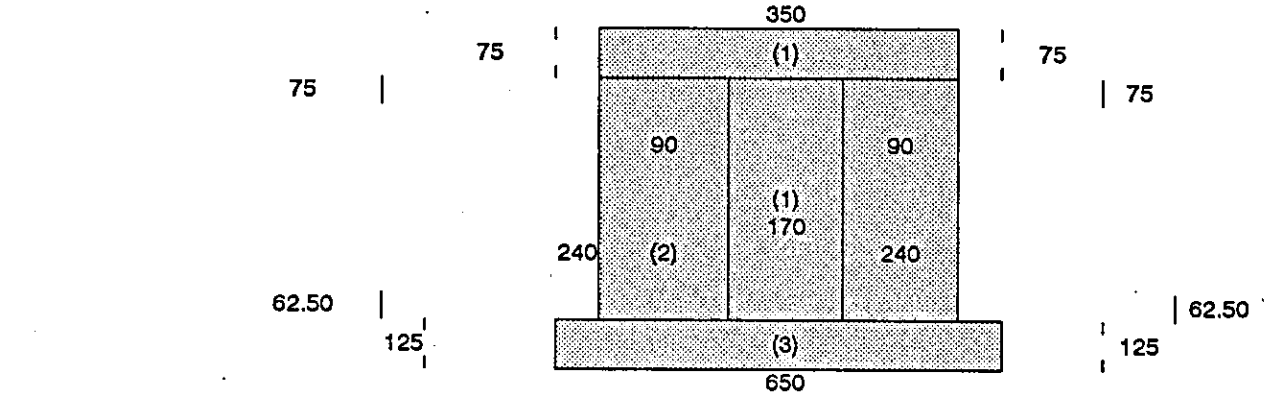
Total length = 16.60 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.350	0.075	1.000	0.026
(2)	0.170	0.525	1.000	0.089
(3)	0.650	0.125	1.000	0.081
(4)	0.090	0.075	2.000	0.007
(5)	0.240	0.100	2.000	0.024
			sum	
	area section main beam		=	0.22750

Volume 1 = area x length
= 0.22750 x 16.60
= 3.777 m3

End Block Section L = 1.200 m



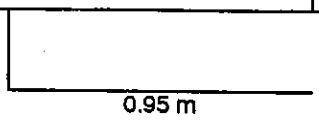
2. Bearing Block Area

piece	width m	depth m	nos	total area m2
(1)	0.350	0.713	1.000	0.249
(2)	0.350	0.063	1.000	0.022
(3)	0.650	0.125	1.000	0.081
		0.900	sum	0.3525

1/2

beam-L16

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br P3 PE 114 + 76 m (Titi Gantung)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (0.525 + 0.725) : 2
= 0.63 m

area = width x depth
= 0.09 x 0.63
= 0.0562 m2

section	area	length	nos	volume
	m2	m		m3
Ia	0.35250	1.200	1.00	0.423
Ib	0.05625	0.250	1.00	0.014
Ic	0.22750	3.627	1.00	0.825
II	0.08925	6.447	1.00	0.575
Ic	0.22750	3.627	1.00	0.825
Ib	0.05625	0.250	1.00	0.014
Ia	0.35250	1.200	1.00	0.423
	sum	16.60		3.100

Total volume = 3.100 m3

Total volume (5 Beam) = 5.00 x 3.100 m3

= 15.498 m3

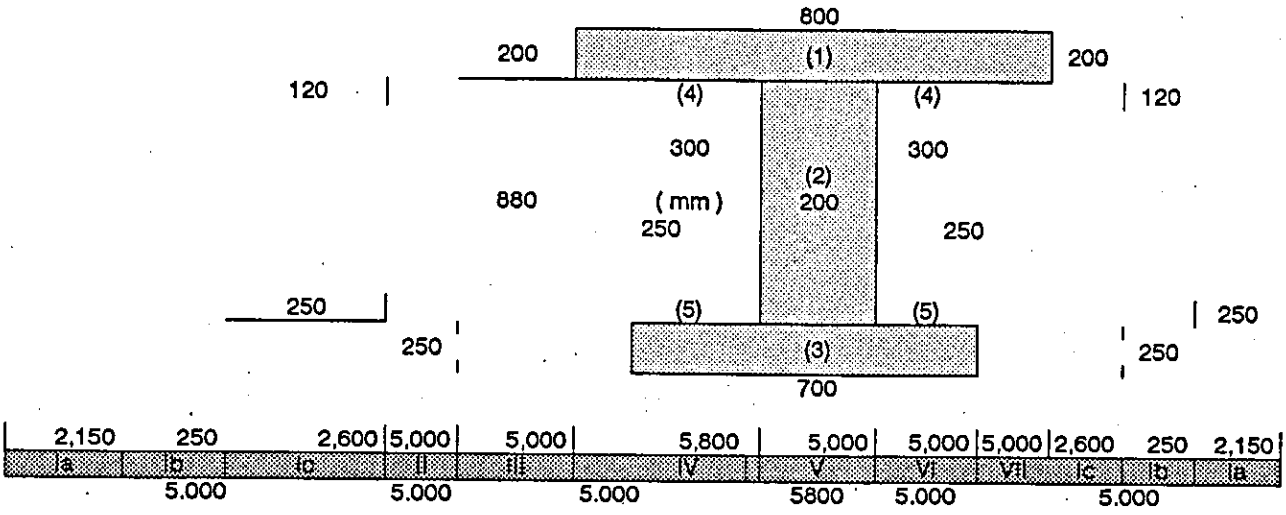
br3–L16

2/2

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam BrP3 PE 114 + 76 m (Titi Gantung br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K−400,l = 40.80 m

Main Beam Section



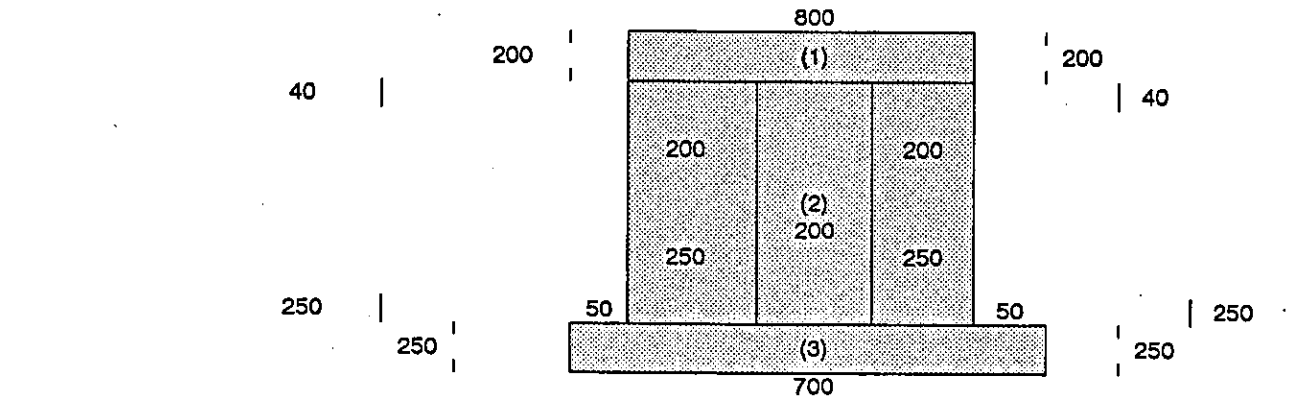
Total length = **40,800** m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.200	1.250	1.000	0.250
(3)	0.700	0.250	1.000	0.175
(4)	0.300	0.120	2.000	0.036
(5)	0.250	0.250	2.000	0.062
			sum	
	area section main beam		=	0.6835

Volume 1 = area x length
= 0.6835 x 40,800
= 27,886.80 m3

End Block Section L = 2.150 m



2. Bearing Block Area

piece	width m	depth m	nos	total area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.700	1.250	1.000	0.875
(3)	0.700	0.250	1.000	0.175
		1.700	sum	1.210

1075
1250

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam BrP3 PE 114 + 76 m (Titi Gantung br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

length = 0.25 m

End Block Section L = 0.25 m

depth = (1.16 + 1.25) : 2
= 1.21 m

area = width x depth
= 0.25 x 1.21
= 0.301 m2

section	area	length	nos	volume
	m2	m		m3
Ia	1.2100	2.150	1.00	2.601
Ib	0.3012	0.250	1.00	0.075
Ic	0.6835	2.600	1.00	1.777
II	0.6835	5.000	1.00	3.418
III	0.6835	5.000	1.00	3.418
IV	0.6835	5.800	1.00	3.964
V	0.6835	5.000	1.00	3.418
VI	0.6835	5.000	1.00	3.418
VII	0.6835	5.000	1.00	3.418
Ic	0.6835	2.600	1.00	1.777
Ib	0.3012	0.250	1.00	0.075
Ia	1.2100	2.150	1.00	2.601
	sum	40.80		29.959

Total volume = 29.960 m3

Total volume (6 Beam) = 6.00 x 29.960 m3

= **179.758** m3

Grand Total = **179.757** + **15.50** m3

= **195.257** m3

beam-br3

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Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	MAIN BEAM Br P3 PE 115 + 06 m (Titi Gantung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	B1	13	0.700	0.820	0.120	0.820		2.460	20	49.20	0.995	48.954	outer of Beam
(l = 5.0765 m)	B2	13		0.150	0.270	0.150		0.570	6	3.42	0.995	3.403	and end Block
2 nos	B3	13		0.820	0.570	0.820		2.210	6	13.26	0.995	13.194	
	B4	13		0.600	0.270	0.300		1.170	20	23.40	0.995	23.283	
	B5	13		0.680	0.570	0.300		1.550	20	31.00	0.995	30.845	
	B6	16	3.058	0.400		0.420		3.878	4	15.51	1.560	24.199	
	B7	16	5.026					5.026	9	45.23	1.560	70.565	
	B8	16	1.000			0.120		1.120	8	8.96	1.560	13.978	
	B9	13	0.900			0.200		1.100	2	2.20	0.995	2.189	
											sum	230.609	
					Sub Total		:	2.000	x	230.608	=	461.218	
Segment	B10	13	0.700	0.820	0.120	0.820		2.460	26	63.96	0.995	63.640	
(l = 6.477 m)	B11	13		0.150	0.270	0.150		0.570	26	14.82	0.995	14.746	
1 nos	B12	13		0.680	0.570	0.300		1.550	26	40.30	0.995	40.099	
	B13	16	6.397					6.397	17	108.75	1.560	169.648	
	B14	13	1.000			0.120		1.120	16	17.92	0.995	17.830	
	B15	16		0.175		0.500		0.675	4	2.70	1.560	4.212	
	B16	13		0.500		0.175		0.675	4	2.70	0.995	2.687	
											sum	312.862	
					Sub Total		:	1.000	x	312.862	=	312.862	

Total for 1 pcs (l = 16.60)	=	774.079	kg	
Total for 5 pcs	=	5.00	x	774.08 Kg
	=	3870.39		Kg

mb-br3a

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	MAIN BEAM Br P3 PE 115 + 06 m (Titi Gantung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Segment	B1	13	600	1,660	150	1,660		4.070	30	122.10	0.995	121.490	outer Beam
(l = 5.000 m)	B2	13		300	720	300		1.320	16	21.12	0.995	21.014	and end Block
2 nos	B3	13	1,600	620	1,600			3.820	16	61.12	0.995	60.814	
	B4	13		886	650	310		1.846	30	55.38	0.995	55.103	
	B5	13		1,045	650	310		2.005	30	60.15	0.995	59.849	
	B6	16	4,300	675		750		5.725	5	28.63	1.560	44.655	
	B7	16	4,950					4.950	24	118.80	1.560	185.328	
	B8	16	1,000			150		1.150	16	18.40	1.560	28.704	
	B9	13		1,000		750		1.750	2	3.50	0.995	3.483	
											sum	580.4401	1,160.880
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	887.077

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	887.077
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
1 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	443.538
Segment	B1	13	600	1,660	150	1,660		4.070	33	134.31	0.995	133.638	Inner of Beam
(l = 5.800 m)	B2	13		886	720	310		1.916	33	63.23	0.995	62.912	
1 nos	B3	13		1,045	650	310		2.005	33	66.16	0.995	65.834	
	B4	16	5,720					5.720	24	137.28	1.560	214.157	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	505.295	505.295

Main Beam l = 5.000 m (2 Segment)	=	1,160.880	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (1 Segment)	=	443.538	Kg
Main Beam l = 5.800 m (1 Segment)	=	505.295	Kg
Grand total (1 pcs)	=	3,883.867	Kg

total (6 pcs) l = 31.60 m	=	6.000	x	3,883.867	kg
	=	23,303.201	kg		
total (5 pcs) l = 16.60 m	=	3,870.39	kg		
Grand total	=	23,303.20	+	3,870.39	kg
	=	27,173.59	kg		

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	MAIN BEAM BR P3 PE 115 + 06 m (Titi Gantung Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

$$S = -l^2/8.f \times [\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ln[\{-4f/l+@sqrt(4f/l)^2+1\}] - [\{2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$$

(a)	=	$l^2/8.f$			
(b)	=	$2.f/l$			
(c)	=	$4.f/l$			
(d)	=	$(4.f/l)^2$			
(e)	=	$(4.f/l)^2 + 1$			
(f)	=	$@sqrt((4.f/l)^2 + 1)$	=	@sqrt (e)	
(g)	=	$-2.f/l.@sqrt((4.f/l)^2+1)$	=	$-(b) \times (f)$	
(h)	=	$-4f/l+@sqrt(4f/l)^2+1$	=	$(-c) + (f)$	
(i)	=	$1/2\ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$	=	1/2xln (h)	
S1	=	$[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$		=	(g) + (i)
(k)	=	$-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\}$	=	(b) x (f)	
(l)	=	$[\{4.f/l)+@sqrt(4.f/l)^2+1)$	=	(c) + (f)	
(m)	=	$1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$	=	1/2 x ln(l)	
S2	=	$-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$		=	(k) + (m)

$$S = (-a) \times [(S1) - (S2)]$$

S is length of parabola curve

te-br3

1/2

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	MAIN BEAM BR P3 PE 115 + 06 m (Titi Gantung Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 40.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
2	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66
3	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
4	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66

f = Average

nos wire per tendon	=	19	nos				
sum of tendon length	=	19	x	85.6625	=	1,627.59	m
nos wire per tendon	=	12	nos				
sum of tendon length	=	12	x	85.6625	=	1,027.95	m
				sum		2,655.54	m

Total = 0.80 x 2,655.54 x 6.00 = 12,746.59 kg

te−br3

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	MAIN BEAM BR P3 PE 115 + 06 m (Titi Gantung Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 16.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.276	18.600	156.685	0.030	0.059	0.004	1.004	1.002	(0.030)	0.942	(0.030)	(0.059)	0.030	1.061	0.030	0.059	18.611
2	0.276	18.600	156.685	0.030	0.059	0.004	1.004	1.002	(0.030)	0.942	(0.030)	(0.059)	0.030	1.061	0.030	0.059	18.611
3	0.276	18.600	156.685	0.030	0.059	0.004	1.004	1.002	(0.030)	0.942	(0.030)	(0.059)	0.030	1.061	0.030	0.059	18.611
					total												55.83

f = Average

nos wire per tendon	=	6	nos				
sum of tendon leñgth	=	6	x	55.8327	=	335.00	m
Total per beam	=	0.8	x	335.00	=	268.00	kg
Grand Total (5 Beam)	=	5.00	x	268.00	=	1,339.99	kg
Grand Total	=	12,746.59	+	1,339.99	=	14,086.581	kg

te-br3

2/2

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	PANEL SLAB Br3 PE 115 + 06 m (Titi Gantung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K–400 (L = 40.80 m)

	volume panel slab								
section	width w	depth d	area (m 2)	thick t	nos	volume			
	m	m		m		m3			
(1)	1.000	1.200	1.2	0.070	1.00	0.0840			
	sum volume per pcs				=	0.0840			
	nose per row				=	5.0000	row	x	0.0840
					=	0.42	m3		
	nos of per span				=	5.00		x	40
					=	200	nos		
	Total volume per span				=	16.8000	m3		
	Total volume per Span				=	1.000	x	16.800	m3
					=	16.800	m3		

Structure Concrete Class K–400 (L = 16.60 m)

	volume panel slab								
section	width w	depth d	area (m 2)	thick t	nos	volume			
	m	m		m		m3			
(1)	1.000	1.580	1.58000	0.070	1.00	0.111			
	sum volume per pcs				=	0.1106			
	Volume nos per row				=	4	x	0.1106	
	nose per row				=	0.4424	m3		
	nos of per span				=	4.00		x	16
					=	64	nos		
	Total volume per span				=	0.1106	x	64	
					=	7.078	m3		
	Grand Total				=	16.800	+	7.078	
					=	23.8784	m3		

pl–br3

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	REINFORCING STEEL OF PANEL DECK SLAB Br P3 PE 115 + 06 m (Titi Gantung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of panel deck slab per span (l = 40.80 m) 1 / 1

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
P3	16	1,520	150	1,520	150	150	3.490	2.00	6.98	1.560	10.889	main steel
P4	16	1,520	200	1,520	200	150	3.590	1.00	3.59	1.560	5.600	
P5	12	450	0	0	0	110	0.560	6.00	3.36	0.995	3.343	tranverse steel
P6	12	950	0	0	0	220	1.170	4.00	4.68	0.995	4.657	
P7	12	400	0	0	0	0	0.400	4.00	1.60	0.995	1.592	
										sum	26.081	

nos of span	=	1.00					
nos of panel slab per span	=	5	x	1.00	=	5.00	nos
total nos of span	=	5.00	x	40.00	=	200.00	nos
sub total weight	=	200.00	x	26.081	=	**5,216.20**	kg

Quantities steel of panel deck slab per span (l = 16.60 m)

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
P3	16	1,520	150	1,520	150	150	3.490	2.00	6.98	1.560	10.889	main steel
P4	16	1,520	200	1,520	200	150	3.590	1.00	3.59	1.560	5.600	
P5	12	450	0	0	0	110	0.560	6.00	3.36	0.995	3.343	tranverse steel
P6	12	950	0	0	0	220	1.170	4.00	4.68	0.995	4.657	
P7	12	400	0	0	0	0	0.400	4.00	1.60	0.995	1.592	
										sum	26.08	

nos of span	=	1.00					
nos of panel slab per span	=	17.00	x	1.00	=	17.00	nos
total nos of span	=	4.00	x	17.00	=	68.00	nos
sub total weight	=	26.08	x	68.00	=	1,774	kg
Grand total for panel	=	**5,216.20**	+	**1,774**	=	**6,989.71**	kg

repl-p3

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	CROSS BEAM Br3 PE 115 + 06 m (Titi Gantung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K-400 (L = 16.60 m)

section	volume cross beam width w	depth d	area (m 2)	thick t	nos	volume
	m	m		m		m3
(1)	1.390	1.050	1.4595	0.200	1.00	0.2919
	sum volume per pcs				=	0.2919
	nose per row				=	4.0000 nos
	volume per row				=	2.0000 x 0.2919
					=	0.5838 m3
	nose per span				=	2.00 row
					=	2.0000 x 0.5838
	Total volume per span				=	1.1676 m3
	Total volume per span				=	2 x **1.1676**
					=	**2.3352 m3**

Structure Concrete Class K-400 (L = 40.80 m)

section	volume cross beam per span width w	depth d	area (m 2)	thick t	nos	volume	
	m	m		m		m3	
(1)	0.620	1.250	0.77500	0.200	1.00	0.155	Cross Beam End
(2)	0.060	0.050	0.00150	0.200	4.00	(0.002)	
	sum volume per pcs				=	0.1526	
	Volume nose per row				=	5 x 0.1526	
					=	0.763	
	nose per span				=	2 row	
	Total volume per span				=	2 x 0.763	
					=	1.526 m3	

Structure Concrete Class K-400 (L = 40.80 m)

section	volume cross beam per span width w	depth d	area (m 2)	thick t	nos	volume		Cross Beam Central
	m	m		m		m3		
(1)	1.140	1.250	1.42500	0.150	1.00	0.214		
(2)	0.300	0.120	0.01800	0.150	2.00	(0.011)		
(3)	0.250	0.250	0.03125	0.150	2.00	(0.019)		
	sum volume per pcs				=	0.1842		
	Volume per row				=	5 x 0.1842		
					=	0.9210		
	nose per span				=	2 row		
					=	2 x 0.921		
	Total volume per span				=	1.842 m3		
	Total volume per span				=	1.526 + 1.842 m3		
					=	3.368 m3		
	Grand Total				=	3.368 + 2.335 m3		
					=	5.703 m3		

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF CROSS BEAM Br P3 PE 115 + 06 m (Titi Gantung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of Cross beam (l = 16.60 m) 1 / 1

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
C.1	13	1,290	0	0	0	200	1.490	3.00	4.47	0.995	4.448	End
C.2	13	1,290	140	1,290	140	140	3.000	5.00	15.00	0.995	14.925	
										sum	19.37	

Nos per row	=	3.00		
sub total per span	=	12.00	x	19.37
	=	232.47	Kg	

Quantities steel of Cross beam (l = 40.8 m)

C.1	13	590	140	590	140	140	1.600	6.00	9.60	0.995	9.552	End
C.2	13	1,200	140	1,200	140	140	2.820	3.00	8.46	0.995	8.418	
										sum	17.97	

Nos per row	=	5.00		
sub total per span	=	20.00	x	17.97
	=	359.39	Kg	

C.1	13	1,090	140	1,090	140	140	2.600	6.00	15.60	0.995	15.522	Center
C.2	13	1,200	140	1,200	140	140	2.820	3.00	8.46	0.995	8.418	
										sum	23.94	

Nos per row	=	5.00		
sub total per span	=	20.00	x	23.94
	=	478.79	Kg	
Grand total	=	1,070.660	Kg	

cr-br3

Direktorat General of Water Resources Development Direktorat of River Medan Flood Contral	Concrete Inside Pipe of Pier Br P3 PE 115 + 06 m (Titi Gantung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of concrete pile		=	0.406	m			
	area	=	0.129	m2			
thick of pipe	=	0.011036	m				
inner diameter	=	0.406	–	0.022			
	=	0.384	m				
area	=	0.250	x	3.142	x	0.147	
	=	0.12946	m2				
depth	=	6.500	m				
nos	=	28.000					
volume	=	0.129	x	6.500	x	28.00	
	=	23.56	m3 ✓				
Volume inside pipe	=	23.56	m3	(PIER)			

Description	Nos	Side	Depth (m)	total (m)	Remark
Supply and Driving of SPP dia.400 mm for Abutment	18.00	L/S ✓	25.00	450.00	
	32.00	R/S ✓	28.00	896.00	
Supply and Driving of SPP dia.400 mm forPier	28.00	center ✓	19.00	532.00	
			sum	**1,878.00**	

inc-br3

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Pier BR – P3 (Titi Gantung Br) STA : 114 + 76	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles
dia. = 0.406 m
area = 0.129 m2

describtion	part	width m	depth m	area m2	length m	nos	volume m3
footing	1	0.000	0.000	0.000	0.000	0.000	8.565
cap	2	0.000	0.000	0.000	0.000	0.000	5.600
footing	3	5.100	1.000	5.100	10.000	1.000	51.000
column	4	1.200	3.300	3.960	5.600	1.000	22.176
column	5	0.000	3.300	0.581	0.000	2.000	3.836
cap	6	0.000	1.800	1.272	0.000	2.000	4.580
cap	7	1.800	1.800	3.240	8.200	1.000	26.568
block out	8	0.250	0.250	0.063	1.100	4.000	0.275
block out	9	0.250	0.250	0.063	0.650	4.000	0.163
cap	10	1.050	0.800	0.840	10.000	1.000	(8.400)
pipe reducing		area	x	nos pipe	x	depth	
		0.129	x	28.000	x	0.100	(0.362)
						sum	114.000
		Grand Total	1.00	x	114.000		**114.000**

co–pie3

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – P3 (Titi Gantung Br) STA : 114 + 76 (R)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.406	m	
area	=	0.129	m2	
H	=	6.300	m	
W	=	5.100	m	
L	=	10.00	m	

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	2.045	0.61	10.00	1.00	6.14
stem	2	0.55	0.500	0.28	9.20	1.00	2.53
stem	3	0.55	0.500	0.14	9.20	1.00	1.27
stem	4	0.20	0.500	0.10	10.00	1.00	1.00
stem	5	0.20	0.250	0.03	10.00	1.00	0.25
stem	6	1.00	3.255	3.26	10.00	1.00	32.55
stem	7	1.80	0.300	0.27	10.00	1.00	2.70
footing	8	2.30	0.300	0.35	10.00	1.00	3.45
footing	9	5.10	1.000	5.10	10.00	1.00	51.00
wingwall	10	3.00	2.045	6.14	0.40	2.00	4.91
wingwall	11	3.30	0.955	1.58	0.40	2.00	1.26
wingwall	12	2.30	2.000	4.60	0.40	2.00	3.68
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	2.045	2.00	0.18
App.Slab	16	3.00	0.200	0.30	9.200	1.00	2.76
	17	0.275	0.05	0.01	9.200	1.00	0.13
inside blockout	lbo	0.30	0.250	0.08	0.70	5.00	0.262
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	32.00	x	0.10	(0.414)
						sum	114.32

concrete filling in piles

thick of pipe	=	0.01036	m					
inner diameter	=	0.406	–	0.021				
	=	0.385	m					
area	=	0.250	x	3.142	x	0.148		
	=	0.1165	m2					
depth	=	9.500	m	--->	0.333	x	28.000	m
nos	=	32.000						
volume	=	0.117	x	9.500	x	32.00		
	=	35.44	m3					
sub total	=	114.32	+	35.44				
	=	149.76	m3					
Total	=	149.76	m3					
Grand Total (R & L)	=	149.76	+	134.57	m3			
	=	284.33	m3					

abr3R–co

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR -- P3 (Titi Gantung Br) STA : 114 + 76 (L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

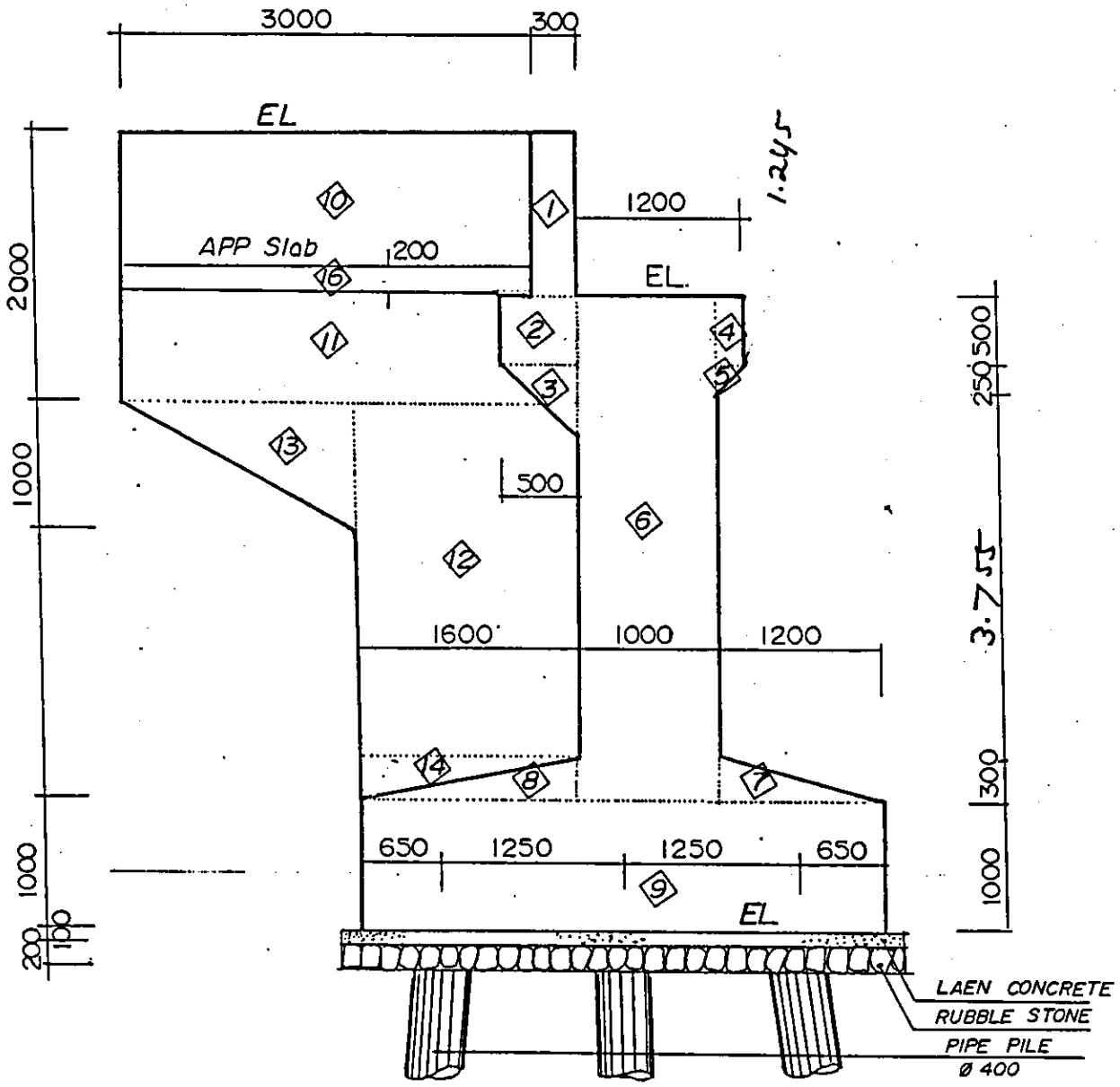
dia.	=	0.406	m
area	=	0.129	m2
H	=	6.000	m
W	=	3.800	m
L	=	10.00	m

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	1.245	0.37	10.00	1.00	3.74
stem	2	0.55	0.500	0.28	9.20	1.00	2.53
stem	3	0.55	0.500	0.14	9.20	1.00	1.27
stem	4	0.20	0.500	0.10	10.00	1.00	1.00
stem	5	0.20	0.250	0.03	10.00	1.00	0.25
stem	6	1.00	3.755	3.75	10.00	1.00	37.55
stem	7	1.80	0.300	0.27	10.00	1.00	2.70
footing	8	2.30	0.300	0.35	10.00	1.00	3.45
footing	9	5.10	1.000	5.10	10.00	1.00	51.00
wingwall	10	3.00	1.245	3.74	0.40	2.00	2.99
wingwall	11	3.30	1.755	2.90	0.40	2.00	2.32
wingwall	12	2.30	1.700	3.91	0.40	2.00	3.13
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	1.245	2.00	0.11
App.Slab	16	3.00	0.200	0.30	9.200	1.00	2.76
	17	0.275	0.05	0.01	9.200	1.00	0.13
inside blockout	lbo	0.30	0.250	0.08	1.10	4.00	0.330
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	18.00	x	0.10	(0.233)
						sum	115.68

concrete filling in piles

thick of pipe	=	0.01036	m					
inner diameter	=	0.406	-	0.021				
	=	0.385	m					
area	=	0.250	x	3.142	x	0.148		
	=	0.1165	m2					
depth	=	9.000	m	--->	0.333	x	27.000	m
nos	=	18.000						
volume	=	0.117	x	9.000	x	18.00		
	=	18.89	m3					
sub total	=	115.68	+	18.89				
	=	134.57	m3					
Total								
	=	**134.57**	m3					

abr3L-co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PIPE PILE
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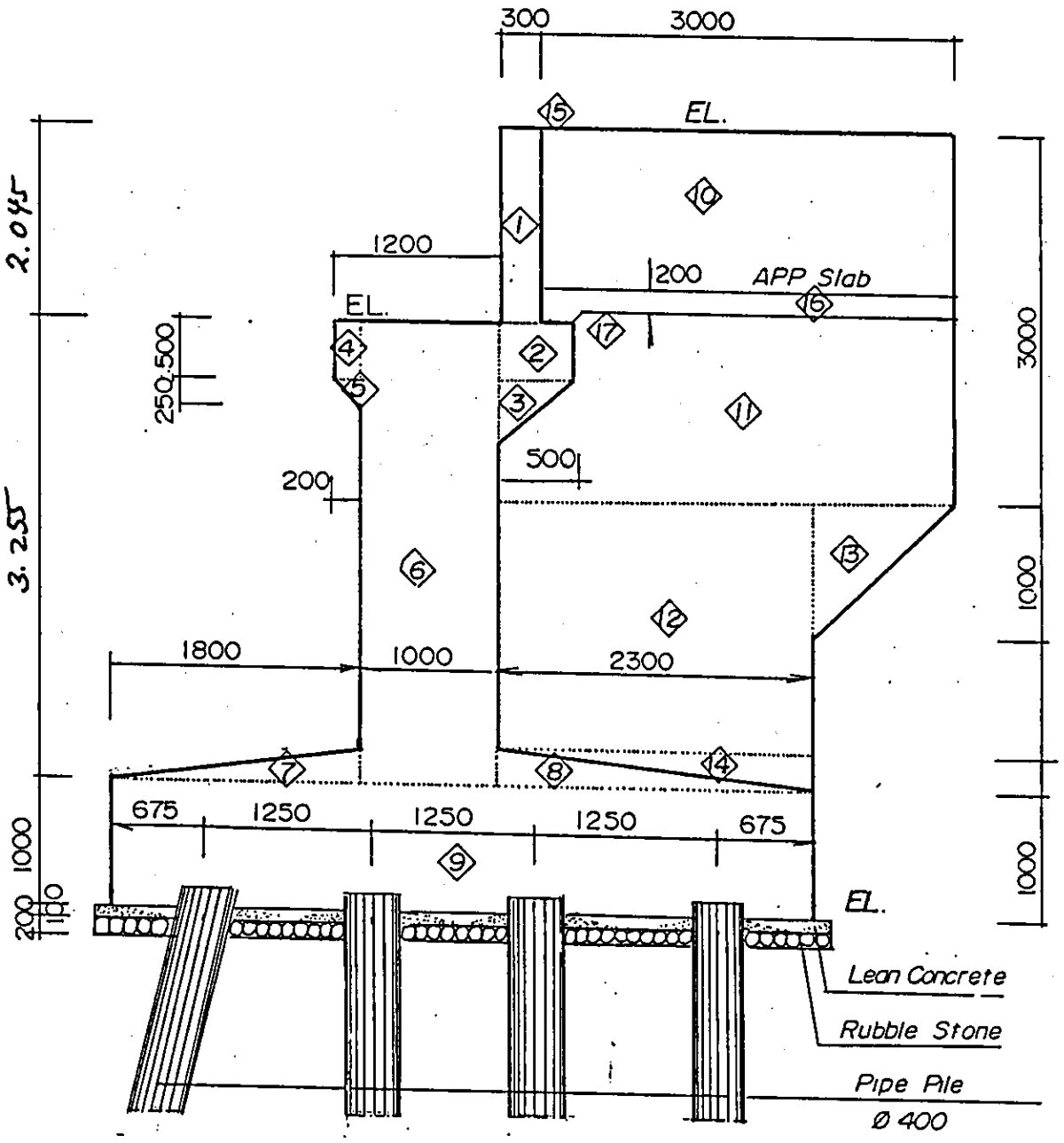
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Lean Concrete
Rubble Stone
Pipe Pile
Ø 400
2.045
3.255
3000
1000
1000
200
100
1000

Lean concrete (m3)

diameter of concrete pile = 0.40 m

area = 0.126 m2

Lean Concrete 0.10

4.1 m

width	length	area	depth	volume
m	m	m2	m	m3
4.10	10.30	42.23	0.10	4.22

reducing volume by pile

area	=	0.25	x	3.141	x	0.160	
	=	0.126	m2				
depth	=	0.10	m				
nos	=	18					
volume	=	0.126	x	0.10	x	18	
	=	0.226	m3				
net volume	=	4.22	–	0.226			
	=	3.997	m3				
nos	=	1.00					
Total volume	=	1.00	x	3.997			
	=	3.997	m3		(Abutment L)		
Total volume	=	5.21	m3		(for Pier)		
Grand Total	=	**5.21**	+	**4.00**	+	**5.21**	**m3**
	=	**14.42**	**m3**				

Rubble stone (m3)

diameter of concrete pile = 0.40 m

area = 0.126 m2

Rubble Stone 0.200

4.1 m

width	length	area	depth	volume
m	m	m2	m	m3
4.10	10.30	42.23	0.20	8.45

reducing volume by pile

area	=	0.25	x	3.141	x	0.160	
	=	0.126	m2				
depth	=	0.20	m				
nos	=	18					
volume	=	0.126	x	0.20	x	18	
	=	0.452	m3				
net volume	=	8.45	–	0.452			
	=	7.99	m3				
nos	=	1.00					
Total volume	=	1.00	x	7.99			
	=	7.99	m3		(Abutment L)		
Total volume	=	10.42	m3		(for Pier)		
Grand Total	=	**10.42**	+	**7.99**	+	**10.42**	
	=	**18.41**	**m3**				

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P3 PE 115 + 06 m Titi Gantung Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel inside pile (kg)

Diameter of pipe = dp	=	40	cm					
thick of pipe = t	=	1.031	cm					
Diameter of spiral = ds	=	1.30	cm					
covering of concrete = d'	=	5	cm					
dc	=	40 − 2 x (1.031 + 5)						
	=	27.938	cm					
(dc − ds)	=	27.938	−	5				
	=	22.938	cm					
Ag	=	0.25 x @pi x dp^2						
	=	1,256.64	cm2					
Ac	=	0.25 x @pi x dc^2						
	=	613.028	cm2					
f'c	=	225	kg/cm2					
fsy	=	4,000	kg/cm2					
Ag/Ac	=	2.050						
f'c/fsy	=	0.056						
ps	=	0.45 x (Ag/Ac − 1) x f'c/fsy						
ps	=	0.027						
Area of spiral = as	=	0.25*@pi x ds^2						
	=	1.327	cm2					
spacing of spiral = s	=	as x @pi x (dc−ds) / ps x @pi x dc^2/4						
		1.327	x	3.142	x	22.938		
s	=	0.027	x	3.142	x	195.133		
		95.649						
	=	16.291	cm					
	=	5.87	cm					
say	=	7.00	cm					
Length of spiral per picth	=	@sqrt((@pi x dc)^2 + s^2)						
	=	88.05	cm					
length of culumn	=	950	cm					
nos of pitch	=	135.71						
length of spiral	=	88.05	x	135.71				
	=	11,949.44	cm					
	=	119.49	m					
Radius of steel ring								
Outer diameter of pile	=	40.64	cm					
Thick of pile	=	1.031	cm					
Inner diameter of pile	=	40.64	−	2.062				
	=	38.578	cm					
Concrete covering	=	5	cm					
Diameter of steel bar	=	1.6	cm					
Diameter of ring	=	1.3	cm					
Inner diameter of pile	=	38.578						
Distance outside to ring	=	5	+	0.65	+	1.6	+	0.65
	=	7.90	cm					
Inner diameter of ring	=	38.578	−	7.90				
	=	30.678	cm					
Radius of ring steel	=	30.678	:	2				
	=	15.339	cm					
	=	0.153	m					

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P3 PE 115 + 06 m Titi Gantung Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel inside pile (kg)

Length of each = 2 x @pi x r
= 2 x 3.14159 x 0.153 m
= 0.964 m

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	9.50		0.36	10.21	18.00	8	81.68	1.560	127.42
2.	R1	13							(L)		119.49	0.995	118.90
3.	Ring	13						0.964		9	8.67	0.995	8.63
												sum	254.95

Total weight = 18.00 x 254.948 = 4,589.07 kg

total = 1.00 x 4,589.07 = **4,589.07** kg

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	9.00		0.36	9.71	32.00	8	77.68	1.560	121.181
2.	R1	13							(R)		119.49	0.995	118.897
3.	Ring	13						0.964		8	7.71	0.995	7.672
												sum	247.75

Total weight = 32.00 x 247.749 = 7,927.98 kg
total = 1.00 x 7,927.98 = 7,927.98 kg

Grand total = 4,589.071 + 7,927.98 = 12,517.052 kg

inb-br3

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br P3 (Titi Gantung Br) Sta : 115 + 06 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	1.245	2.00	0.75
wall	1a	1.245	10.000	1.00	12.45
wall	1b	1.245	9.200	1.00	11.45
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	9.200	1.00	4.60
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	9.200	1.00	6.90
stem	4	0.200	0.500	2.00	0.20
	4a	0.500	10.000	1.00	5.00
stem	5	0.200	0.250	2.00	0.05
	5a	0.320	10.000	1.00	3.20
stem	6	1.000	3.755	2.00	7.51
stem	6a	2.705	10.000	1.00	27.05
stem	6b	9.200	2.455	1.00	22.59
footing	7	1.200	0.300	2.00	0.36
footing	8	1.600	0.300	2.00	0.96
footing	9	3.800	1.000	2.00	7.60
footing	10	1.000	10.000	2.00	20.00
wingwall	11	1.245	2.000	4.00	9.96
wingwall	11a	0.400	1.245	2.00	1.00
wingwall	12	3.300	1.755	4.00	22.34
wingwall	13	0.400	1.755	2.00	1.40
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	1.600	1.700	4.000	10.880
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	1.600	4.000	0.96
			sum	=	180.83

Total	=	1.00	x	180.83		
	=	180.83		sq.m		
	=	201.23	+	180.833		sq.m
Grand Total	=	382.063		sq.m		

abr3-fwl

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br P3 (Titi Gantung Br) Sta : 115 + 06 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	2.045	2.00	1.23
wall	1a	2.045	10.000	1.00	20.45
wall	1b	2.045	9.200	1.00	18.81
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	9.200	1.00	4.60
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	9.200	1.00	6.90
stem	4	0.200	0.500	2.00	0.20
	4a	0.500	10.000	1.00	5.00
stem	5	0.200	0.250	2.00	0.05
	5a	0.320	10.000	1.00	3.20
stem	6	1.000	3.255	2.00	6.51
stem	6a	2.205	10.000	1.00	22.05
stem	6b	9.200	1.955	1.00	17.99
footing	7	1.800	0.300	2.00	0.54
footing	8	2.300	0.300	2.00	1.38
footing	9	5.100	1.000	2.00	10.20
footing	10	1.000	10.000	2.00	20.00
wingwall	11	2.045	3.000	4.00	24.54
wingwall	11a	0.400	2.045	2.00	1.64
wingwall	12	3.300	0.955	4.00	11.78
wingwall	13	0.400	0.955	2.00	0.76
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	2.300	2.000	4.000	18.400
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	201.23

Total = 1.00 x 201.23

= 201.23 sq.m

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abr3-fwr

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Pier Br P3 (Titi Gantung Br) Sta : 114 + 76 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
footing	1	5.100	1.000	2.00	10.20
footing	2	10.000	1.000	2.00	20.00
column	3	1.200	3.300	2.00	7.92
column	4	7.000	3.300	2.00	46.20
bottom cap	5	0.650	7.000	2.00	9.10
bottom cap	6	1.400	1.500	2.00	4.20
cap	7	1.000	1.800	2.00	3.60
cap	8	10.000	1.800	1.00	18.00
cap	9	1.800	10.000	1.00	18.00
cap	10	0.800	1.000	2.00	1.60
cap	11	10.000	1.000	1.00	10.00
			sum =		148.82

Total = 1.00 x 148.82 sq.m

= 148.82 sq.m

pier3-fw

Quantity of Reinforcing Bar for Pier Br P3

pbr3–rb

NO.	TYPE	DIMENSION a	b	c	d	e	Diam. D. (m m)	LENGTH (m)	QUANTITY (Pcs)	TOTAL LENGTH (m)	WEIGHT (m) (Kg)	TOTAL WEIGHT (Kg)	DESCRIPTION
1	P.1	9,800.00				240	20	10.040	55.00	552.20	2.250	1,242.45	
2	P.2	9,800.00				240	20	10.040	27.00	271.08	2.250	609.93	only left side Pier
3	P.3	4,900.00	800.00			300	25	6.000	79.00	474.00	3.980	1,886.52	
4	P.4		150.00	4,940.00	800.00	300	25	6.190	79.00	489.01	3.980	1,946.26	
5	P.5		800.00	6,060.00	800.00	240	20	7.900	4.00	31.60	2.250	71.10	
6	P.6	3,250.00				240	20	3.490	30.00	104.70	2.250	235.58	
7	P.7				5,950.00	300	25	6.250	15.00	93.75	3.980	373.13	
8	P.8				1,000.00	156	13	1.156	504.00	582.62	0.995	579.71	
9	P.9	6,900.00				240	16	7.140	44.00	314.16	1.560	490.09	
10	P.10	1,200.00			5,950.00	300	25	7.450	112.00	834.40	3.980	3,320.91	
11	P.11	1,700.00	900.00	1,100.00		300	25	4.000	79.00	316.00	3.980	1,257.68	
12	P.12	900.00	1,050.00	150.00		300	25	2.400	79.00	189.60	3.980	754.61	
13	P.13	1,200.00				156	13	1.356	330.00	447.48	0.995	445.24	
14	P.14	350.00	400.00	1,000.00		156	13	1.906	36.00	68.62	0.995	68.27	
15	P.15	500.00				156	13	0.656	20.00	13.12	0.995	13.05	
16	P.16	1,700.00				156	13	1.856	133.00	246.85	0.995	245.61	
17	P.17	8,200.00				192	16	8.392	30.00	251.76	1.560	392.75	
18	R.1	2,076.00				192	16	2.268	54.00	122.47	1.560	191.06	
19	R.2	3,020.00				192	16	3.212	30.00	96.36	1.560	150.32	
20	S.1	200	500	500		192	16	1.392	40.00	55.68	1.560	86.86	
21	S.2	825				156	13	0.981	36.00	35.32	0.995	35.14	
22	H.1	300	6,500.00			192	16	6.992	224.00	1,566.21	1.560	2,443.28	steel pipe pile
23	Spiral			2,268,000			13	2,268.000		2,268.00	0.995	2,256.660	
24	Ring			964.00			13	0.964	168.00	161.952	0.995	161.142	28 Nos
											Sum	19,257	

Grand Total	1	x	19,257	19,257	Kg

rbp–br3

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	List of Bill Quantity BER-P-5	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Deck

1	Quantity of concrete of Deck slab
2	Quantity of concrete of Panel slab
3	Quantity of concrete of cross beam
4	Quantity of Wooden Form Work
5	Quantity of Reinforcement steel Deck slab
6	Quantity of Reinforcement steel Cross beam
	Quantity of Reinforcement steel panel
	Quantity of Haindrail
	Quantity of Expansion Joint

Girder

7	Quantity of concrete of Main Beam
8	Quantity of Reinforcement steel Main Beam
9	Quantity of Tendon
10	Quantity of Anchorage
11	Quantity of Bearing pad
12	

Abutment

13	Quantity of concrete of Abutment
14	Quantity of Reinforcing steel
15	Quantity of Wooden Form Work
16	Quantity of Inside pile Reinf.steel
17	Quantity of Concrte Inside pile
	Quantity of Lean Concrete & Rubble stone

Br5 PE 137 + 49 m

(Payung Br)

NO	DESCRIPTION	UNIT	Quantity	Unit Price (Rp)	REMARKS
	BRIDGE				
	SUPERSTRUCTURE				
	CONCRETE				
	a. Deck Slab (Insitu)				
	Concrete (Type – B) Class K 350	Cu.m	99.25	✓	
	Reinforcing Steel Deform	Kg	14,714.07		
	Wooden Form Work with Supporting Frame	Sq.m	160.68		
	b. Precast Prestressed Concrete Main Beam				
	Precast Prestressed Concrete Beam (Type – A) Class K 400	Cu.m	179.76	✓	
	Reinforcing Steel Deform	Kg	23,303.20	✓	
	Tendon [H.T.W] diameter 13 mm	Kg	15,938.04	✓	
	Live end Anchorage	Nos	48.00	✓	
	c. PC Panel Concrete				
	PC Panel Concrete, t = 7 cm (Type – A) Class K 400	Cu.m	16.80	✓	
	Reinforcing Steel Deform	Kg	5,216.20	✓	
	c. PC Diaphragm Concrete				
	PC Diaphragm Concrete (Type – A) Class K 400	Cu.m	3.37		
	Reinforcing Steel Deform	Kg	838.19	✓	
	PRESTRESSING				
	Prestressing Tendon [H.T.W.] diameter 13 mm for Main Beam (incl. Diaphragm)	each	6.00	✓	
	Grout Injection Main Beam (icl. Diaphragm)	m	988.80	✓	
	ERECTING				
	Erection of Concrete Main Beam	Kg	449,395.00	✓	
sup–p5	(Incl.PC Diaphragm , PC Panel)				

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. P5 PE 137 + 49 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 **Length = 40.80 m**

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	7.000	1.715	1.000	1.715	41.200	70.658
End slab	(2)	0.055	0.500	0.027	2.000	0.055	4.250	0.234
End slab	(3)	0.300	0.200	0.060	2.000	0.120	7.200	0.864
							sum	71.756

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.223	1.500	0.334	1.000	0.334	41.200	13.751
Right Side slab	(5)	0.223	1.500	0.334	1.000	0.334	41.200	13.751
							sum	27.501

Total Volume K.350 = 71.756 + 27.501
= 99.257 m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	43.000	0.688	0.550	0.378
Railing post	(7)	0.165	0.160	0.026	43.000	1.135	0.470	0.534
slab side Walk	(8)	0.250	1.266	0.317	2.000	0.633	41.200	26.085
Wall	(9)	0.470	0.100	0.047	2.000	0.094	37.840	3.557
							sum	30.554

Total Volume K.225 = 30.554 m3

Grand Total K.350 = 99.25675 m3

Grand Total K.225 = 30.55365 m3

slab –br5

Dictorate General of Water Resources Development Dictorate of River Medan Flood Control Project	REINFORCING STEEL OF DECK SLAB AND HAND RAIL Br P5 PE 137 + 49 m (Payung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of deck slab per span (l = 40.8 m)

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
D1	16	6,980	150	0	150	260	7.540	136.00	1,025.44	1.560	1,599.69	main steel deck slab
D2	16	2,820	6,720	0	0	260	9.800	136.00	1,332.80	1.560	2,079.17	
D3	13	39,660	125	1,140	125	880	41.930	50.00	2,096.50	0.995	2,086.02	
D4	13	39,660	0	1,140	0	880	41.680	50.00	2,084.00	0.995	2,073.58	
D5.A	16	2,868.00	0	8,524.00	0	660	12.052	68.00	819.54	1.560	1,278.48	
D5.B	16	2,868.00	0	8,524.00	0	660	12.052	68.00	819.54	1.560	1,278.48	
D6	16	9,680	125	0	125	260	10.190	8.00	81.52	1.560	127.17	Reinf. steel Expantion Joint
D7	16	0	0	900	0	260	1.160	20.00	23.20	1.560	36.19	
D8	16	450	250	450	200	150	1.500	48.00	72.00	1.560	112.32	
D9	16	150	250	150	200	260	1.010	22.00	22.22	1.560	34.66	
H1	13	100	1350	200	900	220	2.770	88.00	243.76	0.995	242.54	Reinf. steel haidrail and side Walk
H2	13	110	50	110	50	220	0.540	264.00	142.56	0.995	141.85	
H3	13	200	50	200	50	220	0.720	220.00	158.40	0.995	157.61	
H4	13	0	0	700	0	220	0.920	408.00	375.36	0.995	373.48	
H5	13	40,750	0	920	0	220	41.890	8.00	335.12	0.995	333.44	
P1	16	40,750	0	920	0	260	41.930	20.00	838.60	1.560	1,308.22	
P2	16	1,150	250	200	420	260	2.280	408.00	930.24	1.560	1,451.17	
										sum	14,714.07	

nos.of span	=	1.00					
sub total weight	=	1.00	x	14,714.07	=	14,714.07	kg
Grand Total	=	**14,714**	**kg**				

deck-br5

Direktorat General Water Resources Development Direktorat General Medan Flood Control	DECK SLAB AND HAND RAIL Br P5 PE 137 + 49 m (Payung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 41.20 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	7.20	2.16	2.00	4.32
end slab	(2)	0.20	7.20	1.44	2.00	2.88
	(3)	0.35	3.00	1.05	2.00	2.10
	(4)	0.47	1.50	0.71	4.00	2.84
in side walk (curb)	(5)	0.25	41.20	10.30	2.00	20.60
in side walk	(6)	0.47	40.95	19.25	2.00	38.49
out side walk	(7)	0.47	39.10	18.38	2.00	36.75
Railing post	(8)	0.10	0.92	0.09	42.00	3.86
Railing post	(9)	0.16	0.45	0.07	84.00	6.05
Railing post	(10)	0.14	0.45	0.06	84.00	5.10
					sum	123.00
				numbers of span =		1.00
total	=	123.00	x	1.00	=	123.00

= **123.00** m2

Scafolding (L = 41.20 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.50	41.20	61.80	2.00	123.60
end slab	(2)	0.45	41.20	18.540	2.00	37.08
					sum	160.68
				numbers of span =		1.00
total	=	1.00	x	160.68	=	160.68

= **160.68** m2

Grand total form Work = 123.00 m2

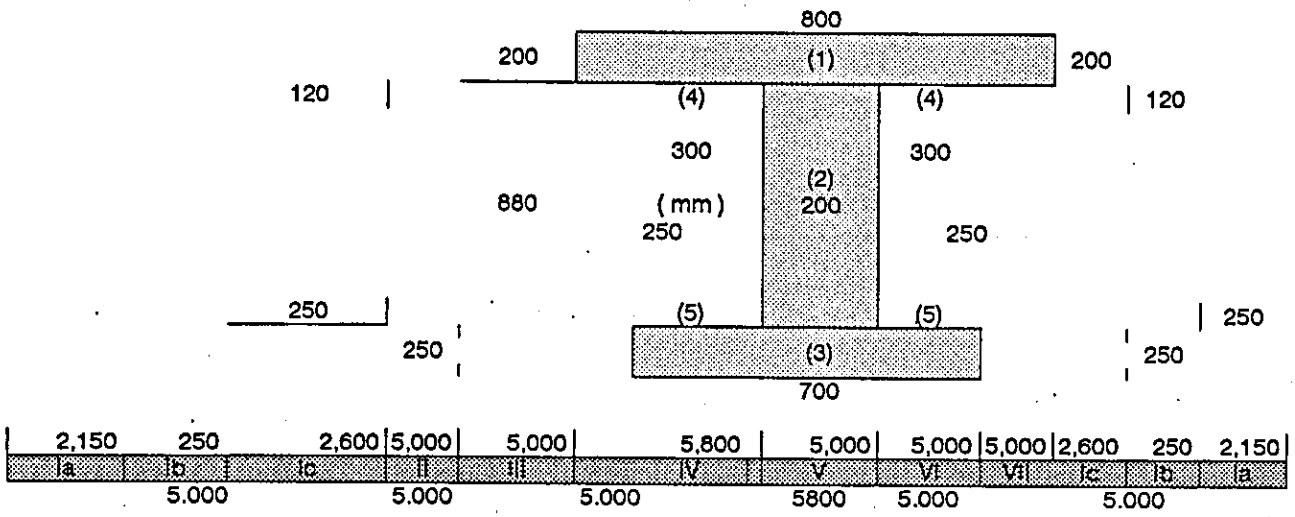
Grand total Scafolding = 160.68 m2

f-wrkbr5

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br. P5 PE 137 + 39 m (Payung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K-400,l = 40.80 m

Main Beam Section



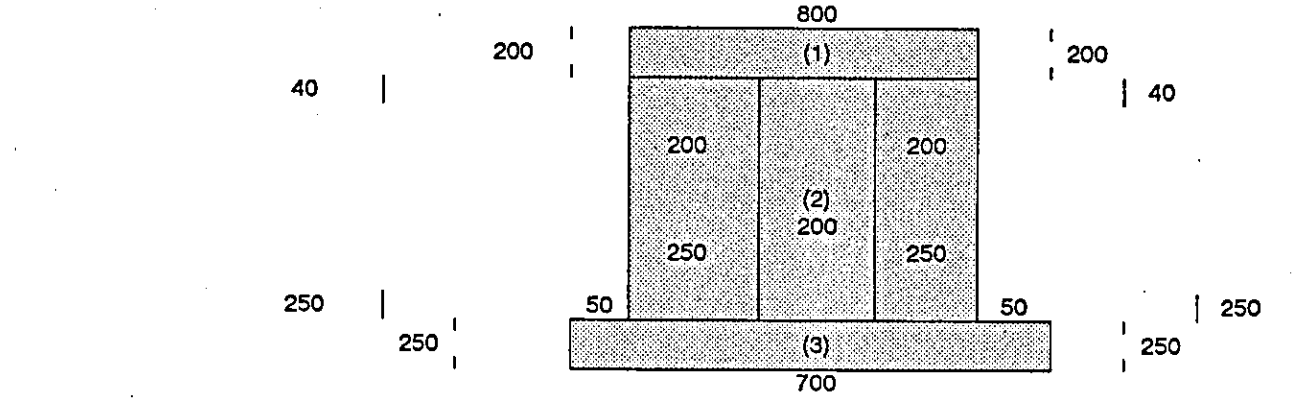
Total length = 40,800 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.200	1.250	1.000	0.250
(3)	0.700	0.250	1.000	0.175
(4)	0.300	0.120	2.000	0.036
(5)	0.250	0.250	2.000	0.062
			sum	
	area section main beam		=	0.6835

Volume 1 = area x length
= 0.6835 x 40,800
= 27,886.80 m3

End Block Section L = 2.150 m



2. Bearing Block Area

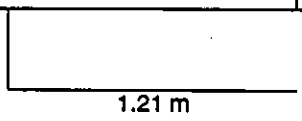
piece	width m	depth m	nos	total area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.700	1.250	1.000	0.875
(3)	0.700	0.250	1.000	0.175
		1.700	sum	1.210

1075
1250

1/2

beam-br5

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br. P5 PE 137 + 39 m (Payung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.16 + 1.25) : 2
= 1.21 m

area = width x depth
= 0.25 x 1.21
= 0.301 m2

section	area m2	length m	nos	volume m3
Ia	1.2100	2.150	1.00	2.601
Ib	0.3012	0.250	1.00	0.075
Ic	0.6835	2.600	1.00	1.777
II	0.6835	5.000	1.00	3.418
III	0.6835	5.000	1.00	3.418
IV	0.6835	5.800	1.00	3.964
V	0.6835	5.000	1.00	3.418
VI	0.6835	5.000	1.00	3.418
VII	0.6835	5.000	1.00	3.418
Ic	0.6835	2.600	1.00	1.777
Ib	0.3012	0.250	1.00	0.075
Ia	1.2100	2.150	1.00	2.601
	sum	40.80		29.959

Total volume = 29.960 m3

Total volume (6 Beam) = 6.00 x 29.960 m3

Grand Total = 179.758 m3

beam-br5

2/2

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	MAIN BEAM Br P5 PE 137 + 49 m (Payung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Segment	B1	13	600	1,660	150	1,660		4.070	30	122.10	0.995	121.490	outer Beam
(l = 5.000 m)	B2	13		300	720	300		1.320	16	21.12	0.995	21.014	and end Block
2 nos	B3	13	1,600	620	1,600			3.820	16	61.12	0.995	60.814	
	B4	13		886	650	310		1.846	30	55.38	0.995	55.103	
	B5	13		1,045	650	310		2.005	30	60.15	0.995	59.849	
	B6	16	4,300	675		750		5.725	5	28.63	1.560	44.655	
	B7	16	4,950					4.950	24	118.80	1.560	185.328	
	B8	16	1,000			150		1.150	16	18.40	1.560	28.704	
	B9	13		1,000		750		1.750	2	3.50	0.995	3.483	
											sum	580.4401	1,160.880
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	887.077

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	887.077
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
1 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	443.538
Segment	B1	13	600	1,660	150	1,660		4.070	33	134.31	0.995	133.638	Inner of Beam
(l = 5.800 m)	B2	13		886	720	310		1.916	33	63.23	0.995	62.912	
1 nos	B3	13		1,045	650	310		2.005	33	66.16	0.995	65.834	
	B4	16	5,720					5.720	24	137.28	1.560	214.157	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	505.295	505.295

Main Beam l = 5.000 m (2 Segment)	=	1,160.880	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (1 Segment)	=	443.538	Kg
Main Beam l = 5.800 m (1 Segment)	=	505.295	Kg
Grand total (1 pcs)	=	**3,883.867**	**Kg**

total (6 pcs) l = 40.80 m	=	6.000	x	3,883.867	kg
	=	23,303.201	kg		
Grand total	=	23,303.20	kg		

mb-br5

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	M A I N B E A M BR P5 PE 137 + 49 m (Payung Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

$$S = -l^2/8.f \times [\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}] - [\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$$

(a) = $l^2 / 8.f$
(b) = $2.f/l$
(c) = $4.f/l$
(d) = $(4.f/l)^2$
(e) = $(4.f/l)^2 + 1$

(f) = $@sqrt((4.f/l)^2 + 1)$ = @sqrt (e)
(g) = $-2.f/l.@sqrt((4.f/l)^2+1)$ = −(b) x (f)
(h) = $-4f/l+@sqrt(4f/l)^2+1$ = (−c) + (f)
(i) = $1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = 1/2xln (h)
S1 = $[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = (g) + (i)

(k) = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\}$ = (b) x (f)
(l) = $[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = (c) + (f)
(m) = $1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = 1/2 x ln(l)
S2 = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = (k) + (m)

S = (−a) x [(S1) − (S2)]

S is length of parabola curve

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	**M A I N B E A M** **BR P5 PE 137 + 49 m** **(Payung Br)**	Japan International Cooperartion Agency Date Nos of Sheet Prepared by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 40.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
2	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66
3	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
4	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66

f = Average

nos wire per tendon	=	19	nos				
sum of tendon length	=	19	x	85.6625	=	1,627.59	m
nos wire per tendon	=	12	nos				
sum of tendon length	=	12	x	85.6625	=	1,027.95	m
				sum		2,655.54	m
Total	=	0.80	+	2,655.54	=	2,656.341	kg
Grand Total (6 Nos)	=	6.00	x	2,656.34	=	15,938.04	kg

te-br5

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	PANEL SLAB Br5 PE 137 + 49 m (Payung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K−400 (L = 40.80 m)

section	volume panel slab								
	width	depth	area	thick	nos	volume			
	w	d	(m 2)	t					
	m	m		m		m3			
(1)	1.000	1.200	1.2	0.070	1.00	0.0840			
	sum volume per pcs				=	0.0840			
	nose per row				=	5.0000	row	x	0.0840
					=	0.42	m3		
	nos of per span				=	5.00		x	40
					=	200	nos		
	Total volume per span				=	16.8000	m3		
	Total volume per Span				=	1.000	x	16.800	m3
	Grand Total				=	16.800	m3		

pl−br5

Dictorate General of Water Resources Development Dictorate of River Medan Flood Control Project	REINFORCING STEEL OF PANEL DECK SLAB Br P5 PE 137 + 49 m (Payung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of panel deck slab per span (l = 40.80 m) 1 / 1

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
P3	16	1,520	150	1,520	150	150	3.490	2.00	6.98	1.560	10.889	main steel
P4	16	1,520	200	1,520	200	150	3.590	1.00	3.59	1.560	5.600	
P5	12	450	0	0	0	110	0.560	6.00	3.36	0.995	3.343	tranverse steel
P6	12	950	0	0	0	220	1.170	4.00	4.68	0.995	4.657	
P7	12	400	0	0	0	0	0.400	4.00	1.60	0.995	1.592	
										sum	26.081	

nos of span	=	1.00					
nos of panel slab per span	=	5	x	1.00	=	5.00	nos
total nos of span	=	5.00	x	40.00	=	200.00	nos
Total weight	=	**200.00**	x	**26.081**	=	**5,216.20**	**kg**

repl-p5

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	CROSS BEAM Br5 PE 137 + 49 m (Payung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K–400 (L = 40.80 m)

	volume cross beam per span							
	width	depth	area	thick	nos	volume		
section	w	d	(m 2)	t				
	m	m		m		m3		
(1)	0.620	1.250	0.77500	0.200	1.00	0.155		Cross Beam End
(2)	0.060	0.050	0.00150	0.200	4.00	(0.002)		
	sum volume per pcs				=	0.1526		
	Volume nose per row				=	5	x	0.1526
					=	0.763		
	nose per span				=	2	row	
	Total volume per span				=	2	x	0.763
					=	**1.526**	m3	

Structure Concrete Class K–400 (L = 40.80 m)

	volume cross beam per span							Cross Beam Central	
	width	depth	area	thick	nos	volume			
section	w	d	(m 2)	t					
	m	m		m		m3			
(1)	1.140	1.250	1.42500	0.150	1.00	0.214			
(2)	0.300	0.120	0.01800	0.150	2.00	(0.011)			
(3)	0.250	0.250	0.03125	0.150	2.00	(0.019)			
	sum volume per pcs				=	0.1842			
	Volume per row				=	5	x	0.1842	
					=	0.9210			
	nose per span				=	2	row		
					=	2		x	0.921
	Total volume per span				=	1.842	m3		
	Grand Total				=	**1.526**	+	**1.842**	**m3**
					=	**3.368**	**m3**		

cb–br5

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF CROSS BEAM Br P5 PE 137 + 49 m (Payung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of Cross beam (l = 40.8 m)

C.1	13	590	140	590	140	140	1.600	6.00	9.60	0.995	9.552	End
C.2	13	1,200	140	1,200	140	140	2.820	3.00	8.46	0.995	8.418	
										sum	17.97	

Nos per row	=	5.00		
sub total per span	=	20.00	x	17.97
	=	359.39	Kg	

C.1	13	1,090	140	1,090	140	140	2.600	6.00	15.60	0.995	15.522	Center
C.2	13	1,200	140	1,200	140	140	2.820	3.00	8.46	0.995	8.418	
										sum	23.94	

Nos per row	=	5.00		
sub total per span	=	20.00	x	23.94
	=	478.79	Kg	
Grand total	=	**838.188**	**Kg**	

cr–br5

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – P5 (Payung Br) STA : 137 + 39 (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.406	m
area	=	0.129	m2
H	=	7.000	m
W	=	5.100	m
L	=	10.00	m

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	2.045	0.61	10.00	1.00	6.14
stem	2	0.55	0.500	0.28	9.20	1.00	2.53
stem	3	0.55	0.500	0.14	9.20	1.00	1.27
stem	4	0.20	0.500	0.10	10.00	1.00	1.00
stem	5	0.20	0.250	0.03	10.00	1.00	0.25
stem	6	1.00	3.955	3.96	10.00	1.00	39.55
stem	7	1.80	0.300	0.27	10.00	1.00	2.70
footing	8	2.30	0.300	0.35	10.00	1.00	3.45
footing	9	5.10	1.000	5.10	10.00	1.00	51.00
wingwall	10	3.00	2.045	6.14	0.40	2.00	4.91
wingwall	11	3.30	0.955	1.58	0.40	2.00	1.26
wingwall	12	2.30	2.700	6.21	0.40	2.00	4.97
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	2.045	2.00	0.18
App.Slab	16	3.00	0.200	0.30	9.200	1.00	2.76
	17	0.275	0.05	0.01	9.200	1.00	0.13
inside blockout	lbo	0.30	0.250	0.08	0.70	5.00	0.262
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	32.00	x	0.10	(0.414)
						sum	122.61

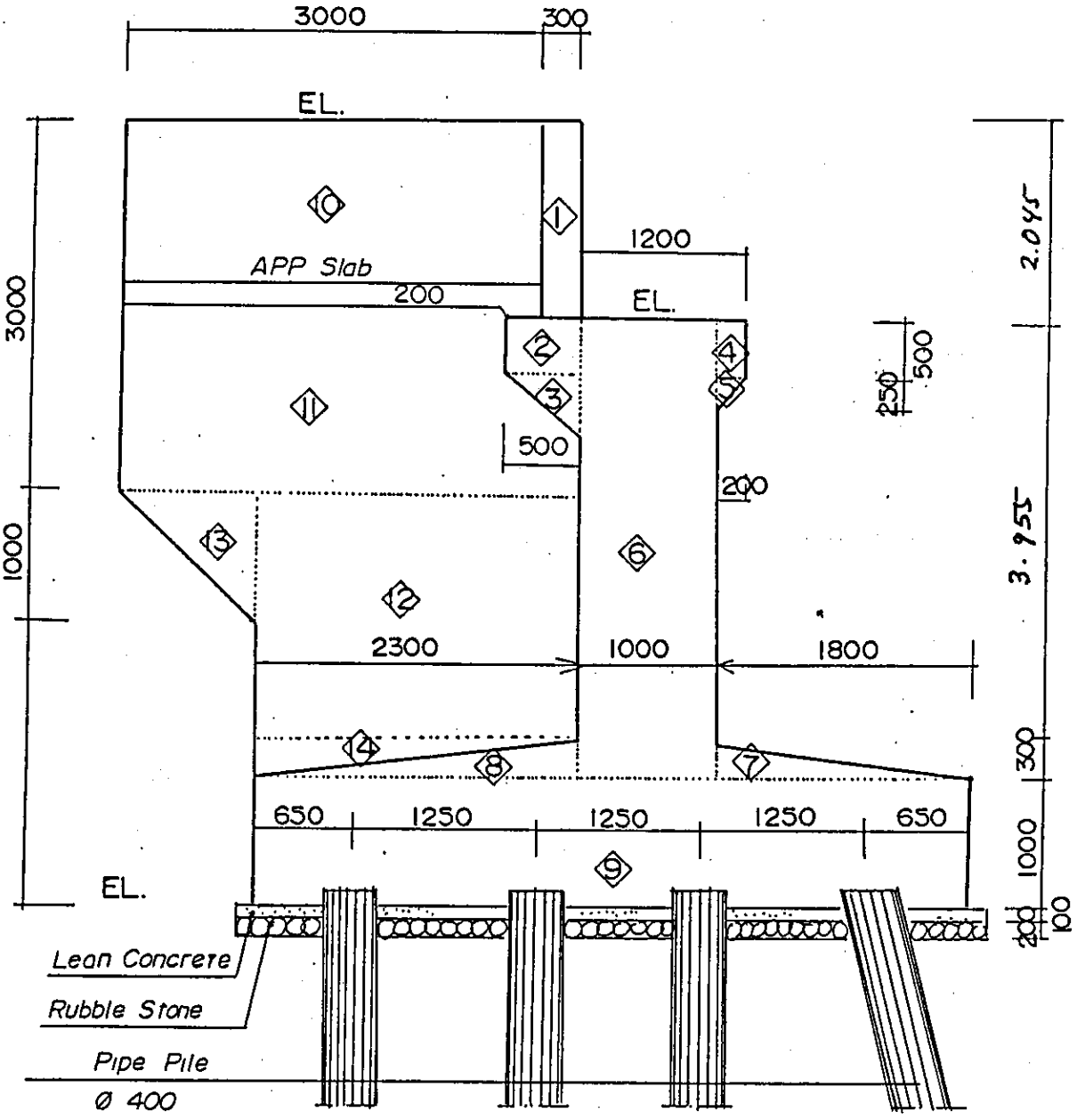
concrete filling in piles

thick of pipe	=	0.01036	m					
inner diameter	=	0.406	–	0.021				
	=	0.385	m					
area	=	0.250	x	3.142	x	0.148		
	=	0.1165	m2					
depth	=	8.000	m	--->	0.333	x	24.000	m
nos	=	32.000						
volume	=	0.117	x	8.000	x	32.00		
	=	**29.85**	m3					
sub total	=	122.61	+	29.85				
	=	152.45	+	152.45	m3			
Total								
	=	**304.91**	m3					

Description	Nos	side	Depth	total	Remark
Suppy and Driving of SPP dia. 400 mm for Abutment	32.00 X 2.	R/L	24.00	1536 ~~768.00~~	

1 / 2

abr5–co


3000
300
EL.
APP Slab
200
EL.
1200
3000
1000
500
250
500
200
2300
1000
1800
650
1250
1250
1250
650
2.045
3.955
300
1000
100
200
EL.
Lean Concrete
Rubble Stone
Pipe Pile
Ø 400

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P5 PE 137 + 49 m Payung Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

Diameter of pipe = dp	=	40	cm					
thick of pipe = t	=	1.031	cm					
Diameter of spiral = ds	=	1.30	cm					
covering of concrete = d'	=	5	cm					
dc	=	40 − 2 x (1.031 + 5)						
	=	27.938	cm					
(dc − ds)	=	27.938	−	5				
	=	22.938	cm					
Ag	=	0.25 x @pi x dp ^ 2						
	=	1,256.64	cm2					
Ac	=	0.25 x @pi x dc ^ 2						
	=	613.028	cm2					
f'c	=	225	kg/cm2					
fsy	=	4,000	kg/cm2					
Ag/Ac	=	2.050						
f'c/fsy	=	0.056						
ps	=	0.45 x (Ag/Ac − 1) x f'c/fsy						
ps	=	0.027						
Area of spiral = as	=	0.25*@pi x ds ^ 2						
	=	1.327	cm2					
spacing of spiral = s	=	as x @pi x (dc−ds) / ps x @pi x dc ^ 2/4						
s	=	1.327 x 3.142 x 22.938 / 0.027 x 3.142 x 195.133						
	=	95.649 / 16.291	cm					
	=	5.87	cm					
say	=	7.00	cm					
Length of spiral per picth	=	@sqrt((@pi x dc) ^ 2 + s ^ 2)						
	=	88.05	cm					
length of culumn	=	800	cm					
nos of pitch	=	114.29						
length of spiral	=	88.05	x	114.29				
	=	10,062.69	cm					
	=	100.63	m					
Radius of steel ring								
Outer diameter of pile	=	40.64	cm					
Thick of pile	=	1.031	cm					
Inner diameter of pile	=	40.64	−	2.062				
	=	38.578	cm					
Concrete covering	=	5	cm					
Diameter of steel bar	=	1.6	cm					
Diameter of ring	=	1.3	cm					
Inner diameter of pile	=	38.578						
Distance outside to ring	=	5	+	0.65	+	1.6	+	0.65
	=	7.90	cm					
Inner diameter of ring	=	38.578	−	7.90				
	=	30.678	cm					
Radius of ring steel	=	30.678	:	2				
	=	15.339	cm					
	=	0.153	m					

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P5 PE 137 + 49 m Payung Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steil inside pile (kg)

Length of each = 2 x @pi x r
= 2 x 3.1415 x 0.153 m
= 0.964 m

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	8.00		0.36	8.71	28.00	8	69.68	1.560	108.70
2.	R1	13									100.63	0.995	100.12
3.	Ring	13						0.964		7	6.75	0.995	6.71
												sum	215.54

Total weight = 32.00 x 215.53 = 6,897.19 kg

Grand total = 2.00 x 6,897.19 = **13,794.38** kg

inb-br5

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br P5 (Payung Br) Sta : 137 + 49 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area	
		m	m		m2	
wall	1	0.300	2.045	2.00	1.23	
wall	1a	2.045	10.000	1.00	20.45	
wall	1b	2.045	9.200	1.00	18.81	
stem	2	0.500	0.550	2.00	0.55	
stem	2a	0.500	9.200	1.00	4.60	
stem	3	0.500	0.550	2.00	0.28	
stem	3a	0.750	9.200	1.00	6.90	
stem	4	0.200	0.500	2.00	0.20	
	4a	0.500	10.000	1.00	5.00	
stem	5	0.200	0.250	2.00	0.05	
	5a	0.320	10.000	1.00	3.20	
stem	6	1.000	3.955	2.00	7.91	50%
stem	6a	2.905	10.000	1.00	29.05	50%
stem	6b	9.200	2.655	1.00	24.43	50%
footing	7	1.800	0.300	2.00	0.54	✓
footing	8	2.300	0.300	2.00	1.38	✓
footing	9	5.100	1.000	2.00	10.20	✓
footing	10	1.000	10.000	2.00	20.00	✓
wingwall	11	2.045	3.000	4.00	24.54	
wingwall	11a	0.400	2.045	2.00	1.64	
wingwall	12	3.300	0.955	4.00	11.78	
wingwall	13	0.400	0.955	2.00	0.76	
wingwall	14	1.000	1.000	4.00	2.00	
wingwall	14a	2.300	2.000	4.000	18.400	
wingwall	14b	0.400	1.000	2.000	0.800	
wingwall	14c	0.300	2.300	4.000	1.38	
			sum	=	216.07	

30.695 F.W1

Total = 2.00 x 216.07

= 432.15 sq.m

abr5-fw

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Lean Concrete and Rubble Stone Br P5 PE 137 + 49 m (Payung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Lean concrete (m3)

diameter of concrete pile = 0.40 m
area = 0.126 m2

Lean Concrete 0.10
5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	10.30	55.62	0.10	5.56

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.10	m			
nos	=	32				
volume	=	0.126	x	0.10	x	32
	=	0.402	m3			
net volume	=	5.56	–	0.402		
	=	5.16	m3			
nos	=	2.00				
Total volume	=	2.00	x	5.16		
	=	10.32	m3		(Abutment L & R)	
Grand Total	=	10.32	m3			

Rubble stone (m3)

diameter of concrete pile = 0.40 m
area = 0.126 m2

Rubble Stone 0.200
5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	10.30	55.62	0.20	11.12

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.20	m			
nos	=	32				
volume	=	0.126	x	0.20	x	32
	=	0.804	m3			
net volume	=	11.12	–	0.804		
	=	10.32	m3			
nos	=	2.00				
Total volume	=	2.00	x	10.32		
	=	20.64	m3		(Abutment L & R)	
Grand Total	=	20.64	m3			

lc-br5

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	List of Bill Quantity BR. P.G (Pendestrian Br.)	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Deck

1	Quantity of concrete of Deck slab
2	~~Quantity of concrete of Panel slab~~
3	~~Quantity of concrete of cross beam~~
4	Quantity of Wooden Form Work
5	Quantity of Reinforcement steel Deck slab
6	~~Quantity of Reinforcement steel Cross beam~~
	Quantity of Reinforcement steel panel
	Quantity of Haindrail
	Quantity of Expansion Joint

Girder

7	Quantity of concrete of Main Beam
8	Quantity of Reinforcement steel Main Beam
9	Quantity of Tendon
10	Quantity of Anchorage
11	Quantity of Bearing pad
12	

Abutment

13	Quantity of concrete of Abutment
14	Quantity of Reinforcing steel
15	Quantity of Wooden Form Work
16	Quantity of Inside pile Reinf.steel
17	Quantity of Concrte Inside pile
	Quantity of Lean Concrete & Rubble stone

Br P6 PE 147 + 58 m

(Pendestrian Br)

NO	DESCRIPTION	UNIT	Quantity	Unit Price (Rp)	REMARKS
	BRIDGE				
	SUPERSTRUCTURE				
	CONCRETE				
	a. Deck Slab (Insitu)				
	Concrete (Type – B) Class K 350	Cu.m	19.36		
	Reinforcing Steel Deform	Kg	3,291.88		
	Wooden Form Work with Supporting Frame	Sq.m	90.26		
	b. Precast Prestressed Concrete Main Beam				
	Precast Prestressed Concrete Beam (Type – A) Class K 400	Cu.m	29.96		
	Reinforcing Steel Deform	Kg	3,883.87		
	Tendon [H.T.W] diameter 13 mm	Kg	2,656.34		
	Live end Anchorage	Nos	8.00		
	c. PC Panel Concrete				
	PC Panel Concrete, t = 7 cm (Type – A) Class K 400	Cu.m	0.00		
	Reinforcing Steel Deform	Kg	0.00		
	c. PC Diaphragm Concrete				
	PC Diaphragm Concrete (Type – A) Class K 400	Cu.m	0.00		
	Reinforcing Steel Deform	Kg	0.00		
	PRESTRESSING				
	Prestressing Tendon [H.T.W.] diameter 13 mm for Main Beam (incl. Diaphragm)	each	1.00		
	Grout Injection Main Beam (icl. Diaphragm)	m	164.80		
	ERECTING				
	Erection of Concrete Main Beam	Kg	74,900.00		
sup–p6	(Incl.PC Diaphragm , PC Panel)				

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. P6 PE 147 + 58 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 Length = 40.80 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.200	3.000	0.600	1.000	0.600	41.200	24.720
End slab	(2)	0.000	0.500	0.000	2.000	0.000	4.250	0.000
End slab	(3)	0.100	0.200	0.020	2.000	0.040	3.000	0.120
							sum	**24.840**

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.000	1.500	0.000	1.000	0.000	41.200	0.000
Right Side slab	(5)	0.000	1.500	0.000	1.000	0.000	41.200	0.000
							sum	**0.000**

Total Volume K.350 = 24.840 + 0.000
= **24.840** m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	43.000	0.688	0.550	0.378
Railing post	(7)	0.165	0.160	0.026	43.000	1.135	0.470	0.534
slab side Walk	(8)	0.000	1.266	0.000	2.000	0.000	41.200	0.000
Wall	(9)	0.470	0.100	0.047	2.000	0.094	37.840	3.557
							sum	**4.469**

Total Volume K.225 = **4.469** m3

Grand Total K.350 = **24.84** m3

Grand Total K.225 = **4.468904** m3

slab –br6

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. P6 PE 147 + 58 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 Length = 40.80 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.200	2.350 (300)	0.470	1.000	0.470	41.200	19.364
End slab	(2)	0.000	0.500	0.000	2.000	0.000	4.250	0.000
End slab	(3)	~~0.000~~ 0.10	0.200	0.000	2.000	0.000	2.550	0.000
							sum	19.364

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.000	1.500	0.000	1.000	0.000	41.200	0.000
Right Side slab	(5)	0.000	1.500	0.000	1.000	0.000	41.200	0.000
							sum	0.000

Total Volume K.350 = 19.364 + 0.000
= **19.364** m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	43.000	0.688	0.550	0.378
Railing post	(7)	0.165	0.160	0.026	43.000	1.135	0.470	0.534
slab side Walk	(8)	0.000	1.266	0.000	2.000	0.000	41.200	0.000
Wall	(9)	0.470	0.100	0.047	2.000	0.094	37.840	3.557
							sum	4.469

Total Volume K.225 = **4.469** m3

Grand Total K.350 = **19.364** m3

Grand Total K.225 = **4.469** m3

slab –br6

Direktorat General Water Resources Development Direktorat General Medan Flood Control	DECK SLAB AND HAND RAIL Br P6 PE 147 + 58 m (Pendestrian Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 41.20 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.00	7.20	0.00	2.00	0.00
end slab	(2)	0.00	7.20	0.00	2.00	0.00
	(3)	0.00	3.00	0.00	2.00	0.00
	(4)	0.00	1.50	0.00	4.00	0.00
in side walk (curb)	(5)	0.00	41.20	0.00	2.00	0.00
in side walk	(6)	0.47	40.95	19.25	2.00	38.49
out side walk	(7)	0.47	39.10	18.38	2.00	36.75
Railing post	(8)	0.10	0.92	0.09	42.00	3.86
Railing post	(9)	0.16	0.45	0.07	84.00	6.05
Railing post	(10)	0.14	0.45	0.06	84.00	5.10
					sum	90.26
				numbers of span =		1.00
total	=	90.26	x	1.00	=	90.26
	=	90.26	m2			

Scafolding (L = 41.20 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.10	41.20	45.32	2.00	90.64
end slab	(2)	0.20	3.00	0.600	2.00	1.20
					sum	91.84
				numbers of span =		1.00
total	=	1.00	x	91.84	=	91.84
	=	91.84	m2			

Grand total form Work = 90.26 m2

Grand total Scafolding = 91.84 m2

f-wrkbr6

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	MAIN BEAM Br P6 PE 147 + 58 m (Pendestrian Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Segment	B1	13	600	1,660	150	1,660		4.070	30	122.10	0.995	121.490	outer Beam
(l = 5.000 m)	B2	13		300	720	300		1.320	16	21.12	0.995	21.014	and end Block
2 nos	B3	13	1,600	620	1,600			3.820	16	61.12	0.995	60.814	
	B4	13		886	650	310		1.846	30	55.38	0.995	55.103	
	B5	13		1,045	650	310		2.005	30	60.15	0.995	59.849	
	B6	16	4,300	675		750		5.725	5	28.63	1.560	44.655	
	B7	16	4,950					4.950	24	118.80	1.560	185.328	
	B8	16	1,000			150		1.150	16	18.40	1.560	28.704	
	B9	13		1,000		750		1.750	2	3.50	0.995	3.483	
											sum	580.4401	1,160.880
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	887.077

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	**443.538**	**887.077**
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
1 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	**443.538**	**443.538**
Segment	B1	13	600	1,660	150	1,660		4.070	33	134.31	0.995	133.638	Inner of Beam
(l = 5.800 m)	B2	13		886	720	310		1.916	33	63.23	0.995	62.912	
1 nos	B3	13		1,045	650	310		2.005	33	66.16	0.995	65.834	
	B4	16	5,720					5.720	24	137.28	1.560	214.157	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	505.295	505.295

Main Beam l = 5.000 m (2 Segment)	=	1,160.880	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (1 Segment)	=	443.538	Kg
Main Beam l = 5.800 m (1 Segment)	=	505.295	Kg
Grand total (1 pcs)	=	3,883.867	Kg

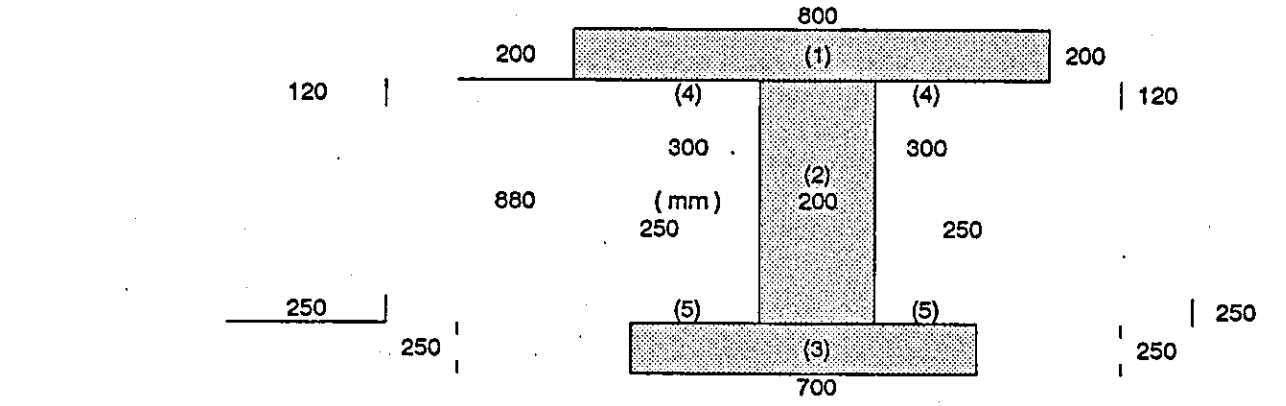
total (1 pcs) l = 40.80 m	=	1.000	x	3,883.867	kg
	=	3,883.867	kg		
Grand total	=	3,883.87	kg		

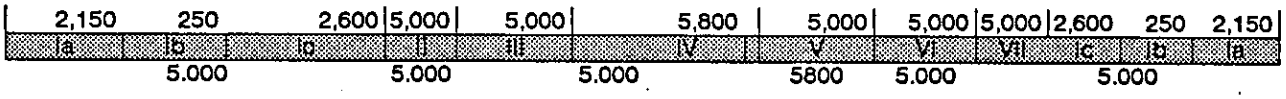
mb-br6

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br. P6 PE 147 + 58 m (Pendestrian Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K–400,l = 40.80 m

Main Beam Section





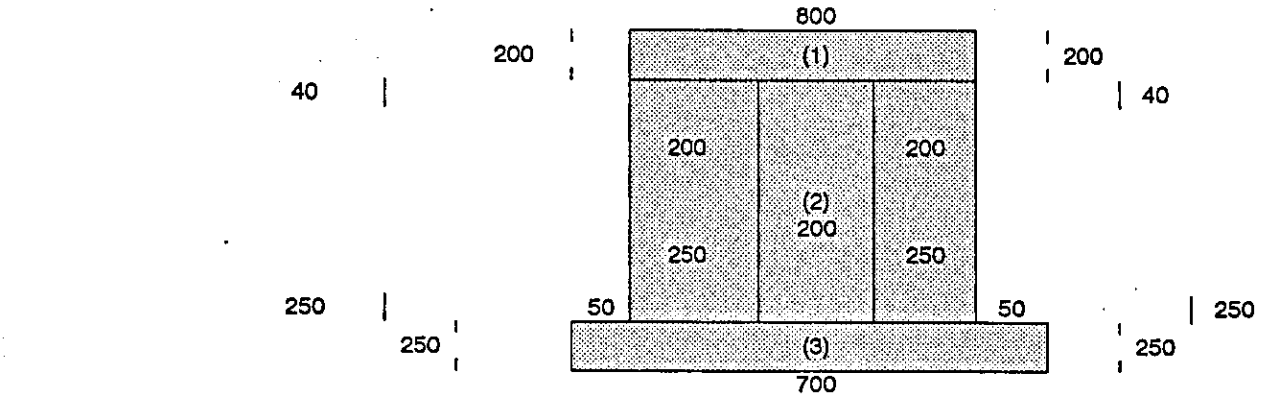
Total length = 40,800 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.200	1.250	1.000	0.250
(3)	0.700	0.250	1.000	0.175
(4)	0.300	0.120	2.000	0.036
(5)	0.250	0.250	2.000	0.062
			sum	
	area section main beam		=	0.6835

Volume 1 = area x length
= 0.6835 x 40,800
= 27,886.80 m3

End Block Section L = 2.150 m

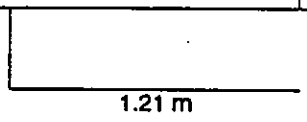


2. Bearing Block Area

1075
1250

piece	width m	depth m	nos	total area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.700	1.250	1.000	0.875
(3)	0.700	0.250	1.000	0.175
		1.700	sum	1.210

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br. P6 PE 147 + 58 m (Pendestrian Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.16 + 1.25) : 2
= 1.21 m

area = width x depth
= 0.25 x 1.21
= 0.301 m2

section	area	length	nos	volume
	m2	m		m3
Ia	1.2100	2.150	1.00	2.601
Ib	0.3012	0.250	1.00	0.075
Ic	0.6835	2.600	1.00	1.777
II	0.6835	5.000	1.00	3.418
III	0.6835	5.000	1.00	3.418
IV	0.6835	5.800	1.00	3.964
V	0.6835	5.000	1.00	3.418
VI	0.6835	5.000	1.00	3.418
VII	0.6835	5.000	1.00	3.418
Ic	0.6835	2.600	1.00	1.777
Ib	0.3012	0.250	1.00	0.075
Ia	1.2100	2.150	1.00	2.601
	sum	40.80		29.959

Total volume = 29.960 m3

Total volume (6 Beam) = 1.00 x 29.960 m3

Grand Total = 29.960 m3

beam-br6

2/2

Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR P6 PE 147 + 58 m (Pendestrian Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

$$S = -1^2/8.f \times [\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}] - [\{2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2.ln.[\{4.f/l\}+@sqrt(4.f/l)^2+1)$$

(a) = $1^2/8.f$
(b) = $2.f/l$
(c) = $4.f/l$
(d) = $(4.f/l)^2$
(e) = $(4.f/l)^2 + 1$

(f) = $@sqrt((4.f/l)^2 + 1)$ = @sqrt (e)
(g) = $-2.f/l.@sqrt((4.f/l)^2+1)$ = −(b) x (f)
(h) = $-4f/l+@sqrt(4f/l)^2+1$ = (−c) + (f)
(i) = $1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = 1/2xln (h)
S1 = $[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = (g) + (i)

(k) = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\}$ = (b) x (f)
(l) = $[\{4.f/l\}+@sqrt(4.f/l)^2+1)$ = (c) + (f)
(m) = $1/2.ln.[\{4.f/l\}+@sqrt(4.f/l)^2+1)$ = 1/2 x ln(l)
S2 = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l\}+@sqrt(4.f/l)^2+1)$ = (k) + (m)

S = (−a) x [(S1) − (S2)]

S is length of parabola curve

te−br6

1/2

Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	M A I N B E A M BR P6 PE 147 + 58 m (Pendestrian Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 40.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
2	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66
3	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
4	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66

f = Average

nos wire per tendon	=	19	nos				
sum of tendon length	=	19	x	85.6625	=	1,627.59	m
nos wire per tendon	=	12	nos				
sum of tendon length	=	12	x	85.6625	=	1,027.95	m
				sum		2,655.54	m
Total	=	0.80	+	2,655.54	=	2,656.341	kg
Grand Total (1 Nos)	=	1.00	x	2,656.34	=	2,656.34	kg

te-br6

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment,Wing wall BR – P6 (Pendestrian Br) STA : 147 + 58 (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.406	m	
area	=	0.129	m2	
H	=	6.300	m	
W	=	3.800	m	
L	=	3.00	m	

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	2.045	0.61	3.00	1.00	1.84
wall	1a	1.90	1.800	3.42	3.00	1.00	10.26
Reduced of beam	1b	0.75	1.70	1.28	2.15	1.00	(2.74)
stem	2	0.55	0.500	0.28	3.00	1.00	0.83
stem	3	0.55	0.500	0.14	3.00	1.00	0.41
	4	1.15	0.500	0.58	3.00	1.00	1.72
stem	5	1.15	0.500	0.29	3.00	1.00	0.86
stem	6	1.00	3.255	3.26	3.00	1.00	9.77
footing	7	1.20	0.300	0.18	3.00	1.00	0.54
footing	8	1.60	0.300	0.24	3.00	1.00	0.72
footing	9	3.80	1.000	3.80	3.00	1.00	11.40
wingwall	10	3.00	2.045	6.14	0.40	2.00	4.91
wingwall	11	3.30	0.955	3.15	0.40	2.00	2.52
wingwall	12	1.60	2.000	3.20	0.40	2.00	2.56
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	1.60	0.300	0.24	0.40	2.00	0.19
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	6.00	x	0.10	(0.078)
						sum	46.11

concrete filling in piles

thick of pipe	=	0.01036	m					
inner diameter	=	0.406	–	0.021				
	=	0.385	m					
area	=	0.250	x	3.142	x	0.148		
	=	0.1165	m2					
depth	=	8.000	m	--->	0.333	x	24.000	m
nos	=	6.000						
volume	=	0.117	x	8.000	x	6.00		
	=	5.60	m3					
sub total	=	46.112	+	5.60				
Total	=	51.708	+	51.708	m3			
	=	**103.41**	m3					

Description	nos	Side	Depth	total	Remark
Supply and Driving of SPP dia.400 mm for Abutment	12.00	R / L	24.00	288.00	

abr6–co

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br P6 (Pendestrian Br) Sta : 147 + 58 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	2.045	2.00	1.23
wall	1a	2.045	3.000	1.00	6.14
wall	1b	2.045	2.200	1.00	4.50
wall of beam	1c	1.900	1.800	2.000	6.84
wall of beam	1d	0.500	1.900	2.000	1.90
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	2.200	1.00	1.10
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	2.200	1.00	1.65
stem	4	0.500	2.150	2.00	2.15
	4a	0.500	3.000	1.00	1.50
stem	5	0.500	1.000	2.00	0.50
	5a	1.200	3.000	1.00	3.60
stem	6	1.000	3.255	2.00	6.51
stem	6a	3.555	3.000	1.00	10.67
stem	6b	3.555	3.000	1.00	10.67
footing	7	1.200	0.300	2.00	0.36
footing	8	1.600	0.300	2.00	0.96
footing	9	3.800	1.000	2.00	7.60
footing	10	1.000	3.000	2.00	6.00
wingwall	11	2.045	3.000	4.00	24.54
wingwall	11a	0.400	2.045	2.00	1.64
wingwall	12	3.300	0.955	4.00	11.78
wingwall	13	0.400	0.955	2.00	0.76
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	1.600	2.000	4.000	12.800
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	130.39

Total = 2.00 x 130.39

= 260.77 sq.m

abr6-fw

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br P6 PE 147 + 58 m (Pendestrian Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

Diameter of pipe = dp	=	40	cm					
thick of pipe = t	=	1.031	cm					
Diameter of spiral = ds	=	1.30	cm					
covering of concrete = d'	=	5	cm					
dc	=	40 – 2 x (1.031 + 5)						
	=	27.938	cm					
(dc – ds)	=	27.938	–	5				
	=	22.938	cm					
Ag	=	0.25 x @pi x dp^2						
	=	1,256.64	cm2					
Ac	=	0.25 x @pi x dc^2						
	=	613.028	cm2					
f'c	=	225	kg/cm2					
fsy	=	4,000	kg/cm2					
Ag/Ac	=	2.050						
f'c/fsy	=	0.056						
ps	=	0.45 x (Ag/Ac – 1) x f'c/fsy						
ps	=	0.027						
Area of spiral = as	=	0.25*@pi x ds^2						
	=	1.327	cm2					
spacing of spiral = s	=	as x @pi x (dc–ds) / ps x @pi x dc^2/4						
s	=	1.327 x 3.142 x 22.938 / 0.027 x 3.142 x 195.133						
	=	95.649 / 16.291	cm					
	=	5.87	cm					
say	=	7.00	cm					
Length of spiral per picth	=	@sqrt((@pi x dc)^2 + s^2)						
	=	88.05	cm					
length of culumn	=	800	cm					
nos of pitch	=	114.29						
length of spiral	=	88.05	x	114.29				
	=	10,062.69	cm					
	=	100.63	m					
Radius of steel ring								
Outer diameter of pile	=	40.64	cm					
Thick of pile	=	1.031	cm					
Inner diameter of pile	=	40.64	–	2.062				
	=	38.578	cm					
Concrete covering	=	5	cm					
Diameter of steel bar	=	1.6	cm					
Diameter of ring	=	1.3	cm					
Inner diameter of pile	=	38.578						
Distance outside to ring	=	5	+	0.65	+	1.6	+	0.65
	=	7.90	cm					
Inner diameter of ring	=	38.578	–	7.90				
	=	30.678	cm					
Radius of ring steel	=	30.678	:	2				
	=	15.339	cm					
	=	0.153	m					

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br P6 PE 147 + 58 m (Pendestrian Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steil inside pile (kg)

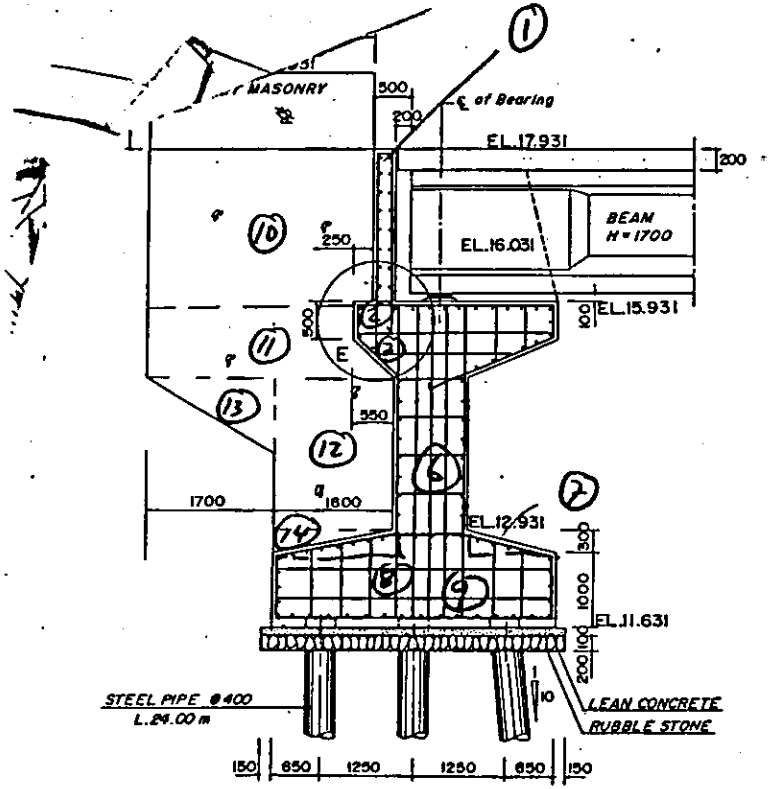
Length of each = 2 x @pi x r
= 2 x 3.1415 x 0.153 m
= 0.964 m

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	8.00		0.36	8.71	28.00	8	69.68	1.560	108.70
2.	R1	13									100.63	0.995	100.12
3.	Ring	13						0.964		7	6.75	0.995	6.71
												sum	215.54

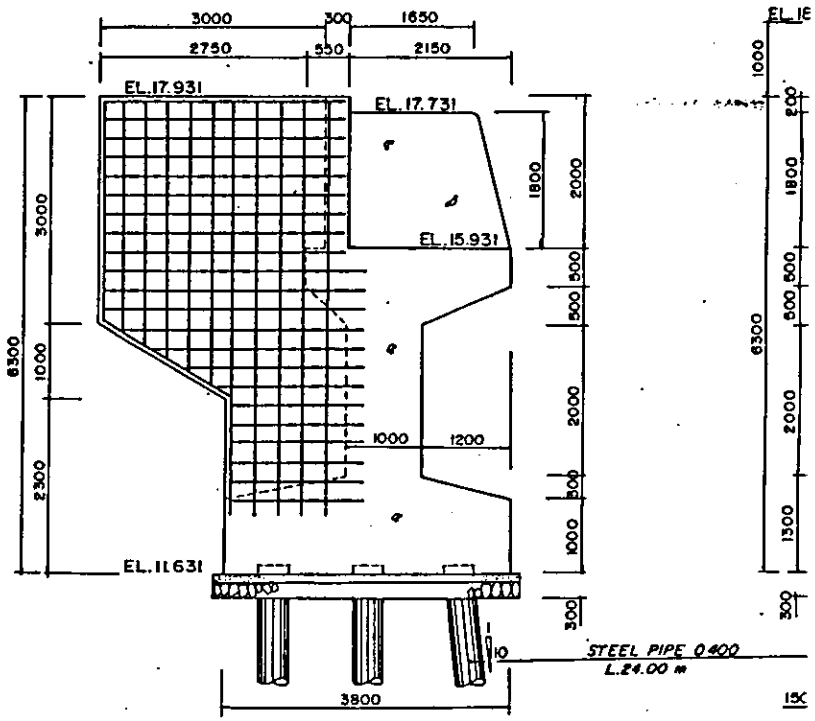
Total weight = 6.00 x 215.53 = 1,293.22 kg

Grand total = 2.00 x 1,293.22 = 2,586.45 kg

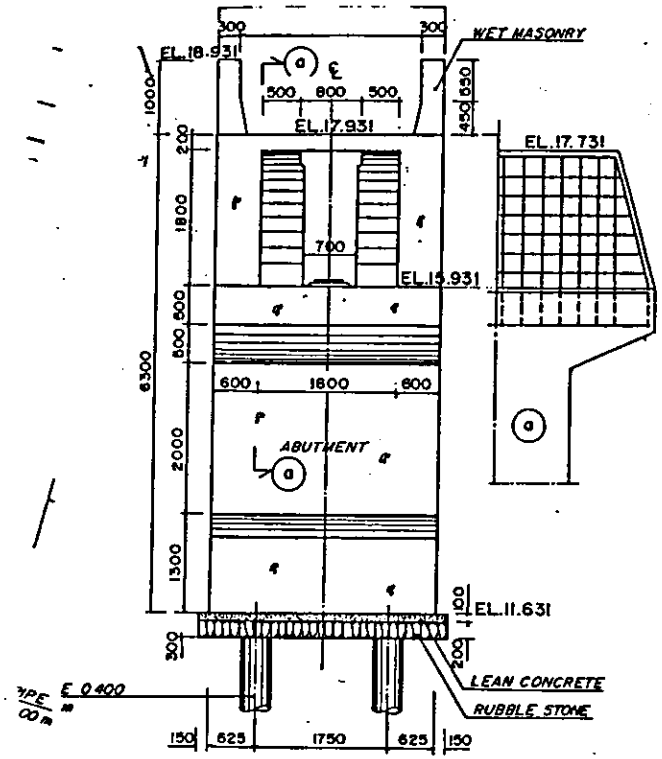
inb-br6



SECTION. A – A
SCALE. A

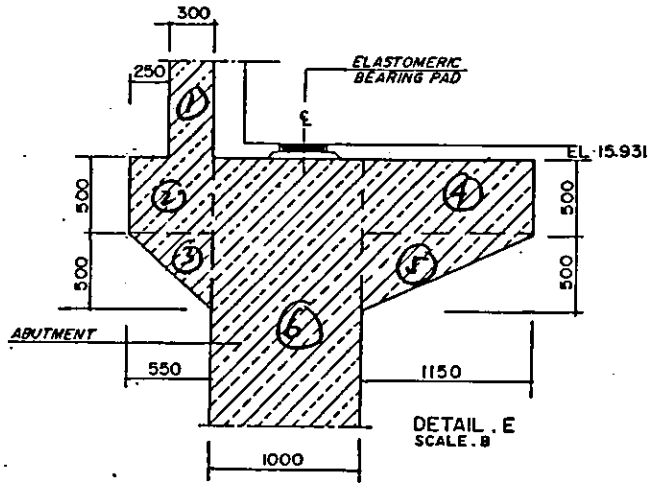


SECTION. B – B
SCALE. A



SECTION . D-D
SCALE . A

ABUTMENT (BR. P.6)



DETAIL . E
SCALE . B

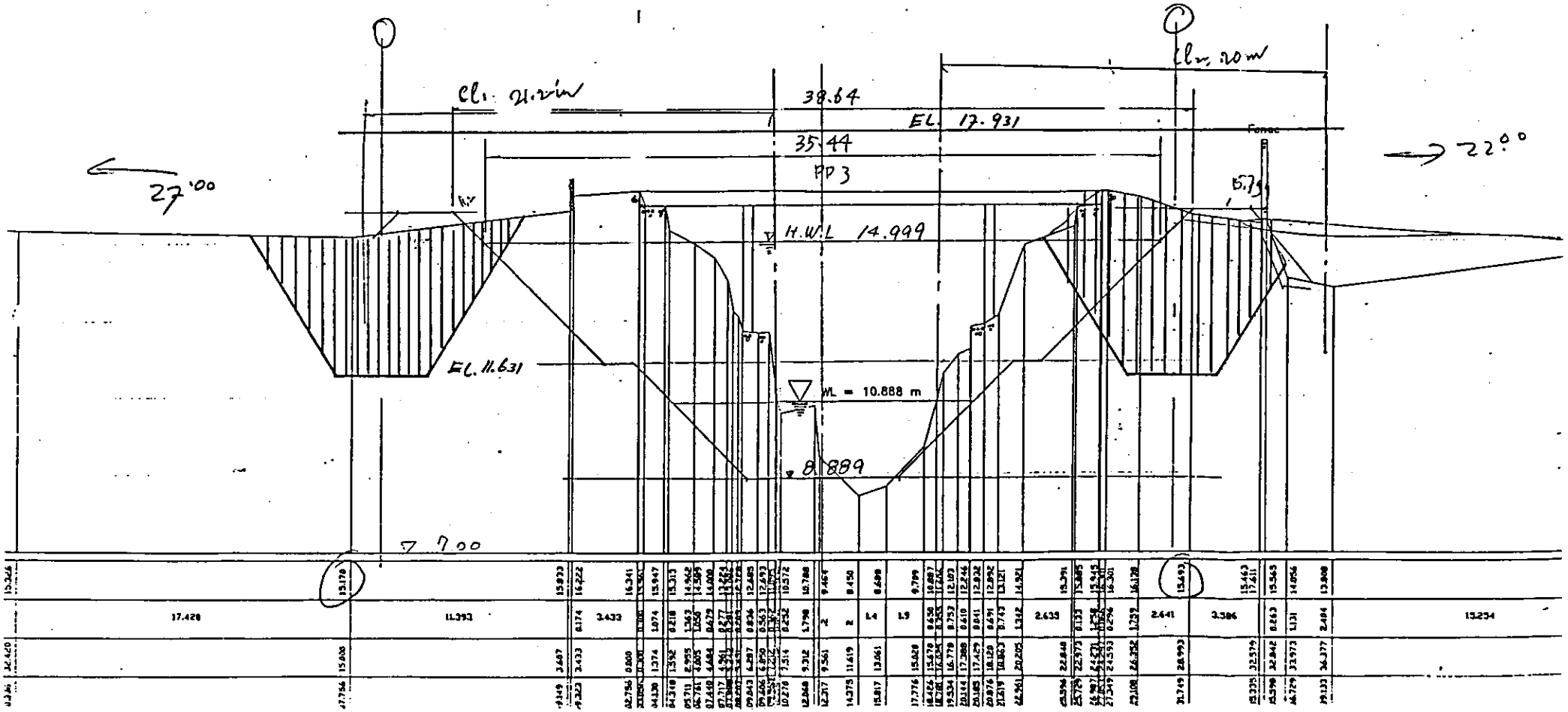
(A P.6 ABUTMENT)

REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
DIRECTORATE OF TECHNICAL GUIDANCE

P6 PEDESTRIAN, Br.

SECTION. STA 147+58 (PERCUT RIVER)

St 1 = 6m
St 2 = 7m



Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	List of Bill Quantity BR P7	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Deck

1 Quantity of concrete of Deck slab ✓
2 Quantity of concrete of Panel slab ✓
3 Quantity of concrete of cross beam ✓
4 Quantity of Wooden Form Work ✓
5 Quantity of Reinforcement steel Deck slab
6 Quantity of Reinforcement steel Cross beam
Quantity of Haindrail
Quantity of Expansion Joint

Girder

7 Quantity of concrete of Main Beam
8 Quantity of Reinforcement steel Main Beam
9 Quantity of Tendon ✓
10 Quantity of Anchorage
11 Quantity of Bearing pad
12

Abutment

13 Quantity of concrete of Abutment ✓
14 Quantity of Reinforcing steel
15 Quantity of Wooden Form Work ✓
16 Quantity of Inside pile Reinf.steel ✓
17 Quantity of Concrte Inside pile
Quantity of Lean Concrete & Rubble stone

18

Br P7 PE 169 + 59 m

(Medan – Tembung Br)

NO	DESCRIPTION	UNIT	Quantity	Unit Price (Rp)	REMARKS
	BRIDGE				
	SUPERSTRUCTURE				
	CONCRETE				
	a. Deck Slab (Insitu)				
	Concrete (Type – B) Class K 350	Cu.m	97.92		
	Reinforcing Steel Deform	Kg	17,430.56		
	Wooden Form Work with Supporting Frame	Sq.m	160.68		
	b. Precast Prestressed Concrete Main Beam				
	Precast Prestressed Concrete Beam (Type – A) Class K 400	Cu.m	209.72		
	Reinforcing Steel Deform	Kg	27,187.07		
	Tendon [H.T.W] diameter 13 mm	Kg	18,594.38		
	Live end Anchorage	Nos	56.00		
	c. PC Panel Concrete				
	PC Panel Concrete, t = 7 cm (Type – A) Class K 400	Cu.m	21.84		
	Reinforcing Steel Deform	Kg	5,731.54		
	c. PC Diaphragm Concrete				
	PC Diaphragm Concrete (Type – A) Class K 400	Cu.m	4.32		
	Reinforcing Steel Deform	Kg	517.24		
	PRESTRESSING				
	Prestressing Tendon [H.T.W.] diameter 13 mm for Main Beam (incl. Diaphragm)	each	7.00		
	Grout Injection Main Beam (icl. Diaphragm)	m	1,153.60		
	ERECTING				
	Erection of Concrete Main Beam	Kg	524,292.50		
sup–p7	(Incl.PC Diaphragm , PC Panel)				

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. P7 PE 169 + 59 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 Length = 40.80 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	9.000	2.205	1.000	2.205	41.200	90.846
End slab	(2)	0.055	0.500	0.027	2.000	0.055	5.700	0.313
End slab	(3)	0.300	0.200	0.060	2.000	0.120	9.200	1.104
							sum	92.264

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.223	1.500	0.334	1.000	0.334	41.200	13.751
Right Side slab	(5)	0.223	1.500	0.334	1.000	0.334	41.200	13.751
							sum	27.501

Total Volume K.350 = 92.264 + 27.501
= 119.765 m3 ✓

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	43.000	0.688	0.550	0.378
Railing post	(7)	0.165	0.160	0.026	43.000	1.135	0.470	0.534
slab side Walk	(8)	0.250	1.266	0.317	2.000	0.633	41.200	26.085
Wall	(9)	0.470	0.100	0.047	2.000	0.094	37.840	3.557
							sum	30.554

Total Volume K.225 = 30.554 m3

Grand Total K.350 = 119.7645 m3 ✓

Grand Total K.225 = 30.55365 m3 ✓

slab –br7

Direktorat General Water Resources Development Direktorat General Medan Flood Control	DECK SLAB AND HAND RAIL Br P7 PE 169 + 59 m (Mdn – Tembung Br)	japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 41.20 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	9.20	2.76	2.00	5.52
end slab	(2)	0.20	9.20	1.84	2.00	3.68
	(3)	0.35	4.40	1.54	2.00	3.08
	(4)	0.47	1.50	0.71	4.00	2.84
in side walk (curb)	(5)	0.25	41.20	10.30	2.00	20.60
in side walk	(6)	0.47	40.95	19.25	2.00	38.49
out side walk	(7)	0.47	39.10	18.38	2.00	36.75
Railing post	(8)	0.10	0.92	0.09	42.00	3.86
Railing post	(9)	0.16	0.45	0.07	84.00	6.05
Railing post	(10)	0.14	0.45	0.06	84.00	5.10
					sum	125.98
					numbers of span =	1.00
total	=	125.98	x	1.00	=	125.98
	=	125.98	m2			

Scafolding (L = 41.20 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.50	41.20	61.80	2.00	123.60
end slab	(2)	0.45	41.20	18.540	2.00	37.08
					sum	160.68
					numbers of span =	1.00
total	=	1.00	x	160.68	=	160.68
	=	160.68	m2			

Grand total form Work = 125.98 m2

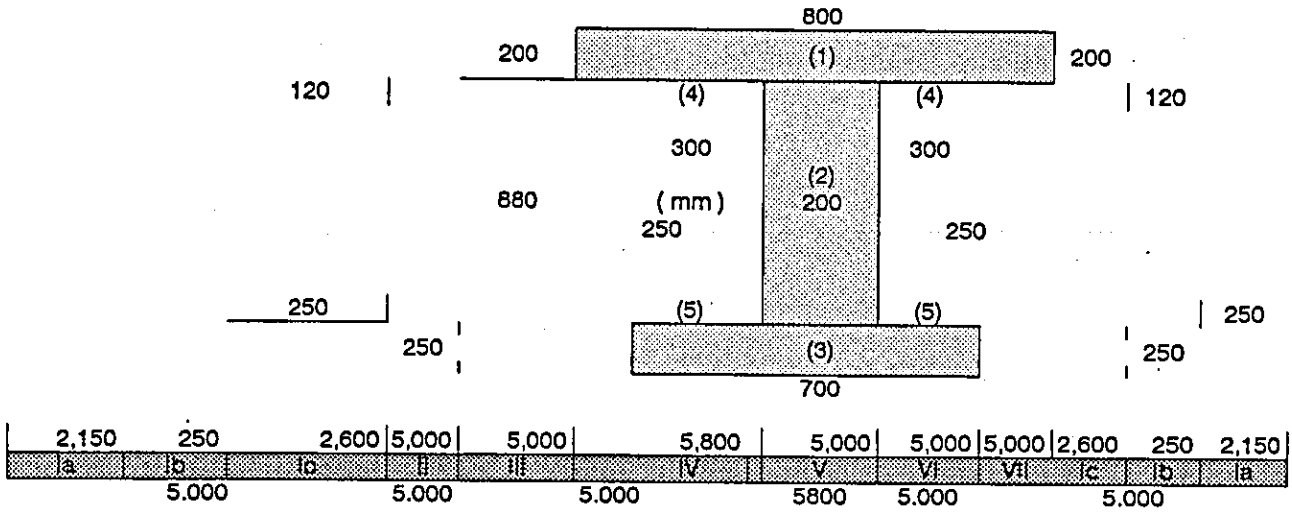
Grand total Scafolding = 160.68 m2

f-wrkbr7

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br. P7 PE 169 + 59 m (Mdn– Tembung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K–400,l = 40.80 m

Main Beam Section



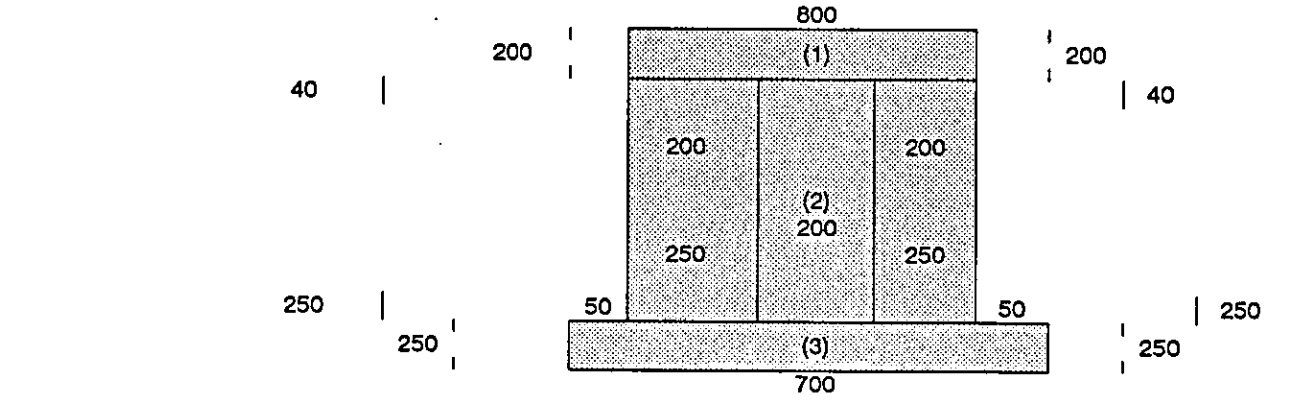
Total length = 40,800 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.200	1.250	1.000	0.250
(3)	0.700	0.250	1.000	0.175
(4)	0.300	0.120	2.000	0.036
(5)	0.250	0.250	2.000	0.062
			sum	
	area section main beam		=	0.6835

Volume 1 = area x length
= 0.6835 x 40,800
= 27,886.80 m3

End Block Section L = 2.150 m



2. Bearing Block Area

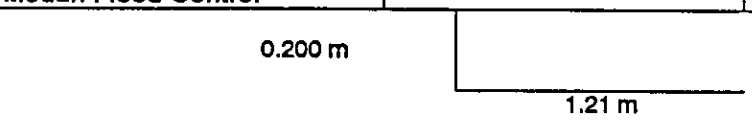
piece	width m	depth m	nos	total area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.700	1.250	1.000	0.875
(3)	0.700	0.250	1.000	0.175
		1.700	sum	1.210

1075
1250

1/2

beam–br7

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br. P7 PE 169 + 59 m (Mdn– Tembung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.16 + 1.25) : 2
= 1.21 m

area = width x depth
= 0.25 x 1.21
= 0.301 m2

section	area	length	nos	volume
	m2	m		m3
Ia	1.2100	2.150	1.00	2.601
Ib	0.3012	0.250	1.00	0.075
Ic	0.6835	2.600	1.00	1.777
II	0.6835	5.000	1.00	3.418
III	0.6835	5.000	1.00	3.418
IV	0.6835	5.800	1.00	3.964
V	0.6835	5.000	1.00	3.418
VI	0.6835	5.000	1.00	3.418
VII	0.6835	5.000	1.00	3.418
Ic	0.6835	2.600	1.00	1.777
Ib	0.3012	0.250	1.00	0.075
Ia	1.2100	2.150	1.00	2.601
	sum	40.80		29.959

Total volume = 29.960 m3

Total volume (6 Beam) = 7.00 x 29.960 m3

Grand Total = 209.717 m3

beam–br7

2/2

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	MAIN BEAM Br P7 PE 169 + 59 m (Medan – Tembung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Segment	B1	13	600	1,660	150	1,660		4.070	30	122.10	0.995	121.490	outer Beam
(l = 5.000 m)	B2	13		300	720	300		1.320	16	21.12	0.995	21.014	and end Block
2 nos	B3	13	1,600	620	1,600			3.820	16	61.12	0.995	60.814	
	B4	13		886	650	310		1.846	30	55.38	0.995	55.103	
	B5	13		1,045	650	310		2.005	30	60.15	0.995	59.849	
	B6	16	4,300	675		750		5.725	5	28.63	1.560	44.655	
	B7	16	4,950					4.950	24	118.80	1.560	185.328	
	B8	16	1,000			150		1.150	16	18.40	1.560	28.704	
	B9	13		1,000		750		1.750	2	3.50	0.995	3.483	
											sum	580.4401	1,160.880
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	887.077

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	887.077
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
1 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	443.538
Segment	B1	13	600	1,660	150	1,660		4.070	33	134.31	0.995	133.638	Inner of Beam
(l = 5.800 m)	B2	13		886	720	310		1.916	33	63.23	0.995	62.912	
1 nos	B3	13		1,045	650	310		2.005	33	66.16	0.995	65.834	
	B4	16	5,720					5.720	24	137.28	1.560	214.157	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	505.295	505.295

Main Beam l = 5.000 m (2 Segment)	=	1,160.880	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (1 Segment)	=	443.538	Kg
Main Beam l = 5.800 m (1 Segment)	=	505.295	Kg
Grand total (1 pcs)	=	3,883.867	Kg
Grand total (7 pcs)	=	7.000	x 3,883.867 kg
	=	27,187.068	kg ✓

mb–br7

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	MAIN BEAM BR P7 PE 169 + 59 m (Medan – Tembung Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

$$S = -l^2/8.f \times [\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ln[\{-4f/l+@sqrt(4f/l)^2+1)\] - [\{2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$$

(a) = $l^2/8.f$
(b) = $2.f/l$
(c) = $4.f/l$
(d) = $(4.f/l)^2$
(e) = $(4.f/l)^2 + 1$

(f) = $@sqrt((4.f/l)^2 + 1)$ = @sqrt (e)
(g) = $-2.f/l.@sqrt((4.f/l)^2+1)$ = $-$(b) x (f)
(h) = $-4f/l+@sqrt(4f/l)^2+1$ = ($-$c) + (f)
(i) = $1/2\ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = 1/2xln (h)
S1 = $[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = (g) + (i)

(k) = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\}$ = (b) x (f)
(l) = $[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = (c) + (f)
(m) = $1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = 1/2 x ln(l)
S2 = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = (k) + (m)

S = ($-$a) x [(S1) – (S2)]

S is length of parabola curve

tc–br7

1/2

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	MAIN BEAM BR P7 PE 169 + 59 m (Medan – Tembung Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 40.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
2	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66
3	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
4	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66

f = Average

nos wire per tendon	=	19	nos				
sum of tendon length	=	19	x	85.6625	=	1,627.59	m
nos wire per tendon	=	12	nos				
sum of tendon length	=	12	x	85.6625	=	1,027.95	m
				sum		2,655.54	m
Total	=	0.80	+	2,655.54	=	2,656.341	kg
Grand Total (7 Nos)	=	7.00	x	2,656.34	=	18,594.38	kg

te-br7

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	PANEL SLAB Br7 PE 169 + 59 m (Medan – Tembung Br	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K–400 (L = 40.80 m)

	volume panel slab								
	width	depth	area	thick	nos	volume			
section	w	d	(m 2)	t					
	m	m		m		m3			
(1)	1.000	1.300	1.3	0.070	1.00	0.0910			
	sum volume per pcs				=	0.0910			
	nose per row				=	6.0000	row	x	0.0910
					=	0.546	m3		
	nos of per span				=	6.00		x	40
					=	240	nos		
	Total volume per span				=	21.8400	m3		
	Total volume per Span				=	1.000	x	21.840	m3
	Grand Total				=	21.840	m3		

pl–br7

Dictorate General of Water Resources Development Dictorate of River Medan Flood Control Project	REINFORCING STEEL OF PANEL DECK SLAB Br P7 PE 169 + 59 m (Medan – Tembung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of panel deck slab per span (l = 40.80 m) 1 / 1

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
P3	16	1,050.00	150	1,520	150	150	3.020	2.00	6.04	1.560	9.422	main steel
P4	16	1,050.00	200	1,520	200	150	3.120	1.00	3.12	1.560	4.867	
P5	12	450.00	0	0	0	110	0.560	6.00	3.36	0.995	3.343	tranverse steel
P6	12	950.00	0	0	0	220	1.170	4.00	4.68	0.995	4.657	
P7	12	400.00	0	0	0	0	0.400	4.00	1.60	0.995	1.592	
										sum	23.881	

nos of span	=	1.00					
nos of panel slab per span	=	6	x	1.00	=	6.00	nos
total nos of span	=	6.00	x	40.00	=	240.00	nos
Total weight	=	**240.00**	x	**23.8814**	=	**5,731.54**	**kg**

repl–p7

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	CROSS BEAM Br7 PE 169 + 59 m (Medan – Tembung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K–400 (L = 40.80 m)

section	volume cross beam per span width w m	depth d m	area (m 2)	thick t m	nos	volume m3
(1)	0.630	1.250	0.78750	0.200	1.00	0.158
(2)	0.060	0.050	0.00150	0.200	4.00	(0.002)

Cross Beam End

sum volume per pcs	=	0.1551		
Volume nose per row	=	6	x	0.1551
	=	0.9306		
nose per span	=	2	row	
Total volume per span	=	2	x	0.9306
	=	**1.8612**	m3	

Structure Concrete Class K–400 (L = 40.80 m)

Cross Beam Central

section	volume cross beam per span width w m	depth d m	area (m 2)	thick t m	nos	volume m3
(1)	1.250	1.250	1.56250	0.150	1.00	0.234
(2)	0.300	0.120	0.01800	0.150	2.00	(0.011)
(3)	0.250	0.250	0.03125	0.150	2.00	(0.019)

sum volume per pcs	=	0.2048			
Volume per row	=	6	x	0.20482	
	=	1.2290			
nose per span	=	2	row		
	=	2		x	1.2289
Total volume per span	=	2.4579	m3		
Grand Total	=	**1.8612**	+	**2.4579**	**m3**
	=	**4.3191**	**m3**		

cb–br7

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF CROSS BEAM Br P7 PE 169 + 59 m (Medan – Tembung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of Cross beam (l = 40.8 m)

C.1	13	690	140	690	140	140	1.800	6.00	10.80	0.995	10.746	End
C.2	13	1,200	140	1,200	140	140	2.820	3.00	8.46	0.995	8.418	
										sum	19.16	

Nos per row	=	6.00		
sub total per span	=	12.00	x	19.16
	=	229.96	Kg	

C.1	13	1,090	140	1,090	140	140	2.600	6.00	15.60	0.995	15.522	Center
C.2	13	1,200	140	1,200	140	140	2.820	3.00	8.46	0.995	8.418	
										sum	23.94	

Nos per row	=	6.00		
sub total per span	=	12.00	x	23.94
	=	287.28	Kg	
Grand total	=	**517.241**	Kg	

cr-br7

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – P7 (Mdn– Temb.Br) STA : 169 + 59 (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.406	m	
area	=	0.129	m2	
H	=	6.700	m	
W	=	5.100	m	
L	=	12.00	m	

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	2.045	0.61	12.00	1.00	7.36
stem	2	0.55	0.500	0.28	11.20	1.00	3.08
stem	3	0.55	0.500	0.14	11.20	1.00	1.54
stem	4	0.20	0.500	0.10	12.00	1.00	1.20
stem	5	0.20	0.250	0.03	12.00	1.00	0.30
stem	6	1.00	3.655	3.65	12.00	1.00	43.86
stem	7	1.80	0.300	0.27	12.00	1.00	3.24
footing	8	2.30	0.300	0.35	12.00	1.00	4.14
footing	9	5.10	1.000	5.10	12.00	1.00	61.20
wingwall	10	3.00	2.045	6.14	0.40	2.00	4.91
wingwall	11	3.30	0.955	1.58	0.40	2.00	1.26
wingwall	12	2.30	2.400	5.52	0.40	2.00	4.42
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	2.045	2.00	0.18
App.Slab	16	3.00	0.200	0.30	11.200	1.00	3.36
	17	0.275	0.05	0.01	11.200	1.00	0.15
inside blockout	lbo	0.30	0.250	0.08	0.70	6.00	0.315
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	36.00	x	0.10	(0.466)
						sum	140.73

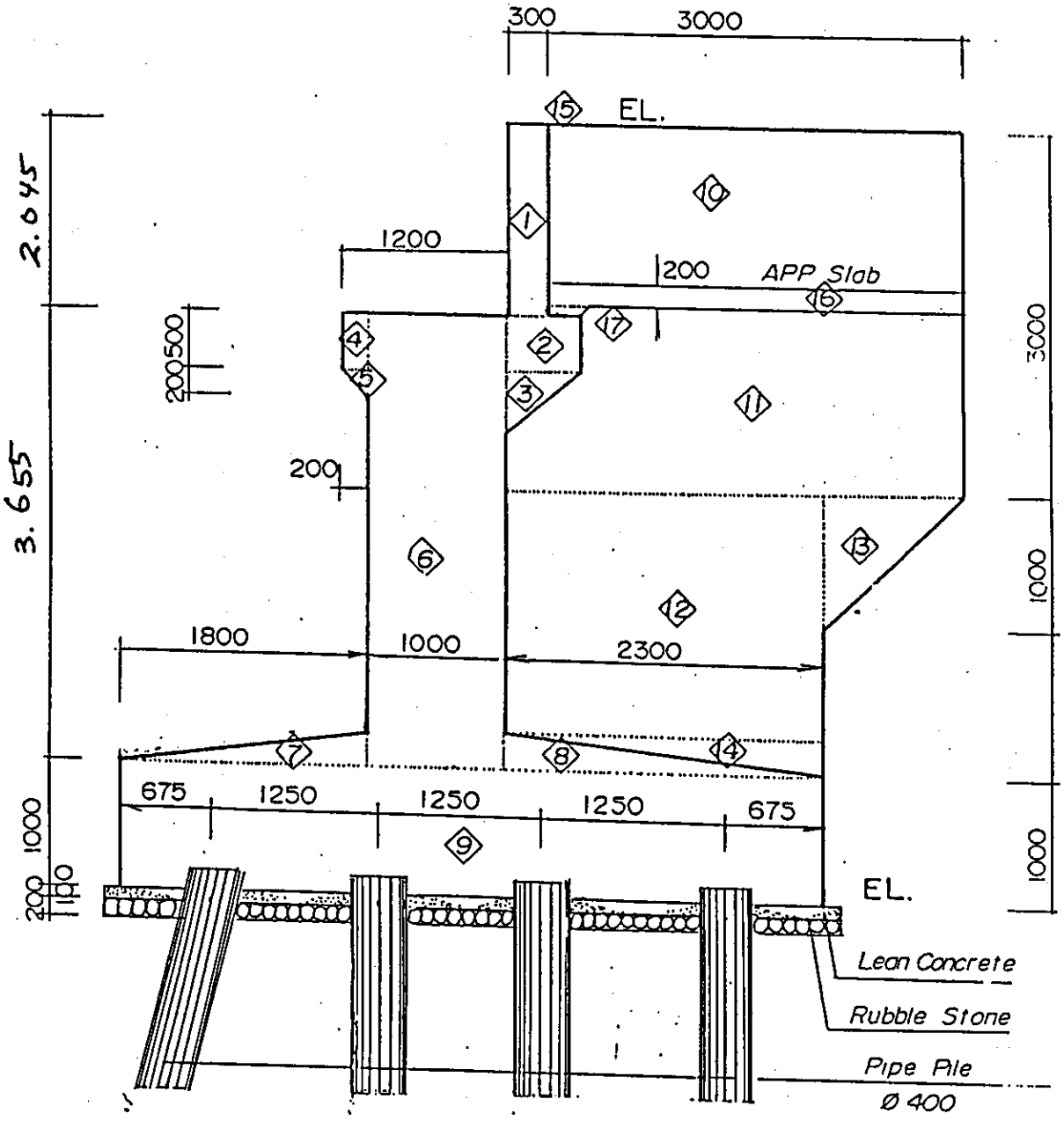
concrete filling in piles

thick of pipe	=	0.01036	m					
inner diameter	=	0.406	–	0.021				
	=	0.385	m					
area	=	0.250	x	3.142	x	0.148		
	=	0.11658	m2					
depth	=	8.000	m	--->	0.333	x	24.000	m
nos	=	36.000						
volume	=	0.117	x	8.000	x	36.00		
	=	33.58	m3					
sub total	=	140.729	+	33.58				
Total	=	174.306	+	174.30	m3			
Grand Total (R & L)	=	348.612	m3					

Description	Nos	side	Depth		total	Remark
Supply and Driving of SPP dia. 400 mm for Abutment	36.00	L / S	24.00		864.00	
	36.00	R / S	17.00		612.00	
				sum	1,476.00	

1/1

abr7–co


300
3000
EL.
2.045
3.655
1200
200
APP Slab
200
500
200
3000
1000
1800
1000
2300
675
1250
1250
1250
675
1000
200
1100
EL.
Lean Concrete
Rubble Stone
Pipe Pile
Ø 400

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P7 PE 169 + 59 m Medan – Tembung Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

Diameter of pipe = dp	=	40	cm					
thick of pipe = t	=	1.031	cm					
Diameter of spiral = ds	=	1.30	cm					
covering of concrete = d'	=	5	cm					
dc	=	40 – 2 x (1.031 + 5)						
	=	27.938	cm					
(dc – ds)	=	27.938	–	5				
	=	22.938	cm					
Ag	=	0.25 x @pi x dp ^ 2						
	=	1,256.64	cm2					
Ac	=	0.25 x @pi x dc ^ 2						
	=	613.028	cm2					
f'c	=	225	kg/cm2					
fsy	=	4,000	kg/cm2					
Ag/Ac	=	2.050						
f'c/fsy	=	0.056						
ps	=	0.45 x (Ag/Ac – 1) x f'c/fsy						
ps	=	0.027						
Area of spiral = as	=	0.25*@pi x ds ^ 2						
	=	1.327	cm2					
spacing of spiral = s	=	as x @pi x (dc–ds) / ps x @pi x dc ^ 2/4						
s	=	1.327 x 3.142 x 22.938 / 0.027 x 3.142 x 195.133						
	=	95.649 / 16.291	cm					
	=	5.87	cm					
say	=	7.00	cm					
Length of spiral per picth	=	@sqrt((@pi x dc) ^ 2 + s ^ 2)						
	=	88.05	cm					
length of culumn	=	800	cm					
nos of pitch	=	114.29						
length of spiral	=	88.05	x	114.29				
	=	10,062.69	cm					
	=	100.63	m					
Radius of steel ring								
Outer diameter of pile	=	40.64	cm					
Thick of pile	=	1.031	cm					
Inner diameter of pile	=	40.64	–	2.062				
	=	38.578	cm					
Concrete covering	=	5	cm					
Diameter of steel bar	=	1.6	cm					
Diameter of ring	=	1.3	cm					
Inner diameter of pile	=	38.578						
Distance outside to ring	=	5	+	0.65	+	1.6	+	0.65
	=	7.90	cm					
Inner diameter of ring	=	38.578	–	7.90				
	=	30.678	cm					
Radius of ring steel	=	30.678	:	2				
	=	15.339	cm					
	=	0.153	m					

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P7 PE 169 + 59 m Medan – Tembung Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

Length of each = 2 x @pi x r
= 2 x 3.1415 x 0.153 m
= 0.964 m

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	8.00		0.36	8.71	36.00	8	69.68	1.560	108.70
2.	R1	13									100.63	0.995	100.12
3.	Ring	13						0.964		7	6.75	0.995	6.71
												sum	215.54

Total weight = 36.00 x 215.53 = 7,759.34 kg

Grand total = 2.00 x 7,759.34 = **15,518.68** kg ✓

inb–br7

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br P7 (Mdn – Tembung Br) Sta : 169 + 59 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	2.045	2.00	1.23
wall	1a	2.045	12.000	1.00	24.54
wall	1b	2.045	11.200	1.00	22.90
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	11.200	1.00	5.60
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	11.200	1.00	8.40
stem	4	0.200	0.500	2.00	0.20
	4a	0.500	12.000	1.00	6.00
stem	5	0.200	0.250	2.00	0.05
	5a	0.320	12.000	1.00	3.84
stem	6	1.000	3.655	2.00	7.31
stem	6a	2.605	12.000	1.00	31.26
stem	6b	11.200	2.355	1.00	26.38
footing	7	1.800	0.300	2.00	0.54
footing	8	2.300	0.300	2.00	1.38
footing	9	5.100	1.000	2.00	10.20
footing	10	1.000	12.000	2.00	24.00
wingwall	11	2.045	3.000	4.00	24.54
wingwall	11a	0.400	2.045	2.00	1.64
wingwall	12	3.300	0.955	4.00	11.78
wingwall	13	0.400	0.955	2.00	0.76
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	2.300	2.000	4.000	18.400
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	235.95

Total = 2.00 x 235.95

= 471.91 sq.m

abr7-fw

Lean concrete (m3)

diameter of concrete pile = 0.40 m

area = 0.126 m2

Lean Concrete 0.10

5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	12.30	66.42	0.10	6.64

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.10	m			
nos	=	36				
volume	=	0.126	x	0.10	x	36
	=	0.452	m3			
net volume	=	6.64	–	0.452		
	=	6.19	m3			
nos	=	2.00				
Total volume	=	2.00	x	6.19		
	=	12.38	m3		(Abutment L & R)	
Grand Total	=	12.38	m3	✓		
	=	12.38	m3			

Rubble stone (m3)

diameter of concrete pile = 0.40 m

area = 0.126 m2

Rubble Stone 0.200

5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	12.30	66.42	0.20	13.28

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.20	m			
nos	=	36				
volume	=	0.126	x	0.20	x	36
	=	0.905	m3			
net volume	=	13.28	–	0.905		
	=	12.38	m3			
nos	=	2.00				
Total volume	=	2.00	x	12.38		
	=	24.76	m3		(Abutment L & R)	
Grand Total	=	24.76	m3	✓		
	=	24.76	m3			

lc-br7

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	List of Bill Quantity Br P9 PE 200+25 (Medan - Deli)	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Deck

1	Quantity of concrete of Deck slab ✓
2	Quantity of concrete of Panel slab ✓
3	Quantity of concrete of cross beam ✓
4	Quantity of Wooden Form Work ✓
5	Quantity of Reinforcement steel Deck slab *)
6	Quantity of Reinforcement steel Cross beam ✓
	Quantity of Reinforcement steel panel *)
	Quantity of Haindrail *)
	Quantity of Expansion Joint *)

Girder

7	Quantity of concrete of Main Beam ✓ (12 nos)
8	Quantity of Reinforcement steel Main Beam ✓
9	Quantity of Tendon ✓
10	Quantity of Anchorage *)
11	Quantity of Bearing pad *)
12	

Abutment

13	Quantity of concrete of Abutment ✓
14	Quantity of Reinforcing steel
15	Quantity of Wooden Form Work ✓
16	Quantity of Inside pile Reinf.steel ✓
17	Quantity of Concrte Inside pile *)
	Quantity of Lean Concrete & Rubble stone ✓
18	Quantity of Furnished = 3,132 M.

Br P9 PE 200 + 25 m

(Medan – Denai Br)

NO	DESCRIPTION	UNIT	Quantity	Unit Price (Rp)	REMARKS
	BRIDGE				
	SUPERSTRUCTURE				
	CONCRETE				
	a. Deck Slab (Insitu)				
	Concrete (Type – B) Class K 350	Cu.m	191.94		
	Reinforcing Steel Deform	Kg	34,165.80	+10%	
	Wooden Form Work with Supporting Frame	Sq.m	185.40		
	b. Precast Prestressed Concrete Main Beam				
	Precast Prestressed Concrete Beam (Type – A) Class K 400	Cu.m	359.52		
	Reinforcing Steel Deform	Kg	46,606.40		
	Tendon [H.T.W] diameter 13 mm	Kg	31,876.09		
	Live end Anchorage	Nos	96.00		
	c. PC Panel Concrete				
	PC Panel Concrete, t = 7 cm (Type – A) Class K 400	Cu.m	40.04		
	Reinforcing Steel Deform	Kg	11,476.00		
	c. PC Diaphragm Concrete				
	PC Diaphragm Concrete (Type – A) Class K 400	Cu.m	7.92		
	Reinforcing Steel Deform	Kg	948.28		
	PRESTRESSING				
	Prestressing Tendon [H.T.W.] diameter 13 mm for Main Beam (incl. Diaphragm)	each	12.00		
	Grout Injection Main Beam (icl. Diaphragm)	m	1,977.60		
	ERECTING				
	Erection of Concrete Main Beam	Kg	898,790.00		
sup–p9	(Incl.PC Diaphragm , PC Panel)				

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. P9 PE 200 + 25 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 Length = 40.80 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	18.867	4.622	1.000	4.622	41.200	190.442
End slab	(2)	0.055	0.500	0.027	2.000	0.055	12.817	0.705
End slab	(3)	0.300	0.200	0.060	2.000	0.120	19.067	2.288
							sum	193.435

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.223	1.500	0.334	1.000	0.334	41.200	13.751
Right Side slab	(5)	0.223	1.500	0.334	1.000	0.334	41.200	13.751
							sum	27.501

Total Volume K.350 = 193.435 + 27.501
= 220.936 m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	43.000	0.688	0.550	0.378
Railing post	(7)	0.165	0.160	0.026	43.000	1.135	0.470	0.534
slab side Walk	(8)	0.250	1.319	0.330	2.000	0.659	41.200	27.163
Wall	(9)	0.470	0.100	0.047	2.000	0.094	37.840	3.557
							sum	31.632

Total Volume K.225 = 31.632 m3

Grand Total K.350 = 231.9827 m3

Grand Total K.225 = 33.21308 m3

slab –br9

Direktorat General Water Resources Development Direktorat General Medan Flood Control	DECK SLAB AND HAND RAIL Br P9 PE 200 + 25 m (Medan – Denai Br)	japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 41.20 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	22.40	6.72	2.00	13.44
end slab	(2)	0.20	22.40	4.48	2.00	8.96
	(3)	0.35	13.60	4.76	2.00	9.52
	(4)	0.47	1.80	0.85	4.00	3.40
In side walk (curb)	(5)	0.25	41.20	10.30	2.00	20.60
In side walk	(6)	0.47	40.95	19.25	2.00	38.49
out side walk	(7)	0.47	39.10	18.38	2.00	36.75
Railing post	(8)	0.10	0.92	0.09	42.00	3.86
Railing post	(9)	0.16	0.45	0.07	84.00	6.05
Railing post	(10)	0.14	0.45	0.06	84.00	5.10
					sum	146.18
				numbers of span =		1.00
total	=	146.18	x	1.00	=	**146.18**
	=	**146.18**	m2			

Scafolding (L = 41.20 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.80	41.20	74.16	2.00	148.32
end slab	(2)	0.45	41.20	18.540	2.00	37.08
					sum	185.40
				numbers of span =		1.00
total	=	1.00	x	185.40	=	**185.40**
	=	**185.40**	m2			

Grand total form Work = 146.18 m2

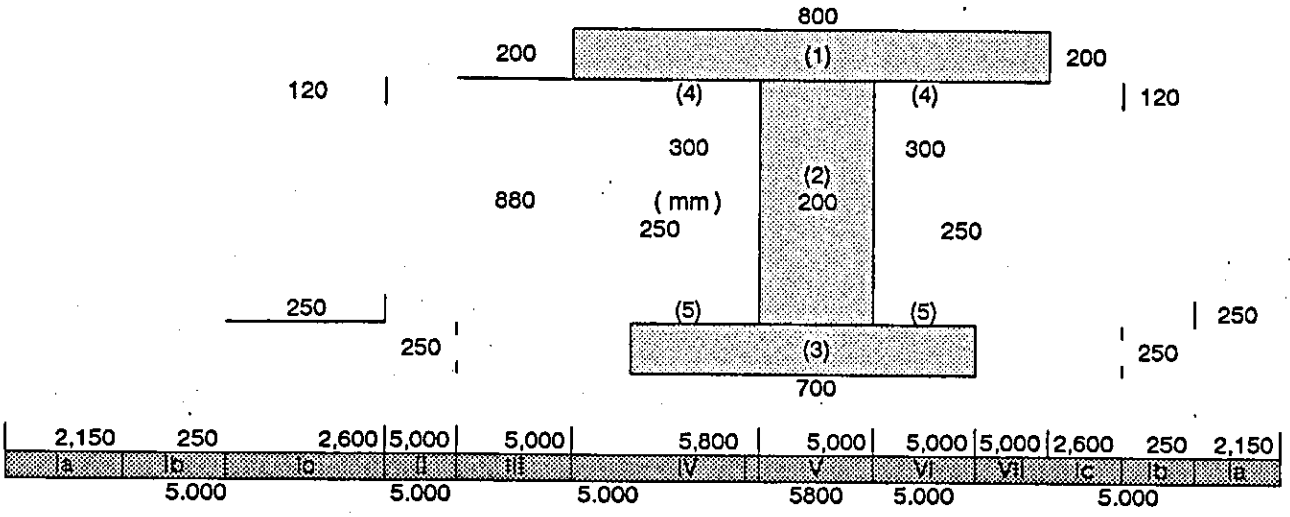
Grand total Scafolding = 185.40 m2

f-wrkbr9

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br P9 PE 200 + 25 m (Medan – Denai Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K–400,l = 40.80 m

Main Beam Section



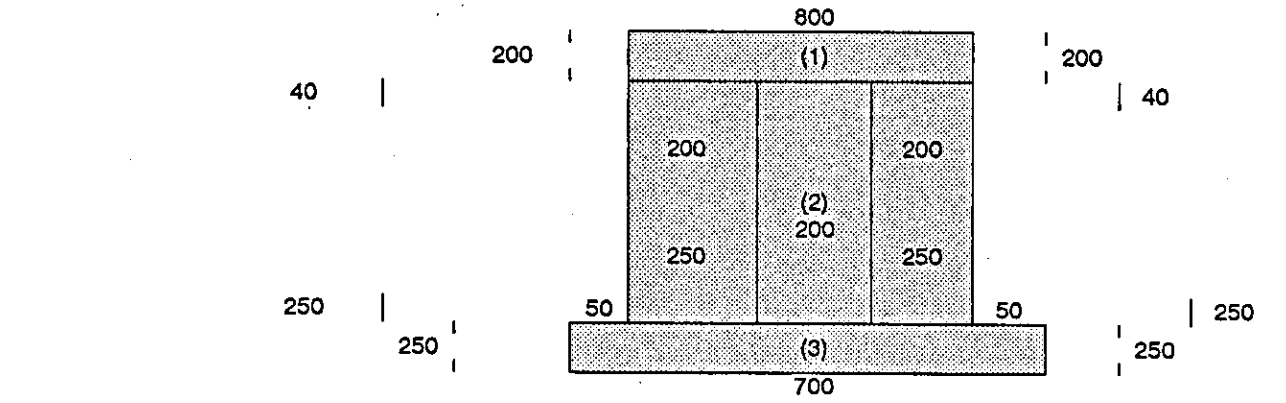
Total length = **40,800** m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.200	1.250	1.000	0.250
(3)	0.700	0.250	1.000	0.175
(4)	0.300	0.120	2.000	0.036
(5)	0.250	0.250	2.000	0.062
			sum	
	area section main beam		=	0.6835

Volume 1 = area x length
= 0.6835 x 40,800
= 27,886.80 m3

End Block Section L = 2.150 m



2. Bearing Block Area

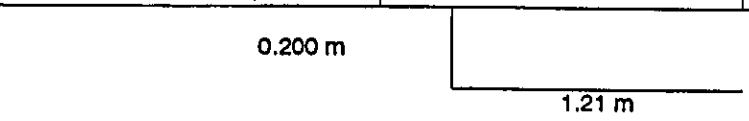
piece	width m	depth m	nos	total area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.700	1.250	1.000	0.875
(3)	0.700	0.250	1.000	0.175
		1.700	sum	1.210

1075
1250

1/2

beam–br9

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br P9 PE 200 + 25 m (Medan – Denai Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.16 + 1.25) : 2
= 1.21 m

area = width x depth
= 0.25 x 1.21
= 0.301 m2

section	area	length	nos	volume
	m2	m		m3
Ia	1.2100	2.150	1.00	2.601
Ib	0.3012	0.250	1.00	0.075
Ic	0.6835	2.600	1.00	1.777
II	0.6835	5.000	1.00	3.418
III	0.6835	5.000	1.00	3.418
IV	0.6835	5.800	1.00	3.964
V	0.6835	5.000	1.00	3.418
VI	0.6835	5.000	1.00	3.418
VII	0.6835	5.000	1.00	3.418
Ic	0.6835	2.600	1.00	1.777
Ib	0.3012	0.250	1.00	0.075
Ia	1.2100	2.150	1.00	2.601
	sum	40.80		29.959

Total volume = 29.960 m3

Total volume (6 Beam) = 12.00 x 29.960 m3

Grand Total = 359.516 m3

beam–br9

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Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	MAIN BEAM Br P9 PE 200 + 25 m (Medan – Denai Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Segment	B1	13	600	1,660	150	1,660		4.070	30	122.10	0.995	121.490	outer Beam
(l = 5.000 m)	B2	13		300	720	300		1.320	16	21.12	0.995	21.014	and end Block
2 nos	B3	13	1,600	620	1,600			3.820	16	61.12	0.995	60.814	
	B4	13		886	650	310		1.846	30	55.38	0.995	55.103	
	B5	13		1,045	650	310		2.005	30	60.15	0.995	59.849	
	B6	16	4,300	675		750		5.725	5	28.63	1.560	44.655	
	B7	16	4,950					4.950	24	118.80	1.560	185.328	
	B8	16	1,000			150		1.150	16	18.40	1.560	28.704	
	B9	13		1,000		750		1.750	2	3.50	0.995	3.483	
											sum	580.4401	1,160.880
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	887.077

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	887.077
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
1 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	443.538
Segment	B1	13	600	1,660	150	1,660		4.070	33	134.31	0.995	133.638	Inner of Beam
(l = 5.800 m)	B2	13		886	720	310		1.916	33	63.23	0.995	62.912	
1 nos	B3	13		1,045	650	310		2.005	33	66.16	0.995	65.834	
	B4	16	5,720					5.720	24	137.28	1.560	214.157	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	505.295	505.295

Main Beam l = 5.000 m (2 Segment)	=	1,160.880	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (1 Segment)	=	443.538	Kg
Main Beam l = 5.800 m (1 Segment)	=	505.295	Kg
Grand total (1 pcs)	=	3,883.867	Kg
Grand total (12 pcs)	=	12.000	x 3,883.867 kg
	=	46,606.403	kg

mb–br9

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	M A I N B E A M BR P9 PE 200 + 25 m (Medan – Denai Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

$$S = -l^2/8.f \times [\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ln[\{-4f/l+@sqrt(4f/l)^2+1\}] - [\{2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$$

(a) = $l^2/8.f$
(b) = $2.f/l$
(c) = $4.f/l$
(d) = $(4.f/l)^2$
(e) = $(4.f/l)^2 + 1$

(f) = $@sqrt((4.f/l)^2 + 1)$ = @sqrt (e)
(g) = $-2.f/l.@sqrt((4.f/l)^2+1)$ = $-(b) \times (f)$
(h) = $-4f/l+@sqrt(4f/l)^2+1$ = $(-c) + (f)$
(i) = $1/2\ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = 1/2xln (h)
S1 = $[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = (g) + (i)

(k) = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\}$ = $(b) \times (f)$
(l) = $[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = (c) + (f)
(m) = $1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = 1/2 x ln(l)
S2 = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = (k) + (m)

S = $(-a) \times [(S1) - (S2)]$

S is length of parabola curve

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	**M A I N B E A M** **BR P9 PE 200 + 25 m** **(Medan – Denai Br)**	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 40.80 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
2	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66
3	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
4	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66

f = Average

nos wire per tendon	=	19	nos				
sum of tendon length	=	19	x	85.6625	=	1,627.59	m
nos wire per tendon	=	12	nos				
sum of tendon length	=	12	x	85.6625	=	1,027.95	m
				sum		2,655.54	m
Total	=	0.80	+	2,655.54	=	2,656.341	kg
Grand Total (12 Nos)	=	12.00	x	2,656.34	=	31,876.09	kg

te-br9

2/2

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	PANEL SLAB Br9 PE 200 + 25 m (Medan – Denai Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K–400 (L = 40.80 m)

section	volume panel slab width w m	depth d m	area (m 2)	thick t m	nos	volume m3			
(1)	1.000	1.300	1.3	0.070	1.00	0.0910			
	sum volume per pcs				=	0.0910			
	nose per row				=	11.0000	row	x	0.0910
					=	1.001	m3		
	nos of per span				=	11.00		x	40
					=	440	nos		
	Total volume per span				=	40.0400	m3		
	Total volume per Span				=	1.000	x	40.040	m3
	Grand Total				=	40.040	m3		

pl–br9

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	C R O S S B E A M Br9 PE 200 + 25 m (Medan – Denai Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K–400 (L = 40.80 m)

section	volume cross beam per span width w m	depth d m	area (m 2)	thick t m	nos	volume m3		Cross Beam End
(1)	0.630	1.250	0.78750	0.200	1.00	0.158		
(2)	0.060	0.050	0.00150	0.200	4.00	(0.002)		
	sum volume per pcs				=	0.1551		
	Volume nose per row				=	11	x	0.1551
					=	1.7061		
	nose per span				=	2	row	
	Total volume per span				=	2	x	1.7061
					=	3.4122	m3	

Structure Concrete Class K–400 (L = 40.80 m)

section	volume cross beam per span width w m	depth d m	area (m 2)	thick t m	nos	volume m3		Cross Beam Central	
(1)	1.250	1.250	1.56250	0.150	1.00	0.234			
(2)	0.300	0.120	0.01800	0.150	2.00	(0.011)			
(3)	0.250	0.250	0.03125	0.150	2.00	(0.019)			
	sum volume per pcs				=	0.2048			
	Volume per row				=	11	x	0.20482	
					=	2.2531			
	nose per span				=	2	row		
					=	2		x	2.2530
	Total volume per span				=	4.50615	m3		
	Grand Total				=	3.4122	+	4.50615	m3
					=	7.91835	m3		

cb–br9

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF CROSS BEAM Br P9 PE 200 + 25 m (Medan – Denai Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of Cross beam (l = 40.8 m)

C.1	13	690	140	690	140	140	1.800	6.00	10.80	0.995	10.746	End
C.2	13	1,200	140	1,200	140	140	2.820	3.00	8.46	0.995	8.418	
										sum	19.16	

Nos per row	=	11.00		
sub total per span	=	22.00	x	19.16
	=	**421.60**	Kg	

C.1	13	1,090	140	1,090	140	140	2.600	6.00	15.60	0.995	15.522	Center
C.2	13	1,200	140	1,200	140	140	2.820	3.00	8.46	0.995	8.418	
										sum	23.94	

Nos per row	=	11.00		
sub total per span	=	22.00	x	23.94
	=	526.67	Kg	
Grand total	=	**948.275**	**Kg**	

cr–br9

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – P9 (Mdn – Denai Br) STA : 200 + 25 (L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles	dia.	=	0.406	m
	area	=	0.129	m2
	H	=	9.000	m
	W	=	5.100	m
	L	=	22.40	m
	Skew Degree	=	58.00	

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	2.045	0.61	22.40	1.00	13.74
stem	2	0.55	0.500	0.28	21.60	1.00	5.94
stem	3	0.55	0.500	0.14	21.60	1.00	2.97
stem	4	0.20	0.500	0.10	22.40	1.00	2.24
stem	5	0.20	0.250	0.03	22.40	1.00	0.56
stem	6	1.00	5.955	5.96	22.40	1.00	133.39
stem	7	1.80	0.300	0.27	22.40	1.00	6.05
footing	8	2.30	0.300	0.35	22.40	1.00	7.73
footing	9	5.10	1.000	5.10	22.40	1.00	114.24
wingwall	10	3.00	2.045	6.14	0.40	2.00	4.91
wingwall	11	3.30	0.955	1.58	0.40	2.00	1.26
wingwall	12	2.30	4.700	10.81	0.40	2.00	8.65
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	2.045	2.00	0.18
App.Slab	16	3.00	0.200	0.30	21.600	1.00	6.48
	17	0.275	0.05	0.01	21.600	1.00	0.30
inside blockout	lbo	0.30	0.250	0.08	0.70	11.00	0.577
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	64.00	x	0.10	(0.829)
						sum	309.06

concrete filling in piles

thick of pipe	=	0.01036	m					
inner diameter	=	0.406	–	0.021				
	=	0.385	m					
area	=	0.250	x	3.142	x	0.148		
	=	0.11658	m2					
depth	=	9.000	m	--->	0.333	x	27.000	m
nos	=	64.000						
volume	=	0.117	x	9.000	x	64.00		
	=	67.15	m3					
sub total	=	309.062	+	67.15				
Total	=	376.215	m3					
Grand Total	=	**376.215**	+	**301.96**	=	**678.180**	**m3**	

Description	Nos	side	Depth		Total	Remark
Supply and Driving of SPP	**64.00**	**R**	**27.00**		**1,728.00**	
dia. 400 mm for Abutment	**52.00**	**L**	**27.00**		**1,404.00**	
				sum	**3,132.00**	

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – P9 (Mdn– Denai Br) STA : 200 + 25 (R)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.406	m
area	=	0.129	m2
H	=	6.700	m
W	=	5.100	m
L	=	22.40	m
Skew Degree	=	58.00	

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	2.045	0.61	22.40	1.00	13.74
stem	2	0.55	0.500	0.28	21.60	1.00	5.94
stem	3	0.55	0.500	0.14	21.60	1.00	2.97
stem	4	0.20	0.500	0.10	22.40	1.00	2.24
stem	5	0.20	0.250	0.03	22.40	1.00	0.56
stem	6	1.00	3.655	3.65	22.40	1.00	81.87
stem	7	1.80	0.300	0.27	22.40	1.00	6.05
footing	8	2.30	0.300	0.35	22.40	1.00	7.73
footing	9	5.10	1.000	5.10	22.40	1.00	114.24
wingwall	10	3.00	2.045	6.14	0.40	2.00	4.91
wingwall	11	3.30	0.955	1.58	0.40	2.00	1.26
wingwall	12	2.30	2.400	5.52	0.40	2.00	4.42
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	2.045	2.00	0.18
App.Slab	16	3.00	0.200	0.30	21.600	1.00	6.48
	17	0.275	0.05	0.01	21.600	1.00	0.30
inside blockout	lbo	0.30	0.250	0.08	0.70	11.00	0.577
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	52.00	x	0.10	(0.673)
						sum	253.47

concrete filling in piles

thick of pipe	=	0.01036	m					
inner diameter	=	0.406	–	0.021				
	=	0.385	m					
area	=	0.250	x	3.142	x	0.148		
	=	0.11658	m2					
depth	=	8.000	m	--->	0.333	x	24.000	m
nos	=	52.000						
volume	=	0.117	x	8.000	x	52.00		
	=	48.50	m3					
sub total	=	253.466	+	48.50				
Total	=	301.965	m3					

abr9R–co

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P9 PE 200 + 25 m Medan – Denai Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steil inside pile (kg)

Diameter of pipe = dp	=	40	cm					
thick of pipe = t	=	1.031	cm					
Diameter of spiral = ds	=	1.30	cm					
covering of concrete = d'	=	5	cm					
dc	=	40 – 2 x (1.031 + 5)						
	=	27.938	cm					
(dc – ds)	=	27.938	–	5				
	=	22.938	cm					
Ag	=	0.25 x @pi x dp^2						
	=	1,256.64	cm2					
Ac	=	0.25 x @pi x dc^2						
	=	613.028	cm2					
f'c	=	225	kg/cm2					
fsy	=	4,000	kg/cm2					
Ag/Ac	=	2.050						
f'c/fsy	=	0.056						
ps	=	0.45 x (Ag/Ac – 1) x f'c/fsy						
ps	=	0.027						
Area of spiral = as	=	0.25*@pi x ds^2						
	=	1.327	cm2					
spacing of spiral = s	=	as x @pi x (dc–ds) / ps x @pi x dc^2/4						
		1.327	x	3.142	x	22.938		
s	=	0.027	x	3.142	x	195.133		
	=	95.649 / 16.291	cm					
	=	5.87	cm					
say	=	7.00	cm					
Length of spiral per picth	=	@sqrt((@pi x dc)^2 + s^2)						
	=	88.05	cm					
length of culumn	=	850	cm					
nos of pitch	=	121.43						
length of spiral	=	88.05	x	121.43				
	=	10,691.61	cm					
	=	106.92	m					
Radius of steel ring								
Outer diameter of pile	=	40.64	cm					
Thick of pile	=	1.031	cm					
Inner diameter of pile	=	40.64	–	2.062				
	=	38.578	cm					
Concrete covering	=	5	cm					
Diameter of steel bar	=	1.6	cm					
Diameter of ring	=	1.3	cm					
Inner diameter of pile	=	38.578						
Distance outside to ring	=	5	+	0.65	+	1.6	+	0.65
	=	7.90	cm					
Inner diameter of ring	=	38.578	–	7.90				
	=	30.678	cm					
Radius of ring steel	=	30.678	:	2				
	=	15.339	cm					
	=	0.153	m					

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P9 PE 200 + 25 m Medan – Denai Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steil inside pile (kg)

Length of each = 2 x @pl x r
= 2 x 3.141592 x 0.153 m
= 0.964 m

No.	shape of steel bar							length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	8.50		0.36	9.21	64.00	8	73.68	1.560	114.94
2.	R1	13							(L) 52.00		106.92	0.995	106.38
3.	Ring	13						0.964	(L)	8	7.71	0.995	7.67
												sum	228.99

Total weight = 116.00 x 228.9939 = 26,563.30 kg

Grand total = 1.00 x 26,563.30 = **26,563.30** kg

inb-br9

Diktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br P9 (Medan – Denai Br) Sta : 200 + 25 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	2.045	2.00	1.23
wall	1a	2.045	22.400	1.00	45.81
wall	1b	2.045	21.600	1.00	44.17
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	21.600	1.00	10.80
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	21.600	1.00	16.20
stem	4	0.200	0.500	2.00	0.20
	4a	0.500	22.400	1.00	11.20
stem	5	0.200	0.250	2.00	0.05
	5a	0.320	22.400	1.00	7.17
stem	6	1.000	3.655	2.00	7.31
stem	6a	2.605	22.400	1.00	58.35
stem	6b	21.600	2.355	1.00	50.87
footing	7	1.800	0.300	2.00	0.54
footing	8	2.300	0.300	2.00	1.38
footing	9	5.100	1.000	2.00	10.20
footing	10	1.000	22.400	2.00	44.80
wingwall	11	2.045	3.000	4.00	24.54
wingwall	11a	0.400	2.045	2.00	1.64
wingwall	12	3.300	0.955	4.00	11.78
wingwall	13	0.400	0.955	2.00	0.76
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	2.300	2.000	4.000	18.400
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	372.40

Total = 1.00 x 372.40
= 372.40 sq.m
Grand Total = 372.401 + 478.20 sq.m
= 850.60 sq.m

abr9–fwR

Diktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br P9 (Medan – Denai Br) Sta : 200 + 25 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	2.045	2.00	1.23
wall	1a	2.045	22.400	1.00	45.81
wall	1b	2.045	21.600	1.00	44.17
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	21.600	1.00	10.80
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	21.600	1.00	16.20
stem	4	0.200	0.500	2.00	0.20
	4a	0.500	22.400	1.00	11.20
stem	5	0.200	0.250	2.00	0.05
	5a	0.320	22.400	1.00	7.17
stem	6	1.000	5.955	2.00	11.91
stem	6a	4.905	22.400	1.00	109.87
stem	6b	21.600	4.655	1.00	100.55
footing	7	1.800	0.300	2.00	0.54
footing	8	2.300	0.300	2.00	1.38
footing	9	5.100	1.000	2.00	10.20
footing	10	1.000	22.400	2.00	44.80
wingwall	11	2.045	3.000	4.00	24.54
wingwall	11a	0.400	2.045	2.00	1.64
wingwall	12	3.300	0.955	4.00	11.78
wingwall	13	0.400	0.955	2.00	0.76
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	2.300	2.000	4.000	18.400
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	478.20

Total = 1.00 x 478.20
= 478.20 sq.m

abr9–fwl

Lean concrete (m3)

diameter of concrete pile = 0.40 m
area = 0.126 m2

Lean Concrete 0.10
5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	22.70	122.58	0.10	12.26

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.10	m			
nos	=	64				
volume	=	0.126	x	0.10	x	64
	=	0.804	m3			
net volume	=	12.26	–	0.804		
	=	11.45	m3			
nos	=	1.00				
Total volume	=	1.00	x	11.45		
	=	11.45	m3		(Abutment L)	
Total volume	=	11.60	m3		(Abutment R)	
Grand Total	=	11.60	+	11.45	m3	
	=	23.05	m3			

Rubble stone (m3)

diameter of concrete pile = 0.40 m
area = 0.126 m2

Rubble Stone 0.200
5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	22.70	122.58	0.20	24.52

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.20	m			
nos	=	64				
volume	=	0.126	x	0.20	x	64
	=	1.608	m3			
net volume	=	24.52	–	1.608		
	=	22.91	m3			
nos	=	1.00				
Total volume	=	1.00	x	22.91		
	=	22.91	m3		(Abutment L)	
Total volume	=	23.21	m3		(Abutment R)	
Grand Total	=	23.21	+	22.91	m3	
	=	46.12	m3			

lc–br9

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	List of Bill Quantity BR P11 PE222+00 (R/L)	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Deck

1	Quantity of concrete of Deck slab ✓
2	Quantity of concrete of Panel slab ✓
3	Quantity of concrete of cross beam ✓
4	Quantity of Wooden Form Work ✓
5	Quantity of Reinforcement steel Deck slab *)
6	Quantity of Reinforcement steel Cross beam ✓
	Quantity of Reinforcement steel panel *)
	Quantity of Haindrail *)
	Quantity of Expansion Joint *)

Girder

7	Quantity of concrete of Main Beam ✓ (12 nos)
8	Quantity of Reinforcement steel Main Beam ✓
9	Quantity of Tendon ✓
10	Quantity of Anchorage *)
11	Quantity of Bearing pad *)
12	

Abutment

13	Quantity of concrete of Abutment ✓
14	Quantity of Reinforcing steel *)
15	Quantity of Wooden Form Work ✓
16	Quantity of Inside pile Reinf.steel ✓
17	Quantity of Concrte Inside pile ✓
	Quantity of Lean Concrete & Rubble stone ✓

Br P11 PE 222 + 00 m

(Binjei Br)

NO	DESCRIPTION	UNIT	Quantity	Unit Price (Rp)	REMARKS
	BRIDGE				
	SUPERSTRUCTURE				
	CONCRETE				
	a. Deck Slab (Insitu)				
	Concrete (Type – B) Class K 350	Cu.m	170.98		
	Reinforcing Steel Deform	Kg	30,434.03		
	Wooden Form Work with Supporting Frame	Sq.m	168.92		
	b. Precast Prestressed Concrete Main Beam				
	Precast Prestressed Concrete Beam (Type – A) Class K 400	Cu.m	359.52		
	Reinforcing Steel Deform	Kg	46,606.40		
	Tendon [H.T.W] diameter 13 mm	Kg	31,876.09		
	Live end Anchorage	Nos	96.00		
	c. PC Panel Concrete				
	PC Panel Concrete, t = 7 cm (Type – A) Class K 400	Cu.m	40.04		
	Reinforcing Steel Deform	Kg	11,476.00		
	c. PC Diaphragm Concrete				
	PC Diaphragm Concrete (Type – A) Class K 400	Cu.m	7.92		
	Reinforcing Steel Deform	Kg	948.28		
	PRESTRESSING				
	Prestressing Tendon [H.T.W.] diameter 13 mm for Main Beam (incl. Diaphragm)	each	12.00		
	Grout Injection Main Beam (icl. Diaphragm)	m	1,977.60		
	ERECTING				
	Erection of Concrete Main Beam	Kg	898,790.00		
sup–p11	(Incl.PC Diaphragm , PC Panel)				

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. P11 PE 222 + 00 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 **Length = 40.80 m**

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	16.922	4.146	1.000	4.146	41.200	170.810
End slab	(2)	0.055	0.500	0.027	2.000	0.055	10.872	0.598
End slab	(3)	0.300	0.200	0.060	2.000	0.120	17.122	2.055
							sum	**173.463**

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.223	1.500	0.334	1.000	0.334	41.200	13.751
Right Side slab	(5)	0.223	1.500	0.334	1.000	0.334	41.200	13.751
							sum	**27.501**

Total Volume K.350 = 173.463 + 27.501
= **200.964** m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	43.000	0.688	0.550	0.378
Railing post	(7)	0.165	0.160	0.026	43.000	1.135	0.470	0.534
slab side Walk	(8)	0.250	1.303	0.326	2.000	0.652	41.200	26.843
Wall	(9)	0.470	0.100	0.047	2.000	0.094	37.840	3.557
							sum	**31.312**

Total Volume K.225 = **31.312** m3

Grand Total K.350 = **211.0117** m3

Grand Total K.225 = **32.87778** m3

slab –br11

Direktorat General Water Resources Development Direktorat General Medan Flood Control	DECK SLAB AND HAND RAIL Br P11 PE 222 + 00 m (Binjai Br)	japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 41.20 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	20.10	6.03	2.00	12.06
end slab	(2)	0.20	20.10	4.02	2.00	8.04
	(3)	0.35	11.30	3.96	2.00	7.91
	(4)	0.47	1.60	0.76	4.00	3.02
in side walk (curb)	(5)	0.25	41.20	10.30	2.00	20.60
in side walk	(6)	0.47	40.95	19.25	2.00	38.49
out side walk	(7)	0.47	39.10	18.38	2.00	36.75
Railing post	(8)	0.10	0.92	0.09	42.00	3.86
Railing post	(9)	0.16	0.45	0.07	84.00	6.05
Railing post	(10)	0.14	0.45	0.06	84.00	5.10
					sum	141.90
				numbers of span =		1.00
total	=	141.90	x	1.00	=	**141.90**
	=	**141.90**	m2			

Scafolding (L = 41.20 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.60	41.20	65.92	2.00	131.84
end slab	(2)	0.45	41.20	18.540	2.00	37.08
					sum	168.92
				numbers of span =		1.00
total	=	1.00	x	168.92	=	**168.92**
	=	**168.92**	m2			

Grand total form Work = 141.90 m2

Grand total Scafolding = 168.92 m2

f-wbr11

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	PANEL SLAB Br11 PE 222 + 00 m (Bijei Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K–400 (L = 40.80 m)

	volume panel slab								
	width	depth	area	thick	nos	volume			
section	w	d	(m 2)	t					
	m	m		m		m3			
(1)	1.000	1.300	1.3	0.070	1.00	0.0910			
	sum volume per pcs				=	0.0910			
	nose per row				=	11.0000	row	x	0.0910
					=	1.001	m3		
	nos of per span				=	11.00		x	40
					=	440	nos		
	Total volume per span				=	40.0400	m3		
	Total volume per Span				=	1.000	x	40.040	m3
	Grand Total				=	40.040	m3		

pl–br11

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	CROSS BEAM Br11 PE 222 + 00 m (Bijei Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K-400 (L = 40.80 m)

	volume cross beam per span							
section	width w	depth d	area (m 2)	thick t	nos	volume		
	m	m		m		m3		
(1)	0.630	1.250	0.78750	0.200	1.00	0.158		Cross Beam End
(2)	0.060	0.050	0.00150	0.200	4.00	(0.002)		
	sum volume per pcs				=	0.1551		
	Volume nose per row				=	11	x	0.1551
					=	1.7061		
	nose per span				=	2	row	
	Total volume per span				=	2	x	1.7061
					=	**3.4122**	m3	

Structure Concrete Class K-400 (L = 40.80 m)

	volume cross beam per span							Cross Beam Central	
section	width w	depth d	area (m 2)	thick t	nos	volume			
	m	m		m		m3			
(1)	1.250	1.250	1.56250	0.150	1.00	0.234			
(2)	0.300	0.120	0.01800	0.150	2.00	(0.011)			
(3)	0.250	0.250	0.03125	0.150	2.00	(0.019)			
	sum volume per pcs				=	0.2048			
	Volume per row				=	11	x	0.20482	
					=	2.2531			
	nose per span				=	2	row		
					=	2		x	2.2530
	Total volume per span				=	4.50615	m3		
	Grand Total				=	3.4122	+	4.50615	m3
					=	**7.91835**	**m3**		

cb-br11

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF CROSS BEAM Br P11 PE 222 + 00 m (Binjei Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of Cross beam (l = 40.8 m)

C.1	13	690	140	690	140	140	1.800	6.00	10.80	0.995	10.746	End
C.2	13	1,200	140	1,200	140	140	2.820	3.00	8.46	0.995	8.418	
										sum	19.16	

Nos per row	=	11.00		
sub total per span	=	22.00	x	19.16
	=	**421.60**	Kg	

C.1	13	1,090	140	1,090	140	140	2.600	6.00	15.60	0.995	15.522	Center
C.2	13	1,200	140	1,200	140	140	2.820	3.00	8.46	0.995	8.418	
										sum	23.94	

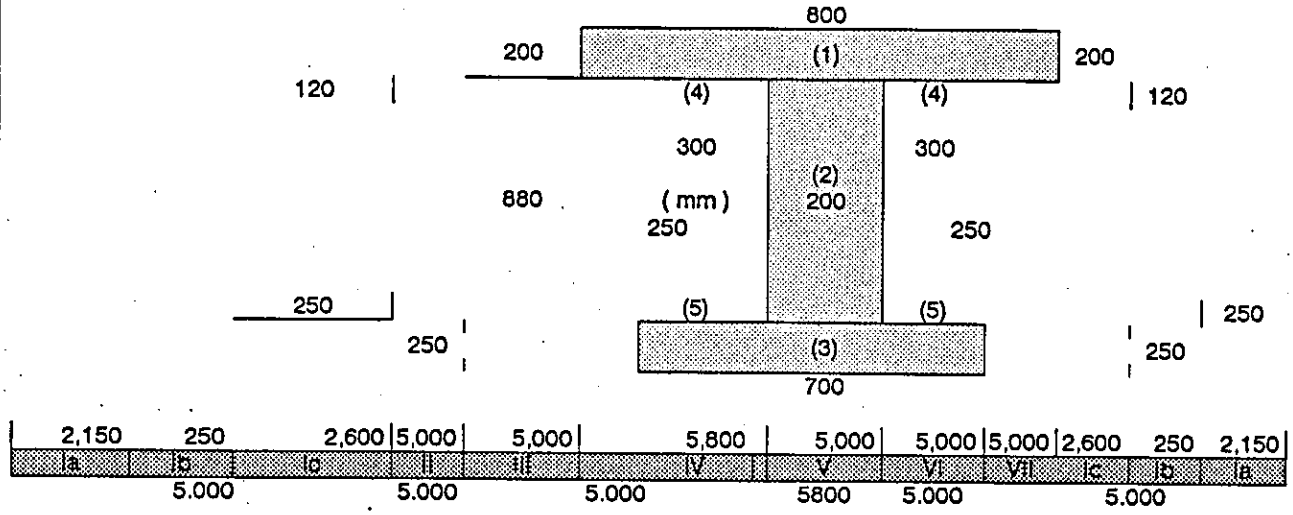
Nos per row	=	11.00		
sub total per span	=	22.00	x	23.94
	=	526.67	Kg	
Grand total	=	**948.275**	**Kg**	

cr-br11

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br P11 PE 222 + 00 m (Binjai Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K–400,l = 40.80 m

Main Beam Section



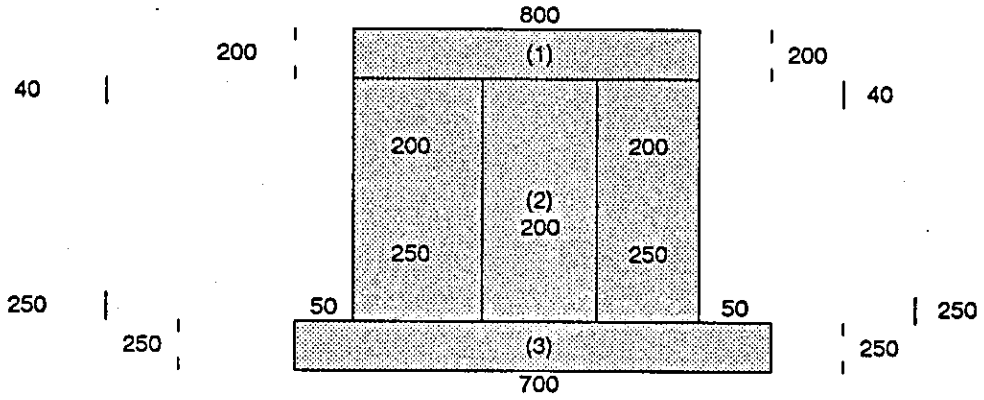
Total length = **40,800** m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.200	1.250	1.000	0.250
(3)	0.700	0.250	1.000	0.175
(4)	0.300	0.120	2.000	0.036
(5)	0.250	0.250	2.000	0.062
			sum	
	area section main beam		=	0.6835

Volume 1 = area x length
= 0.6835 x 40,800
= 27,886.80 m3

End Block Section L = 2.150 m

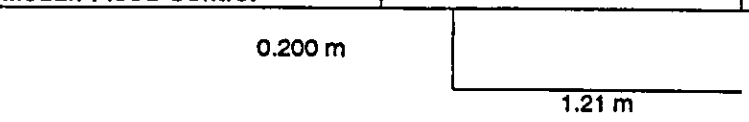


2. Bearing Block Area

piece	width m	depth m	nos	total area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.700	1.250	1.000	0.875
(3)	0.700	0.250	1.000	0.175
		1.700	sum	1.210

1075
1250

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br P11 PE 222 + 00 m (Binjai Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.16 + 1.25) : 2
= 1.21 m

area = width x depth
= 0.25 x 1.21
= 0.301 m2

section	area	length	nos	volume
	m2	m		m3
Ia	1.2100	2.150	1.00	2.601
Ib	0.3012	0.250	1.00	0.075
Ic	0.6835	2.600	1.00	1.777
II	0.6835	5.000	1.00	3.418
III	0.6835	5.000	1.00	3.418
IV	0.6835	5.800	1.00	3.964
V	0.6835	5.000	1.00	3.418
VI	0.6835	5.000	1.00	3.418
VII	0.6835	5.000	1.00	3.418
Ic	0.6835	2.600	1.00	1.777
Ib	0.3012	0.250	1.00	0.075
Ia	1.2100	2.150	1.00	2.601
	sum	40.80		29.959

Total volume = 29.960 m3

Total volume (6 Beam) = 12.00 x 29.960 m3

Grand Total = 359.516 m3

be-br11

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Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	MAIN BEAM Br P11 PE 222 + 00 m (Binjai Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Segment	B1	13	600	1,660	150	1,660		4.070	30	122.10	0.995	121.490	outer Beam
(l = 5.000 m)	B2	13		300	720	300		1.320	16	21.12	0.995	21.014	and end Block
2 nos	B3	13	1,600	620	1,600			3.820	16	61.12	0.995	60.814	
	B4	13		886	650	310		1.846	30	55.38	0.995	55.103	
	B5	13		1,045	650	310		2.005	30	60.15	0.995	59.849	
	B6	16	4,300	675		750		5.725	5	28.63	1.560	44.655	
	B7	16	4,950					4.950	24	118.80	1.560	185.328	
	B8	16	1,000			150		1.150	16	18.40	1.560	28.704	
	B9	13		1,000		750		1.750	2	3.50	0.995	3.483	
											sum	580.4401	1,160.880
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	887.077

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	weight kg	Remark
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	**443.538**	**887.077**
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
1 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	**443.538**	**443.538**
Segment	B1	13	600	1,660	150	1,660		4.070	33	134.31	0.995	133.638	Inner of Beam
(l = 5.800 m)	B2	13		886	720	310		1.916	33	63.23	0.995	62.912	
1 nos	B3	13		1,045	650	310		2.005	33	66.16	0.995	65.834	
	B4	16	5,720					5.720	24	137.28	1.560	214.157	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	505.295	505.295

Main Beam l = 5.000 m (2 Segment)	=	1,160.880	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (1 Segment)	=	443.538	Kg
Main Beam l = 5.800 m (1 Segment)	=	505.295	Kg
Grand total (1 pcs)	=	3,883.867	Kg
Grand total (12 pcs)	=	12.000	x 3,883.867 kg
	=	46,606.403	kg

mb-br11

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	M A I N B E A M BR P11 PE 222 + 00 m (Bijai Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

$$S = -1^2/8.f \times [\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2 \ln[\{-4f/l+@sqrt(4f/l)^2+1\}] - [\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l\}+@sqrt(4.f/l)^2+1)$$

(a) = $1^2/8.f$
(b) = $2.f/l$
(c) = $4.f/l$
(d) = $(4.f/l)^2$
(e) = $(4.f/l)^2 + 1$

(f) = $@sqrt((4.f/l)^2 + 1)$ = $@sqrt (e)$
(g) = $-2.f/l.@sqrt((4.f/l)^2+1)$ = $-(b) \times (f)$
(h) = $-4f/l+@sqrt(4f/l)^2+1$ = $(-c) + (f)$
(i) = $1/2 \ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = $1/2 \times ln (h)$
S1 = $[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2 \ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = $(g) + (i)$

(k) = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\}$ = $(b) \times (f)$
(l) = $[\{4.f/l\}+@sqrt(4.f/l)^2+1)$ = $(c) + (f)$
(m) = $1/2.ln.[\{4.f/l\}+@sqrt(4.f/l)^2+1)$ = $1/2 \times ln(l)$
S2 = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l\}+@sqrt(4.f/l)^2+1)$ = $(k) + (m)$

$$S = (-a) \times [(S1) - (S2)]$$

S is length of parabola curve

te−br11

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Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	**M A I N B E A M** **BR P11 PE 222 + 00 m** **(Bijai Br)**	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 40.80 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
2	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66
3	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
4	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66

f = Average

nos wire per tendon	=	19	nos				
sum of tendon length	=	19	x	85.6625	=	1,627.59	m
nos wire per tendon	=	12	nos				
sum of tendon length	=	12	x	85.6625	=	1,027.95	m
				sum		2,655.54	m
Total	=	0.80	+	2,655.54	=	2,656.341	kg
Grand Total (12 Nos)	=	12.00	x	2,656.34	=	31,876.09	kg

te-br11

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Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P11 PE 222 + 00 m Binjei Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steil inside pile (kg)

Diameter of pipe = dp	=	40	cm					
thick of pipe = t	=	1.031	cm					
Diameter of spiral = ds	=	1.30	cm					
covering of concrete = d'	=	5	cm					
dc	=	40 − 2 x (1.031 + 5)						
	=	27.938	cm					
(dc − ds)	=	27.938	−	5				
	=	22.938	cm					
Ag	=	0.25 x @pi x dp ^ 2						
	=	1,256.64	cm2					
Ac	=	0.25 x @pi x dc ^ 2						
	=	613.028	cm2					
f'c	=	225	kg/cm2					
fsy	=	4,000	kg/cm2					
Ag/Ac	=	2.050						
f'c/fsy	=	0.056						
ps	=	0.45 x (Ag/Ac − 1) x f'c/fsy						
ps	=	0.027						
Area of spiral = as	=	0.25*@pi x ds ^ 2						
	=	1.327	cm2					
spacing of spiral = s	=	as x @pi x (dc−ds) / ps x @pi x dc ^ 2/4						
s	=	1.327 x 3.142 x 22.938 / 0.027 x 3.142 x 195.133						
	=	95.649 / 16.291	cm					
	=	5.87	cm					
say	=	7.00	cm					
Length of spiral per picth	=	@sqrt((@pi x dc) ^ 2 + s ^ 2)						
	=	88.05	cm					
length of culumn	=	800	cm					
nos of pitch	=	114.29						
length of spiral	=	88.05	x	114.29				
	=	10,062.69	cm					
	=	100.63	m					
Radius of steel ring								
Outer diameter of pile	=	40.64	cm					
Thick of pile	=	1.031	cm					
Inner diameter of pile	=	40.64	−	2.062				
	=	38.578	cm					
Concrete covering	=	5	cm					
Diameter of steel bar	=	1.6	cm					
Diameter of ring	=	1.3	cm					
Inner diameter of pile	=	38.578						
Distance outside to ring	=	5	+	0.65	+	1.6	+	0.65
	=	7.90	cm					
Inner diameter of ring	=	38.578	−	7.90				
	=	30.678	cm					
Radius of ring steel	=	30.678	:	2				
	=	15.339	cm					
	=	0.153	m					

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P11 PE 222 + 00 m Binjai Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

Length of each = 2 x @pi x r
= 2 x 3.141592 x 0.153 m
= 0.964 m

No.	shape of steel bar							length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	8.00		0.36	8.71	52.00	8	69.68	1.560	108.70
2.	R1	13									100.63	0.995	100.12
3.	Ring	13						0.964		8	7.71	0.995	7.67
												sum	216.50

Total weight = 52.00 x 216.4962 = 11,257.80 kg

Grand total = 2.00 x 11,257.80 = 22,515.61 kg

inb-br11

Diktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br P11 (Binjei Br) Sta : 222 + 00 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	2.045	2.00	1.23
wall	1a	2.045	20.100	1.00	41.10
wall	1b	2.045	19.300	1.00	39.47
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	19.300	1.00	9.65
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	19.300	1.00	14.48
stem	4	0.200	0.500	2.00	0.20
	4a	0.500	20.100	1.00	10.05
stem	5	0.200	0.250	2.00	0.05
	5a	0.320	20.100	1.00	6.43
stem	6	1.000	3.655	2.00	7.31
stem	6a	2.605	20.100	1.00	52.36
stem	6b	19.300	2.355	1.00	45.45
footing	7	1.800	0.300	2.00	0.54
footing	8	2.300	0.300	2.00	1.38
footing	9	5.100	1.000	2.00	10.20
footing	10	1.000	20.100	2.00	40.20
wingwall	11	2.045	3.000	4.00	24.54
wingwall	11a	0.400	2.045	2.00	1.64
wingwall	12	3.300	0.955	4.00	11.78
wingwall	13	0.400	0.955	2.00	0.76
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	2.300	2.000	4.000	18.400
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	342.22

Total = 2.00 x 342.22
= 684.45 sq.m

abr11-fw

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – P11 (Binjei Br) STA : 222 + 00 (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.406	m	
area	=	0.129	m2	
H	=	6.700	m	
W	=	5.100	m	
L	=	20.10	m	
Skew Degree	=	71.00		

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	2.045	0.61	20.10	1.00	12.33
stem	2	0.55	0.500	0.28	19.30	1.00	5.31
stem	3	0.55	0.500	0.14	19.30	1.00	2.65
stem	4	0.20	0.500	0.10	20.10	1.00	2.01
stem	5	0.20	0.250	0.03	20.10	1.00	0.50
stem	6	1.00	3.655	3.65	20.10	1.00	73.47
stem	7	1.80	0.300	0.27	20.10	1.00	5.43
footing	8	2.30	0.300	0.35	20.10	1.00	6.93
footing	9	5.10	1.000	5.10	20.10	1.00	102.51
wingwall	10	3.00	2.045	6.14	0.40	2.00	4.91
wingwall	11	3.30	0.955	1.58	0.40	2.00	1.26
wingwall	12	2.30	2.400	5.52	0.40	2.00	4.42
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	2.045	2.00	0.18
App.Slab	16	3.00	0.200	0.30	19.300	1.00	5.79
	17	0.275	0.05	0.01	19.300	1.00	0.27
inside blockout	lbo	0.30	0.250	0.08	0.70	11.00	0.577
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	52.00	x	0.10	(0.673)
						sum	228.55

concrete filling in piles

thick of pipe	=	0.01036	m					
inner diameter	=	0.406	–	0.021				
	=	0.385	m					
area	=	0.250	x	3.142	x	0.148		
	=	0.11658	m2					
depth	=	9.000	m	--->	0.333	x	27.000	m
nos	=	52.000						
volume	=	0.117	x	9.000	x	52.00		
	=	54.56	m3					
sub total	=	228.546	+	54.56				
Total	=	283.108	m3					
Grand Total (R & L)	=	283.108	+	283.108	m3			
	=	566.216	m3					

Description	Nos	side	Depth	total	Remark
Supply and Driving SPP dia. 400 mm	104.00	R / L	27.00	2,808.00	

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Br P11 PE 222 + 00 m Binjei Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Lean concrete (m3)

diameter of concrete pile = 0.40 m

area = 0.126 m2

Lean Concrete 0.10

5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	20.40	110.16	0.10	11.02

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.10	m			
nos	=	52				
volume	=	0.126	x	0.10	x	52
	=	0.653	m3			
net volume	=	11.02	–	0.653		
	=	10.36	m3			
nos	=	2.00				
Total volume	=	2.00	x	10.36		
	=	20.73	m3		(Abutment L & R)	
Grand Total	=	20.73	m3			
	=	20.73	m3			

Rubble stone (m3)

diameter of concrete pile = 0.40 m

area = 0.126 m2

Rubble Stone 0.200

5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	20.40	110.16	0.20	22.03

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.20	m			
nos	=	52				
volume	=	0.126	x	0.20	x	52
	=	1.307	m3			
net volume	=	22.03	–	1.307		
	=	20.73	m3			
nos	=	2.00				
Total volume	=	2.00	x	20.73		
	=	41.45	m3		(Abutment L & R)	
Grand Total	=	41.45	m3			
	=	41.45	m3			

lc-br11

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	List of Bill Quantity Br P13 (E246 + 57.5 (R/L))	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Deck

1	Quantity of concrete of Deck slab ✓
2	Quantity of concrete of Panel slab ✓
3	Quantity of concrete of cross beam ✓
4	Quantity of Wooden Form Work ✓
5	Quantity of Reinforcement steel Deck slab *)
6	Quantity of Reinforcement steel Cross beam ✓
	Quantity of Reinforcement steel panel *)
	Quantity of Haindrail *)
	Quantity of Expansion Joint *)

Girder

7	Quantity of concrete of Main Beam ✓ (12 nos)
8	Quantity of Reinforcement steel Main Beam ✓
9	Quantity of Tendon ✓
10	Quantity of Anchorage *)
11	Quantity of Bearing pad *)
12	

Abutment

13	Quantity of concrete of Abutment ✓
14	Quantity of Reinforcing steel *)
15	Quantity of Wooden Form Work ✓
16	Quantity of Inside pile Reinf.steel ✓
17	Quantity of Concrte Inside pile *)
18	Quantity of Lean Concrete & Rubble stone ✓

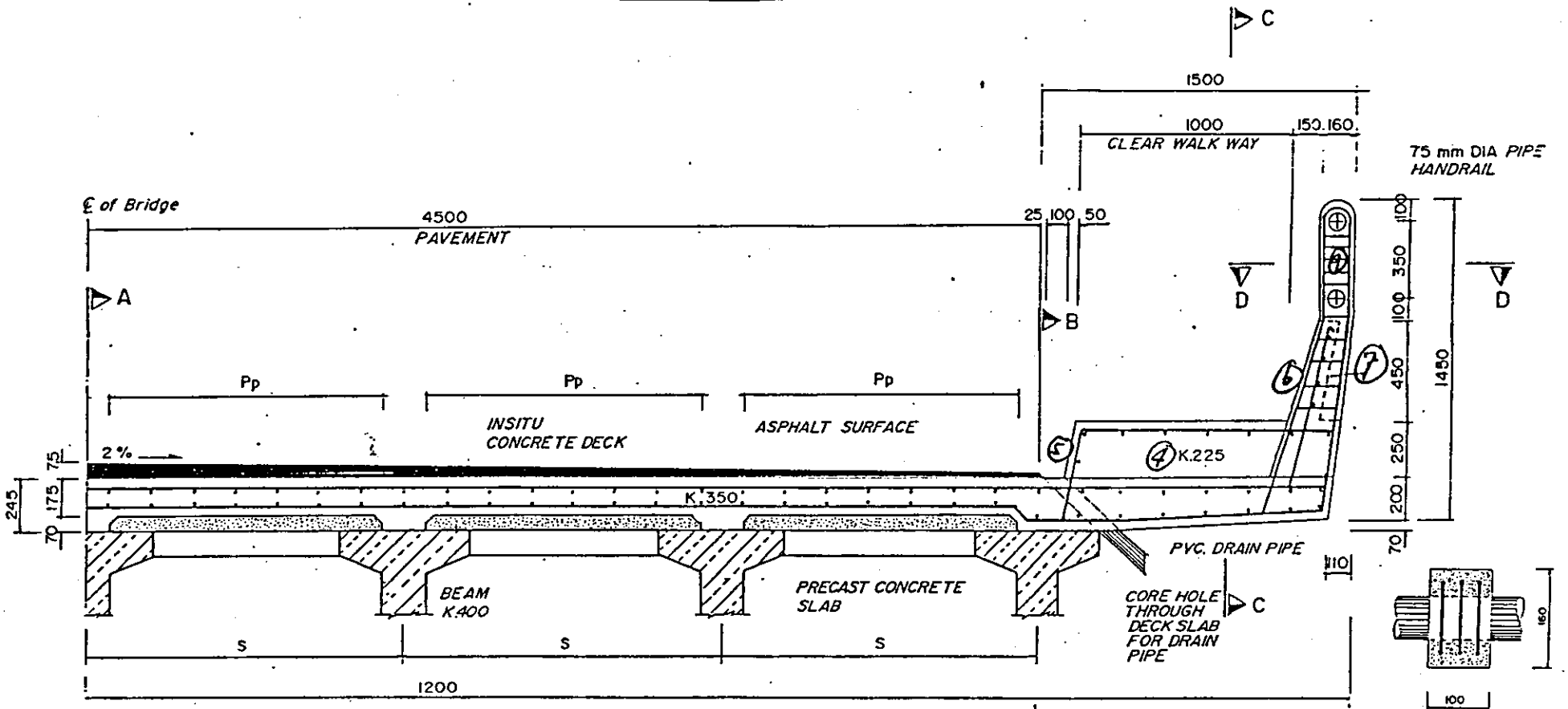
Quantity of Furnished = 2600 m1

Br P13 PE 246 + 57.5 m

(Amplas Br)

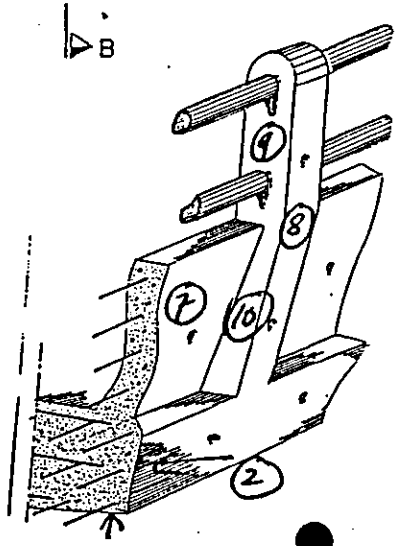
NO	DESCRIPTION	UNIT	Quantity	Unit Price (Rp)	REMARKS
	BRIDGE				
	SUPERSTRUCTURE				
	CONCRETE				
	a. Deck Slab (Insitu)				
	Concrete (Type – B) Class K 350	Cu.m	180.46		
	Reinforcing Steel Deform	Kg	32,121.35		
	Wooden Form Work with Supporting Frame	Sq.m	168.92		
	b. Precast Prestressed Concrete Main Beam				
	Precast Prestressed Concrete Beam (Type – A) Class K 400	Cu.m	359.52		
	Reinforcing Steel Deform	Kg	46,606.40		
	Tendon [H.T.W] diameter 13 mm	Kg	31,876.09		
	Live end Anchorage	Nos	96.00		
	c. PC Panel Concrete				
	PC Panel Concrete, t = 7 cm (Type – A) Class K 400	Cu.m	40.04		
	Reinforcing Steel Deform	Kg	11,476.00		
	c. PC Diaphragm Concrete				
	PC Diaphragm Concrete (Type – A) Class K 400	Cu.m	7.92		
	Reinforcing Steel Deform	Kg	948.28		
	PRESTRESSING				
	Prestressing Tendon [H.T.W.] diameter 13 mm for Main Beam (incl. Diaphragm)	each	12.00		
	Grout Injection Main Beam (icl. Diaphragm)	m	1,977.60		
	ERECTING				
	Erection of Concrete Main Beam	Kg	898,790.00		
sup–p13	(Incl.PC Diaphragm , PC Panel)				

FORM WORK



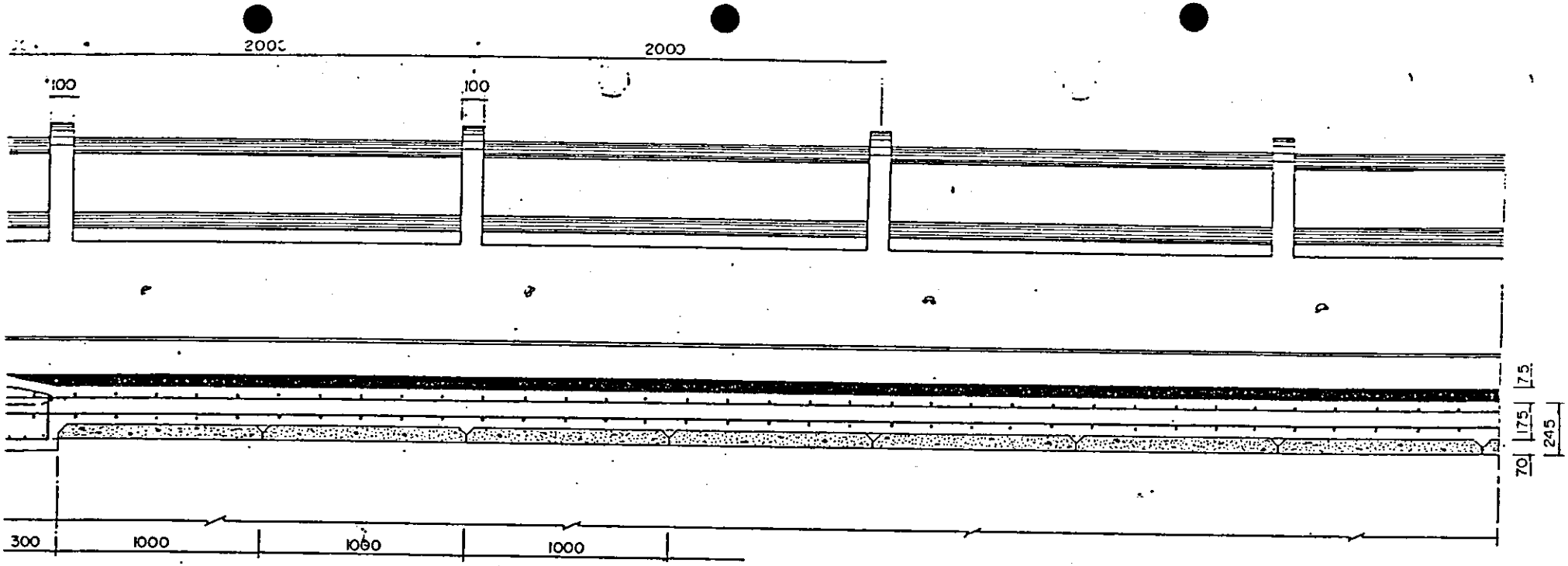
TYPICAL SECTION THROUGH DECK, 9000 Width

SCALE. 1: 20

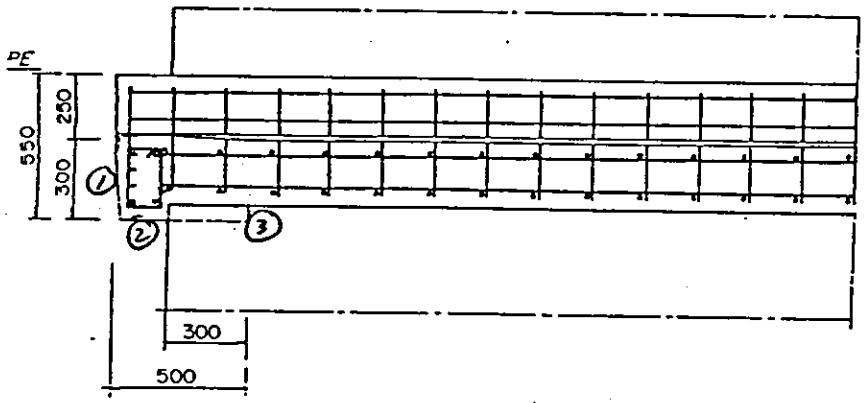


SECTION. D – D

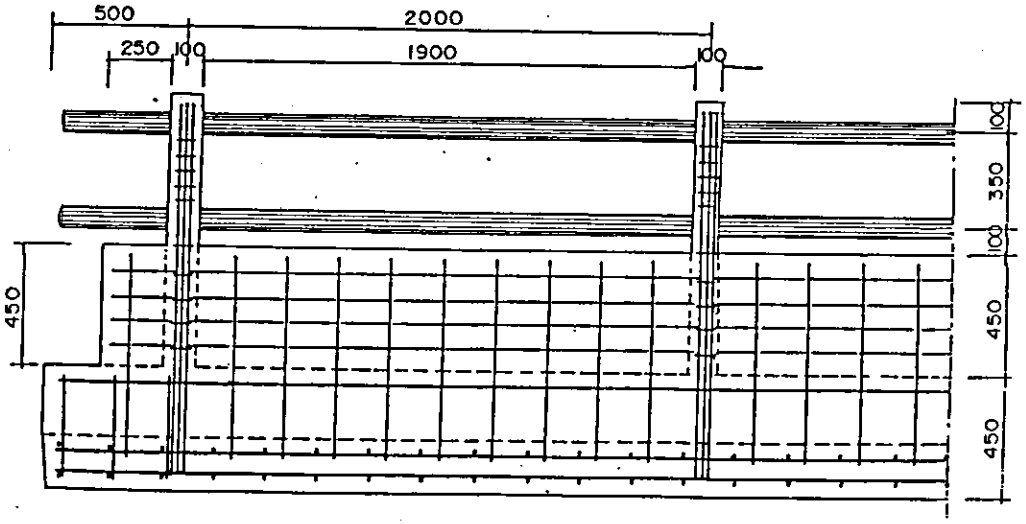
NOT TO SCALE



SECTION. A – A
SCALE. 1 : 20



SECTION. B – B
SCALE . 1 : 20



SECTION. C – C
SCALE . 1 : 20

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. P13 PE 246 + 57.5 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 Length = 40.80 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	17.802	4.361	1.000	4.361	41.200	179.690
End slab	(2)	0.055	0.500	0.027	2.000	0.055	11.752	0.646
End slab	(3)	0.300	0.200	0.060	2.000	0.120	18.002	2.160
							sum	182.496

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.223	1.500	0.334	1.000	0.334	41.200	13.751
Right Side slab	(5)	0.223	1.500	0.334	1.000	0.334	41.200	13.751
							sum	27.501

Total Volume K.350 = 182.496 + 27.501
= 209.997 m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	43.000	0.688	0.550	0.378
Railing post	(7)	0.165	0.160	0.026	43.000	1.135	0.470	0.534
slab side Walk	(8)	0.250	1.349	0.337	2.000	0.674	41.200	27.782
Wall	(9)	0.470	0.100	0.047	2.000	0.094	37.840	3.557
							sum	32.251

Total Volume K.225 = 32.251 m3

Grand Total K.350 = 220.4970 m3

Grand Total K.225 = 33.86354 m3

slab –br13

Direktorat General Water Resources Development Direktorat General Medan Flood Control	DECK SLAB AND HAND RAIL Br P13 PE 246 + 57.50 m (Amplas Br)	japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 41.20 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	20.10	6.03	2.00	12.06
end slab	(2)	0.20	20.10	4.02	2.00	8.04
	(3)	0.35	11.30	3.96	2.00	7.91
	(4)	0.47	1.60	0.76	4.00	3.02
in side walk (curb)	(5)	0.25	41.20	10.30	2.00	20.60
in side walk	(6)	0.47	40.95	19.25	2.00	38.49
out side walk	(7)	0.47	39.10	18.38	2.00	36.75
Railing post	(8)	0.10	0.92	0.09	42.00	3.86
Railing post	(9)	0.16	0.45	0.07	84.00	6.05
Railing post	(10)	0.14	0.45	0.06	84.00	5.10
					sum	141.90
				numbers of span =		1.00
total	=	141.90	x	1.00	=	**141.90**
	=	**141.90**	m2			

Scafolding (L = 41.20 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.60	41.20	65.92	2.00	131.84
end slab	(2)	0.45	41.20	18.540	2.00	37.08
					sum	168.92
				numbers of span =		1.00
total	=	1.00	x	168.92	=	**168.92**
	=	**168.92**	m2			

Grand total form Work = 141.90 m2

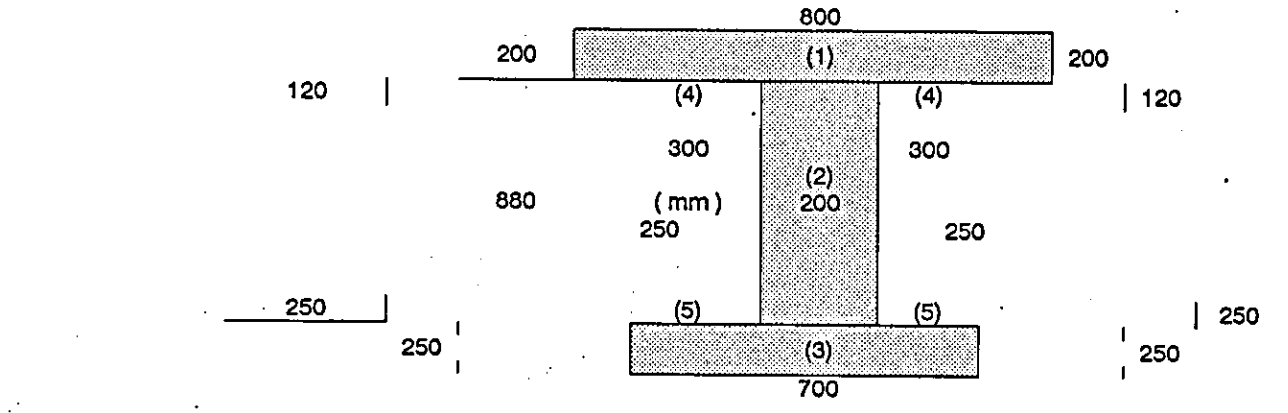
Grand total Scafolding = 168.92 m2

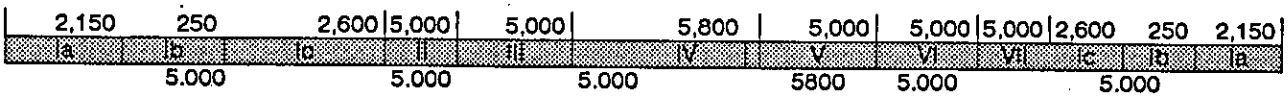
f-wbr13

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br P13 PE 246 + 57.5 m (Amplas Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K–400,l = 40.80 m

Main Beam Section





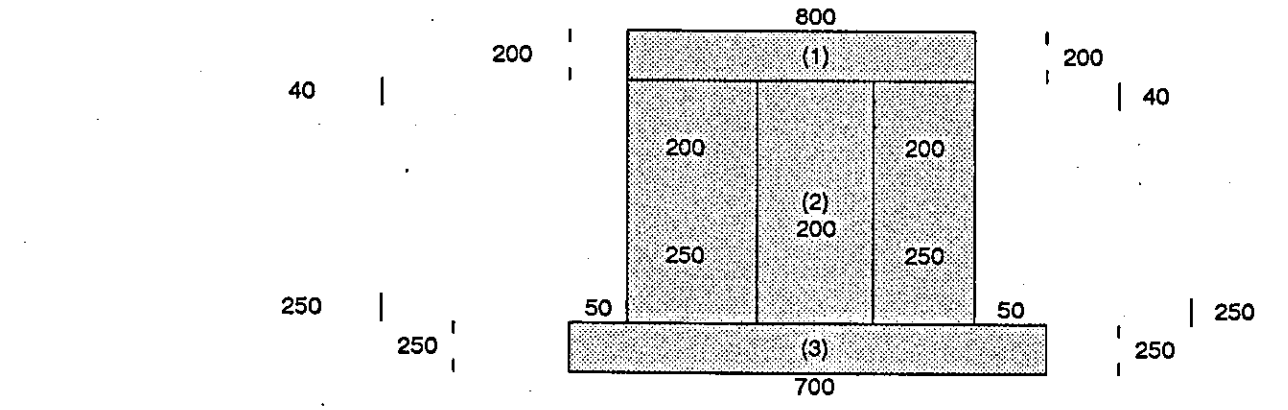
Total length = **40,800** m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.200	1.250	1.000	0.250
(3)	0.700	0.250	1.000	0.175
(4)	0.300	0.120	2.000	0.036
(5)	0.250	0.250	2.000	0.062
			sum	
	area section main beam		=	0.6835

Volume 1 = area x length
= 0.6835 x 40,800
= 27,886.80 m3

End Block Section L = 2.150 m

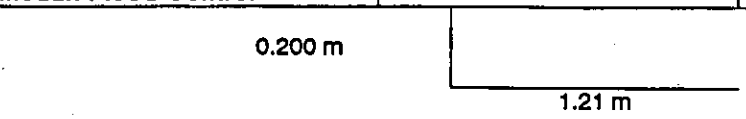


2. Bearing Block Area

piece	width m	depth m	nos	total area m2
(1)	0.800	0.200	1.000	0.160
(2)	0.700	1.250	1.000	0.875
(3)	0.700	0.250	1.000	0.175
		1.700	sum	1.210

1075
1250

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br P13 PE 246 + 57.5 m (Amplas Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.16 + 1.25) : 2
= 1.21 m

area = width x depth
= 0.25 x 1.21
= 0.301 m2

section	area	length	nos	volume
	m2	m		m3
Ia	1.2100	2.150	1.00	2.601
Ib	0.3012	0.250	1.00	0.075
Ic	0.6835	2.600	1.00	1.777
II	0.6835	5.000	1.00	3.418
III	0.6835	5.000	1.00	3.418
IV	0.6835	5.800	1.00	3.964
V	0.6835	5.000	1.00	3.418
VI	0.6835	5.000	1.00	3.418
VII	0.6835	5.000	1.00	3.418
Ic	0.6835	2.600	1.00	1.777
Ib	0.3012	0.250	1.00	0.075
Ia	1.2100	2.150	1.00	2.601
	sum	40.80		29.959

Total volume = 29.960 m3

Total volume (6 Beam) = 12.00 x 29.960 m3 ✓

Grand Total = 359.516 m3

be-br13 2/2

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	MAIN BEAM Br P13 PE 246 + 57.5 m (Amplas Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

		Shape steel						length	total	total	weight	weight	Remark
Section	Type	ø	a	b	c	d	2 x e	per each	Nos.	length	kg/m'	kg	
Segment	B1	13	600	1,660	150	1,660		4.070	30	122.10	0.995	121.490	outer Beam
(l = 5.000 m)	B2	13		300	720	300		1.320	16	21.12	0.995	21.014	and end Block
2 nos	B3	13	1,600	620	1,600			3.820	16	61.12	0.995	60.814	
	B4	13		886	650	310		1.846	30	55.38	0.995	55.103	
	B5	13		1,045	650	310		2.005	30	60.15	0.995	59.849	
	B6	16	4,300	675		750		5.725	5	28.63	1.560	44.655	
	B7	16	4,950					4.950	24	118.80	1.560	185.328	
	B8	16	1,000			150		1.150	16	18.40	1.560	28.704	
	B9	13		1,000		750		1.750	2	3.50	0.995	3.483	
											sum	580.4401	1,160.880
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	887.077

		Shape steel						length	total	total	weight	weight	Remark
Section	Type	ø	a	b	c	d	2 x e	per each	Nos.	length	kg/m'	kg	
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
2 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	887.077
Segment	B1	13	600	1,660	150	1,660		4.070	29	118.03	0.995	117.440	Inner of Beam
(l = 5.000 m)	B2	13		886	720	310		1.916	29	55.56	0.995	55.286	
1 nos	B3	13		1,045	650	310		2.005	29	58.14	0.995	57.854	
	B4	16	4,920					4.920	24	118.08	1.560	184.205	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	443.538	443.538
Segment	B1	13	600	1,660	150	1,660		4.070	33	134.31	0.995	133.638	Inner of Beam
(l = 5.800 m)	B2	13		886	720	310		1.916	33	63.23	0.995	62.912	
1 nos	B3	13		1,045	650	310		2.005	33	66.16	0.995	65.834	
	B4	16	5,720					5.720	24	137.28	1.560	214.157	
	B5	13	1,000			150		1.150	16	18.40	0.995	18.308	
	B6	16		700		250		0.950	4	3.80	1.560	5.928	
	B7	13		750		385		1.135	4	4.54	0.995	4.517	
											sum	505.295	505.295

Main Beam l = 5.000 m (2 Segment)	=	1,160.880	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (2 Segment)	=	887.077	Kg
Main Beam l = 5.000 m (1 Segment)	=	443.538	Kg
Main Beam l = 5.800 m (1 Segment)	=	505.295	Kg
Grand total (1 pcs)	=	3,883.867	Kg
Grand total (12 pcs)	=	12.000	x 3,883.867 kg
	=	46,606.403	kg

mb-br13

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	M A I N B E A M BR P13 PE 246 + 57.5 m (Amplas Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

$$S = -l^2/8.f \times [\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}] - [\{2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2.ln.[\{4.f/l\}+@sqrt(4.f/l)^2+1)$$

(a)	=	$l^2/8.f$				
(b)	=	$2.f/l$				
(c)	=	$4.f/l$				
(d)	=	$(4.f/l)^2$				
(e)	=	$(4.f/l)^2 + 1$				
(f)	=	$@sqrt((4.f/l)^2 + 1)$	=	$@sqrt\ (e)$		
(g)	=	$-2.f/l.@sqrt((4.f/l)^2+1)$	=	$-(b) \times (f)$		
(h)	=	$-4f/l+@sqrt(4f/l)^2+1$	=	$(-c) + (f)$		
(i)	=	$1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$	=	$1/2 x ln\ (h)$		
S1	=	$[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$			=	$(g) + (i)$
(k)	=	$-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\}$	=	$(b) \times (f)$		
(l)	=	$[\{4.f/l\}+@sqrt(4.f/l)^2+1)$	=	$(c) + (f)$		
(m)	=	$1/2.ln.[\{4.f/l\}+@sqrt(4.f/l)^2+1)$	=	$1/2 x ln(l)$		
S2	=	$-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l\}+@sqrt(4.f/l)^2+1)$			=	$(k) + (m)$

$$S = (-a) \times [\ (S1) - (S2)]$$

S is length of parabola curve

te−br13 1/2

Diktorat General of Water Resources Development Diktorat of River Medan Flood Control	**M A I N B E A M** **BR P13 PE 246 + 57.5 m** **(Amplas Br)**	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 40.80 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
2	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66
3	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
4	0.709	42.800	322.962	0.033	0.066	0.004	1.004	1.002	(0.033)	0.936	(0.033)	(0.066)	0.033	1.068	0.033	0.066	42.831
																total	85.66

f = Average

nos wire per tendon	=	19	nos				
sum of tendon length	=	19	x	85.6625	=	1,627.59	m
nos wire per tendon	=	12	nos				
sum of tendon length	=	12	x	85.6625	=	1,027.95	m
				sum		2,655.54	m
Total	=	0.80	+	2,655.54	=	2,656.341	kg
Grand Total (12 Nos)	=	12.00	x	2,656.34	=	31,876.09	kg

te-br13

2/2

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	PANEL SLAB Br13 PE 246 + 57.5 m (Amplas Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K--400 (L = 40.80 m)

	volume panel slab								
section	width w	depth d	area (m 2)	thick t	nos	volume			
	m	m		m		m3			
(1)	1.000	1.300	1.3	0.070	1.00	0.0910			
	sum volume per pcs				=	0.0910			
	nose per row				=	11.0000	row	x	0.0910
					=	1.001	m3		
	nos of per span				=	11.00		x	40
					=	440	nos		
	Total volume per span				=	40.0400	m3		
	Total volume per Span				=	1.000	x	40.040	m3
	Grand Total				=	40.040	m3		

pl--br13

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	CROSS BEAM Br13 PE 246 + 57.5 m (Amplas Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K–400 (L = 40.80 m)

section	volume cross beam per span width w m	depth d m	area (m 2)	thick t m	nos	volume m3		
(1)	0.630	1.250	0.78750	0.200	1.00	0.158		Cross Beam End
(2)	0.060	0.050	0.00150	0.200	4.00	(0.002)		
	sum volume per pcs				=	0.1551		
	Volume nose per row				=	11	x	0.1551
					=	1.7061		
	nose per span				=	2	row	
	Total volume per span				=	2	x	1.7061
					=	3.4122	m3	

Structure Concrete Class K–400 (L = 40.80 m)

section	volume cross beam per span width w m	depth d m	area (m 2)	thick t m	nos	volume m3			Cross Beam Central
(1)	1.250	1.250	1.56250	0.150	1.00	0.234			
(2)	0.300	0.120	0.01800	0.150	2.00	(0.011)			
(3)	0.250	0.250	0.03125	0.150	2.00	(0.019)			
	sum volume per pcs				=	0.2048			
	Volume per row				=	11	x	0.20482	
					=	2.2531			
	nose per span				=	2	row		
					=	2		x	2.2530
	Total volume per span				=	4.50615	m3		
	Grand Total				=	3.4122	+	4.50615	m3
					=	7.91835	m3		

cb–br13

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF CROSS BEAM Br P13 PE 246 + 57.5 m (Amplas Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of Cross beam (l = 40.8 m)

C.1	13	690	140	690	140	140	1.800	6.00	10.80	0.995	10.746	End
C.2	13	1,200	140	1,200	140	140	2.820	3.00	8.46	0.995	8.418	
										sum	19.16	

Nos per row	=	11.00		
sub total per span	=	22.00	x	19.16
	=	**421.60**	Kg	

C.1	13	1,090	140	1,090	140	140	2.600	6.00	15.60	0.995	15.522	Center
C.2	13	1,200	140	1,200	140	140	2.820	3.00	8.46	0.995	8.418	
										sum	23.94	

Nos per row	=	11.00		
sub total per span	=	22.00	x	23.94
	=	526.67	Kg	
Grand total	=	**948.275**	Kg	

cr-br13

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P13 PE 246 + 57.5 m Amplas Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steil inside pile (kg)

Diameter of pipe = dp	=	40	cm					
thick of pipe = t	=	1.031	cm					
Diameter of spiral = ds	=	1.30	cm					
covering of concrete = d'	=	5	cm					
dc	=	40 – 2 x (1.031 + 5)						
	=	27.938	cm					
(dc – ds)	=	27.938	–	5				
	=	22.938	cm					
Ag	=	0.25 x @pi x dp^2						
	=	1,256.64	cm2					
Ac	=	0.25 x @pi x dc^2						
	=	613.028	cm2					
f'c	=	225	kg/cm2					
fsy	=	4,000	kg/cm2					
Ag/Ac	=	2.050						
f'c/fsy	=	0.056						
ps	=	0.45 x (Ag/Ac – 1) x f'c/fsy						
ps	=	0.027						
Area of spiral = as	=	0.25*@pi x ds^2						
	=	1.327	cm2					
spacing of spiral = s	=	as x @pi x (dc–ds) / ps x @pi x dc^2/4						
s	=	1.327 x 3.142 x 22.938 / 0.027 x 3.142 x 195.133						
	=	95.649 / 16.291	cm					
	=	5.87	cm					
say	=	7.00	cm					
Length of spiral per picth	=	@sqrt((@pi x dc)^2 + s^2)						
	=	88.05	cm					
length of culumn	=	850	cm					
nos of pitch	=	121.43						
length of spiral	=	88.05	x	121.43				
	=	10,691.61	cm					
	=	106.92	m					
Radius of steel ring								
Outer diameter of pile	=	40.64	cm					
Thick of pile	=	1.031	cm					
Inner diameter of pile	=	40.64	–	2.062				
	=	38.578	cm					
Concrete covering	=	5	cm					
Diameter of steel bar	=	1.6	cm					
Diameter of ring	=	1.3	cm					
Inner diameter of pile	=	38.578						
Distance outside to ring	=	5	+	0.65	+	1.6	+	0.65
	=	7.90	cm					
Inner diameter of ring	=	38.578	–	7.90				
	=	30.678	cm					
Radius of ring steel	=	30.678	:	2				
	=	15.339	cm					
	=	0.153	m					

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	Abutment Foundation Br P13 PE 246 + 57.5 m Amplas Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

Length of each = 2 x @pi x r
= 2 x 3.141592 x 0.153 m
= 0.964 m

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	8.50		0.36	9.21	52.00	8	73.68	1.560	114.94
2.	R1	13									106.92	0.995	106.38
3.	Ring	13						0.964		8	7.71	0.995	7.67
												sum	228.99

Total weight = 52.00 x 228.9939 = 11,907.68 kg

Grand total = 2.00 x 11,907.68 = **23,815.37** kg

inb-br13

Diktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br P13 (Amplas Br) Sta : 246 + 57.5 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	2.045	2.00	1.23
wall	1a	2.045	21.150	1.00	43.25
wall	1b	2.045	20.350	1.00	41.62
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	20.350	1.00	10.17
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	20.350	1.00	15.26
stem	4	0.200	0.500	2.00	0.20
	4a	0.500	21.150	1.00	10.58
stem	5	0.200	0.250	2.00	0.05
	5a	0.320	21.150	1.00	6.77
stem	6	1.000	3.655	2.00	7.31
stem	6a	2.605	21.150	1.00	55.10
stem	6b	20.350	2.355	1.00	47.92
footing	7	1.800	0.300	2.00	0.54
footing	8	2.300	0.300	2.00	1.38
footing	9	5.100	1.000	2.00	10.20
footing	10	1.000	21.150	2.00	42.30
wingwall	11	2.045	3.000	4.00	24.54
wingwall	11a	0.400	2.045	2.00	1.64
wingwall	12	3.300	0.955	4.00	11.78
wingwall	13	0.400	0.955	2.00	0.76
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	2.300	2.000	4.000	18.400
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	356.00

Total = 2.00 x 356.00
= 712.00 sq.m

abr13-fw

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – P13 (Amplas Br) STA : 246 + 57.5 (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.406	m
area	=	0.129	m2
H	=	6.700	m
W	=	5.100	m
L	=	21.14	m
Skew Degree	=	64.00	

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	2.045	0.61	21.14	1.00	12.97
stem	2	0.55	0.500	0.28	19.30	1.00	5.31
stem	3	0.55	0.500	0.14	19.30	1.00	2.65
stem	4	0.20	0.500	0.10	21.14	1.00	2.11
stem	5	0.20	0.250	0.03	21.14	1.00	0.53
stem	6	1.00	3.655	3.65	21.14	1.00	77.27
stem	7	1.80	0.300	0.27	21.14	1.00	5.71
footing	8	2.30	0.300	0.35	21.14	1.00	7.29
footing	9	5.10	1.000	5.10	21.14	1.00	107.81
wingwall	10	3.00	2.045	6.14	0.40	2.00	4.91
wingwall	11	3.30	0.955	1.58	0.40	2.00	1.26
wingwall	12	2.30	2.400	5.52	0.40	2.00	4.42
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	2.045	2.00	0.18
App.Slab	16	3.00	0.200	0.30	19.300	1.00	5.79
	17	0.275	0.05	0.01	19.300	1.00	0.27
inside blockout	lbo	0.30	0.250	0.08	0.70	11.00	0.577
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	52.00	x	0.10	(0.673)
						sum	239.06

concrete filling in piles

thick of pipe	=	0.01036	m					
inner diameter	=	0.406	–	0.021				
	=	0.385	m					
area	=	0.250	x	3.142	x	0.148		
	=	0.11658	m2					
depth	=	8.500	m	--->	0.333	x	25.000	m
nos	=	52.000						
volume	=	0.117	x	8.500	x	52.00		
	=	51.53	m3					
sub total	=	239.059	+	51.53				
Total	=	290.589	m3					
Grand Total (R & L)	=	290.589	+	290.590	m3			
	=	581.179	m3					

Description	Nos	side	Depth	total	Remark
Supply and Driving of SPP dia.400 mm	104.00	R / L	25.00	2,600.00	

1/1

abr13–co

Lean concrete (m3)

diameter of concrete pile = 0.40 m

area = 0.126 m2

Lean Concrete 0.10

5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	21.45	115.83	0.10	11.58

reducing volume by pile

area	=	0.25	x	3.1415	x	0.160
	=	0.126	m2			
depth	=	0.10	m			
nos	=	52				
volume	=	0.126	x	0.10	x	52
	=	0.653	m3			
net volume	=	11.58	–	0.653		
	=	10.93	m3			
nos	=	2.00				
Total volume	=	2.00	x	10.93		
	=	21.86	m3		(Abutment L & R)	
Grand Total	=	21.86	m3			

Rubble stone (m3)

diameter of concrete pile = 0.40 m

area = 0.126 m2

Rubble Stone 0.200

5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	21.45	115.83	0.20	23.17

reducing volume by pile

area	=	0.25	x	3.1415	x	0.160
	=	0.126	m2			
depth	=	0.20	m			
nos	=	52				
volume	=	0.126	x	0.20	x	52
	=	1.307	m3			
net volume	=	23.17	–	1.307		
	=	21.86	m3			
nos	=	2.00				
Total volume	=	2.00	x	21.86		
	=	43.72	m3		(Abutment L & R)	
Grand Total	=	43.72	m3			

lc-br13

Br F1 FW 6 + 90 m

(Jln. Bajak Br)

NO	DESCRIPTION	UNIT	Quantity	Unit Price (Rp)	REMARKS
	BRIDGE				
	SUPERSTRUCTURE				
	CONCRETE				
	a. Deck Slab (Insitu)				
	Concrete (Type – B) Class K 350	Cu.m	63.74		
	Reinforcing Steel Deform	Kg	11,690.66		
	Wooden Form Work with Supporting Frame	Sq.m	124.00		
	b. Precast Prestressed Concrete Main Beam				
	Precast Prestressed Concrete Beam (Type – A) Class K 400	Cu.m	82.08		
	Reinforcing Steel Deform	Kg	8,462.14		
	Tendon [H.T.W] diameter 13 mm	Kg	5,684.79		
	Live end Anchorage	Nos	60.00		
	c. PC Panel Concrete				
	PC Panel Concrete, t = 7 cm (Type – A) Class K 400	Cu.m	13.63		
	Reinforcing Steel Deform	Kg	3,357.23		
	c. PC Diaphragm Concrete				
	PC Diaphragm Concrete (Type – A) Class K 400	Cu.m	4.80		
	Reinforcing Steel Deform	Kg	485.24		
	PRESTRESSING				
	Prestressing Tendon [H.T.W.] diameter 13 mm for Main Beam (incl. Diaphragm)	each	5.00		
	Grout Injection Main Beam (icl. Diaphragm)	m	960.00		
	ERECTING				
	Erection of Concrete Main Beam	Kg	205,200.00		
sup–F1	(Incl.PC Diaphragm , PC Panel)				

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. F1 FW 6 + 90 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 Length = 31.60 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	7.000	1.715	1.000	1.715	32.000	54.880
End slab	(2)	0.055	0.500	0.027	2.000	0.055	4.800	0.264
End slab	(3)	0.300	0.200	0.060	2.000	0.120	7.200	0.864
							sum	56.008

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.223	1.500	0.334	1.000	0.334	32.000	10.680
Right Side slab	(5)	0.223	1.500	0.334	1.000	0.334	32.000	10.680
							sum	21.360

Total Volume K.350 = 56.008 + 21.360
= 77.368 m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	34.000	0.544	0.550	0.299
Railing post	(7)	0.165	0.160	0.026	34.000	0.898	0.470	0.422
slab side Walk	(8)	0.250	1.266	0.317	2.000	0.633	32.000	20.260
Wall	(9)	0.470	0.100	0.047	2.000	0.094	29.280	2.752
							sum	23.733

Total Volume K.225 = 23.733 m3

Grand Total K.350 = 77.368 m3

Grand Total K.225 = 23.733 m3

slb –brf1

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF DECK SLAB AND HAND RAIL Br F1 FW 6 + 90 m (Jln. Bajak Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of deck slab per span (l = 31.60 m)

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
D1	16	6,980	150	0	150	260	7.540	105.00	791.70	1.560	1,235.05	main steel deck slab
D2	16	2,820	6,720	0	0	260	9.800	105.00	1,029.00	1.560	1,605.24	
D3	13	31,900	125	760	125	660	33.570	50.00	1,678.50	0.995	1,670.11	
D4	13	31,900	0	760	0	660	33.320	50.00	1,666.00	0.995	1,657.67	
D5.A	16	2,868.00	0	8,524.00	0	660	12.052	53.00	638.76	1.560	996.46	
D5.B	16	2,868.00	0	8,524.00	0	660	12.052	53.00	638.76	1.560	996.46	
D6	16	9,680	125	0	125	260	10.190	8.00	81.52	1.560	127.17	Reinf. steel Expantion Joint
D7	16	0	0	1300	0	260	1.560	16.00	24.96	1.560	38.94	
D8	16	450	250	450	200	150	1.500	48.00	72.00	1.560	112.32	
D9	16	150	250	150	200	260	1.010	22.00	22.22	1.560	34.66	
H1	13	100	1350	200	900	220	2.770	68.00	188.36	0.995	187.42	Reinf. steel haidrail
H2	13	110	50	110	50	220	0.540	170.00	91.80	0.995	91.34	
H3	13	200	50	200	50	220	0.720	320.00	230.40	0.995	229.25	
H4	13	0	0	700	0	220	0.920	320.00	294.40	0.995	292.93	
H5	13	31,450	0	920	0	220	32.590	8.00	260.72	0.995	259.42	Reinf. steel side Walk
P1	16	31,450	0	920	0	260	32.630	20.00	652.60	1.560	1,018.06	
P2	16	1,150	250	200	420	260	2.280	320.00	729.60	1.560	1,138.18	
										sum	11,690.66	

nos.of span = 1.00

Grand Total = 1.00 x 11,690.66 = 11,690.66 kg

deck-br1

Directorate General Water Resources Development Directorate General Medan Flood Control Project	DECK SLAB AND HAND RAIL Br F1 FW 6 + 90 m (Jln. Bajak Br)	japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 32.00 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	7.20	2.16	2.00	4.32
end slab	(2)	0.20	7.20	1.44	2.00	2.88
	(3)	0.35	4.80	1.68	2.00	3.36
	(4)	0.47	1.50	0.71	4.00	2.84
in side walk (curb)	(5)	0.25	32.00	8.00	2.00	16.00
in side walk	(6)	0.47	31.75	14.92	2.00	29.85
out side walk	(7)	0.47	30.30	14.24	2.00	28.48
Railing post	(8)	0.10	0.92	0.09	34.00	3.13
Railing post	(9)	0.16	0.45	0.07	68.00	4.90
Railing post	(10)	0.14	0.45	0.06	68.00	4.13
					sum	99.88
				numbers of span =		1.00
total	=	99.88	x	1.00	=	**99.88**

Scafolding (L = 32.00 m)

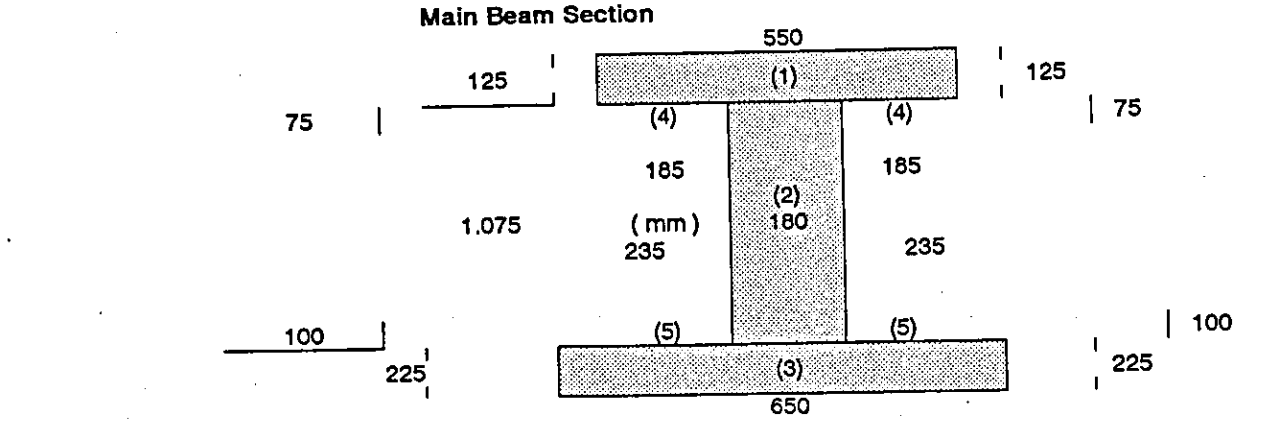
Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.50	32.00	48.00	2.00	96.00
end slab	(2)	0.45	32.00	14.400	2.00	28.80
					sum	124.80
				numbers of span =		1.00
total	=	124.80	x	1.00	=	**124.80**

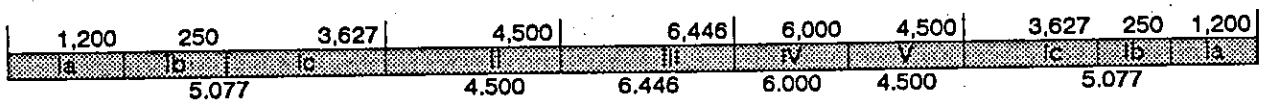
f1-fwdeck

Directorate General Water Resources Development Directorate of River Medan Flood Control Project	Main Beam Br F1 FW 6 + 90 m (Jln.Bajak Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K-400,l = 31.60 m

Main Beam Section





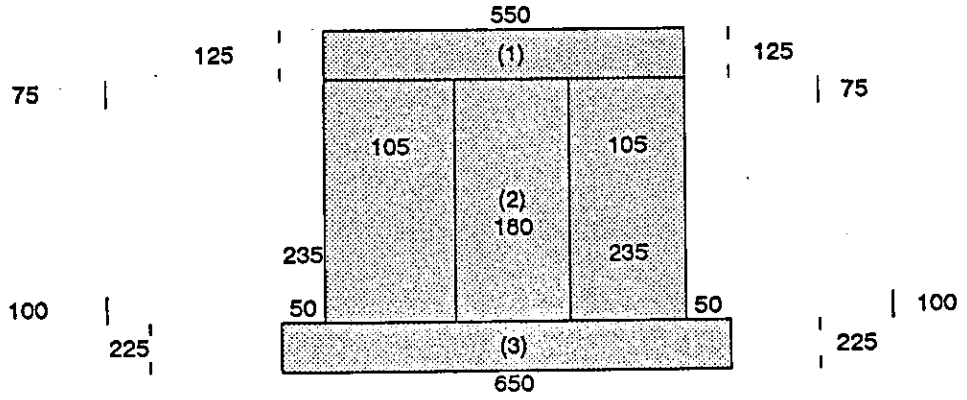
Total length = 31.60 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.180	1.250	1.000	0.225
(3)	0.650	0.225	1.000	0.146
(4)	0.185	0.075	2.000	0.014
(5)	0.235	0.100	2.000	0.024
			sum	
area section main beam			=	0.4774

Volume 1 = area x length
= 0.477 x 31.60
= 15.09 m3

End Block Section L = 1.200 m



2. Bearing Block Area

piece	width m	depth m	nos	total area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.550	1.250	1.000	0.688
(3)	0.650	0.225	1.000	0.146
		1.600	sum	0.903

1075
1250

1/2

beam-cf1

length = 0.25 m

End Block Section L = 0.25 m

depth = (1.075 + 1.30) : 2
= 1.19 m

area = width x depth
= 0.185 x 1.19
= 0.220 m2

section	area	length	nos	volume
	m2	m		m3
Ia	0.9025	1.200	1.00	1.083
Ib	0.2197	0.250	1.00	0.055
Ic	0.4774	3.627	1.00	1.731
II	0.4774	4.500	1.00	2.148
III	0.4774	6.446	1.00	3.077
IV	0.4774	6.000	1.00	2.864
V	0.4774	4.500	1.00	2.148
Ic	0.4774	3.627	1.00	1.731
Ib	0.2197	0.250	1.00	0.055
Ia	0.9025	1.200	1.00	1.083
	sum	31.60		15.9765

Block out Cross beam

width		depth	area	length	nos	volume
top	bottom					
m	m	m	m2	m	m	m3
0.400	0.60	0.185	0.0925	1.1875	4	0.439

volume per beam = 15.9765 + 0.439 = 16.416 m3

Grand Total = 5.00 x 16.416 m3

= 82.08 m3

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	**MAIN BEAM** **Br F1 FW 6 + 90 m** **(Jln.Bajak Br)**	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(1)	13	1.45		1.45	0.50		3.40	4	13.60	0.995	13.532	outer Beam
(l = 5.077 m)	(2)	16	0.45	0.70		0.70		1.85	7	12.95	1.560	20.202	and end Block
2 nos	(3)	13	1.32		1.32	0.55	0.40	3.59	4	14.36	0.995	14.288	
	(4)	13	1.80					1.80	2	3.60	0.995	3.582	
	(5)	13		0.30	0.55	0.30		1.15	3	3.45	0.995	3.433	
	(6)	16	1.45		1.45	1.50		4.40	2	8.80	1.560	13.728	
	(7)	13		0.46	0.55	0.46	0.30	1.77	7	12.39	0.995	12.328	
	(8)	16		1.75	0.55	1.75		4.05	7	28.35	1.560	44.226	
	(9)	13	4.98					4.98	6	29.86	0.995	29.713	
(I)	(10)	16		0.10	0.45	0.10	0.10	0.75	70	52.50	1.560	81.900	
	(11)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(12)	13		1.75	0.08	1.75		3.58	15	53.70	0.995	53.432	
	(13)	13	4.78					4.78	14	66.88	0.995	66.544	
	(14)	13		0.46	0.55	0.46	0.30	1.77	8	14.16	0.995	14.089	
	(15)	13	0.45	0.40		0.40	0.30	1.55	8	12.40	0.995	12.338	
	(16)	16	1.15	0.20	1.15	0.20	0.26	2.96	2	5.92	1.560	9.235	
	(17)	13		0.30		0.30		0.60	8	4.80	0.995	4.776	
											sum	410.449	
							sub total :	410.449	x	2.000	=	820.898	

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(18)	13		1.75	0.08	1.75		3.58	10	35.80	0.995	35.621	
(l = 4.500 m)	(19)	13	4.40					4.40	20	88.00	0.995	87.560	
2 nos	(20)	13	0.45	0.40		0.40	0.30	1.55	10	15.50	0.995	15.423	
	(21)	13		0.46	0.55	0.46	0.30	1.77	10	17.70	0.995	17.612	
(II)	(22)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(23)	13		0.30		0.30		0.60	10	6.00	0.995	5.970	
											sum	175.289	
							sub total :	175.289	x	2.000	=	350.578	
Inner Beams	(24)	13		1.75	0.08	1.75		3.58	14	50.12	0.995	49.869	
(l = 6,466 m)	(25)	13	6.35					6.35	20	126.92	0.995	126.285	
1 nos	(26)	13	0.45	0.40		0.40	0.30	1.55	14	21.70	0.995	21.592	
(III)	(27)	13		0.46	0.55	0.46	0.30	1.77	14	24.78	0.995	24.656	
	(28)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(29)	16		0.30		0.30		0.60	14	8.40	0.995	8.358	
											sum	243.864	
							sub total :	243.864	x	1.000	=	243.864	
	(30)	13		1.75	0.08	1.75		3.58	13	46.54	0.995	46.307	
Inner Beams	(31)	13	5.90					5.90	20	118.00	0.995	117.410	
(l = 6,000 m)	(32)	16	0.45	0.40		0.40	0.30	1.55	13	20.15	0.995	20.049	
1 nos	(33)	13		0.46	0.55	0.46	0.30	1.77	13	23.01	0.995	22.895	
(IV)	(34)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(35)	13		0.30		0.30		0.60	13	7.80	0.995	7.761	
											sum	227.527	
							sub total :	227.527	x	1.000	=	227.527	
Exterior Beam	(36)	16	1.15	0.20	1.15		0.26	2.76	2	5.52	1.560	8.611	
(V)	(37)	16	0.55	0.15	0.55		0.26	1.51	5	7.55	0.995	7.512	
2 nos	(38)	13	0.75		0.75	0.08	0.16	1.74	5	8.70	0.995	8.657	
											sum	24.780	
							sub total :	24.780	x	2.000	=	49.560	

Total 1 pcs (31.60 Span) = 1,692.427 Kg

Total 5 pcs (31.60 Span) = 5.00 x 1,692.43 Kg

= 8,462.14 Kg

mb-rf1

Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR F1 FW 6 + 90 M (Jln.Bajak Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

S = −1^2/8.f x [{−2.f/l.@sqrt((4.f/l)^2+1)} +1/2 ln[{−4f/l+@sqrt(4f/l)^2+1}]
−[{2.f/l.@sqrt((4.f/l)^2 + 1)} +1/2.ln.[{4.f/l)+@sqrt(4.f/l)^2+1)

(a) = 1^2 / 8.f
(b) = 2.f/l
(c) = 4.f/l
(d) = (4.f/l)^2
(e) = (4.f/l)^2 + 1

(f) = @sqrt((4.f/l)^2 + 1) = @sqrt (e)
(g) = −2.f/l.@sqrt((4.f/l)^2+1) = −(b) x (f)
(h) = −4f/l+@sqrt(4f/l)^2+1 = (−c) + (f)
(i) = 1/2 ln[{−4f/l+@sqrt(4f/l)^2+1}] = 1/2xln (h)
S1 = [{−2.f/l.@sqrt((4.f/l)^2+1)} +1/2 ln[{−4f/l+@sqrt(4f/l)^2+1}] = (g) + (i)

(k) = −[{2.f/l.@sqrt((4.f/l)^2 + 1)} = (b) x (f)
(l) = [{4.f/l)+@sqrt(4.f/l)^2+1) = (c) + (f)
(m) = 1/2.ln.[{4.f/l)+@sqrt(4.f/l)^2+1) = 1/2 x ln(l)
S2 = −[{2.f/l.@sqrt((4.f/l)^2 + 1)} +1/2.ln.[{4.f/l)+@sqrt(4.f/l)^2+1) = (k) + (m)

S = (−a) x [(S1) − (S2)]

S is length of parabola curve

te−F1

1/2

Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR F1 FW 6 + 90 M (Jln.Bajak Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 31.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
2	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
3	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
4	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
5	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
6	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
					total												201.742

f = Average

nos wire per tendon	=	7	nos				
sum of tendon length	=	7	x	201.742	=	1,412.20	m
Total per beam	=	0.8	x	1,412	=	1,129.76	kg
Grand Total (5 Beam)	=	5.00	x	1,129.76	=	5,648.79	kg

te–F1

2/2

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	CROSS BEAM & PANEL Br F1 FW 6 + 90 m (Jln.Bajak Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K-400 Cross Beam (L = 31.60 m)

	volume cross beam							
	width	depth	area	thick	nos	volume		
section	w	d	(m 2)	t				
	m	m		m		m3		
(1)	1.200	1.250	1.5	0.200	1.00	0.3000		
	sum volume per pcs				=	0.3000		
	nose per row				=	4.0000	nos	
	volume per row				=	4.0000	x	0.3000
					=	1.2	m3	
	nose per span				=	4.00	row	
					=	4.0000	x	1.2
	Total volume per span				=	4.8000	m3	

Structure Concrete Class K-400 Panel (L = 31.60 m)

	volume Panel							
	width	depth	area	thick	nos	volume		
section	w	d	(m 2)	t				
	m	m		m		m3		
(1)	1.570	1.000	1.57	0.070	1.00	0.1099		
	sum volume per pcs				=	0.1099		
	nose per row				=	4.0000	nos	
	volume per row				=	4.0000	x	0.1099
					=	0.4396	m3	
	nose per span				=	124.00	nos	
					=	124.0000	x	0.1099
	Total volume per span				=	13.6276	m3	

cb-cf1

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF CROSS BEAM & PANEL Br F1 FW 6 + 90 m (Jln. Bajak Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of Cross beam (l = 31.60 m) 1 / 1

Type	Bar Shape dia.	a	b	c	d	2 x e	lenght/ each	nos	total lenght	weight per m'	total weight	description
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
C.1	13	1,170.00	150	1,170.00	150	0	2.640	7.00	18.48	0.995	18.388	End & Center
C.2	13	1,200.00	0	0	0	0	1.200	10.00	12.00	0.995	11.940	
										sum	30.33	

Nos per row	=	4.00		
sub total per span	=	16.00	x	30.33
	=	**485.24**	Kg	

Quantities steel of Panel

C.1	16	1,620	150	1,620	150	0	3.540	3.00	10.62	1.560	16.567	
C.1	13	1,620	0	0	0	0	1.620	3.00	4.86	0.995	4.836	155
C.2	13	950	0	0	0	0	0.950	6.00	5.70	0.995	5.672	nos
										sum	27.07	

Nos per row	=	4.00		
sub total per span	=	124.00	x	27.07
	=	**3,357.23**	Kg	

cb–rf1

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – F1 (Jln Bajak Br) FW : 6 + 90 (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.406	m	
area	=	0.129	m2	
H	=	6.500	m	
W	=	5.100	m	
L	=	10.00	m	

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	1.945	0.58	10.00	1.00	5.84
stem	2	0.55	0.500	0.28	9.20	1.00	2.53
stem	3	0.55	0.500	0.14	9.20	1.00	1.27
stem	4	0.20	0.500	0.10	10.00	1.00	1.00
stem	5	0.20	0.250	0.03	10.00	1.00	0.25
stem	6	1.00	3.555	3.56	10.00	1.00	35.55
stem	7	1.80	0.300	0.27	10.00	1.00	2.70
footing	8	2.30	0.300	0.35	10.00	1.00	3.45
footing	9	5.10	1.000	5.10	10.00	1.00	51.00
wingwall	10	3.00	1.945	5.84	0.40	2.00	4.67
wingwall	11	3.30	1.055	1.74	0.40	2.00	1.39
wingwall	12	2.30	2.200	5.06	0.40	2.00	4.05
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	1.945	2.00	0.18
App.Slab	16	3.00	0.200	0.30	9.200	1.00	2.76
	17	0.275	0.05	0.01	9.200	1.00	0.13
inside blockout	lbo	0.30	0.250	0.08	1.10	4.00	0.330
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	28.00	x	0.10	(0.362)
						sum	**117.39**

concrete filling in piles

thick of pipe	=	0.01036	m					
inner diameter	=	0.406	–	0.021				
	=	0.385	m					
area	=	0.250	x	3.142	x	0.148		
	=	0.1165	m2					
depth	=	5.500		--->	0.333	x	17.000	m
nos	=	28.000						
volume	=	0.117	x	5.500	x	28.00		
	=	**17.95**	m3					
sub total	=	117.39	+	17.95				
Total	=	135.34	+	135.34	m3			
	=	**270.69**	m3					

Supply and Driving Of SP Piles dia. 400 mm

=	4.00	x	7.00	x	17.00	=	476.00	m
=	2.00	x	476.00			=	952.00	m

1 / 2

abf1–co

DireCtorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br F1 (Jln.Bajak Br) FW : 6 + 90 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	1.945	2.00	1.17
wall	1a	1.945	10.000	1.00	19.45
wall	1b	1.945	9.200	1.00	17.89
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	9.200	1.00	4.60
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	9.200	1.00	6.90
stem	4	0.200	0.500	2.00	0.20
	4a	0.500	10.000	1.00	5.00
stem	5	0.200	0.250	2.00	0.05
	5a	0.320	10.000	1.00	3.20
stem	6	1.000	3.555	2.00	7.11
stem	6a	2.505	10.000	1.00	25.05
stem	6b	9.200	2.255	1.00	20.75
footing	7	1.800	0.300	2.00	0.54
footing	8	2.300	0.300	2.00	1.38
footing	9	5.100	1.000	2.00	10.20
footing	10	1.000	10.000	2.00	20.00
wingwall	11	1.945	3.000	4.00	23.34
wingwall	11a	0.400	1.945	2.00	1.56
wingwall	12	3.300	1.055	4.00	13.10
wingwall	13	0.400	1.055	2.00	0.84
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	2.300	2.000	4.000	18.400
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	205.73

Total = 2.00 x 205.73

= 411.47 sq.m

abf1-fmk

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br F1 FW 6 + 90 m (Jln. Bajak Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing stell inside pile (kg)

Diameter of pipe = dp	=	40	cm					
thick of pipe = t	=	1.031	cm					
Diameter of spiral = ds	=	1.30	cm					
covering of concrete = d'	=	5	cm					
dc	=	40 − 2 x (1.031 + 5)						
	=	27.938	cm					
(dc − ds)	=	27.938	−	5				
	=	22.938	cm					
Ag	=	0.25 x @pi x dp ^2						
	=	1,256.64	cm2					
Ac	=	0.25 x @pi x dc ^2						
	=	613.028	cm2					
f'c	=	225	kg/cm2					
fsy	=	4,000	kg/cm2					
Ag/Ac	=	2.050						
f'c/fsy	=	0.056						
ps	=	0.45 x (Ag/Ac − 1) x f'c/fsy						
ps	=	0.027						
Area of spiral = as	=	0.25*@pi x ds ^2						
	=	1.327	cm2					
spacing of spiral = s	=	as x @pi x (dc−ds) / ps x @pi x dc ^2/4						
s	=	1.327 x 3.142 x 22.938 / 0.027 x 3.142 x 195.133						
	=	95.649 / 16.291	cm					
	=	5.87	cm					
say	=	7.00	cm					
Length of spiral per picth	=	@sqrt((@pi x dc) ^2 + s ^2)						
	=	88.05	cm					
length of culumn	=	550	cm					
nos of pitch	=	78.57						
length of spiral	=	88.05	x	78.57				
	=	6,918.10	cm					
	=	69.18	m					
Radius of steel ring								
Outer diameter of pile	=	40.64	cm					
Thick of pile	=	1.031	cm					
Inner diameter of pile	=	40.64	−	2.062				
	=	38.578	cm					
Concrete covering	=	5	cm					
Diameter of steel bar	=	1.6	cm					
Diameter of ring	=	1.3	cm					
Inner diameter of pile	=	38.578						
Distance outside to ring	=	5	+	0.65	+	1.6	+	0.65
	=	7.90	cm					
Inner diameter of ring	=	38.578	−	7.90				
	=	30.678	cm					
Radius of ring steel	=	30.678	:	2				
	=	15.339	cm					
	=	0.153	m					

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br F1 FW 6 + 90 m (Jln. Bajak Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steil inside pile (kg)

Length of each = 2 x @pi x r
= 2 x 3.14159 x 0.153 m
= 0.964 m

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	5.50		0.36	6.21	28.00	8	49.68	1.560	77.50
2.	R1	13									69.18	0.995	68.84
3.	Ring	13						0.964		5	4.82	0.995	4.79
												sum	151.13

Total weight = 28.00 x 151.130 = 4,231.66 kg

Grand total = 2.00 x 4,231.66 = 8,463.32 kg

inb-ft

Direcktorate General of Water Resources Development Directorate of River Medan Flood Control Project	Lean Concrte and Rubble Stone Br F1 FW 6 + 90 m Jln.Bajak Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Lean concrete (m3)

diameter of concrete pile = 0.406 m
area = 0.129 m2

Lean Concrete 0.10
5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	10.30	55.62	0.10	5.56

reducing volume by pile

area	=	0.25	x	3.141	x	0.165
	=	0.129	m2			
depth	=	0.10	m			
nos	=	28				
volume	=	0.129	x	0.10	x	28
	=	0.362	m3			
net volume	=	5.56	–	0.362		
	=	5.20	m3			
nos	=	2.00				
Total volume	=	2.00	x	5.20		
Grand Total	=	**10.40**	m3		(Abutment L & R)	

Rubble stone (m3)

diameter of concrete pile = 0.406 m
area = 0.129 m2

Rubble Stone 0.200
5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	10.30	55.62	0.20	11.12

reducing volume by pile

area	=	0.25	x	3.141	x	0.165
	=	0.129	m2			
depth	=	0.20	m			
nos	=	28				
volume	=	0.129	x	0.20	x	28
	=	0.725	m3			
net volume	=	11.12	–	0.725		
	=	10.40	m3			
nos	=	2.00				
Total volume	=	2.00	x	10.40		
Grand Total	=	**20.80**	m3		(Abutment L & R)	

lc-f1

Br F2 FW 20 + 45 m

(PTP Br)

NO	DESCRIPTION	UNIT	Quantity	Unit Price (Rp)	REMARKS
	BRIDGE				
	SUPERSTRUCTURE				
	CONCRETE				
	a. Deck Slab (Insitu)				
	Concrete (Type – B) Class K 350	Cu.m	75.76		
	Reinforcing Steel Deform	Kg	13,485.37		
	Wooden Form Work with Supporting Frame	Sq.m	124.00		
	b. Precast Prestressed Concrete Main Beam				
	Precast Prestressed Concrete Beam (Type – A) Class K 400	Cu.m	98.50		
	Reinforcing Steel Deform	Kg	10,154.56		
	Tendon [H.T.W] diameter 13 mm	Kg	6,778.54		
	Live end Anchorage	Nos	72.00		
	c. PC Panel Concrete				
	PC Panel Concrete, t = 7 cm (Type – A) Class K 400	Cu.m	17.58		
	Reinforcing Steel Deform	Kg	4,196.53		
	c. PC Diaphragm Concrete				
	PC Diaphragm Concrete (Type – A) Class K 400	Cu.m	6.25		
	Reinforcing Steel Deform	Kg	606.55		
	PRESTRESSING				
	Prestressing Tendon [H.T.W.] diameter 13 mm for Main Beam (incl. Diaphragm)	each	6.00		
	Grout Injection Main Beam (icl. Diaphragm)	m	1,152.00		
	ERECTING				
	Erection of Concrete Main Beam	Kg	246,250.00		
sup–F2	(Incl.PC Diaphragm , PC Panel)				

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. F2 FW 20 + 45 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 Length = 31.60 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	9.000	2.205	1.000	2.205	32.000	70.560
End slab	(2)	0.055	0.500	0.027	2.000	0.055	5.700	0.313
End slab	(3)	0.300	0.200	0.060	2.000	0.120	9.200	1.104
							sum	71.978

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.223	1.500	0.334	1.000	0.334	32.000	10.680
Right Side slab	(5)	0.223	1.500	0.334	1.000	0.334	32.000	10.680
							sum	21.360

Total Volume K.350 = 71.978 + 21.360
= 93.338 m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	34.000	0.544	0.550	0.299
Railing post	(7)	0.165	0.160	0.026	34.000	0.898	0.470	0.422
slab side Walk	(8)	0.250	1.266	0.317	2.000	0.633	32.000	20.260
Wall	(9)	0.470	0.100	0.047	2.000	0.094	29.280	2.752
							sum	23.733

Total Volume K.225 = 23.733 m3

Grand Total K.350 = 93.3375 m3

Grand Total K.225 = 23.73339 m3

slb –brF2

Directorate General Water Resources Development Directorate General Medan Flood Control Project	DECK SLAB AND HAND RAIL Br F2 FW 20 + 45 m (PTP IX Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 32.00 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	9.20	2.76	2.00	5.52
end slab	(2)	0.20	9.20	1.84	2.00	3.68
	(3)	0.35	6.25	2.19	2.00	4.38
	(4)	0.47	1.50	0.71	4.00	2.84
in side walk (curb)	(5)	0.25	32.00	8.00	2.00	16.00
in side walk	(6)	0.47	31.75	14.92	2.00	29.85
out side walk	(7)	0.47	30.30	14.24	2.00	28.48
Railing post	(8)	0.10	0.92	0.09	34.00	3.13
Railing post	(9)	0.16	0.45	0.07	68.00	4.90
Railing post	(10)	0.14	0.45	0.06	68.00	4.13
					sum	102.89
					numbers of span =	1.00
total	=	102.89	x	1.00	=	**102.89**

Scafolding (L = 32.00 m)

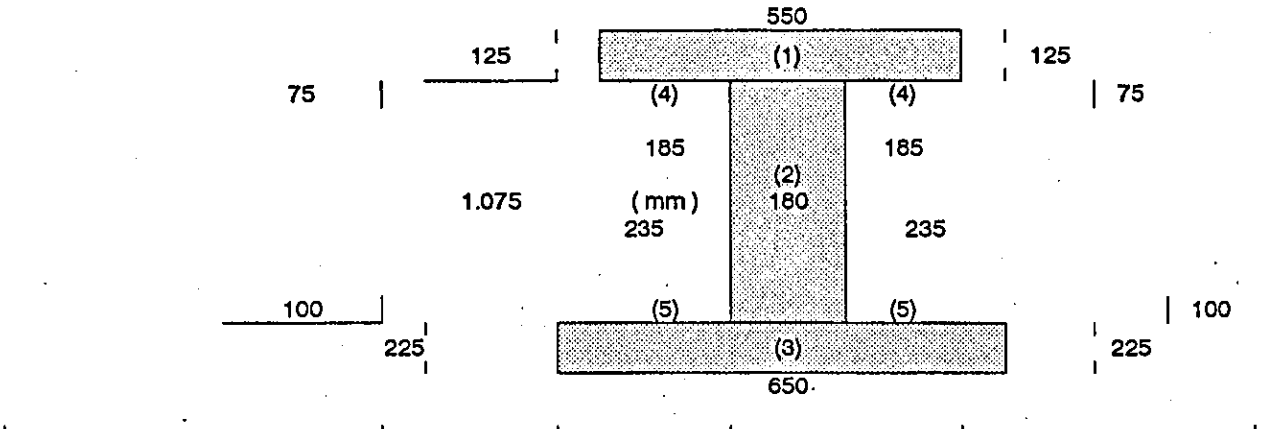
Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.50	32.00	48.00	2.00	96.00
end slab	(2)	0.45	32.00	14.400	2.00	28.80
					sum	124.80
					numbers of span =	1.00
total	=	124.80	x	1.00	=	**124.80**

f2-fwdeck

Directorate General Water Resources Development Directorate of River Medan Flood Control Project	Main Beam Br F2 FW 20 + 45 m (PTP Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K−400,l = 31.60 m

Main Beam Section



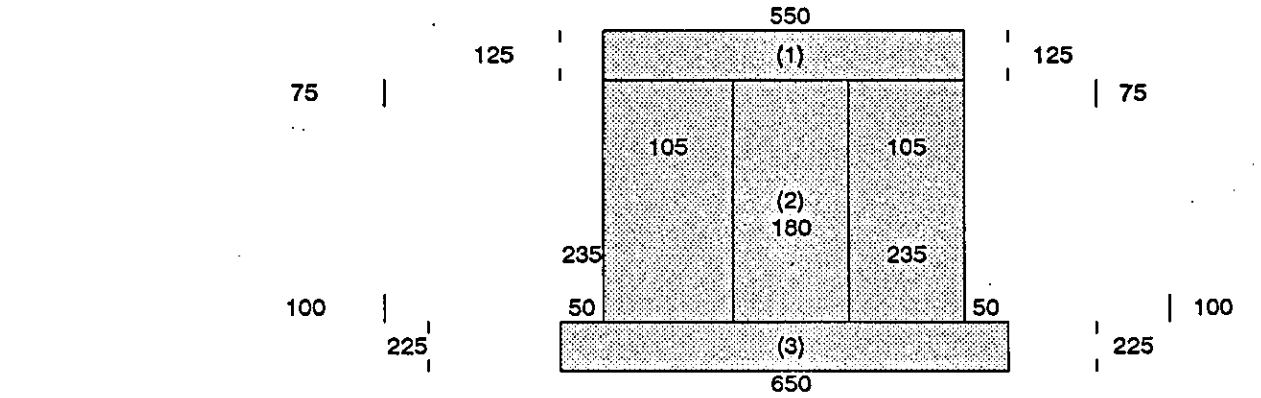
Total length = 31.60 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.180	1.250	1.000	0.225
(3)	0.650	0.225	1.000	0.146
(4)	0.185	0.075	2.000	0.014
(5)	0.235	0.100	2.000	0.024
			sum	
	area section main beam		=	0.4774

Volume 1 = area x length
= 0.477 x 31.60
= 15.09 m3

End Block Section L = 1.200 m



2. Bearing Block Area

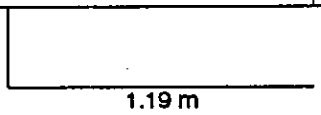
1075
1250

piece	width m	depth m	nos	total area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.550	1.250	1.000	0.688
(3)	0.650	0.225	1.000	0.146
		1.600	sum	0.903

1/2

beam−cf2

Directorate General Water Resources Development Directorate of River Medan Flood Control Project	Main Beam Br F2 FW 20 + 45 m (PTP Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.075 + 1.30) : 2
= 1.19 m

area = width x depth
= 0.185 x 1.19
= 0.220 m2

section	area	length	nos	volume
	m2	m		m3
Ia	0.9025	1.200	1.00	1.083
Ib	0.2197	0.250	1.00	0.055
Ic	0.4774	3.627	1.00	1.731
II	0.4774	4.500	1.00	2.148
III	0.4774	6.446	1.00	3.077
IV	0.4774	6.000	1.00	2.864
V	0.4774	4.500	1.00	2.148
Ic	0.4774	3.627	1.00	1.731
Ib	0.2197	0.250	1.00	0.055
Ia	0.9025	1.200	1.00	1.083
	sum	31.60		15.9765

Block out Cross beam

width		depth	area	length	nos	volume
top	bottom					
m	m	m	m2	m	m	m3
0.400	0.60	0.185	0.0925	1.1875	4	0.439

volume per beam = 15.9765 + 0.439 = 16.416 m3

Grand Total = 6.00 x 16.416 m3

= 98.50 m3

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	MAIN BEAM Br F2 FW 20 + 45 m (PTP Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(1)	13	1.45		1.45	0.50		3.40	4	13.60	0.995	13.532	outer Beam
(l = 5.077 m)	(2)	16	0.45	0.70		0.70		1.85	7	12.95	1.560	20.202	and end Block
2 nos	(3)	13	1.32		1.32	0.55	0.40	3.59	4	14.36	0.995	14.288	
	(4)	13	1.80					1.80	2	3.60	0.995	3.582	
	(5)	13		0.30	0.55	0.30		1.15	3	3.45	0.995	3.433	
	(6)	16	1.45		1.45	1.50		4.40	2	8.80	1.560	13.728	
	(7)	13		0.46	0.55	0.46	0.30	1.77	7	12.39	0.995	12.328	
	(8)	16		1.75	0.55	1.75		4.05	7	28.35	1.560	44.226	
	(9)	13	4.98					4.98	6	29.86	0.995	29.713	
(I)	(10)	16		0.10	0.45	0.10	0.10	0.75	70	52.50	1.560	81.900	
	(11)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(12)	13		1.75	0.08	1.75		3.58	15	53.70	0.995	53.432	
	(13)	13	4.78					4.78	14	66.88	0.995	66.544	
	(14)	13		0.46	0.55	0.46	0.30	1.77	8	14.16	0.995	14.089	
	(15)	13	0.45	0.40		0.40	0.30	1.55	8	12.40	0.995	12.338	
	(16)	16	1.15	0.20	1.15	0.20	0.26	2.96	2	5.92	1.560	9.235	
	(17)	13		0.30		0.30		0.60	8	4.80	0.995	4.776	
											sum	410.449	
						sub total	:	410.449	x	2.000	=	820.898	

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(18)	13		1.75	0.08	1.75		3.58	10	35.80	0.995	35.621	
(l = 4.500 m)	(19)	13	4.40					4.40	20	88.00	0.995	87.560	
2 nos	(20)	13	0.45	0.40		0.40	0.30	1.55	10	15.50	0.995	15.423	
	(21)	13		0.46	0.55	0.46	0.30	1.77	10	17.70	0.995	17.612	
(II)	(22)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(23)	13		0.30		0.30		0.60	10	6.00	0.995	5.970	
											sum	175.289	
						sub total	:	175.289	x	2.000	=	350.578	
Inner Beams	(24)	13		1.75	0.08	1.75		3.58	14	50.12	0.995	49.869	
(l = 6,466 m)	(25)	13	6.35					6.35	20	126.92	0.995	126.285	
1 nos	(26)	13	0.45	0.40		0.40	0.30	1.55	14	21.70	0.995	21.592	
(III)	(27)	13		0.46	0.55	0.46	0.30	1.77	14	24.78	0.995	24.656	
	(28)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(29)	16		0.30		0.30		0.60	14	8.40	0.995	8.358	
											sum	243.864	
						sub total	:	243.864	x	1.000	=	243.864	
	(30)	13		1.75	0.08	1.75		3.58	13	46.54	0.995	46.307	
Inner Beams	(31)	13	5.90					5.90	20	118.00	0.995	117.410	
(l = 6,000 m)	(32)	16	0.45	0.40		0.40	0.30	1.55	13	20.15	0.995	20.049	
1 nos	(33)	13		0.46	0.55	0.46	0.30	1.77	13	23.01	0.995	22.895	
(IV)	(34)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(35)	13		0.30		0.30		0.60	13	7.80	0.995	7.761	
											sum	227.527	
						sub total	:	227.527	x	1.000	=	227.527	
Exterior Beam	(36)	16	1.15	0.20	1.15		0.26	2.76	2	5.52	1.560	8.611	
(V)	(37)	16	0.55	0.15	0.55		0.26	1.51	5	7.55	0.995	7.512	
2 nos	(38)	13	0.75		0.75	0.08	0.16	1.74	5	8.70	0.995	8.657	
											sum	24.780	
						sub total	:	24.780	x	2.000	=	49.560	

Total 1 pcs (31.60 Span)	=	1,692.427	Kg	
Total 6 pcs (31.60 Span)	=	6.00	x	1,692.43 Kg
	=	10,154.56	Kg	

mb-rf2

Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR F2 FW 20 + 45 M (PTP Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

$$S = -l^2/8.f \times [\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}] - [\{2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$$

(a)	=	$l^2/8.f$				
(b)	=	$2.f/l$				
(c)	=	$4.f/l$				
(d)	=	$(4.f/l)^2$				
(e)	=	$(4.f/l)^2 + 1$				
(f)	=	$@sqrt((4.f/l)^2 + 1)$	=	$@sqrt\ (e)$		
(g)	=	$-2.f/l.@sqrt((4.f/l)^2+1)$	=	$-(b) \times (f)$		
(h)	=	$-4f/l+@sqrt(4f/l)^2+1$	=	$(-c) + (f)$		
(i)	=	$1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$	=	$1/2 x ln\ (h)$		
S1	=	$[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$			=	$(g) + (i)$
(k)	=	$-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\}$	=	$(b) \times (f)$		
(l)	=	$[\{4.f/l)+@sqrt(4.f/l)^2+1)$	=	$(c) + (f)$		
(m)	=	$1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$	=	$1/2 x\ ln(l)$		
S2	=	$-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$			=	$(k) + (m)$

$$S = (-a) \times [(S1) - (S2)]$$

S is length of parabola curve

te-F2

1/2

Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR F2 FW 20 + 45 M (PTP Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 31.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
2	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
3	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
4	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
5	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
6	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
					total												201.742

f = Average

nos wire per tendon	=	7	nos				
sum of tendon length	=	7	x	201.742	=	1,412.20	m
Total per beam	=	0.8	x	1,412	=	1,129.76	kg
Grand Total (6 Beam)	=	6.00	x	1,129.76	=	6,778.54	kg

te-F2

2/2

Structure Concrete Class K-400 Cross Beam (L = 31.60 m)

	volume cross beam							
	width	depth	area	thick	nos	volume		
section	w	d	(m 2)	t				
	m	m		m		m3		
(1)	1.250	1.250	1.5625	0.200	1.00	0.3125		
	sum volume per pcs				=	0.3125		
	nose per row				=	5.0000	nos	
	volume per row				=	5.0000	x	0.3125
					=	1.5625	m3	
	nose per span				=	4.00	row	
					=	4.0000	x	1.5625
	Total volume per span				=	6.2500	m3	

Structure Concrete Class K-400 Panel (L = 31.60 m)

	volume Panel							
	width	depth	area	thick	nos	volume		
section	w	d	(m 2)	t				
	m	m		m		m3		
(1)	1.620	1.000	1.62	0.070	1.00	0.1134		
	sum volume per pcs				=	0.1134		
	nose per row				=	5.0000	nos	
	volume per row				=	5.0000	x	0.1134
					=	0.567	m3	
	nose per span				=	155.00	nos	
					=	155.0000	x	0.1134
	Total volume per span				=	17.5770	m3	

cb-cf2

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF CROSS BEAM & PANEL Br F2 FW 20 + 45 m (PTP Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of Cross beam (l = 31.60 m) 1 / 1

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
C.1	13	1,170.00	150	1,170.00	150	0	2.640	7.00	18.48	0.995	18.388	End & Center
C.2	13	1,200.00	0	0	0	0	1.200	10.00	12.00	0.995	11.940	
										sum	30.33	

Nos per row	=	5.00			
sub total per span	=	20.00	x	30.33	
	=	606.55	Kg		

Quantities steel of Panel

C.1	16	1,620	150	1,620	150	0	3.540	3.00	10.62	1.560	16.567	
C.1	13	1,620	0	0	0	0	1.620	3.00	4.86	0.995	4.836	155
C.2	13	950	0	0	0	0	0.950	6.00	5.70	0.995	5.672	nos
										sum	27.07	

Nos per row	=	5.00			
sub total per span	=	155.00	x	27.07	
	=	4,196.53	Kg		

cb–rf2

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br F2 FW 20 + 45 m (PTP IX Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steil inside pile (kg)

Diameter of pipe = dp	=	40	cm					
thick of pipe = t	=	1.031	cm					
Diameter of spiral = ds	=	1.30	cm					
covering of concrete = d'	=	5	cm					
dc	=	40 − 2 x (1.031 + 5)						
	=	27.938	cm					
(dc − ds)	=	27.938	−	5				
	=	22.938	cm					
Ag	=	0.25 x @pi x dp ^ 2						
	=	1,256.64	cm2					
Ac	=	0.25 x @pi x dc ^ 2						
	=	613.028	cm2					
f'c	=	225	kg/cm2					
fsy	=	4,000	kg/cm2					
Ag/Ac	=	2.050						
f'c/fsy	=	0.056						
ps	=	0.45 x (Ag/Ac − 1) x f'c/fsy						
ps	=	0.027						
Area of spiral = as	=	0.25*@pi x ds ^ 2						
	=	1.327	cm2					
spacing of spiral = s	=	as x @pi x (dc−ds) / ps x @pi x dc ^ 2/4						
s	=	1.327 x 3.142 x 22.938 / 0.027 x 3.142 x 195.133						
	=	95.649 / 16.291	cm					
	=	5.87	cm					
say	=	7.00	cm					
Length of spiral per picth	=	@sqrt((@pi x dc) ^ 2 + s ^ 2)						
	=	88.05	cm					
length of culumn	=	700	cm					
nos of pitch	=	100.00						
length of spiral	=	88.05	x	100.00				
	=	8,804.85	cm					
	=	88.05	m					
Radius of steel ring								
Outer diameter of pile	=	40.64	cm					
Thick of pile	=	1.031	cm					
Inner diameter of pile	=	40.64	−	2.062				
	=	38.578	cm					
Concrete covering	=	5	cm					
Diameter of steel bar	=	1.6	cm					
Diameter of ring	=	1.3	cm					
Inner diameter of pile	=	38.578						
Distance outside to ring	=	5	+	0.65	+	1.6	+	0.65
	=	7.90	cm					
Inner diameter of ring	=	38.578	−	7.90				
	=	30.678	cm					
Radius of ring steel	=	30.678	:	2				
	=	15.339	cm					
	=	0.153	m					

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br F2 FW 20 + 45 m (PTP IX Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steil inside pile (kg)

Length of each = 2 x @pi x r
= 2 x 3.14159 x 0.153 m
= 0.964 m

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	7.00		0.36	7.71	32.00	8	61.68	1.560	96.22
2.	R1	13									88.05	0.995	87.61
3.	Ring	13						0.964		6	5.78	0.995	5.75
												sum	189.58

Total weight = 32.00 x 189.582 = 6,066.65 kg

Grand total = 2.00 x 6,066.65 = 12,133.30 kg

inb-f2

DireCtorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br F2 (PTP IX Br) FW : 20 + 45 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	1.945	2.00	1.17
wall	1a	1.945	12.000	1.00	23.34
wall	1b	1.945	11.200	1.00	21.78
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	11.200	1.00	5.60
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	11.200	1.00	8.40
stem	4	0.200	0.500	2.00	0.20
	4a	0.500	12.000	1.00	6.00
stem	5	0.200	0.250	2.00	0.05
	5a	0.320	12.000	1.00	3.84
stem	6	1.000	5.855	2.00	11.71
stem	6a	4.805	12.000	1.00	57.66
stem	6b	11.200	4.555	1.00	51.02
footing	7	1.800	0.300	2.00	0.54
footing	8	2.300	0.300	2.00	1.38
footing	9	5.100	1.000	2.00	10.20
footing	10	1.000	12.000	2.00	24.00
wingwall	11	1.945	3.000	4.00	23.34
wingwall	11a	0.400	1.945	2.00	1.56
wingwall	12	3.300	1.055	4.00	13.10
wingwall	13	0.400	1.055	2.00	0.84
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	2.300	2.000	4.000	18.400
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	289.13

Total = 2.00 x 289.13

= 578.27 sq.m

abf2-fmk

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – F2 (PTP IX Br) FW : 20 + 45 (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.406	m	
area	=	0.129	m2	
H	=	8.800	m	
W	=	5.100	m	
L	=	12.00	m	

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	1.945	0.58	12.00	1.00	7.00
stem	2	0.55	0.500	0.28	11.20	1.00	3.08
stem	3	0.55	0.500	0.14	11.20	1.00	1.54
stem	4	0.20	0.500	0.10	12.00	1.00	1.20
stem	5	0.20	0.250	0.03	12.00	1.00	0.30
stem	6	1.00	5.855	5.86	12.00	1.00	70.26
stem	7	1.80	0.300	0.27	12.00	1.00	3.24
footing	8	2.30	0.300	0.35	12.00	1.00	4.14
footing	9	5.10	1.000	5.10	12.00	1.00	61.20
wingwall	10	3.00	1.945	5.84	0.40	2.00	4.67
wingwall	11	3.30	1.055	1.74	0.40	2.00	1.39
wingwall	12	2.30	4.500	10.35	0.40	2.00	8.28
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	1.945	2.00	0.18
App.Slab	16	3.00	0.200	0.30	11.200	1.00	3.36
	17	0.275	0.05	0.01	11.200	1.00	0.15
Inside blockout	lbo	0.30	0.250	0.08	1.10	5.00	0.413
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	32.00	x	0.10	(0.414)
						sum	170.67

concrete filling in piles

thick of pipe	=	0.01036	m					
inner diameter	=	0.406	–	0.021				
	=	0.385	m					
area	=	0.250	x	3.142	x	0.148		
	=	0.1165	m2					
depth	=	7.000		--->	0.333	x	21.000	m
nos	=	32.000						
volume	=	0.117	x	7.000	x	32.00		
	=	26.12	m3					
sub total	=	170.66	+	26.12				
	=	196.78	+	196.78	m3			
Total	=	393.56	m3					

Supply and Driving of SP Piles dia. 400 mmm

=	4.00	x	8.00	x	21.00	=	672.00 m
=	2.00	x	672.00			=	1,344.00 m

1 / 2

abf2–co

Direcktorate General of Water Resources Development Directorate of River Medan Flood Control Project	Lean Concrte and Rubble Stone Br F2 FW 20 + 45 m PTP Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Lean concrete (m3)

diameter of concrete pile = 0.406 m

area = 0.129 m2

Lean Concrete 0.10

5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	12.30	66.42	0.10	6.64

reducing volume by pile

area	=	0.25	x	3.141	x	0.165
	=	0.129	m2			
depth	=	0.10	m			
nos	=	32				
volume	=	0.129	x	0.10	x	32
	=	0.414	m3			
net volume	=	6.64	–	0.414		
	=	6.23	m3			
nos	=	2.00				
Total volume	=	2.00	x	6.23		
Grand Total	=	12.46	m3		(Abutment L & R)	

Rubble stone (m3)

diameter of concrete pile = 0.406 m

area = 0.129 m2

Rubble Stone 0.200

5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	12.30	66.42	0.20	13.28

reducing volume by pile

area	=	0.25	x	3.141	x	0.165
	=	0.129	m2			
depth	=	0.20	m			
nos	=	32				
volume	=	0.129	x	0.20	x	32
	=	0.829	m3			
net volume	=	13.28	–	0.829		
	=	12.46	m3			
nos	=	2.00				
Total volume	=	2.00	x	12.46		
Grand Total	=	24.91	m3		(Abutment L & R)	

lc-f2

Br F3 FW 28 + 22 m

(JL. STM Ujung Br)

NO	DESCRIPTION	UNIT	Quantity	Unit Price (Rp)	REMARKS
	BRIDGE				
	SUPERSTRUCTURE				
	CONCRETE				
	a. Deck Slab (Insitu)				
	Concrete (Type – B) Class K 350	Cu.m	75.76		
	Reinforcing Steel Deform	Kg	13,485.37		
	Wooden Form Work with Supporting Frame	Sq.m	124.00		
	b. Precast Prestressed Concrete Main Beam				
	Precast Prestressed Concrete Beam (Type – A) Class K 400	Cu.m	98.50		
	Reinforcing Steel Deform	Kg	10,154.56		
	Tendon [H.T.W] diameter 13 mm	Kg	6,778.54		
	Live end Anchorage	Nos	72.00		
	c. PC Panel Concrete				
	PC Panel Concrete, t = 7 cm (Type – A) Class K 400	Cu.m	17.58		
	Reinforcing Steel Deform	Kg	4,196.53		
	c. PC Diaphragm Concrete				
	PC Diaphragm Concrete (Type – A) Class K 400	Cu.m	6.25		
	Reinforcing Steel Deform	Kg	606.55		
	PRESTRESSING				
	Prestressing Tendon [H.T.W.] diameter 13 mm for Main Beam (incl. Diaphragm)	each	6.00		
	Grout Injection Main Beam (icl. Diaphragm)	m	1,152.00		
	ERECTING				
	Erection of Concrete Main Beam	Kg	246,250.00		
sup–F3	(Incl.PC Diaphragm , PC Panel)				

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. F3 FW 28 + 22 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 Length = 31.60 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	9.000	2.205	1.000	2.205	32.000	70.560
End slab	(2)	0.055	0.500	0.027	2.000	0.055	5.700	0.313
End slab	(3)	0.300	0.200	0.060	2.000	0.120	9.200	1.104
							sum	71.978

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.223	1.500	0.334	1.000	0.334	32.000	10.680
Right Side slab	(5)	0.223	1.500	0.334	1.000	0.334	32.000	10.680
							sum	21.360

Total Volume K.350 = 71.978 + 21.360
= 93.338 m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	34.000	0.544	0.550	0.299
Railing post	(7)	0.165	0.160	0.026	34.000	0.898	0.470	0.422
slab side Walk	(8)	0.250	1.266	0.317	2.000	0.633	32.000	20.260
Wall	(9)	0.470	0.100	0.047	2.000	0.094	29.280	2.752
							sum	23.733

Total Volume K.225 = 23.733 m3

Grand Total K.350 = 93.3375 m3

Grand Total K.225 = 23.73339 m3

slb –brF3

Directorate General Water Resources Development Directorate General Medan Flood Control Project	DECK SLAB AND HAND RAIL Br F3 FW 28 + 22 m (Jln. STM Ujung Br)	japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 32.00 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	9.20	2.76	2.00	5.52
end slab	(2)	0.20	9.20	1.84	2.00	3.68
	(3)	0.35	6.25	2.19	2.00	4.38
	(4)	0.47	1.50	0.71	4.00	2.84
in side walk (curb)	(5)	0.25	32.00	8.00	2.00	16.00
in side walk	(6)	0.47	31.75	14.92	2.00	29.85
out side walk	(7)	0.47	30.30	14.24	2.00	28.48
Railing post.	(8)	0.10	0.92	0.09	34.00	3.13
Railing post	(9)	0.16	0.45	0.07	68.00	4.90
Railing post	(10)	0.14	0.45	0.06	68.00	4.13
					sum	102.89
					numbers of span =	1.00
total	=	102.89	x	1.00	=	102.89

Scafolding (L = 32.00 m)

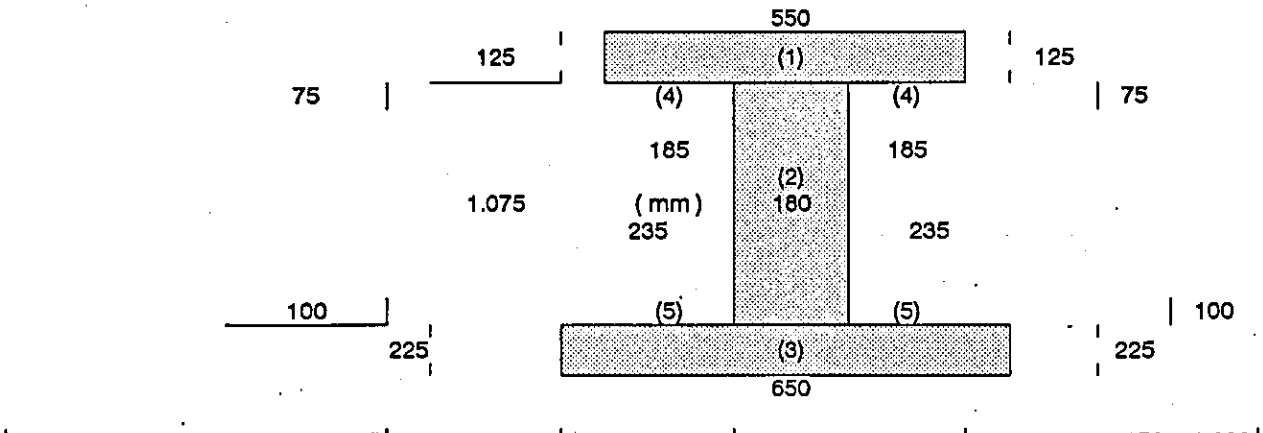
Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.50	32.00	48.00	2.00	96.00
end slab	(2)	0.45	32.00	14.400	2.00	28.80
					sum	124.80
					numbers of span =	1.00
total	=	124.80	x	1.00	=	124.80

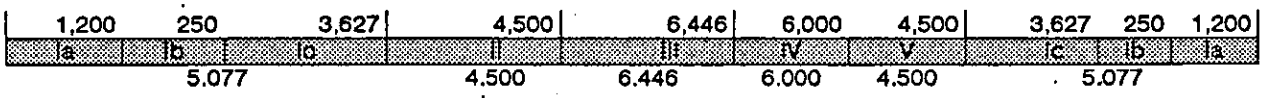
f3-fwdeck

Directorate General Water Resources Development Directorate of River Medan Flood Control Project	Main Beam Br F3 FW 28 + 22 m (Jl. STM Ujung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K-400,l = 31.60 m

Main Beam Section





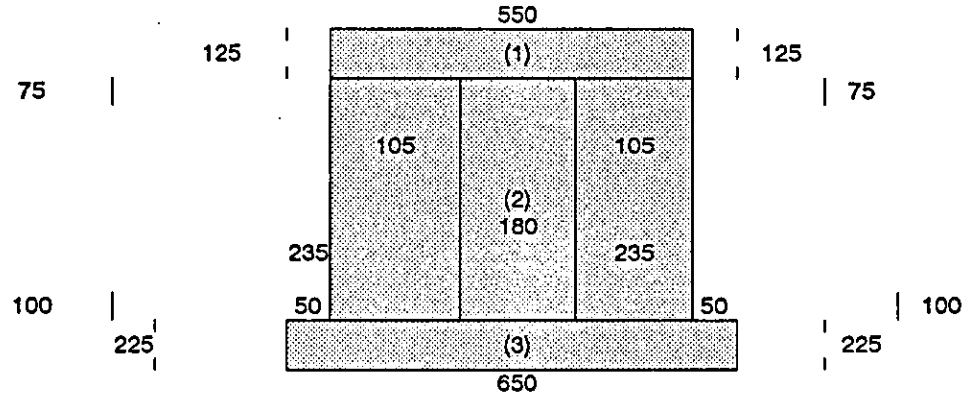
Total length = 31.60 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.180	1.250	1.000	0.225
(3)	0.650	0.225	1.000	0.146
(4)	0.185	0.075	2.000	0.014
(5)	0.235	0.100	2.000	0.024
			sum	
	area section main beam		=	0.4774

Volume 1 = area x length
= 0.477 x 31.60
= 15.09 m3

End Block Section L = 1.200 m



2. Bearing Block Area

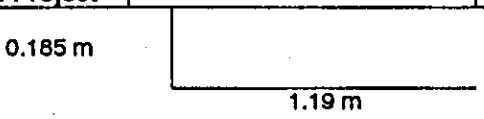
1075
1250

piece	width m	depth m	nos	total area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.550	1.250	1.000	0.688
(3)	0.650	0.225	1.000	0.146
		1.600	sum	0.903

1/2

beam-cf3

Directorate General Water Resources Development Directorate of River Medan Flood Control Project	Main Beam Br F3 FW 28 + 22 m (Jl. STM Ujung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.075 + 1.30) : 2
= 1.19 m
area = width x depth
= 0.185 x 1.19
= 0.220 m2

section	area	length	nos	volume
	m2	m		m3
Ia	0.9025	1.200	1.00	1.083
Ib	0.2197	0.250	1.00	0.055
Ic	0.4774	3.627	1.00	1.731
II	0.4774	4.500	1.00	2.148
III	0.4774	6.446	1.00	3.077
IV	0.4774	6.000	1.00	2.864
V	0.4774	4.500	1.00	2.148
Ic	0.4774	3.627	1.00	1.731
Ib	0.2197	0.250	1.00	0.055
Ia	0.9025	1.200	1.00	1.083
	sum	31.60		15.9765

Block out Cross beam

width		depth	area	length	nos	volume
top	bottom					
m	m	m	m2	m	m	m3
0.400	0.60	0.185	0.0925	1.1875	4	0.439

volume per beam = 15.9765 + 0.439 = 16.416 m3

Grand Total = 6.00 x 16.416 m3

= 98.50 m3

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	MAIN BEAM Br F3 FW 28 + 22 m (Jl. STM Ujung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	ø	Shape steel a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(1)	13	1.45		1.45	0.50		3.40	4	13.60	0.995	13.532	outer Beam
(l = 5.077 m)	(2)	16	0.45	0.70		0.70		1.85	7	12.95	1.560	20.202	and end Block
2 nos	(3)	13	1.32		1.32	0.55	0.40	3.59	4	14.36	0.995	14.288	
	(4)	13	1.80					1.80	2	3.60	0.995	3.582	
	(5)	13		0.30	0.55	0.30		1.15	3	3.45	0.995	3.433	
	(6)	16	1.45		1.45	1.50		4.40	2	8.80	1.560	13.728	
	(7)	13		0.46	0.55	0.46	0.30	1.77	7	12.39	0.995	12.328	
	(8)	16		1.75	0.55	1.75		4.05	7	28.35	1.560	44.226	
	(9)	13	4.98					4.98	6	29.86	0.995	29.713	
(I)	(10)	16		0.10	0.45	0.10	0.10	0.75	70	52.50	1.560	81.900	
	(11)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(12)	13		1.75	0.08	1.75		3.58	15	53.70	0.995	53.432	
	(13)	13	4.78					4.78	14	66.88	0.995	66.544	
	(14)	13		0.46	0.55	0.46	0.30	1.77	8	14.16	0.995	14.089	
	(15)	13	0.45	0.40		0.40	0.30	1.55	8	12.40	0.995	12.338	
	(16)	16	1.15	0.20	1.15	0.20	0.26	2.96	2	5.92	1.560	9.235	
	(17)	13		0.30		0.30		0.60	8	4.80	0.995	4.776	
											sum	410.449	
						sub total	:	410.449	x	2.000	=	820.898	

Section	Type	ø	Shape steel a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(18)	13		1.75	0.08	1.75		3.58	10	35.80	0.995	35.621	
(l = 4.500 m)	(19)	13	4.40					4.40	20	88.00	0.995	87.560	
2 nos	(20)	13	0.45	0.40		0.40	0.30	1.55	10	15.50	0.995	15.423	
	(21)	13		0.46	0.55	0.46	0.30	1.77	10	17.70	0.995	17.612	
(II)	(22)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(23)	13		0.30		0.30		0.60	10	6.00	0.995	5.970	
											sum	175.289	
						sub total	:	175.289	x	2.000	=	350.578	
Inner Beams	(24)	13		1.75	0.08	1.75		3.58	14	50.12	0.995	49.869	
(l = 6,466 m)	(25)	13	6.35					6.35	20	126.92	0.995	126.285	
1 nos	(26)	13	0.45	0.40		0.40	0.30	1.55	14	21.70	0.995	21.592	
(III)	(27)	13		0.46	0.55	0.46	0.30	1.77	14	24.78	0.995	24.656	
	(28)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(29)	16		0.30		0.30		0.60	14	8.40	0.995	8.358	
											sum	243.864	
						sub total	:	243.864	x	1.000	=	243.864	
	(30)	13		1.75	0.08	1.75		3.58	13	46.54	0.995	46.307	
Inner Beams	(31)	13	5.90					5.90	20	118.00	0.995	117.410	
(l = 6,000 m)	(32)	16	0.45	0.40		0.40	0.30	1.55	13	20.15	0.995	20.049	
1 nos	(33)	13		0.46	0.55	0.46	0.30	1.77	13	23.01	0.995	22.895	
(IV)	(34)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(35)	13		0.30		0.30		0.60	13	7.80	0.995	7.761	
											sum	227.527	
						sub total	:	227.527	x	1.000	=	227.527	
Exterior Beam	(36)	16	1.15	0.20	1.15		0.26	2.76	2	5.52	1.560	8.611	
(V)	(37)	16	0.55	0.15	0.55		0.26	1.51	5	7.55	0.995	7.512	
2 nos	(38)	13	0.75		0.75	0.08	0.16	1.74	5	8.70	0.995	8.657	
											sum	24.780	
						sub total	:	24.780	x	2.000	=	49.560	

Total 1 pcs (31.60 Span) = 1,692.427 Kg

Total 6 pcs (31.60 Span) = 6.00 x 1,692.43 Kg

= 10,154.56 Kg

mb-rf3

Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR F3 FW 28 + 22 M (Jl. STM Ujung Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

$$S = -l^2/8.f \times [\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}] - [\{2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$$

(a)	=	$l^2/8.f$			
(b)	=	$2.f/l$			
(c)	=	$4.f/l$			
(d)	=	$(4.f/l)^2$			
(e)	=	$(4.f/l)^2+1$			
(f)	=	$@sqrt((4.f/l)^2+1)$	=	@sqrt (e)	
(g)	=	$-2.f/l.@sqrt((4.f/l)^2+1)$	=	−(b) x (f)	
(h)	=	$-4f/l+@sqrt(4f/l)^2+1$	=	(−c) + (f)	
(i)	=	$1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$	=	1/2xln (h)	
S1	=	$[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$		=	(g) + (i)
(k)	=	$-[\{2.f/l.@sqrt((4.f/l)^2+1)\}$	=	(b) x (f)	
(l)	=	$[\{4.f/l)+@sqrt(4.f/l)^2+1)$	=	(c) + (f)	
(m)	=	$1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$	=	1/2 x ln(l)	
S2	=	$-[\{2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$		=	(k) + (m)

$$S = (-a) \times [(S1) - (S2)]$$

S is length of parabola curve

te−F3

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Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR F3 FW 28 + 22 M (Jl. STM Ujung Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 31.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
2	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
3	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
4	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
5	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
6	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
					total												201.742

f = Average

nos wire per tendon	=	7	nos				
sum of tendon length	=	7	x	201.742	=	1,412.20	m
Total per beam	=	0.8	x	1,412	=	1,129.76	kg
Grand Total (6 Beam)	=	6.00	x	1,129.76	=	6,778.54	kg

te-F3

2/2

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	CROSS BEAM & PANEL Br F3 FW 28 + 22 m (Jl. STM Ujung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K-400 Cross Beam (L = 31.60 m)

section	volume cross beam width w m	depth d m	area (m 2)	thick t m	nos	volume m3		
(1)	1.250	1.250	1.5625	0.200	1.00	0.3125		
	sum volume per pcs				=	0.3125		
	nose per row				=	5.0000	nos	
	volume per row				=	5.0000	x	0.3125
					=	1.5625	m3	
	nose per span				=	4.00	row	
					=	4.0000	x	1.5625
	Total volume per span				=	6.2500	m3	

Structure Concrete Class K-400 Panel (L = 31.60 m)

section	volume Panel width w m	depth d m	area (m 2)	thick t m	nos	volume m3		
(1)	1.620	1.000	1.62	0.070	1.00	0.1134		
	sum volume per pcs				=	0.1134		
	nose per row				=	5.0000	nos	
	volume per row				=	5.0000	x	0.1134
					=	0.567	m3	
	nose per span				=	155.00	nos	
					=	155.0000	x	0.1134
	Total volume per span				=	17.5770	m3	

cb-cf3

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF CROSS BEAM & PANEL Br F3 FW 28 + 22 m (Jl. STM Ujung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of Cross beam (l = 31.60 m) 1 / 1

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
C.1	13	1,170.00	150	1,170.00	150	0	2.640	7.00	18.48	0.995	18.388	End & Center
C.2	13	1,200.00	0	0	0	0	1.200	10.00	12.00	0.995	11.940	
										sum	30.33	

Nos per row	=	5.00		
sub total per span	=	20.00	x	30.33
	=	**606.55**	Kg	

Quantities steel of Panel

C.1	16	1,620	150	1,620	150	0	3.540	3.00	10.62	1.560	16.567	
C.1	13	1,620	0	0	0	0	1.620	3.00	4.86	0.995	4.836	155
C.2	13	950	0	0	0	0	0.950	6.00	5.70	0.995	5.672	nos
										sum	27.07	

Nos per row	=	5.00		
sub total per span	=	155.00	x	27.07
	=	**4,196.53**	Kg	

cb–rf3

DireCtorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br F3 (Jln. STM Ujung Br) FW : 28 + 22 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	1.945	2.00	1.17
wall	1a	1.945	12.000	1.00	23.34
wall	1b	1.945	11.200	1.00	21.78
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	11.200	1.00	5.60
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	11.200	1.00	8.40
stem	4	0.200	0.500	2.00	0.20
	4a	0.500	12.000	1.00	6.00
stem	5	0.200	0.250	2.00	0.05
	5a	0.320	12.000	1.00	3.84
stem	6	1.000	4.355	2.00	8.71
stem	6a	3.305	12.000	1.00	39.66
stem	6b	11.200	3.055	1.00	34.22
footing	7	1.800	0.300	2.00	0.54
footing	8	2.300	0.300	2.00	1.38
footing	9	5.100	1.000	2.00	10.20
footing	10	1.000	12.000	2.00	24.00
wingwall	11	1.945	3.000	4.00	23.34
wingwall	11a	0.400	1.945	2.00	1.56
wingwall	12	3.300	1.055	4.00	13.10
wingwall	13	0.400	1.055	2.00	0.84
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	2.300	2.000	4.000	18.400
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	251.33

Total = 2.00 x 251.33

= 502.67 sq.m

abf3-fmk

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – F3 (Jln. STM Ujung Br) FW : 28 + 22 (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.400	m	
area	=	0.126	m2	
H	=	7.300	m	
W	=	5.100	m	
L	=	12.00	m	

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	1.945	0.58	12.00	1.00	7.00
stem	2	0.55	0.500	0.28	11.20	1.00	3.08
stem	3	0.55	0.500	0.14	11.20	1.00	1.54
stem	4	0.20	0.500	0.10	12.00	1.00	1.20
stem	5	0.20	0.250	0.03	12.00	1.00	0.30
stem	6	1.00	4.355	4.36	12.00	1.00	52.26
stem	7	1.80	0.300	0.27	12.00	1.00	3.24
footing	8	2.30	0.300	0.35	12.00	1.00	4.14
footing	9	5.10	1.000	5.10	12.00	1.00	61.20
wingwall	10	3.00	1.945	5.84	0.40	2.00	4.67
wingwall	11	3.30	1.055	1.74	0.40	2.00	1.39
wingwall	12	2.30	3.000	6.90	0.40	2.00	5.52
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	1.945	2.00	0.18
App.Slab	16	3.00	0.200	0.30	11.200	1.00	3.36
	17	0.275	0.05	0.01	11.200	1.00	0.15
inside blockout	lbo	0.30	0.250	0.08	1.10	5.00	0.413
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.126	x	32.00	x	0.10	(0.402)
						sum	149.92

concrete filling in piles

thick of pipe	=	0.07500	m				
inner diameter	=	0.400	–	0.150			
	=	0.250	m				
area	=	0.250	x	3.142	x	0.063	
	=	0.0490	m2				
depth	=	2.000		--->	0.333	x	9.000 m
nos	=	32.000					
volume	=	0.049	x	2.000	x	32.00	
	=	3.14	m3				
sub total	=	149.91	+	3.14			
	=	153.05	+	153.05	m3		
Total	=	306.11	m3				

Supply and Driving of PC Piles dia. 400 mm

=	4.00	x	8.00	x	9.00	=	288.00	m
=	2.00	x	288.00			=	576.00	m

1 / 2

abf3–co

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br F3 FW 28 + 22 m (Jln. STM Ujung Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.25	2.30			2.55	32.00	8	20.40	1.560	31.824
2.	R1	13		0.55				0.55		12	6.60	0.995	6.567
3.	Ring	13											
												sum	38.39

Total weight	=	32.00	x	38.391	=	1,228.51	kg	
Grand total	=	2.00	x	1,228.51	=	2,457.02	kg	

inb-f3

Direcktorate General of Water Resources Development Directorate of River Medan Flood Control Project	Lean Concrte and Rubble Stone Br F3 FW 28 + 22 m Jln. STM Ujung Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Lean concrete (m3)

diameter of concrete pile = 0.406 m

area = 0.129 m2

Lean Concrete 0.10

5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	12.30	66.42	0.10	6.64

reducing volume by pile

area	=	0.25	x	3.141	x	0.165
	=	0.129	m2			
depth	=	0.10	m			
nos	=	32				
volume	=	0.129	x	0.10	x	32
	=	0.414	m3			
net volume	=	6.64	–	0.414		
	=	6.23	m3			
nos	=	2.00				
Total volume	=	2.00	x	6.23		
Grand Total	=	**12.46**	m3		(Abutment L & R)	

Rubble stone (m3)

diameter of concrete pile = 0.406 m

area = 0.129 m2

Rubble Stone 0.200

5.4 m

width	length	area	depth	volume
m	m	m2	m	m3
5.40	12.30	66.42	0.20	13.28

reducing volume by pile

area	=	0.25	x	3.141	x	0.165
	=	0.129	m2			
depth	=	0.20	m			
nos	=	32				
volume	=	0.129	x	0.20	x	32
	=	0.829	m3			
net volume	=	13.28	–	0.829		
	=	12.46	m3			
nos	=	2.00				
Total volume	=	2.00	x	12.46		
Grand Total	=	**24.91**	m3		(Abutment L & R)	

lc-f3

Br F4 FW 32 + 00 m

(RAILWAY Br)

NO	DESCRIPTION	UNIT	Quantity	Unit Price (Rp)	REMARKS
	BRIDGE				
	SUPERSTRUCTURE				
	CONCRETE				
	a. Deck Slab (Insitu)				
	Concrete (Type – B) Class K 350	Cu.m	48.00	✓	
	Reinforcing Steel Deform	Kg	8,544.00	✓	
	Wooden Form Work with Supporting Frame	Sq.m	57.60	✓	
	b. Precast Prestressed Concrete Main Beam				
	Precast Prestressed Concrete Beam (Type – A) Class K 400	Cu.m	49.25	✓	
	Reinforcing Steel Deform	Kg	5,077.28	✓	
	Tendon [H.T.W] diameter 13 mm	Kg	~~3,980.27~~	✓ 3,873.45	
	Live end Anchorage	Nos	36.00	✓	
	c. PC Panel Concrete				
	PC Panel Concrete, t = 7 cm (Type – A) Class K 400	Cu.m	5.86	✓	
	Reinforcing Steel Deform	Kg	1,177.67	✓	
	c. PC Diaphragm Concrete				
	PC Diaphragm Concrete (Type – A) Class K 400	Cu.m	1.90	✓	
	Reinforcing Steel Deform	Kg	220.17	✓	
	PRESTRESSING				
	Prestressing Tendon [H.T.W.] diameter 13 mm for Main Beam (incl. Diaphragm)	each	3.00	✓	
	Grout Injection Main Beam (icl. Diaphragm)	m	576.00	✓	
	ERECTING				
	Erection of Concrete Main Beam	Kg	123,125.00	✓	
sup–F4	(Incl.PC Diaphragm , PC Panel)				

Directorate General of Watrer Resources Development Directorate of River Medan Flood Control Project	SUPERSTRUCTURE Br. F4 FW 32 + 00 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 Length = 31.60 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.300	3.600	1.080	1.000	1.080	32.000	34.560
Wall	(2)	0.600	0.350	0.210	1.000	0.210	32.000	6.720
End slab	(3)	0.600	0.350	0.210	1.000	0.210	32.000	6.720
							sum	48.000

Total Volume K.350 = 48.000 m3

slb –cf4

Directorate General Water Resources Development Directorate General Medan Flood Control Project	DECK SLAB Br F4 FW 30 + 80 m (G.Keluarga / Rail Way Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 32.00 m)

Section	Part	width m	length m	area m2	nos	total area m2
Wall (L / S & R / S)	(1)	0.35	0.60	0.21	4.00	0.84
in side walk (curb)	(2)	0.30	3.60	1.08	2.00	2.16
	(3)	0.60	32.00	19.20	2.00	38.40
					sum	41.40
				numbers of span =		1.00
total	=	41.40	x	1.00	=	41.40

Scafolding (L = 32.00 m)

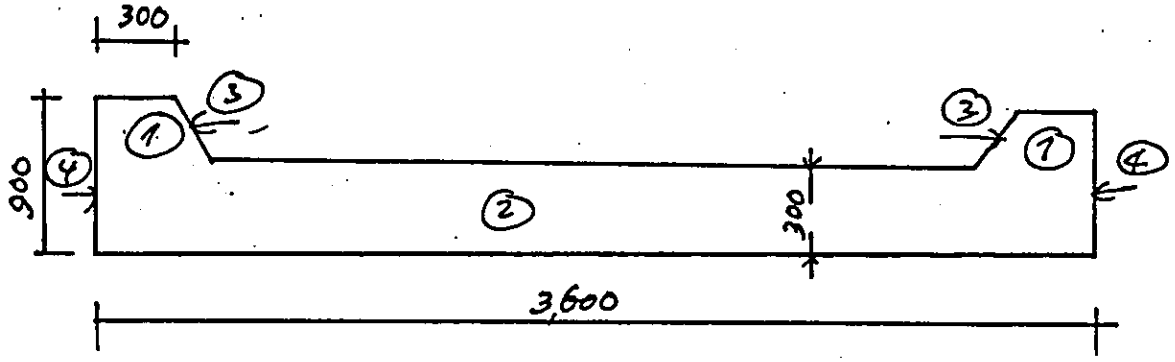
Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(4)	0.90	32.00	28.80	2.00	57.60
					sum	57.60
				numbers of span =		1.00
total	=	57.60	x	1.00	=	57.60

f4-fwdeck

BR. F.4 FW 30 + 80

(Railway Br.)

Sheet.



Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	PANEL SLAB BrF4 FW 32 + 00 m (Rail Way Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K−400 (L = 31.60 m)

	volume panel slab								
section	width w	depth d	area (m 2)	thick t	nos	volume			
	m	m		m		m3			
(1)	1.000	1.350	1.35	0.070	1.00	0.0945			
	sum volume per pcs				=	0.0945			
	nose per row				=	2.0000	row	x	0.0945
					=	0.189	m3		
	nos of per span				=	2.00		x	31
					=	62	nos		
	Total volume per span				=	5.8590	m3		

pl−cf4

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	C R O S S B E A M BrF4 FW 32 + 00 m (Rai Way Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structure Concrete Class K−400 (L = 31.60 m)

	volume cross beam							
	width	depth	area	thick	nos	volume		
section	w	d	(m 2)	t				
	m	m		m		m3		
(1)	0.950	1.250	1.1875	0.200	1.00	0.2375		
	sum volume per pcs				=	0.2375		
	nose per row				=	2.0000	nos	
	volume per row				=	2.0000	x	0.2375
					=	0.475	m3	
	nose per span				=	4.00	row	
					=	4.0000	x	0.475
	Total volume per span				=	1.9000	m3	
	Total volume per span				=	**1**	**x**	**1.9**
					=	**1.90**	**m3**	

cb−cf4

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF CROSS BEAM & PANEL Br F4 FW 32 + 00 m (Rail Way Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of Cross beam (l = 31.60 m) 1 / 1

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
C.1	13	1,190	150	1,190	150	0	2.680	7.00	18.76	0.995	18.666	End & Center
C.2	13	890	0	0	0	0	0.890	10.00	8.90	0.995	8.856	
										sum	27.52	

Nos per row	=	2.00		
sub total per span	=	8.00	x	27.52
	=	**220.17**	Kg	

Quantities steel of Panel

C.1	16	1,300	150	1,300	150	0	2.900	3.00	8.70	1.560	13.572	End
C.1	13	1,300	0	0	0	0	1.300	2.00	2.60	0.995	2.587	
C.2	13	950	0	0	0	0	0.950	3.00	2.85	0.995	2.836	
										sum	18.99	

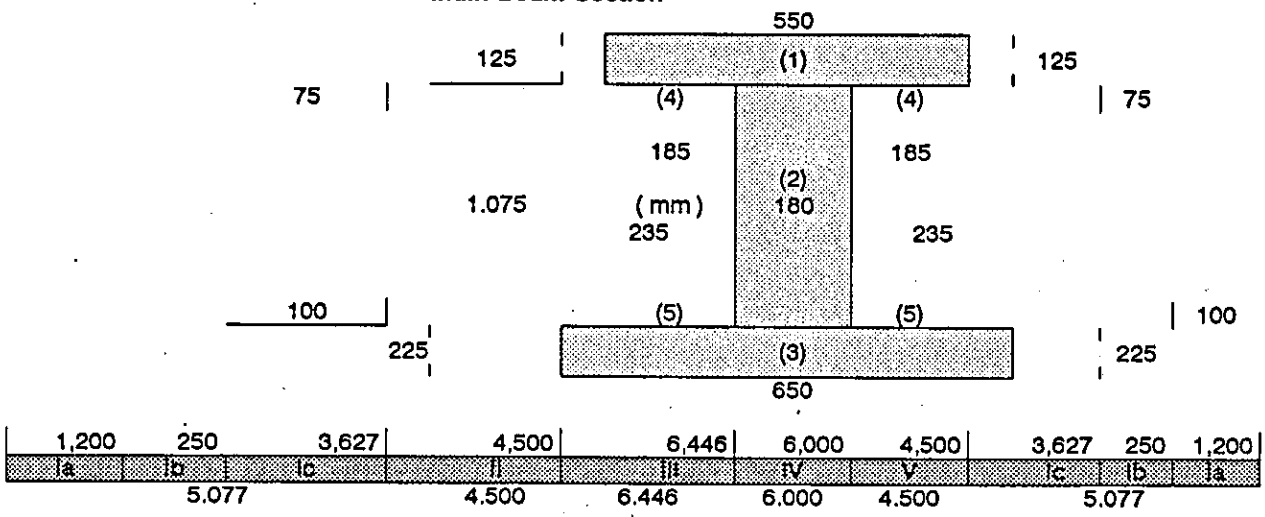
Nos per row	=	2.00		
sub total per span	=	62.00	x	18.99
	=	**1,177.67**	Kg	

cb-rf4

Directorate General Water Resources Development Directorate of River Medan Flood Control	Main Beam Br F4 FW 32 + 00] m (Rail Way Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K-400,l = 31.60 m

Main Beam Section



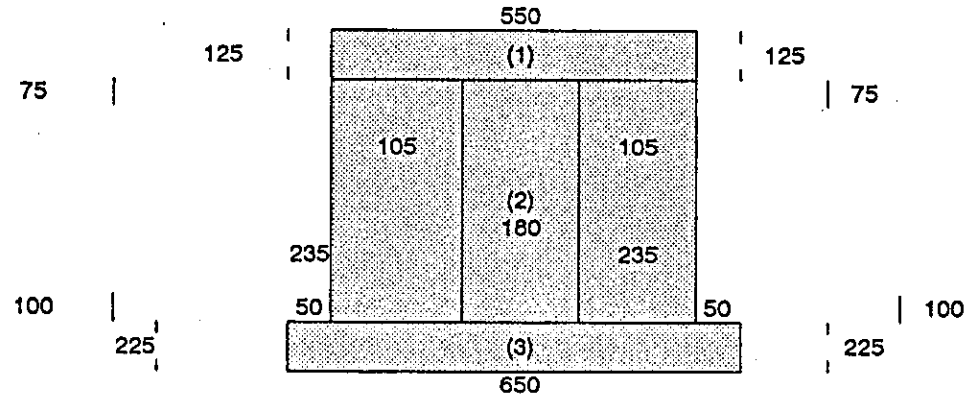
Total length = 31.60 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.180	1.250	1.000	0.225
(3)	0.650	0.225	1.000	0.146
(4)	0.185	0.075	2.000	0.014
(5)	0.235	0.100	2.000	0.024
			sum	
area section main beam			=	0.4774

Volume 1 = area x length
= 0.477 x 31.60
= 15.09 m3

End Block Section L = 1.200 m



2. Bearing Block Area

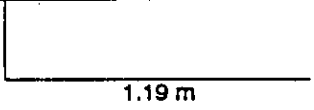
1075
1250

piece	width m	depth m	nos	total area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.550	1.250	1.000	0.688
(3)	0.650	0.225	1.000	0.146
		1.600	sum	0.903

1/2

beam-cf4

Directorate General Water Resources Development Directorate of River Medan Flood Control	Main Beam Br F4 FW 32 + 00] m (Rail Way Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.075 + 1.30) : 2
= 1.19 m

area = width x depth
= 0.185 x 1.19
= 0.220 m2

section	area	length	nos	volume
	m2	m		m3
Ia	0.9025	1.200	1.00	1.083
Ib	0.2197	0.250	1.00	0.055
Ic	0.4774	3.627	1.00	1.731
II	0.4774	4.500	1.00	2.148
III	0.4774	6.446	1.00	3.077
IV	0.4774	6.000	1.00	2.864
V	0.4774	4.500	1.00	2.148
Ic	0.4774	3.627	1.00	1.731
Ib	0.2197	0.250	1.00	0.055
Ia	0.9025	1.200	1.00	1.083
	sum	31.60		15.9765

Block out Cross beam

width		depth	area	length	nos	volume
top	bottom					
m	m	m	m2	m	m	m3
0.400	0.60	0.185	0.0925	1.1875	4	0.439

volume per beam = 15.9765 + 0.439 = 16.416 m3

Grand Total = 3.00 x 16.416 m3

= **49.25** m3

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	**MAIN BEAM** **Br F4 FW 32 + 00 m** **(Railway Br)**	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(1)	13	1.45		1.45	0.50		3.40	4	13.60	0.995	13.532	outer Beam
(l = 5.077 m)	(2)	16	0.45	0.70		0.70		1.85	7	12.95	1.560	20.202	and end Block
2 nos	(3)	13	1.32		1.32	0.55	0.40	3.59	4	14.36	0.995	14.288	
	(4)	13	1.80					1.80	2	3.60	0.995	3.582	
	(5)	13		0.30	0.55	0.30		1.15	3	3.45	0.995	3.433	
	(6)	16	1.45		1.45	1.50		4.40	2	8.80	1.560	13.728	
	(7)	13		0.46	0.55	0.46	0.30	1.77	7	12.39	0.995	12.328	
	(8)	16		1.75	0.55	1.75		4.05	7	28.35	1.560	44.226	
	(9)	13	4.98					4.98	6	29.86	0.995	29.713	
(I)	(10)	16		0.10	0.45	0.10	0.10	0.75	70	52.50	1.560	81.900	
	(11)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(12)	13		1.75	0.08	1.75		3.58	15	53.70	0.995	53.432	
	(13)	13	4.78					4.78	14	66.88	0.995	66.544	
	(14)	13		0.46	0.55	0.46	0.30	1.77	8	14.16	0.995	14.089	
	(15)	13	0.45	0.40		0.40	0.30	1.55	8	12.40	0.995	12.338	
	(16)	16	1.15	0.20	1.15	0.20	0.26	2.96	2	5.92	1.560	9.235	
	(17)	13		0.30		0.30		0.60	8	4.80	0.995	4.776	
											sum	410.449	
						sub total	:	410.449	x	2.000	=	820.898	

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(18)	13		1.75	0.08	1.75		3.58	10	35.80	0.995	35.621	
(l = 4.500 m)	(19)	13	4.40					4.40	20	88.00	0.995	87.560	
2 nos	(20)	13	0.45	0.40		0.40	0.30	1.55	10	15.50	0.995	15.423	
	(21)	13		0.46	0.55	0.46	0.30	1.77	10	17.70	0.995	17.612	
(II)	(22)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(23)	13		0.30		0.30		0.60	10	6.00	0.995	5.970	
											sum	175.289	
						sub total	:	175.289	x	2.000	=	350.578	
Inner Beams	(24)	13		1.75	0.08	1.75		3.58	14	50.12	0.995	49.869	
(l = 6,466 m)	(25)	13	6.35					6.35	20	126.92	0.995	126.285	
1 nos	(26)	13	0.45	0.40		0.40	0.30	1.55	14	21.70	0.995	21.592	
(III)	(27)	13		0.46	0.55	0.46	0.30	1.77	14	24.78	0.995	24.656	
	(28)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(29)	16		0.30		0.30		0.60	14	8.40	0.995	8.358	
											sum	243.864	
						sub total	:	243.864	x	1.000	=	243.864	
	(30)	13		1.75	0.08	1.75		3.58	13	46.54	0.995	46.307	
Inner Beams	(31)	13	5.90					5.90	20	118.00	0.995	117.410	
(l = 6,000 m)	(32)	16	0.45	0.40		0.40	0.30	1.55	13	20.15	0.995	20.049	
1 nos	(33)	13		0.46	0.55	0.46	0.30	1.77	13	23.01	0.995	22.895	
(IV)	(34)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(35)	13		0.30		0.30		0.60	13	7.80	0.995	7.761	
											sum	227.527	
						sub total	:	227.527	x	1.000	=	227.527	
Exterior Beam	(36)	16	1.15	0.20	1.15		0.26	2.76	2	5.52	1.560	8.611	
(V)	(37)	16	0.55	0.15	0.55		0.26	1.51	5	7.55	0.995	7.512	
2 nos	(38)	13	0.75		0.75	0.08	0.16	1.74	5	8.70	0.995	8.657	
											sum	24.780	
						sub total	:	24.780	x	2.000	=	49.560	

Total 1 pcs (31.60 Span) = 1,692.427 Kg

Total 3 pcs (31.60 Span) = 3.00 x 1,692.43 Kg

= 5,077.28 Kg

mb−rf4

Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR F4 FW 32 + 00 M (Rail Way Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

S = $-1^2/8.f \times [\{-2.f/1.@sqrt((4.f/l)^2+1)\} +1/2 \ln[\{-4f/l+@sqrt(4f/l)^2+1\}] -[\{2.f/1.@sqrt((4.f/l)^2 + 1)\} +1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$

(a) = $1^2/8.f$
(b) = $2.f/l$
(c) = $4.f/l$
(d) = $(4.f/l)^2$
(e) = $(4.f/l)^2 + 1$

(f) = $@sqrt((4.f/l)^2 + 1)$ = @sqrt (e)
(g) = $-2.f/l.@sqrt((4.f/l)^2+1)$ = −(b) x (f)
(h) = $-4f/l+@sqrt(4f/l)^2+1$ = (−c) + (f)
(i) = $1/2 \ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = 1/2xln (h)
S1 = $[\{-2.f/l.@sqrt((4.f/l)^2+1)\} +1/2 \ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = (g) + (i)

(k) = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\}$ = (b) x (f)
(l) = $[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = (c) + (f)
(m) = $1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = 1/2 x ln(l)
S2 = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\} +1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = (k) + (m)

S = (−a) x [(S1) − (S2)]

S is length of parabola curve

te−F4

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Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR F4 FW 32 + 00 M (Rail Way Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 31.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
2	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
3	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
4	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
5	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
6	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
					total												201.742

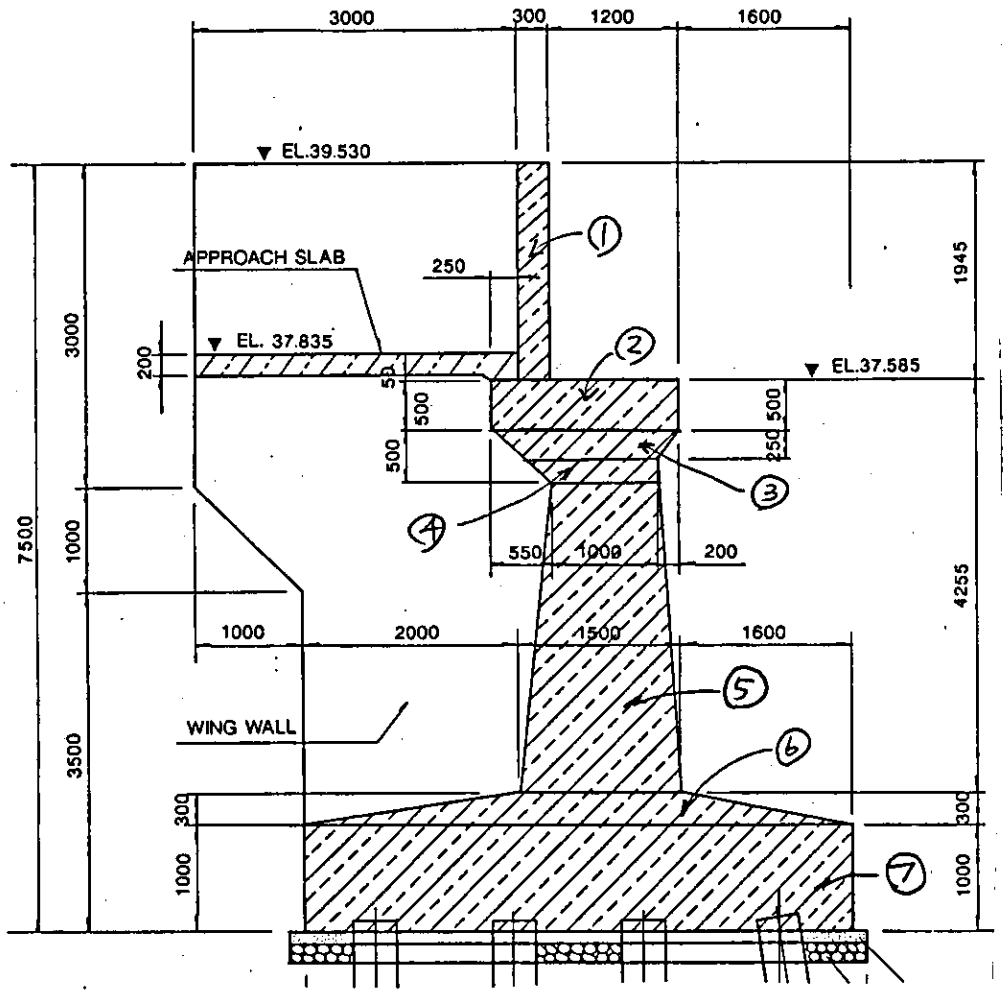
f = Average

nos wire per tendon	=	8 ~~8~~	nos			1,613.94	
sum of tendon length	=	8 ~~8~~	x	201.742	=	~~1,412.20~~	m
Total per beam	=	0.8	x	1,613.94 ~~1,412~~	=	1,291.15 ~~1,129.76~~	kg
Grand Total (3 Beam)	=	3.00	x	~~1,129.76~~ 1,291.15	=	~~3,389.27~~ 3,873.45	kg

ERR

2/2

Concrete for Abutment



Concrete Type C1

① $0.3 \times 1.945 = 0.5835$ m^2

② $(1.2 + 0.55) \times 0.5 = 0.875$ "

③ $(1.75 + 1.3) \times 0.25 \times 1/2 = 0.38125$ "

④ $(1.3 + 1.014) \times 0.25 \times 1/2 = 0.30$ "

⑤ $(1.014 + 1.5) \times 3.505 \times 1/2 = 4.4058$ "

⑥ $(1.5 + 5.1) \times 0.3 \times 1/2 = 0.99$ "

⑦ $1.0 \times 5.1 = 5.1$ "

$\Sigma A = 12.636\ m^2$

$V = 12.636 \times 7.5 = 94.77\ m^3$

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – F4 (Railway Br) FW : 30 + 80 (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.406	m	
area	=	0.129	m2	
H	=	7.500	m	
W	=	3.600	m	
L	=	7.50	m	

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	2.200	0.66	7.50	1.00	4.95
stem	2	0.55	0.500	0.28	6.70	1.00	1.84
stem	3	0.55	0.500	0.14	6.70	1.00	0.92
stem	4	0.20	0.500	0.10	7.50	1.00	0.75
stem	5	0.20	0.250	0.03	7.50	1.00	0.19
stem	6	1.00	4.300	4.30	7.50	1.00	32.25
stem	7	1.20	0.300	0.18	7.50	1.00	1.35
footing	8	1.60	0.300	0.24	7.50	1.00	1.80
footing	9	3.60	1.000	3.60	7.50	1.00	27.00
wingwall	10	3.00	2.200	6.60	0.40	2.00	5.28
wingwall	11	3.30	0.800	1.32	0.40	2.00	1.06
wingwall	12	1.60	3.200	5.12	0.40	2.00	4.10
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	1.60	0.300	0.24	0.40	2.00	0.19
wingwall Vet.	15	0.30	0.30	0.05	2.200	2.00	0.20
App.Slab	16	3.00	0.200	0.30	6.700	1.00	2.01
	17	0.275	0.05	0.01	6.700	1.00	0.09
inside blockout	lbo	0.30	0.250	0.08	0.85	2.00	0.128
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	24.00	x	0.10	(0.311)
						sum	84.19

concrete filling in piles

thick of pipe	=	0.01036	m					
inner diameter	=	0.406	–	0.021				
	=	0.385	m					
area	=	0.250	x	3.142	x	0.148		
	=	0.1165	m2					
depth	=	6.000		--->	0.333	x	18.000	m
nos	=	24.000						
volume	=	0.117	x	6.000	x	24.00		
	=	16.79	m3					
sub total	=	84.192	+	16.79				
	=	100.98	+	100.98	m3			
Total	=	201.96	m3					

Supply and Driving of SP Piles dia. 400 mm

=	4.00	x	6.00	x	18.00	=	432.00	m
=	2.00	x	432.00			=	864.00	m

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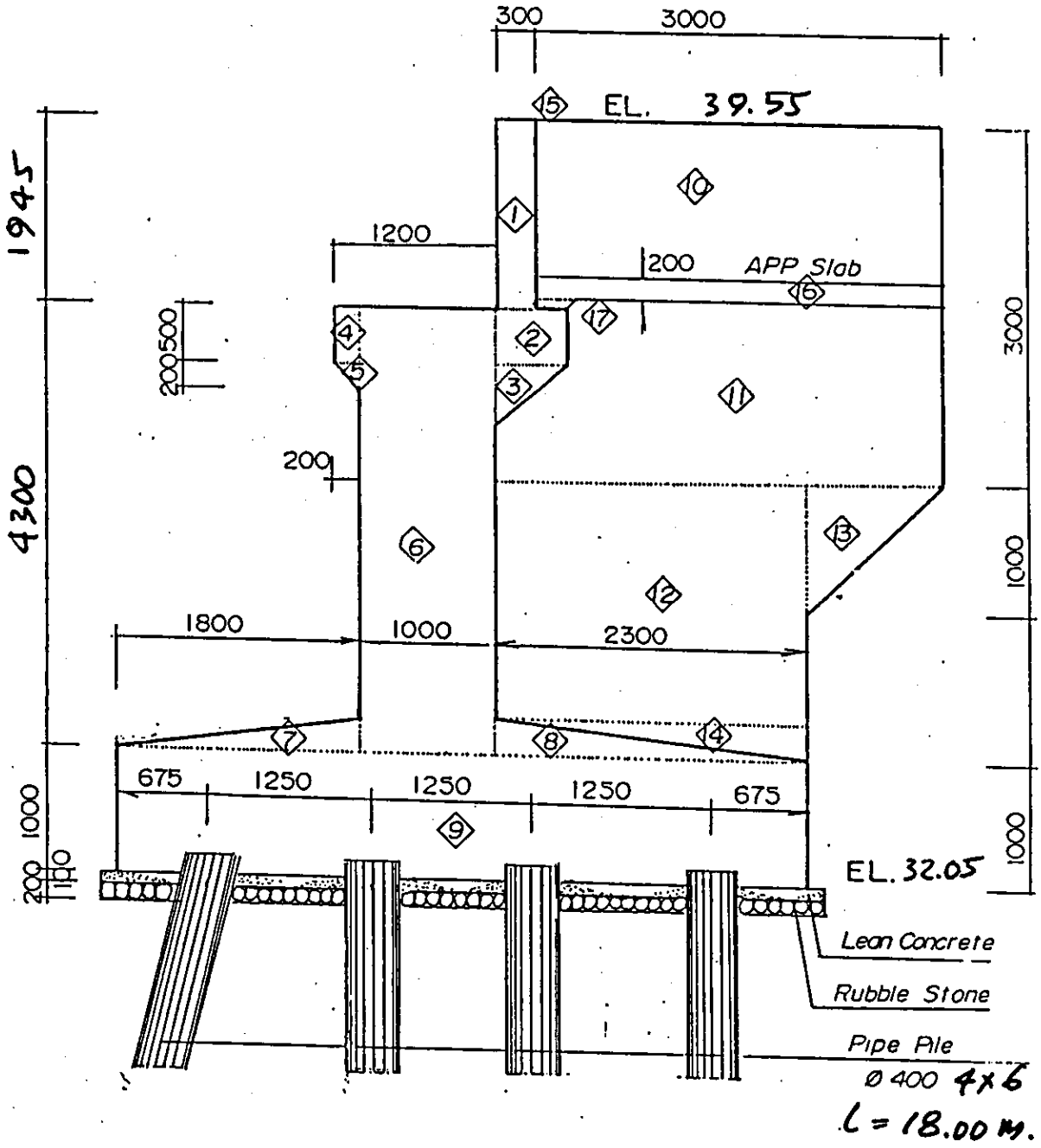
abf4–co

2-79



ABUTMENT

For F4. FW 30+80

(RAILWAY Br.)

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br F4 (Railway Br) FW : 30 + 80 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	2.200	2.00	1.32
wall	1a	2.200	7.500	1.00	16.50
wall	1b	2.200	6.700	1.00	14.74
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	6.700	1.00	3.35
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	6.700	1.00	5.03
stem	4	0.200	0.500	2.00	0.20
	4a	0.500	7.500	1.00	3.75
stem	5	0.200	0.250	2.00	0.05
	5a	0.320	7.500	1.00	2.40
stem	6	1.000	4.300	2.00	8.60
stem	6a	3.250	7.500	1.00	24.38
stem	6b	6.700	3.000	1.00	20.10
footing	7	1.200	0.300	2.00	0.36
footing	8	1.600	0.300	2.00	0.96
footing	9	3.600	1.000	2.00	7.20
footing	10	1.000	7.500	2.00	15.00
wingwall	11	2.200	3.000	4.00	26.40
wingwall	11a	0.400	2.200	2.00	1.76
wingwall	12	3.300	0.800	4.00	9.73
wingwall	13	0.400	0.800	2.00	0.64
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	1.600	2.000	4.000	12.800
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	1.600	4.000	0.96
			sum	=	179.85

Total = 2.00 x 179.85

= 359.70 sq.m

abf4-fmk

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br F4 FW 32 + 00 m (Railway Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

Diameter of pipe = dp	=	40	cm					
thick of pipe = t	=	1.031	cm					
Diameter of spiral = ds	=	1.30	cm					
covering of concrete = d'	=	5	cm					
dc	=	40 − 2 x (1.031 + 5)						
	=	27.938	cm					
(dc − ds)	=	27.938	−	5				
	=	22.938	cm					
Ag	=	0.25 x @pi x dp ^ 2						
	=	1,256.64	cm2					
Ac	=	0.25 x @pi x dc ^ 2						
	=	613.028	cm2					
f'c	=	225	kg/cm2					
fsy	=	4,000	kg/cm2					
Ag/Ac	=	2.050						
f'c/fsy	=	0.056						
ps	=	0.45 x (Ag/Ac − 1) x f'c/fsy						
ps	=	0.027						
Area of spiral = as	=	0.25*@pi x ds ^ 2						
	=	1.327	cm2					
spacing of spiral = s	=	as x @pi x (dc−ds) / ps x @pi x dc ^ 2/4						
s	=	1.327 x 3.142 x 22.938 / 0.027 x 3.142 x 195.133						
	=	95.649 / 16.291	cm					
	=	5.87	cm					
say	=	7.00	cm					
Length of spiral per picth	=	@sqrt((@pi x dc) ^ 2 + s ^ 2)						
	=	88.05	cm					
length of culumn	=	600	cm					
nos of pitch	=	85.71						
length of spiral	=	88.05	x	85.71				
	=	7,547.02	cm					
	=	75.47	m					
Radius of steel ring								
Outer diameter of pile	=	40.64	cm					
Thick of pile	=	1.031	cm					
Inner diameter of pile	=	40.64	−	2.062				
	=	38.578	cm					
Concrete covering	=	5	cm					
Diameter of steel bar	=	1.6	cm					
Diameter of ring	=	1.3	cm					
Inner diameter of pile	=	38.578						
Distance outside to ring	=	5	+	0.65	+	1.6	+	0.65
	=	7.90	cm					
Inner diameter of ring	=	38.578	−	7.90				
	=	30.678	cm					
Radius of ring steel	=	30.678	:	2				
	=	15.339	cm					
	=	0.153	m					

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inb−f4

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Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br F4 FW 32 + 00 m (Railway Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

Length of each = 2 x @pi x r
= 2 x 3.14159 x 0.153 m
= 0.964 m

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	6.00		0.36	6.71	24.00	8	53.68	1.560	83.74
2.	R1	13									75.47	0.995	75.09
3.	Ring	13						0.964		5	4.82	0.995	4.79
												sum	163.63

Total weight = 24.00 x 163.628 = 3,927.08 kg

Grand total = 2.00 x 3,927.08 = 7,854.16 kg

lnb-f4

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Direcktorate General of Water Resources Development Directorate of River Medan Flood Control Project	Lean Concrte and Rubble Stone Br F4 FW 32 + 00 m Rail Way Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Lean concrete (m3)

diameter of concrete pile = 0.406 m

area = 0.129 m2

Lean Concrete 0.10

3.9 m

width	length	area	depth	volume
m	m	m2	m	m3
3.90	7.80	30.42	0.10	3.04

reducing volume by pile

area	=	0.25	x	3.141	x	0.165
	=	0.129	m2			
depth	=	0.10	m			
nos	=	24				
volume	=	0.129	x	0.10	x	24
	=	0.311	m3			
net volume	=	3.04	–	0.311		
	=	2.73	m3			
nos	=	2.00				
Total volume	=	2.00	x	2.73		
Grand Total	=	5.46	m3		(Abutment L & R)	

Rubble stone (m3)

diameter of concrete pile = 0.406 m

area = 0.129 m2

Rubble Stone 0.200

3.9 m

width	length	area	depth	volume
m	m	m2	m	m3
3.90	7.80	30.42	0.20	6.08

reducing volume by pile

area	=	0.25	x	3.141	x	0.165
	=	0.129	m2			
depth	=	0.20	m			
nos	=	24				
volume	=	0.129	x	0.20	x	24
	=	0.621	m3			
net volume	=	6.08	–	0.621		
	=	5.46	m3			
nos	=	2.00				
Total volume	=	2.00	x	5.46		
Grand Total	=	10.93	m3		(Abutment L & R)	

lc-f4

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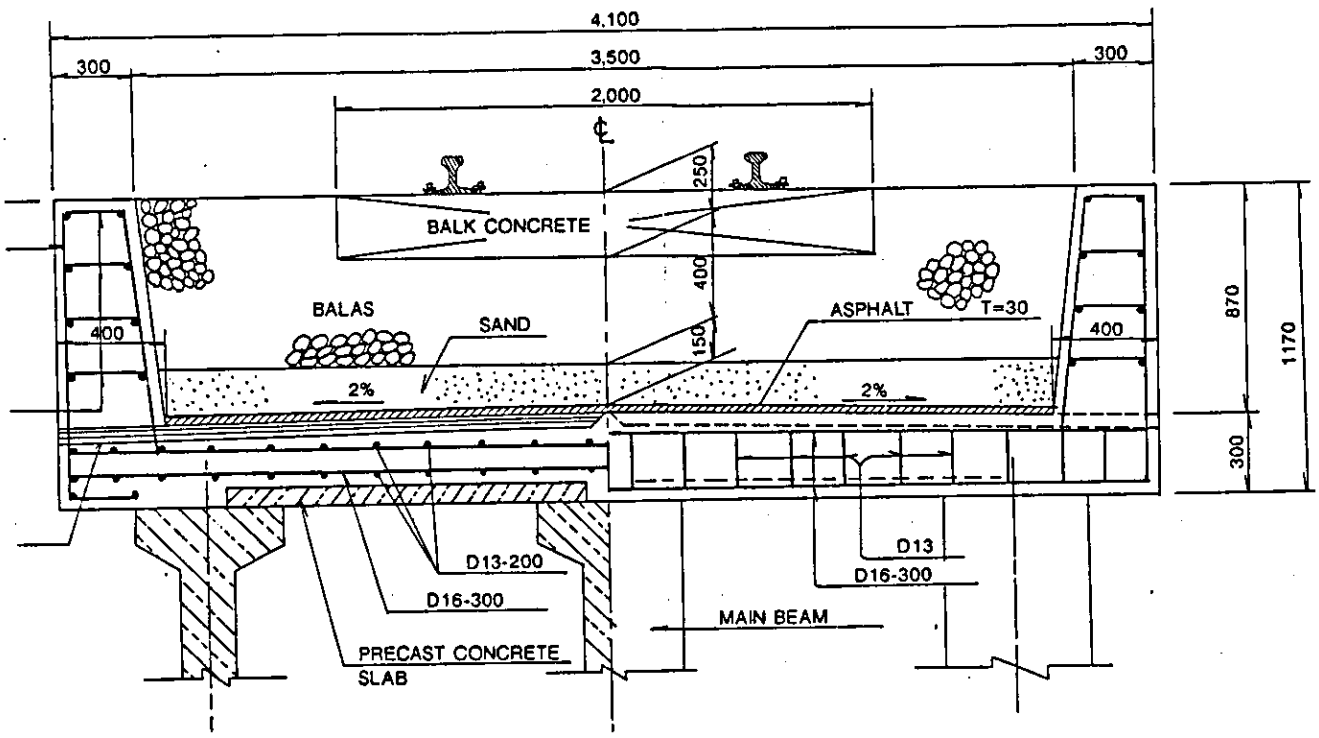


Balas (Crusher-Run)

$\frac{1}{2} \times \{3.5 + (3.3 + 0.08276 \times 2)\} \times 0.72 \times 68 = 170.5\ m^3$

$2.0 \times 0.25 \times 0.25 \times \frac{68}{0.6} = 14.17\ m^3$

$170.5 - 14.17 = 156.33\ m^3$ //

Sand

$3.3 + 0.08276 \times 2 = 3.465$,

3.3069

$(3.465 + 3.307) \times 0.15 \times 1/2 \times 68 = 34.54\ m^3$ //

Asphalt

$V = 0.03 \times 68 \times 3.3 = 6.732\ m^3$

$w = 6.732 \times 2.2 = 14.81$ ton //

- Wet Stone Masonry (1:4)

$A = 7.5 \times (5 - 0.45) \times 0.25 = 8.53\ m^2$

$V = 8.53 \times 0.20 = 16.06\ m^3$

- Balk Concrete (Type C1)

$V = 0.25^2 \times 3.0 \times \left(\frac{64}{0.6}\right) = 13.375\ m^3$

- Wet Stone Masonry (1:3)

$V = (0.4 + 0.6) \times 0.6 \times (7.5 - 0.3 \times 2)$

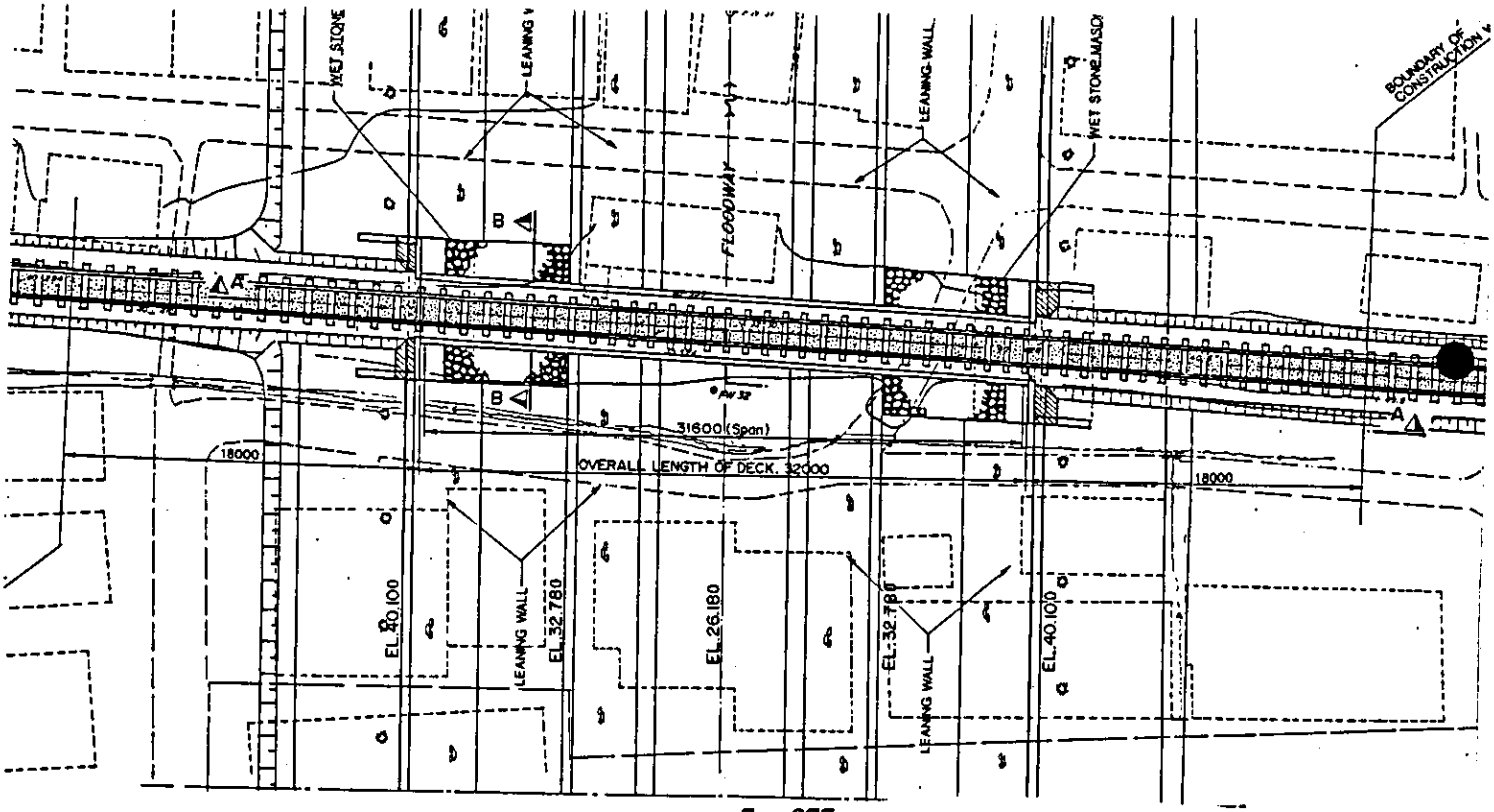
$= 1.0 \times 0.6 \times 6.9$

$= 4.14\ m^3$

$\Sigma V = 4.14 \times 2 = 8.28\ m^3$

- Demolition and Removal of Existing Railway

$64.0 \times 7.5 \times 0.6 = 288\ m^3$



Br F5 FW 33 + 65 m

(JL. DELI TUA Br)

NO	DESCRIPTION	UNIT	Quantity	Unit Price (Rp)	REMARKS
	BRIDGE				
	SUPERSTRUCTURE				
	CONCRETE				
	a. Deck Slab (Insitu)				
	Concrete (Type – B) Class K 350	Cu.m	185.29		
	Reinforcing Steel Deform	Kg	32,980.73		
	Wooden Form Work with Supporting Frame	Sq.m	166.00		
	b. Precast Prestressed Concrete Main Beam				
	Precast Prestressed Concrete Beam (Type – A) Class K 400	Cu.m	164.16		
	Reinforcing Steel Deform	Kg	16,924.27		
	Tendon [H.T.W] diameter 13 mm	Kg	11,297.57		
	Live end Anchorage	Nos	120.00		
	c. PC Panel Concrete				
	PC Panel Concrete, t = 7 cm (Type – A) Class K 400	Cu.m	30.67		
	Reinforcing Steel Deform	Kg	7,553.76		
	c. PC Diaphragm Concrete				
	PC Diaphragm Concrete (Type – A) Class K 400	Cu.m	10.80		
	Reinforcing Steel Deform	Kg	1,091.79		
	PRESTRESSING				
	Prestressing Tendon [H.T.W.] diameter 13 mm for Main Beam (incl. Diaphragm)	each	10.00		
	Grout Injection Main Beam (icl. Diaphragm)	m	1,920.00		
	ERECTING				
	Erection of Concrete Main Beam	Kg	410,400.00		
sup–F5	(Incl.PC Diaphragm , PC Panel)				

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. F5 FW 33 + 65 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 Length = 31.60 m

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.245	23.032	5.643	1.000	5.643	32.000	180.571
End slab	(2)	0.055	0.500	0.027	2.000	0.055	16.982	0.934
End slab	(3)	0.300	0.200	0.060	2.000	0.120	23.232	2.788
							sum	184.293

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.223	1.500	0.334	1.000	0.334	32.000	10.680
Right Side slab	(5)	0.223	1.500	0.334	1.000	0.334	32.000	10.680
							sum	21.360

Total Volume K.350 = 184.293 + 21.360
= 205.653 m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	34.000	0.544	0.550	0.299
Railing post	(7)	0.165	0.160	0.026	34.000	0.898	0.470	0.422
slab side Walk	(8)	0.250	1.962	0.490	2.000	0.981	32.000	31.387
Wall	(9)	0.470	0.100	0.047	2.000	0.094	29.280	2.752
							sum	34.860

Total Volume K.225 = 34.860 m3

Grand Total K.350 = 215.9353 m3

Grand Total K.225 = 36.60303 m3

slab –brF5

Directorate General Water Resources Development Directorate General Medan Flood Control Project	DECK SLAB AND HAND RAIL Br F5 FW 33 + 65 m (Jln. Deli Tua Br)	japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 32.00 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	23.00	6.90	2.00	13.80
end slab	(2)	0.20	23.00	4.60	2.00	9.20
	(3)	0.35	17.50	6.13	2.00	12.25
	(4)	0.47	1.50	0.71	4.00	2.84
In side walk (curb)	(5)	0.25	32.00	8.00	2.00	16.00
In side walk	(6)	0.47	31.75	14.92	2.00	29.85
out side walk	(7)	0.47	31.75	14.92	2.00	29.85
Railing post	(8)	0.10	0.92	0.09	34.00	3.13
Railing post	(9)	0.16	0.45	0.07	68.00	4.90
Railing post	(10)	0.14	0.45	0.06	68.00	4.13
					sum	125.93
				numbers of span =		1.00
total	=	125.93	x	1.00	=	**125.93**

Scafolding (L = 32.00 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	2.15	32.00	68.80	2.00	137.60
end slab	(2)	0.45	32.00	14.400	2.00	28.80
					sum	166.40
				numbers of span =		1.00
total	=	166.40	x	1.00	=	**166.40**

f5-fwdeck

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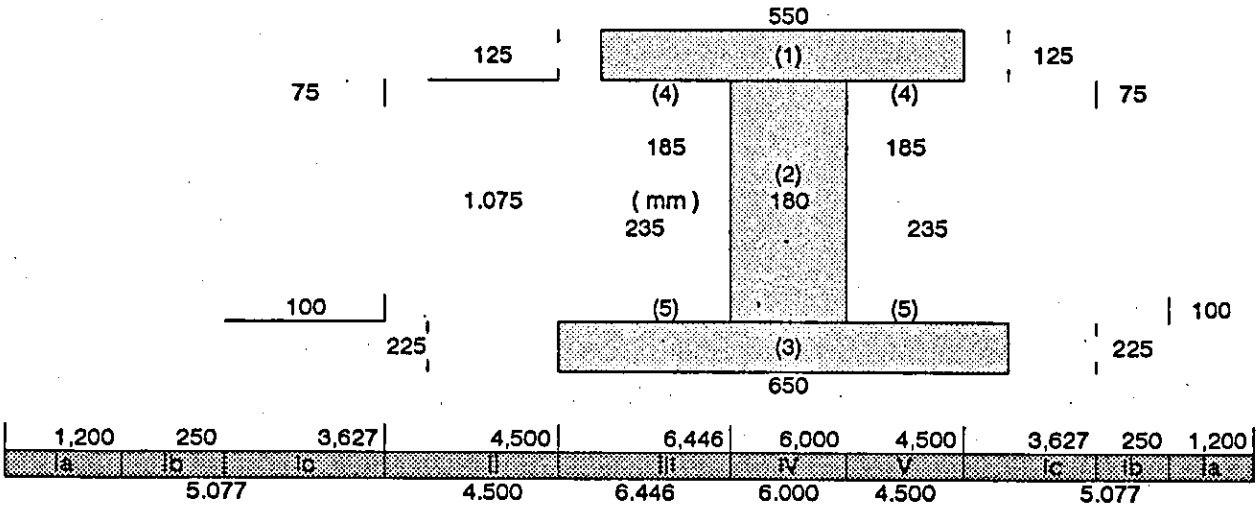
Directorate General Water Resources Development Directorate of River Medan Flood Control Project	Main Beam Br F5 FW 33 + 65 m (Jl. Deli Tua Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K-400,l = 31.60 m

Main Beam Section



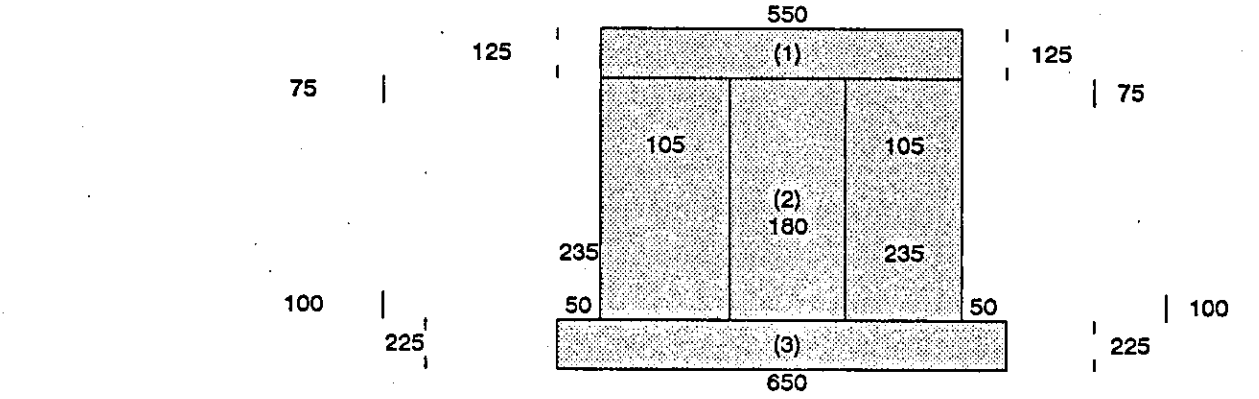
Total length = 31.60 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.180	1.250	1.000	0.225
(3)	0.650	0.225	1.000	0.146
(4)	0.185	0.075	2.000	0.014
(5)	0.235	0.100	2.000	0.024
			sum	
area section main beam			=	0.4774

Volume 1 = area x length
= 0.477 x 31.60
= 15.09 m3

End Block Section L = 1.200 m



2. Bearing Block Area

piece	width m	depth m	nos	total area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.550	1.250	1.000	0.688
(3)	0.650	0.225	1.000	0.146
		1.600	sum	0.903

1075
1250

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beam-cf5

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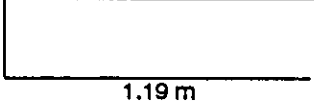
Directorate General Water Resources Development Directorate of River Medan Flood Control Project	Main Beam Br F5 FW 33 + 65 m (Jl. Deli Tua Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.075 + 1.30) : 2
= 1.19 m

area = width x depth
= 0.185 x 1.19
= 0.220 m2

section	area	length	nos	volume
	m2	m		m3
Ia	0.9025	1.200	1.00	1.083
Ib	0.2197	0.250	1.00	0.055
Ic	0.4774	3.627	1.00	1.731
II	0.4774	4.500	1.00	2.148
III	0.4774	6.446	1.00	3.077
IV	0.4774	6.000	1.00	2.864
V	0.4774	4.500	1.00	2.148
Ic	0.4774	3.627	1.00	1.731
Ib	0.2197	0.250	1.00	0.055
Ia	0.9025	1.200	1.00	1.083
	sum	31.60		15.9765

Block out Cross beam

width		depth	area	length	nos	volume
top	bottom					
m	m	m	m2	m	m	m3
0.400	0.60	0.185	0.0925	1.1875	4	0.439

volume per beam = 15.9765 + 0.439 = 16.416 m3

Grand Total = 10.00 x 16.416 m3

= **164.16** m3

beam-cf5

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Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	MAIN BEAM Br F5 FW 33 + 65 m (Jl. Deli Tua Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(1)	13	1.45		1.45	0.50		3.40	4	13.60	0.995	13.532	outer Beam
(l = 5.077 m)	(2)	16	0.45	0.70		0.70		1.85	7	12.95	1.560	20.202	and end Block
2 nos	(3)	13	1.32		1.32	0.55	0.40	3.59	4	14.36	0.995	14.288	
	(4)	13	1.80					1.80	2	3.60	0.995	3.582	
	(5)	13		0.30	0.55	0.30		1.15	3	3.45	0.995	3.433	
	(6)	16	1.45		1.45	1.50		4.40	2	8.80	1.560	13.728	
	(7)	13		0.46	0.55	0.46	0.30	1.77	7	12.39	0.995	12.328	
	(8)	16		1.75	0.55	1.75		4.05	7	28.35	1.560	44.226	
	(9)	13	4.98					4.98	6	29.86	0.995	29.713	
(I)	(10)	16		0.10	0.45	0.10	0.10	0.75	70	52.50	1.560	81.900	
	(11)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(12)	13		1.75	0.08	1.75		3.58	15	53.70	0.995	53.432	
	(13)	13	4.78					4.78	14	66.88	0.995	66.544	
	(14)	13		0.46	0.55	0.46	0.30	1.77	8	14.16	0.995	14.089	
	(15)	13	0.45	0.40		0.40	0.30	1.55	8	12.40	0.995	12.338	
	(16)	16	1.15	0.20	1.15	0.20	0.26	2.96	2	5.92	1.560	9.235	
	(17)	13		0.30		0.30		0.60	8	4.80	0.995	4.776	
											sum	410.449	
						sub total	:	410.449	x	2.000	=	820.898	

Section	Type	Shape steel ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(18)	13		1.75	0.08	1.75		3.58	10	35.80	0.995	35.621	
(l = 4.500 m)	(19)	13	4.40					4.40	20	88.00	0.995	87.560	
2 nos	(20)	13	0.45	0.40		0.40	0.30	1.55	10	15.50	0.995	15.423	
	(21)	13		0.46	0.55	0.46	0.30	1.77	10	17.70	0.995	17.612	
(II)	(22)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(23)	13		0.30		0.30		0.60	10	6.00	0.995	5.970	
											sum	175.289	
						sub total	:	175.289	x	2.000	=	350.578	
Inner Beams	(24)	13		1.75	0.08	1.75		3.58	14	50.12	0.995	49.869	
(l = 6,466 m)	(25)	13	6.35					6.35	20	126.92	0.995	126.285	
1 nos	(26)	13	0.45	0.40		0.40	0.30	1.55	14	21.70	0.995	21.592	
(III)	(27)	13		0.46	0.55	0.46	0.30	1.77	14	24.78	0.995	24.656	
	(28)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(29)	16		0.30		0.30		0.60	14	8.40	0.995	8.358	
											sum	243.864	
						sub total	:	243.864	x	1.000	=	243.864	
	(30)	13		1.75	0.08	1.75		3.58	13	46.54	0.995	46.307	
Inner Beams	(31)	13	5.90					5.90	20	118.00	0.995	117.410	
(l = 6,000 m)	(32)	16	0.45	0.40		0.40	0.30	1.55	13	20.15	0.995	20.049	
1 nos	(33)	13		0.46	0.55	0.46	0.30	1.77	13	23.01	0.995	22.895	
(IV)	(34)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(35)	13		0.30		0.30		0.60	13	7.80	0.995	7.761	
											sum	227.527	
						sub total	:	227.527	x	1.000	=	227.527	
Exterior Beam	(36)	16	1.15	0.20	1.15		0.26	2.76	2	5.52	1.560	8.611	
(V)	(37)	16	0.55	0.15	0.55		0.26	1.51	5	7.55	0.995	7.512	
2 nos	(38)	13	0.75		0.75	0.08	0.16	1.74	5	8.70	0.995	8.657	
											sum	24.780	
						sub total	:	24.780	x	2.000	=	49.560	

Total 1 pcs (31.60 Span)	=	1,692.427	Kg	
Total 10 pcs (31.60 Span)	=	10.00	x	1,692.43 Kg
	=	16,924.27	Kg	

mb-rf5

Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR F5 FW 33 + 65 M (Jln.Deli Tua Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

$$S = -1^2/8.f \times [\{-2.f/1.@sqrt((4.f/1)^2+1)\} + 1/2\ln[\{-4f/1+@sqrt(4f/1)^2+1\}] - [\{2.f/1.@sqrt((4.f/1)^2+1)\} + 1/2.ln.[\{4.f/1\}+@sqrt(4.f/1)^2+1)$$

(a)	=	$1^2/8.f$			
(b)	=	$2.f/1$			
(c)	=	$4.f/1$			
(d)	=	$(4.f/1)^2$			
(e)	=	$(4.f/1)^2+1$			
(f)	=	$@sqrt((4.f/1)^2+1)$	=	@sqrt (e)	
(g)	=	$-2.f/1.@sqrt((4.f/1)^2+1)$	=	−(b) x (f)	
(h)	=	$-4f/1+@sqrt(4f/1)^2+1$	=	(−c) + (f)	
(i)	=	$1/2\ln[\{-4f/1+@sqrt(4f/1)^2+1\}]$	=	1/2xln (h)	
S1	=	$[\{-2.f/1.@sqrt((4.f/1)^2+1)\} + 1/2\ln[\{-4f/1+@sqrt(4f/1)^2+1\}]$		=	(g) + (i)
(k)	=	$-[\{2.f/1.@sqrt((4.f/1)^2+1)\}$	=	(b) x (f)	
(l)	=	$[\{4.f/1\}+@sqrt(4.f/1)^2+1)$	=	(c) + (f)	
(m)	=	$1/2.ln.[\{4.f/1\}+@sqrt(4.f/1)^2+1)$	=	1/2 x ln(l)	
S2	=	$-[\{2.f/1.@sqrt((4.f/1)^2+1)\} + 1/2.ln.[\{4.f/1\}+@sqrt(4.f/1)^2+1)$		=	(k) + (m)

$$S = (-a) \times [(S1) - (S2)]$$

S is length of parabola curve

te−F5

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Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR F5 FW 33 + 65 M (Jln.Deli Tua Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 31.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
2	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
3	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
4	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
5	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
6	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
					total												201.742

f = Average

nos wire per tendon	=	7	nos				
sum of tendon length	=	7	x	201.742	=	1,412.20	m
Total per beam	=	0.8	x	1,412	=	1,129.76	kg
Grand Total (10 Beam)	=	10.00	x	1,129.76	=	11,297.57	kg

te-F5

2/2

Structure Concrete Class K−400 Cross Beam (L = 31.60 m)

	volume cross beam							
	width	depth	area	thick	nos	volume		
section	w	d	(m 2)	t				
	m	m		m		m3		
(1)	1.200	1.250	1.5	0.200	1.00	0.3000		
	sum volume per pcs				=	0.3000		
	nose per row				=	9.0000	nos	
	volume per row				=	9.0000	x	0.3000
					=	2.7	m3	
	nose per span				=	4.00	row	
					=	4.0000	x	2.7
	Total volume per span				=	10.8000	m3	

Structure Concrete Class K−400 Panel (L = 31.60 m)

	volume Panel							
	width	depth	area	thick	nos	volume		
section	w	d	(m 2)	t				
	m	m		m		m3		
(1)	1.570	1.000	1.57	0.070	1.00	0.1099		
	sum volume per pcs				=	0.1099		
	nose per row				=	9.0000	nos	
	volume per row				=	9.0000	x	0.1099
					=	0.9891	m3	
	nose per span				=	279.00	nos	
					=	279.0000	x	0.1099
	Total volume per span				=	**30.6621**	m3	

cb−cf5

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	REINFORCING STEEL OF CROSS BEAM & PANEL Br F5 FW 33 + 65 m (Jln. Deli Tua Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel (kg)

Quantities steel of Cross beam (l = 31.60 m) 1 / 1

Type	Bar Shape						lenght/ each	nos	total lenght	weight per m'	total weight	description
	dia.	a	b	c	d	2 x e						
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
C.1	13	1,170.00	150	1,170.00	150	0	2.640	7.00	18.48	0.995	18.388	End & Center
C.2	13	1,200.00	0	0	0	0	1.200	10.00	12.00	0.995	11.940	
										sum	30.33	

Nos per row	=	9.00		
sub total per span	=	36.00	x	30.33
	=	**1,091.79**	Kg	

Quantities steel of Panel

C.1	16	1,620	150	1,620	150	0	3.540	3.00	10.62	1.560	16.567	
C.1	13	1,620	0	0	0	0	1.620	3.00	4.86	0.995	4.836	155
C.2	13	950	0	0	0	0	0.950	6.00	5.70	0.995	5.672	nos
										sum	27.07	

Nos per row	=	9.00		
sub total per span	=	279.00	x	27.07
	=	**7,553.76**	Kg	

cb – rf5

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment,Wing wall and Approach Slab BR – F5 (Jln Deli Tua Br) FW : 33 + 65 (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.400	m	
area	=	0.126	m2	
H	=	7.500	m	
W	=	5.100	m	
L	=	27.40	m	

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	1.945	0.58	27.40	1.00	15.99
stem	2	0.55	0.500	0.28	26.60	1.00	7.32
stem	3	0.55	0.500	0.14	26.60	1.00	3.66
stem	4	0.20	0.500	0.10	27.40	1.00	2.74
stem	5	0.20	0.250	0.03	27.40	1.00	0.69
stem	6	1.00	4.555	4.56	27.40	1.00	124.81
stem	7	1.80	0.300	0.27	27.40	1.00	7.40
footing	8	2.30	0.300	0.35	27.40	1.00	9.45
footing	9	6.23	1.000	6.23	27.40	1.00	170.56
wingwall	10	3.00	1.945	5.84	0.40	2.00	4.67
wingwall	11	3.30	1.055	1.74	0.40	2.00	1.39
wingwall	12	2.30	3.200	7.36	0.40	2.00	5.89
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	2.30	0.300	0.35	0.40	2.00	0.28
wingwall Vet.	15	0.30	0.30	0.05	1.945	2.00	0.18
App.Slab	16	3.00	0.200	0.30	26.600	1.00	7.98
	17	0.275	0.05	0.01	26.600	1.00	0.37
inside blockout	lbo	0.30	0.250	0.08	1.10	4.00	0.330
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.126	x	80.00	x	0.10	(1.005)
						sum	363.08

concrete filling in piles

thick of pipe	=	0.01036	m				
inner diameter	=	0.400	–	0.021			
	=	0.379	m				
area	=	0.250	x	3.142	x	0.144	
	=	0.112982	m2				
depth	=	2.000					
nos	=	80.000					
volume	=	0.113	x	2.000	x	80.00	
	=	18.08	m3				
sub total	=	363.0784	+	18.08			
	=	381.1556	+	381.1	m3		
Total	=	762.3112	m3				

Supply and Driving of Piles dia. 400 mm

=	4.00	x	20.00	x	13.00	=	1,040.00	m
=	2.00	x	1,040.00			=	2,080.00	m

1 / 2

abf5–co

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br F5 FW 33 + 65 m (Jln. Deli Tua Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steil inside pile (kg)

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.25	2.30			2.55	80.00	8	20.40	1.560	31.824
2.	R1	13		0.55				0.55		12	6.60	0.995	6.567
3.	Ring	13											
												sum	38.39

Total weight	=	80.00	x	38.391	=	3,071.28	kg
Grand total	=	2.00	x	3,071.28	=	6,142.56	kg

inb-f5

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br F5 (Jln.Deli Tua Br) FW : 33 + 65 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	1.945	2.00	1.17
wall	1a	1.945	27.400	1.00	53.29
wall	1b	1.945	26.600	1.00	51.74
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	26.600	1.00	13.30
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	26.600	1.00	19.95
stem	4	0.200	0.500	2.00	0.20
	4a	0.500	27.400	1.00	13.70
stem	5	0.200	0.250	2.00	0.05
	5a	0.320	27.400	1.00	8.77
stem	6	1.000	4.555	2.00	9.11
stem	6a	3.505	27.400	1.00	96.04
stem	6b	26.600	3.255	1.00	86.58
footing	7	1.800	0.300	2.00	0.54
footing	8	2.300	0.300	2.00	1.38
footing	9	6.225	1.000	2.00	12.45
footing	10	1.000	27.400	2.00	54.80
wingwall	11	1.945	3.000	4.00	23.34
wingwall	11a	0.400	1.945	2.00	1.56
wingwall	12	3.300	1.055	4.00	13.10
wingwall	13	0.400	1.055	2.00	0.84
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	2.300	2.000	4.000	18.400
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	485.31

Total = 2.00 x 485.31

= 970.62 sq.m

abf5-fmk

Direcktorate General of Water Resources Development Directorate of River Medan Flood Control Project	Lean Concrte and Rubble Stone Br F5 FW 33 + 65 m Jln.Deli Tua Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Lean concrete (m3)

diameter of concrete pile = 0.400 m

area = 0.126 m2

Lean Concrete 0.10

6.55 m

width	length	area	depth	volume
m	m	m2	m	m3
6.55	27.70	181.44	0.10	18.14

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.10	m			
nos	=	28				
volume	=	0.126	x	0.10	x	28
	=	0.352	m3			
net volume	=	18.14	–	0.352		
	=	17.79	m3			
nos	=	2.00				
Total volume	=	2.00	x	17.79		
Grand Total	=	35.58	m3		(Abutment L & R)	

Rubble stone (m3)

diameter of concrete pile = 0.400 m

area = 0.126 m2

Rubble Stone 0.200

6.55 m

width	length	area	depth	volume
m	m	m2	m	m3
6.55	27.70	181.44	0.20	36.29

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.20	m			
nos	=	28				
volume	=	0.126	x	0.20	x	28
	=	0.704	m3			
net volume	=	36.29	–	0.704		
	=	35.58	m3			
nos	=	2.00				
Total volume	=	2.00	x	35.58		
Grand Total	=	71.17	m3		(Abutment L & R)	

lc-f5

Water Resources Development Direktorat General Medan Flood Control	DECK SLAB AND HAND RAIL Br F6 FW 37 + 70 m (Pendestrian Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 32 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.00	3.00	0.00	2.00	0.00
end slab	(2)	0.30	3.00	0.90	2.00	1.80
	(3)	0.00	3.00	0.00	2.00	0.00
	(4)	0.00	1.50	0.00	4.00	0.00
in side walk (curb)	(5)	0.00	31.60	0.00	2.00	0.00
in side walk	(6)	0.47	31.35	14.73	2.00	29.47
out side walk	(7)	0.47	29.50	13.86	2.00	27.73
Railing post	(8)	0.10	0.92	0.09	34.00	3.13
Railing post	(9)	0.16	0.45	0.07	68.00	4.90
Railing post	(10)	0.14	0.45	0.06	68.00	4.13
					sum	71.15
				numbers of span =		1.00
total	=	71.15	x	1.00	=	71.15
	=	71.15	m2			

Scafolding (L = 31.60 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.23	31.60	38.71	2.00	77.42
end slab	(2)	0.20	3.00	0.600	2.00	1.20
					sum	78.62
				numbers of span =		1.00
total	=	1.00	x	78.62	=	78.62
	=	78.62	m2			

Grand total form Work = 71.15 m2

Grand total Scafolding = 78.62 m2

f-wrkbF6

7-292

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. F6 FW 37 + 70 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 **Length = 31.60 m**

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.200	3.000	0.600	1.000	0.600	32.000	19.200
End slab	(2)	0.000	0.500	0.000	2.000	0.000	4.250	0.000
End slab	(3)	0.100	0.200	0.020	2.000	0.040	3.000	0.120
							sum	**19.320**

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.000	1.500	0.000	1.000	0.000	32.000	0.000
Right Side slab	(5)	0.000	1.500	0.000	1.000	0.000	32.000	0.000
							sum	**0.000**

Total Volume K.350 = 19.320 + 0.000
= **19.320** m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	34.000	0.544	0.550	0.299
Railing post	(7)	0.165	0.160	0.026	34.000	0.898	0.470	0.422
slab side Walk	(8)	0.000	1.266	0.000	2.000	0.000	32.000	0.000
Wall	(9)	0.470	0.100	0.047	2.000	0.094	28.240	2.655
							sum	**3.376**

Total Volume K.225 = **3.376** m3

Grand Total K.350 = **19.32** m3

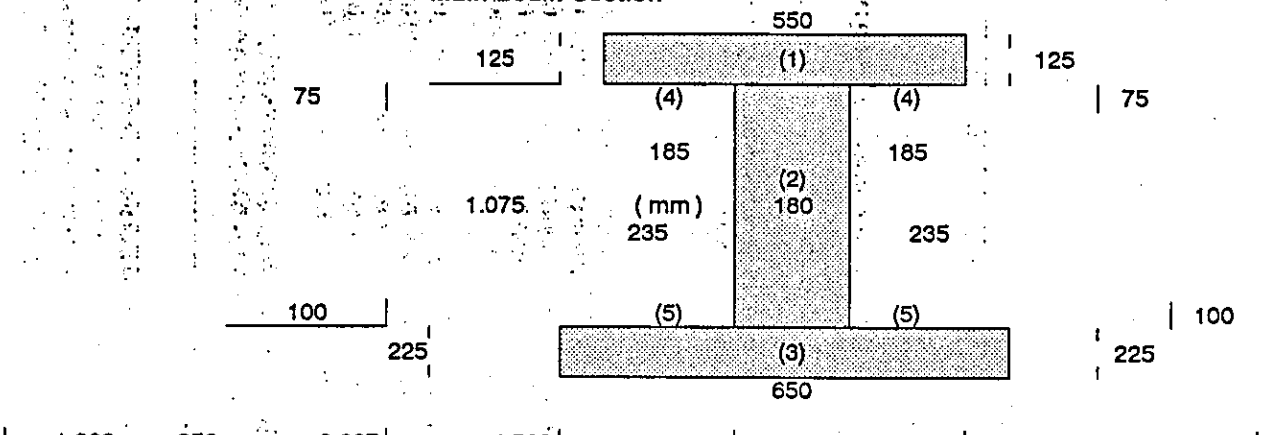
Grand Total K.225 = **3.375632** m3

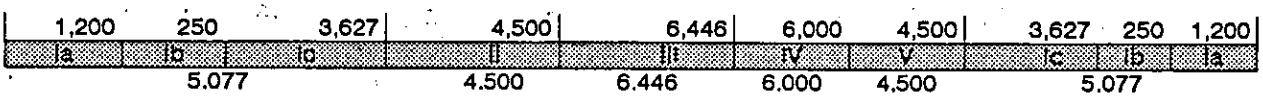
slab –F6

Directorate General Water Resources Development Directorate of River Medan Flood Control Project	Main Beam Br F6 FW 37 + 70 m (Pendestrian Br) (With Water Pipe Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K−400,l = 31.60 m

Main Beam Section





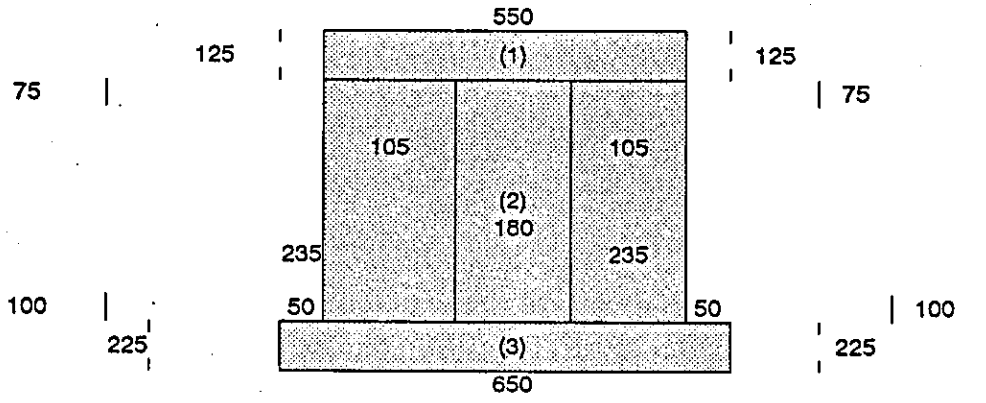
Total length = 31.60 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.180	1.250	1.000	0.225
(3)	0.650	0.225	1.000	0.146
(4)	0.185	0.075	2.000	0.014
(5)	0.235	0.100	2.000	0.024
			sum	
	area section main beam		=	0.4774

Volume 1 = area x length
= 0.477 x 31.60
= 15.09 m3

End Block Section L = 1.200 m



2. Bearing Block Area

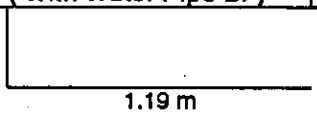
piece	width m	depth m	nos	total area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.550	1.250	1.000	0.688
(3)	0.650	0.225	1.000	0.146
		1.600	sum	0.903

1075
1250

1/2

beam−cf6

Directorate General Water Resources Development Directorate of River Medan Flood Control Project	Main Beam Br F6 FW 37 + 70 m (Pendestrian Br) (With Water Pipe Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (1.075 + 1.30) : 2
= 1.19 m

area = width x depth
= 0.185 x 1.19
= 0.220 m2

section	area	length	nos	volume
	m2	m		m3
Ia	0.9025	1.200	1.00	1.083
Ib	0.2197	0.250	1.00	0.055
Ic	0.4774	3.627	1.00	1.731
II	0.4774	4.500	1.00	2.148
III	0.4774	6.446	1.00	3.077
IV	0.4774	6.000	1.00	2.864
V	0.4774	4.500	1.00	2.148
Ic	0.4774	3.627	1.00	1.731
Ib	0.2197	0.250	1.00	0.055
Ia	0.9025	1.200	1.00	1.083
	sum	31.60		15.9765

Block out Cross beam

width		depth	area	length	nos	volume
top	bottom					
m	m	m	m2	m	m	m3
0.400	0.60	0.185	0.0925	1.1875	4	0.439

volume per beam = 15.9765 + 0.439 = 16.416 m3

Grand Total = 1.00 x 16.416 m3

= 16.42 m3

beam-cf6

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Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR F6 FW 37 + 70 M (Pendestrian & Water Pipe Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

$$S = -l^2/8.f\,x\,[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\,ln[\{-4f/l+@sqrt(4f/l)^2+1\}] - [\{2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$$

(a)	=	$l^2/8.f$			
(b)	=	$2.f/l$			
(c)	=	$4.f/l$			
(d)	=	$(4.f/l)^2$			
(e)	=	$(4.f/l)^2 + 1$			
(f)	=	$@sqrt((4.f/l)^2 + 1)$	=	@sqrt (e)	
(g)	=	$-2.f/l.@sqrt((4.f/l)^2+1)$	=	$-(b)\,x\,(f)$	
(h)	=	$-4f/l+@sqrt(4f/l)^2+1$	=	$(-c) + (f)$	
(i)	=	$1/2\,ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$	=	1/2xln (h)	
S1	=	$[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\,ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$		=	(g) + (i)
(k)	=	$-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\}$	=	$(b)\,x\,(f)$	
(l)	=	$[\{4.f/l)+@sqrt(4.f/l)^2+1)$	=	$(c) + (f)$	
(m)	=	$1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$	=	$1/2\,x\,ln(l)$	
S2	=	$-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$		=	(k) + (m)

$$S = (-a)\,x\,[(S1) - (S2)]$$

S is length of parabola curve

te-F6

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Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR F6 FW 37 + 70 M (Pendestrian & Water Pipe Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 31.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.547	33.600	257.9892	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
2	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
3	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
4	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
5	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
6	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
					total												201.742

f = Average

nos wire per tendon	=	7	nos				
sum of tendon length	=	7	x	201.742	=	1,412.20	m
Total per beam	=	0.8	x	1,412	=	1,129.76	kg
Grand Total (1 Beam)	=	1.00	x	1,129.76	=	1,129.76	kg

te-F6

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Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing Wall and Approach Slab Br F6 (Pendestrian Br) Sta : 37 + 70 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	1.945	2.00	1.17
wall	1a	1.945	3.000	1.00	5.84
wall	1b	1.945	2.200	1.00	4.28
wall of beam	1c	1.900	1.700	2.000	6.46
wall of beam	1d	0.500	1.900	2.000	1.90
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	2.200	1.00	1.10
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	2.200	1.00	1.65
stem	4	0.500	2.150	2.00	2.15
	4a	0.500	3.000	1.00	1.50
stem	5	0.500	1.000	2.00	0.50
	5a	1.200	3.000	1.00	3.60
stem	6	1.000	3.355	2.00	6.71
stem	6a	3.655	3.000	1.00	10.97
stem	6b	3.655	3.000	1.00	10.97
footing	7	1.200	0.300	2.00	0.36
footing	8	1.600	0.300	2.00	0.48
footing	9	3.800	1.000	2.00	7.60
footing	10	1.000	3.000	2.00	6.00
wingwall	11	1.945	3.000	4.00	23.34
wingwall	11a	0.400	1.945	2.00	1.56
wingwall	12	3.300	1.055	4.00	13.10
wingwall	13	0.400	1.055	2.00	0.84
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	1.600	2.000	4.000	12.800
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	129.87

Total = 2.00 x 129.87
= 259.73 sq.m

abF6-fw

Direcktorate General of Water Resources Development Directorate of River Medan Flood Control Project	Lean Concrte and Rubble Stone Br F6 FW 37 + 70 m Pend. & Water Pipe Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Lean concrete (m3)

diameter of concrete pile = 0.400 m

area = 0.126 m2

Lean Concrete 0.10

4.1 m

width	length	area	depth	volume
m	m	m2	m	m3
4.10	3.30	13.53	0.10	1.35

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.10	m			
nos	=	6				
volume	=	0.126	x	0.10	x	6
	=	0.075	m3			
net volume	=	1.35	–	0.075		
	=	1.28	m3			
nos	=	2.00				
Total volume	=	2.00	x	1.28		
Grand Total	=	2.56	m3		(Abutment L & R)	

Rubble stone (m3)

diameter of concrete pile = 0.400 m

area = 0.126 m2

Rubble Stone 0.200

4.1 m

width	length	area	depth	volume
m	m	m2	m	m3
4.10	3.30	13.53	0.20	2.71

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.20	m			
nos	=	6				
volume	=	0.126	x	0.20	x	6
	=	0.151	m3			
net volume	=	2.71	–	0.151		
	=	2.56	m3			
nos	=	2.00				
Total volume	=	2.00	x	2.56		
Grand Total	=	5.11	m3		(Abutment L & R)	

lc-f6

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Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Br F6 (Water Pipe) Sta FW 37 + 70 m Medan Flood Way	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Sheet :

FIGURE	CALCULATION
st–f6	

Part									
					Weight		nos		
1. Steel pipe dia. 300 mm									
	= 42.00	x	1.00	x	53		2.00	=	4,452.00 Kg
2. Profile Steel 100 x 100 x 10									
	= 1.65	x	1.00	x	15.10	x	64.00	=	1,594.56 Kg
3. Plate for Welding									
	= 0.29	x	0.29	x	0.08	x	64.00	=	3,380.15 Kg
4. Ring Tightening									
	= 1.40	x	0.05	x	0.005	x	64.00	=	158.26 Kg
5. Anchor at Deck Slab									
	= 2.00	x	1.00	x	1.56	x	64.00	=	199.68 Kg
	Grand total							=	**9,784.64 Kg**

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment,Wing wall BR – F6 (Pendestrian Br) With Water Pipe FW : 37 + 70	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.400	m	
area	=	0.126	m2	
H	=	6.300	m	
W	=	3.800	m	
L	=	3.00	m	

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	1.945	0.58	3.00	1.00	1.75
wall	1a	1.90	1.700	3.23	3.00	1.00	9.69
Reduced of beam	1b	0.60	1.60	0.96	2.15	1.00	(2.06)
stem	2	0.55	0.500	0.28	3.00	1.00	0.83
stem	3	0.55	0.500	0.14	3.00	1.00	0.41
	4	1.20	0.500	0.60	3.00	1.00	1.80
stem	5	1.20	0.500	0.30	3.00	1.00	0.90
stem	6	1.00	3.355	3.36	3.00	1.00	10.07
footing	7	1.20	0.300	0.18	3.00	1.00	0.54
footing	8	1.60	0.300	0.24	3.00	1.00	0.72
footing	9	3.80	1.000	3.80	3.00	1.00	11.40
wingwall	10	3.00	1.945	5.84	0.40	2.00	4.67
wingwall	11	3.30	1.055	3.48	0.40	2.00	2.79
wingwall	12	1.60	2.000	3.20	0.40	2.00	2.56
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	1.60	0.300	0.24	0.40	2.00	0.19
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.126	x	6.00	x	0.10	(0.075)
						sum	46.57

concrete filling in piles

thick of pipe	=	0.07500	m			
inner diameter	=	0.400	–	0.150		
	=	0.250	m			
area	=	0.250	x	3.142	x	0.063
	=	0.0490	m2			
depth	=	2.000	m			
nos	=	6.000				
volume	=	0.049	x	2.000	x	6.00
	=	0.59	m3			
sub total	=	46.568	+	0.59		
Total	=	47.157	+	47.157	m3	
	=	**94.315**	m3			

Description	nos	Side	Depth	total	Remark
Supply and Driving of SPP dia.400 mm for Abutment	6.00	R / L	11.00	132.00	

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br F6 FW 37 + 70 m (Pendestr. & Watter Pipe Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.25	2.30			2.55	6.00	8	20.40	1.560	31.824
2.	R1	13		0.55				0.55		12	6.60	0.995	6.567
3.	Ring	13											
												sum	38.39

Total weight	=	6.00	x	38.391	=	230.35	kg
Grand total	=	2.00	x	230.35	=	460.69	kg

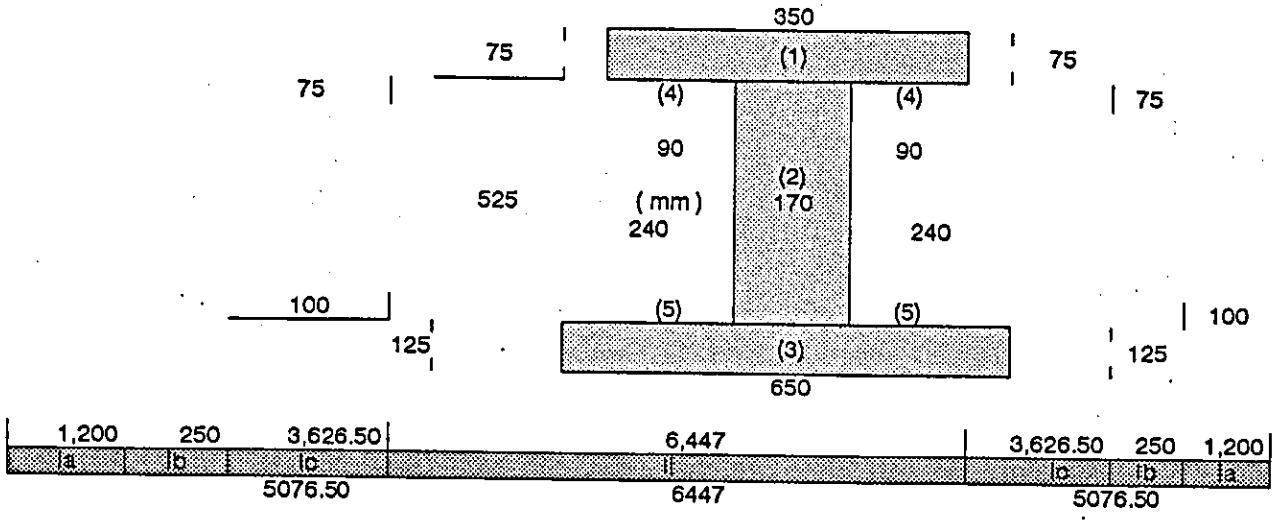
inb-f6

F-7 (JL. SMA12 Bridge)

Superstructure

Precast Prestressed Concrete K–400,l = 16.60 m

Main Beam Section



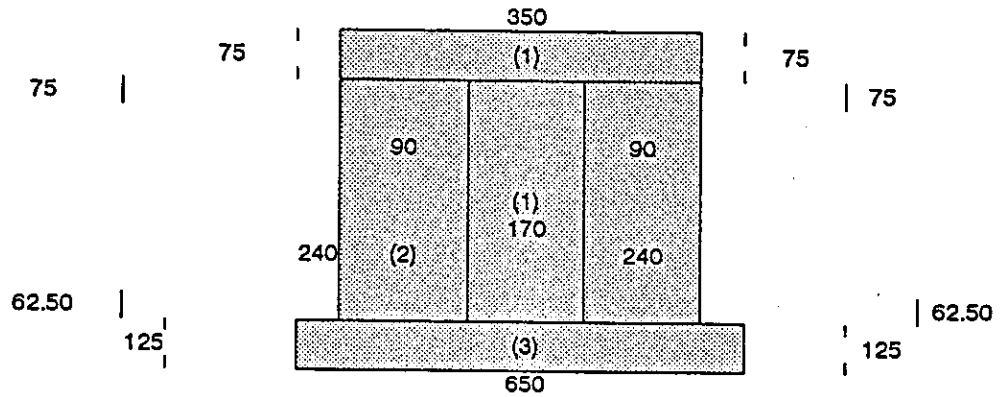
Total length = 16.60 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.350	0.075	1.000	0.026
(2)	0.170	0.525	1.000	0.089
(3)	0.650	0.125	1.000	0.081
(4)	0.090	0.075	2.000	0.007
(5)	0.240	0.100	2.000	0.024
			sum	
area section main beam			=	0.22750

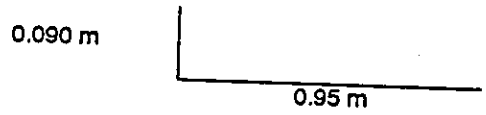
Volume 1 = area x length
= 0.22750 x 16.60
= 3.777 m3

End Block Section L = 1.200 m



2. Bearing Block Area

piece	width m	depth m	nos	total area m2
(1)	0.350	0.713	1.000	0.249
(2)	0.350	0.063	1.000	0.022
(3)	0.650	0.125	1.000	0.081
		0.900	sum	0.3525



length = 0.25 m

End Block Section L = 0.25 m

depth = (0.525 + 0.725) : 2
= 0.63 m

area = width x depth
= 0.09 x 0.63
= 0.0562 m2

section	area	length	nos	volume
	m2	m		m3
Ia	0.35250	1.200	1.00	0.423
Ib	0.05625	0.250	1.00	0.014
Ic	0.22750	3.627	1.00	0.825
II	0.08925	6.447	1.00	0.575
Ic	0.22750	3.627	1.00	0.825
Ib	0.05625	0.250	1.00	0.014
Ia	0.35250	1.200	1.00	0.423
	sum	16.60		3.100

Total volume = 3.100 m3

Total volume (5 Beam) = 5.00 x 3.100 m3

= 15.498 m3

Structure Concrete Class K–400 (L = 16.60 m)

section	volume panel slab							
	width w	depth d	area (m 2)	thick t	nos	volume		
	m	m		m		m3		
(1)	1.000	1.580	1.58000	0.070	1.00	0.111		
	sum volume per pcs				=	0.1106		
	Volume nos per row				=	4	x	0.1106
	nose per row				=	0.4424	m3	
	nos of per span				=	4.00		x 16
					=	64	nos	
	Total volume per span				=	0.1106	x	64
					=	7.078	m3	
	Grand Total				=	16.800	+	7.078
					=	23.8784	m3	

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 16.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.276	18.600	156.685	0.030	0.059	0.004	1.004	1.002	(0.030)	0.942	(0.030)	(0.059)	0.030	1.061	0.030	0.059	18.611
2	0.276	18.600	156.685	0.030	0.059	0.004	1.004	1.002	(0.030)	0.942	(0.030)	(0.059)	0.030	1.061	0.030	0.059	18.611
3	0.276	18.600	156.685	0.030	0.059	0.004	1.004	1.002	(0.030)	0.942	(0.030)	(0.059)	0.030	1.061	0.030	0.059	18.611
					total												55.83

f = Average

nos wire per tendon	=	6	nos				
sum of tendon length	=	6	x	55.8327	=	335.00	m
Total per beam	=	0.8	x	335.00	=	268.00	kg
Grand Total (5 Beam)	=	5.00	x	268.00	=	1,339.99	kg
Grand Total	=	12,746.59	+	1,339.99	=	14,086.581	kg

Reinforcing steel (kg)

Quantities steel of panel deck slab per span (l = 40.80 m) — 1 / 1

Type	Bar Shape dia.	a	b	c	d	2 x e	lenght/ each	nos	total lenght	weight per m'	total weight	description
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
P3	16	1,520	150	1,520	150	150	3.490	2.00	6.98	1.560	10.889	main steel
P4	16	1,520	200	1,520	200	150	3.590	1.00	3.59	1.560	5.600	
P5	12	450	0	0	0	110	0.560	6.00	3.36	0.995	3.343	tranverse steel
P6	12	950	0	0	0	220	1.170	4.00	4.68	0.995	4.657	
P7	12	400	0	0	0	0	0.400	4.00	1.60	0.995	1.592	
										sum	26.081	

nos of span	=	1.00					
nos of panel slab per span	=	5	x	1.00	=	5.00	nos
total nos of span	=	5.00	x	40.00	=	200.00	nos
sub total weight	=	200.00	x	26.081	=	**5,216.20**	kg

Quantities steel of panel deck slab per span (l = 16.60 m)

Type	Bar Shape dia.	a	b	c	d	2 x e	lenght/ each	nos	total lenght	weight per m'	total weight	description
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
P3	16	1,520	150	1,520	150	150	3.490	2.00	6.98	1.560	10.889	main steel
P4	16	1,520	200	1,520	200	150	3.590	1.00	3.59	1.560	5.600	
P5	12	450	0	0	0	110	0.560	6.00	3.36	0.995	3.343	tranverse steel
P6	12	950	0	0	0	220	1.170	4.00	4.68	0.995	4.657	
P7	12	400	0	0	0	0	0.400	4.00	1.60	0.995	1.592	
										sum	26.08	

nos of span	=	1.00					
nos of panel slab per span	=	17.00	x	1.00	=	17.00	nos
total nos of span	=	4.00	x	17.00	=	68.00	nos
sub total weight	=	26.08	x	68.00	=	1,774	kg
Grand total for panel	=	**5,216.20**	**+**	**1,774**	=	**6,989.71**	**kg**

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Structure Concrete Class K−400 (L = 16.60 m)

section	volume cross beam width w m	depth d m	area (m 2)	thick t m	nos	volume m3		
(1)	1.390	1.050	1.4595	0.200	1.00	0.2919		
	sum volume per pcs				=	0.2919		
	nose per row				=	4.0000	nos	
	volume per row				=	2.0000	x	0.2919
					=	0.5838	m3	
	nose per span				=	2.00	row	
					=	2.0000	x	0.5838
	Total volume per span				=	1.1676	m3	
	Total volume per span				=	2	x	1.1676
					=	2.3352	m3	

Wooden form works with supporting frame (L = 17.00 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.30	7.20	2.16	2.00	4.32
end slab	(2)	0.20	7.20	1.44	2.00	2.88
	(3)	0.35	5.60	1.96	2.00	3.92
	(4)	0.47	1.50	0.71	4.00	2.84
in side walk (curb)	(5)	0.25	17.00	4.25	2.00	8.50
in side walk	(6)	0.47	16.75	7.87	2.00	15.75
out side walk	(7)	0.47	16.10	7.57	2.00	15.13
Railing post	(8)	0.10	0.92	0.09	18.00	1.66
Railing post	(9)	0.16	0.45	0.07	36.00	2.59
Railing post	(10)	0.14	0.45	0.06	36.00	2.19
					sum	59.77
					numbers of span =	1.00
total	=	59.77	x	1.00	=	59.77
	=	59.77	m2			

Scafolding (L = 17.00 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.50	17.00	25.50	2.00	51.00
end slab	(2)	0.45	17.00	7.650	2.00	15.30
					sum	66.30
					numbers of span =	1.00
total	=	66.30	x	1.00	=	66.30
	=	66.30	m2			

Grand total form Work	=	59.77	+	123.00	=	182.77	m2
Grand total Scafolding	=	66.30	+	160.68	=	226.98	m2

307

Reinforcing steel (kg)

Quantities steel of Cross beam (l = 16.60 m) 1 / 1

Type	Bar Shape dia.	a	b	c	d	2 x e	lenght/ each	nos	total lenght	weight per m'	total weight	description
	mm	mm	mm	mm	mm	mm	m		m	Kg/m'	kg	
C.1	13	1,290	0	0	0	200	1.490	3.00	4.47	0.995	4.448	End
C.2	13	1,290	140	1,290	140	140	3.000	5.00	15.00	0.995	14.925	
										sum	19.37	

Nos per row	=	3.00		
sub total per span	=	12.00	x	19.37
	=	232.47	Kg	

Quantities steel of Cross beam (l = 40.8 m)

C.1	13	590	140	590	140	140	1.600	6.00	9.60	0.995	9.552	End
C.2	13	1,200	140	1,200	140	140	2.820	3.00	8.46	0.995	8.418	
										sum	17.97	

Nos per row	=	5.00		
sub total per span	=	20.00	x	17.97
	=	359.39	Kg	

C.1	13	1,090	140	1,090	140	140	2.600	6.00	15.60	0.995	15.522	Center
C.2	13	1,200	140	1,200	140	140	2.820	3.00	8.46	0.995	8.418	
										sum	23.94	

Nos per row	=	5.00		
sub total per span	=	20.00	x	23.94
	=	478.79	Kg	
Grand total	=	1,070.660	Kg	

cr–br3

ABUTMENT.

I Concrete Works.

1. Conc. Type C1.

① Footing.	1.0 × 6.05 × 5.5.	=	33.275
② Main Body.	① (4.05 + 1.20) × 5.70 / 2. × 5.5.	=	82.294
	② 1.35 × 1.20 × .5.5	=	8.910
③	(0.5 + 1.05) × 0.55 × 5.5	=	2.349
④	0.3 × 1.28 × 5.5.	=	2.112
⑤ Wing Wall	14.754 m² × 0.4 × 2.	=	11.803
⑥ App. Slab.	4.7m × 3.0 × 0.2.	=	2.820.
			143.558 m³/unit

2. Conc. Type E.

6.35 × 5.8 × 0.1 = 3.683 m³/unit

3. Re-Bars.

① Main Body.

			ℓm	n (nos)	L (m)	Wu	W kg
a1	∏	D16	3.83.	23		1.56	137.421.
a2	⊓	D16	6.495	23		1.58	233.041
a3	|	D16	1.9.	23		1.56	68.172
a4	□	D16	10.457	23		1.56	375.197
a5	\	D16	2.124	23.		1.56	76.209
a6	—	D13	5.35 × .36 =		192.6 × 0.995.		191.637
							1081.677

② Wing Wall

b1	|	D16	(1.894 + 3.944)/2 × 10 + 9.155 × 4 + 7.945 + 1.74 × 2 =	77.205 × 1.56	120.440
b2.	—	D13	3.15 × 7 + 3.725 × 4 + (3.539 + 1.539)/2 × 9 + 1.425 × 18 =	(85.451 × 2) m × 0.995	170.048

290.488.

③ App. Slab.

		ℓ	n	w	W
═══	D13.	6.625	23.	0.995	151.613
———	D13.	4.55	32.	0.995	144.872.
					296.485kg.

Total (1082+291+297)×1.2 = 2,004 kg/unit

4. Form Works.

Less than 2.5m (FW1).

App. Slab.	0.4 × 4.7	= 1.888
END.	13.062 m² × 2.	= 26.124
Land Side.	2.5m × 5.5m.	= 13.750
F.W. Side.	2.677m × 5.5m	= 14.724
Wing.	1.5m² × 2	= 3.000.
		59.486 m².

Higher than 2.5m (FW2).

END.	25.145m² × 2.	50.290
Land (Main)	7.058m × 4.7m	33.173.
(Wing)	7.783m × 0.8m	6.226.
FW. Side.	7.326m × 5.5m.	40.293.
Wing.	13.265m² × 2	26.530
		156.512 m².

5. Rubble Stone Bedding.

6.35×5.8×0.2 = 7.366 m³

II EARTH WORKS.

EXCAVATION.

$74.807 m^2 \times 7.5 m + \frac{1}{3} 74.807 \times 9.5 \times 2 = 1034.830 m^3$

Backfill with Selected Soil.

$64.283 m^2 \times 7.5 m + \frac{1}{3} 174.807 \times 9.5 \times 2 = 955.900 m^3$.

III Miscellaneouse Works.

1. Expansion Joint. 5.5 m × 2 = 11 m.

2. Elastomeric Bearing Pad. (406 × 280 × 45). n = 6 nos.

3. PVC PIPE DRAIN φ100. 7pcs. × 0.5m × 2. = 7 m.

4. Hand rail $\ell = 1.7m \times 2. \times 2 := 68 m$.
   W = 12.2 kg/m W = 829.6 kg.

5. Conc Type. C_1.
   Curb. 0.056 × 16.6m × 2. V = 2.559 m^3.
   Handrail Post. 0.116 × 0.1 × 9 × 2 V = 0.021 m^3
   2.580 m^3.

6. Form Work. for(5).
   Curb. (0.474 + 0.461) × 16.6m × 2. 31.042.
   HR. Post. (0.116×2 + .165×0.1) × 9×2. 7.146.
   38.188 m^2

7. Name Plate 2 nos.

Ⅱ Super Structure.

1. Conc. Type B for Slab.

1.028 m² × 17m. = 17.476 m³

2. Re-Bars.

		L.	n	W	
D16	—	5.258 m	67	1.56	= 549.566
	~~	5.284 m	67	1.56	= 552.284
	——	16.585m	29	1.56	= 750.305

1852.155 kg.
×1.2×1.05
= 2340 kg.

D13 . Hand Rail.

⟨	2.324m × 2 × 9 × 2 × 0.995	= 83.246 kg
—	0.1m × 10 × 2 × 9 × 2 × 0.995	= 35.820 kg.
—	16.6m × 4 × 2. × 0.995	= 132.136 kg.
\	0.6m × 83 × 2 × 0.995	= 99.102 kg.

350.304 kg ×1.2×1.05

441.383 kg.

3. Form Work.

0.896 × × 16.6m × 2	29.747 m².
1.028 × 2.	2.056 m²
	31.803 m².

4. Pre-Cast. PC Beam.

195.26 m^3 × 3. = 585.78 m^3

5. P.C. Diaphragm.

End. 0.17×0.70 ×1.200 ×4 = 0.571 m^3.

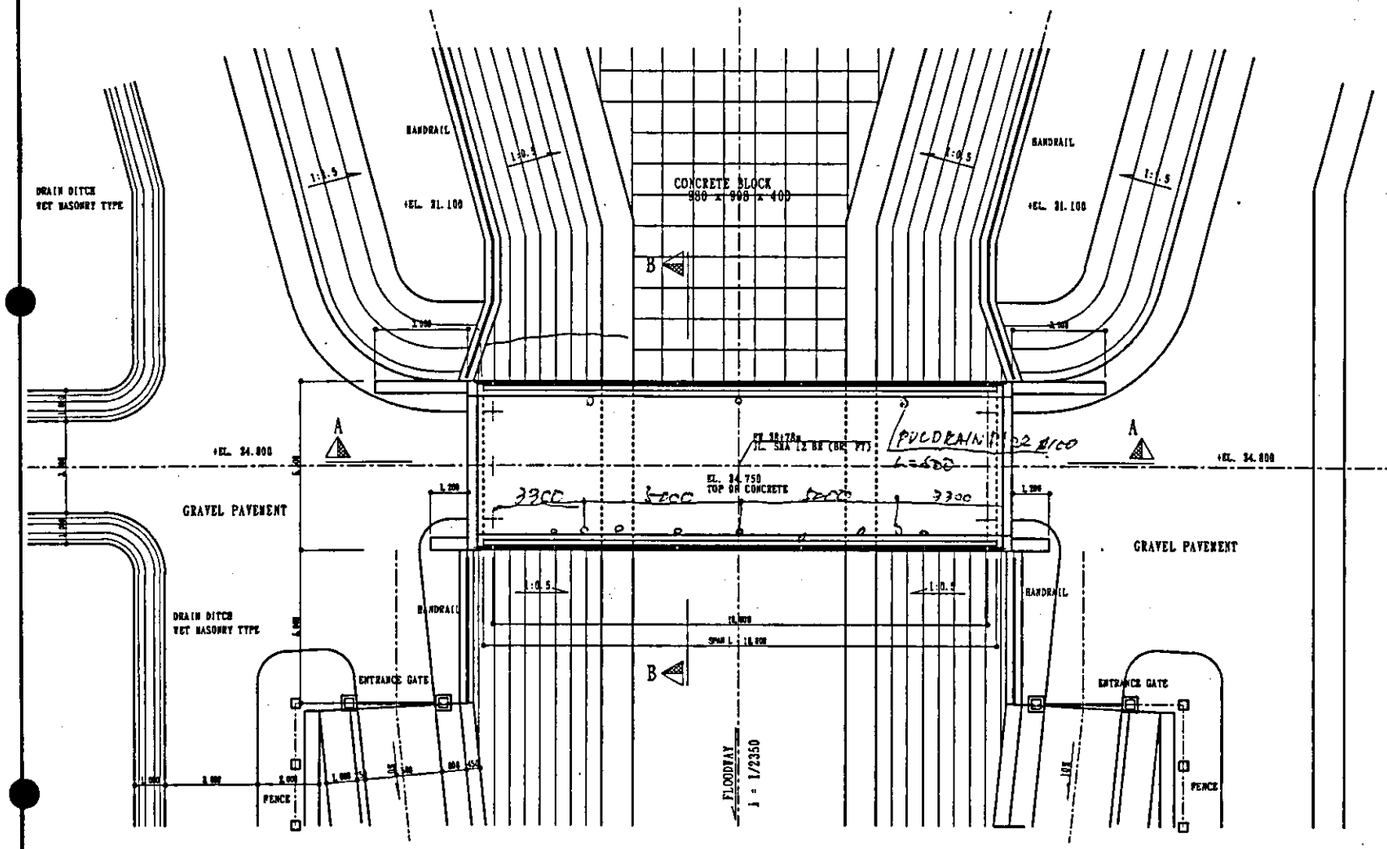
6. Panel for Slab.

1.0 × 1.58 × 0.070 = 0.1106 m^3/pc.

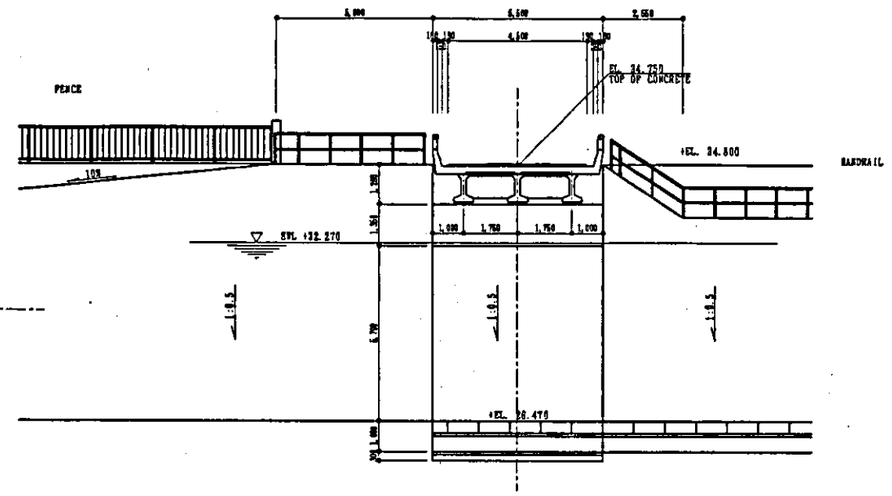
0.1106 × 16 × 2 = 3.539 m^3

Ⅳ Pavement.

(0.075+0.05)/2 × 4.5^m × 17.0$_m$ = 4.78 m^3.



PLAN
SCALE A



SECTION B-B
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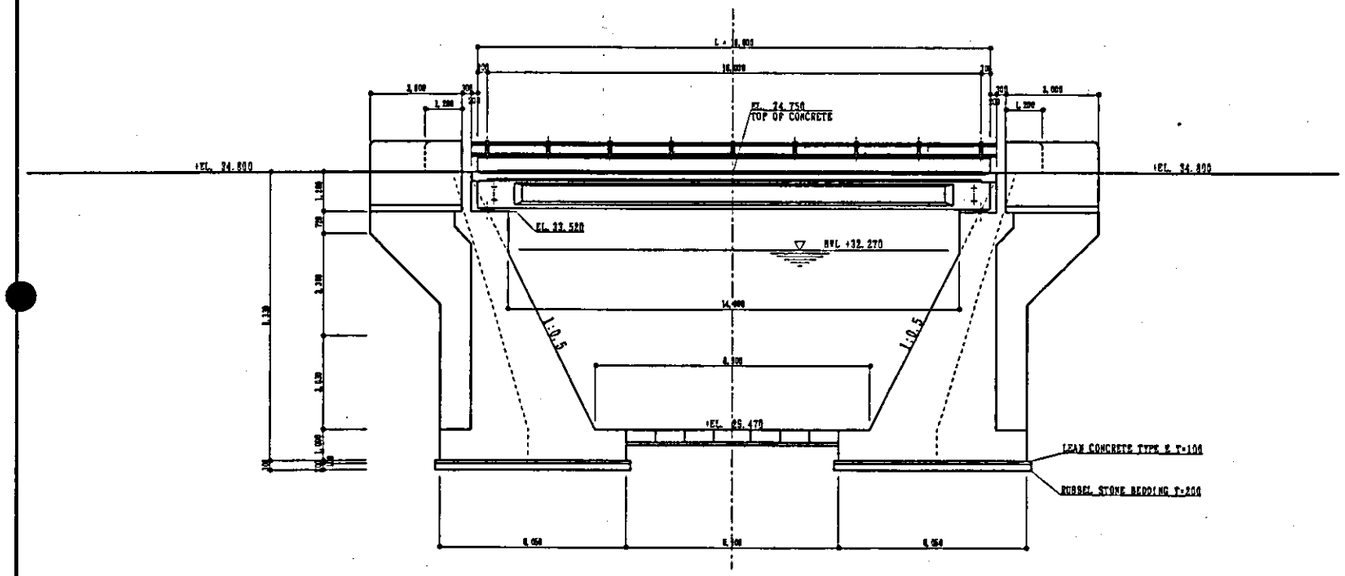

SECTION A-A
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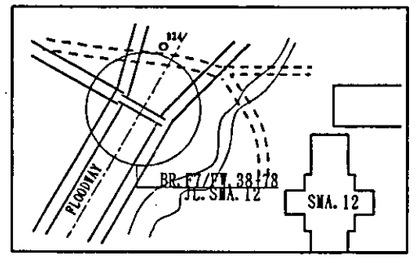


KYE PLAN
NOT TO SCALE

SCALES SCALE A (1:100)

REPUBLIC OF INDONESIA

MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
DIRECTOTATE OF TECHNICAL GUIDANCE

MEDAN FLOOD CONTROL PROJECT

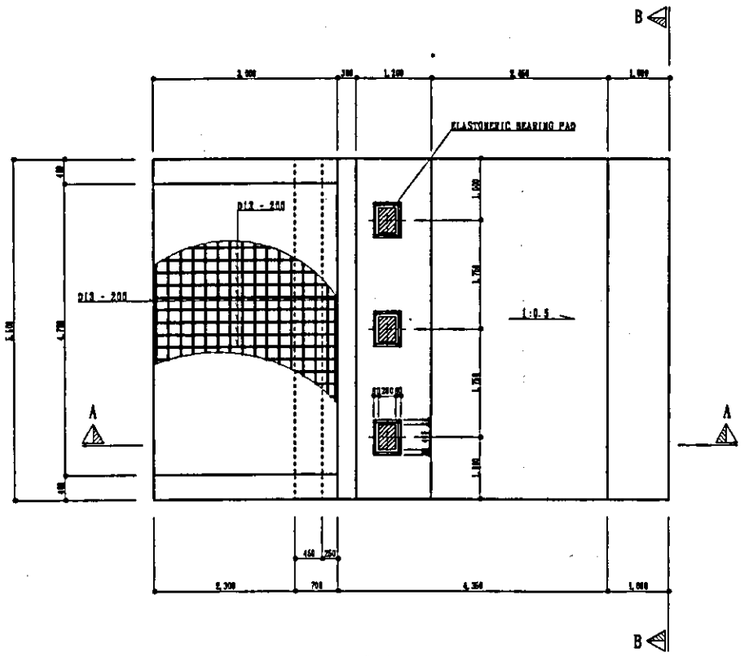
NO.	DATE	REVISIONS	ORIGINATED	APPROVED

PREPARED	CHECKED	SUBMITTED	CERTIFIED	APPROVED	DRAWING NO.

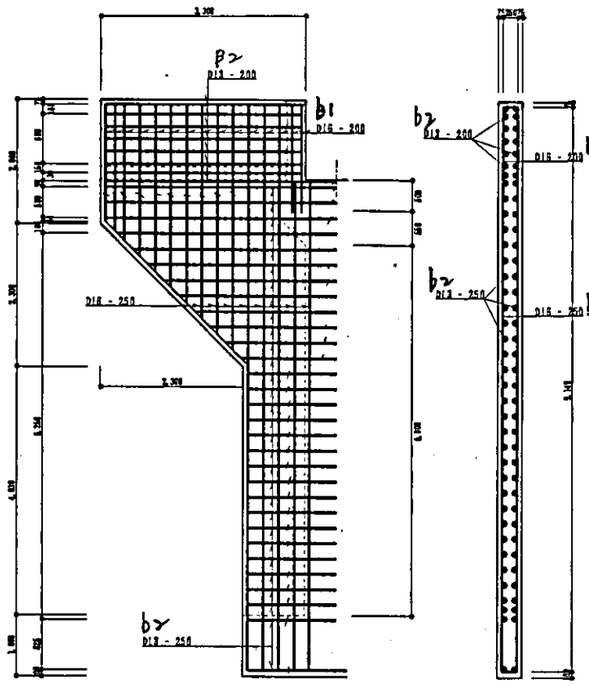
JAPAN INTERNATIONAL COOPERATION AGENCY
CTI ENGINEERING CO., LTD

PROYEK PENGEMBANGAN SUMBER AIR DAN PENGENDALIAN BANJIR SUMATERA UTARA .

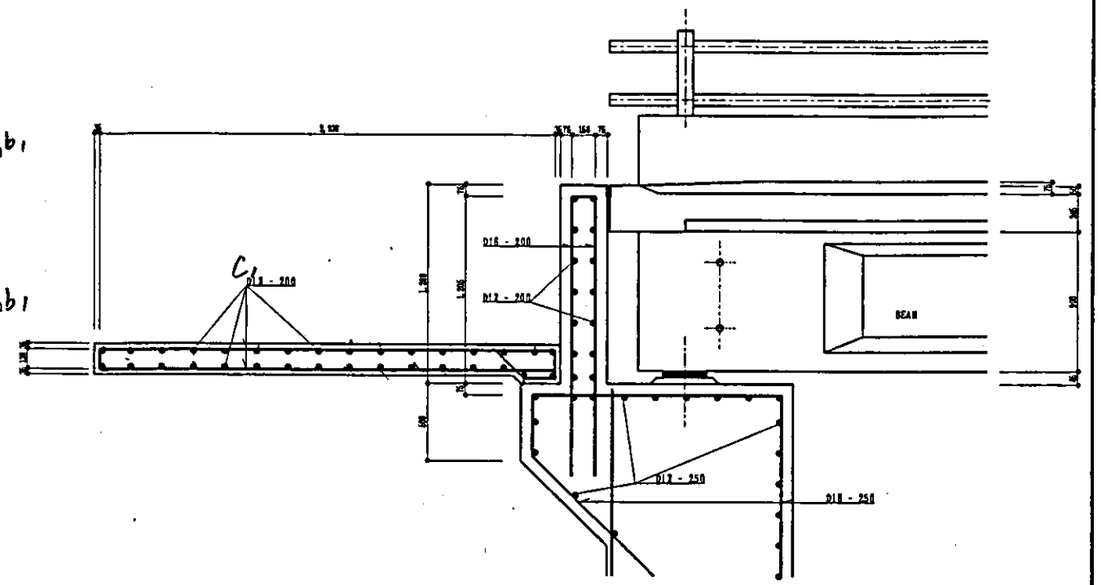
SHEET NO. | REV.



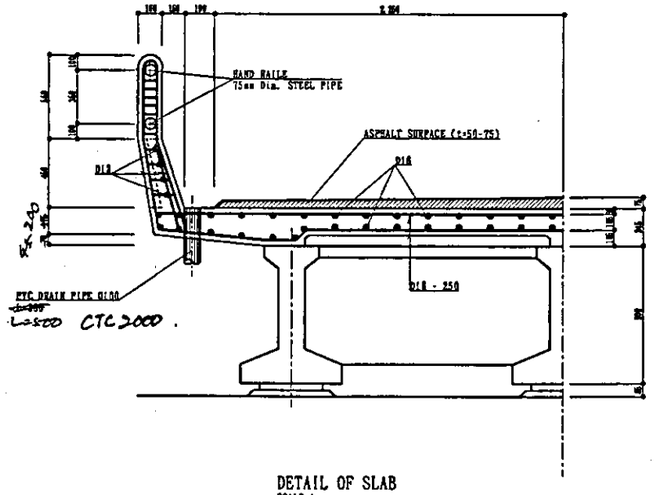
PLAN
SCALE A



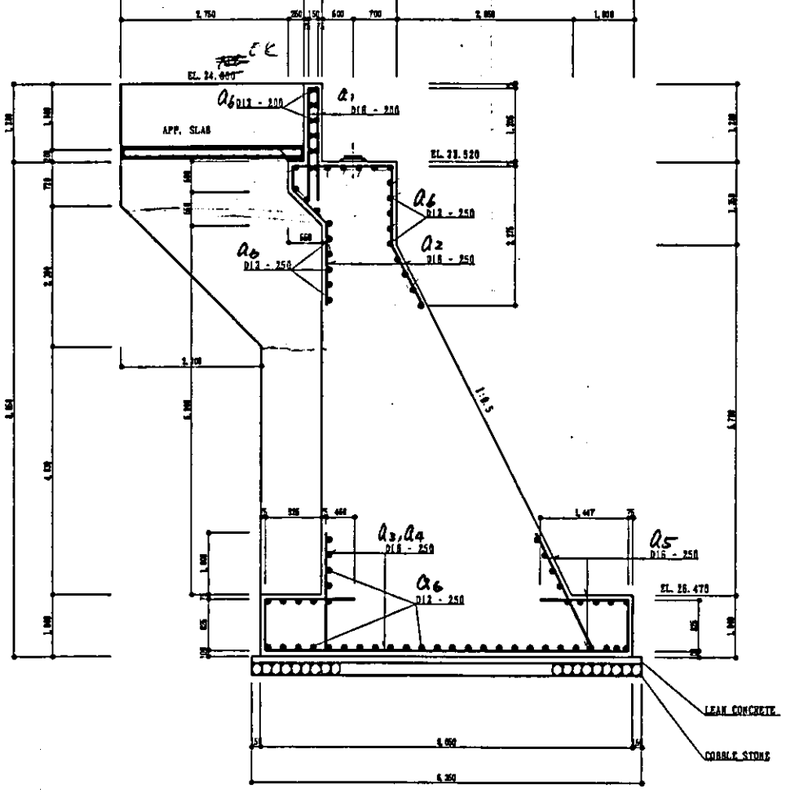
SECTION 1-1
SCALE A



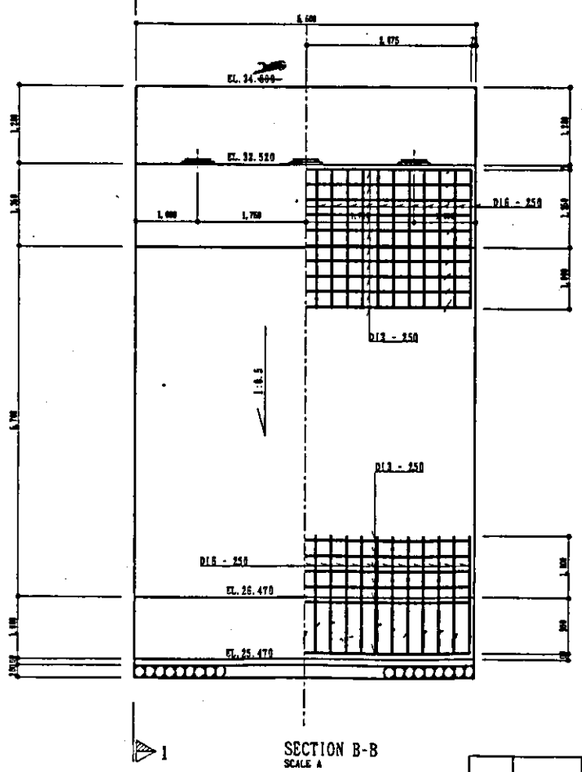
DETAILE OF DECK SLAB
SCALE B



DETAIL OF SLAB
SCALE A



SECTION A-A
SCALE A



SECTION B-B
SCALE A

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REPUBLIC OF INDONESIA

MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
DIRECTOTATE OF TECHNICAL GUIDANCE

MEDAN FLOOD CONTROL PROJECT

NO.	DATE	REVISIONS	ORIGINATED	APPROVED

PREPARED	CHECKED	SUBMITTED	CERTIFIED	APPROVED	DRAWING NO.

JAPAN INTERNATIONAL COOPERATION AGENCY
CTI ENGINEERING CO., LTD

PROYEK PENGELOAAN SUNGEI AIR DAN PENGENDALIAN BANJIR SUMATERA UTARA

SHEET NO. | REV.

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Pier Br F8 (Pendestrian Br) Br F8 (Gg. Saksama Br) DU : 19 + 00 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
footing	1	3.800	1.000	2.00	7.60
footing	2	3.800	1.000	2.00	7.60
column	3	1.100	7.000	2.00	15.40
column	4	2.000	7.000	2.00	28.00
bottom cap	5	1.000	2.000	4.00	8.00
cap	6	0.500	1.600	2.00	1.60
cap	7	1.600	2.500	2.00	8.00
cap	8	2.000	1.800	1.00	3.60
cap	9	1.200	2.000	1.00	2.40
cap	10	0.400	1.700	2.00	1.36
cap	11	2.000	1.000	1.00	2.00
			sum	=	85.56

Total = 2.00 x 85.56 sq.m

= 171.12 sq.m

pif8-fw

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment,Wing wall BR – F8 (Pendestrian Br) DU : 19 + 00 m (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.400	m	
area	=	0.126	m2	
H	=	7.000	m	
W	=	3.800	m	
L	=	3.00	m	

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
wall	1	0.30	1.200	0.36	3.00	1.00	1.08
wall	1a	1.90	1.800	3.42	3.00	1.00	10.26
Reduced of beam	1b	0.75	1.70	1.28	2.15	1.00	(2.74)
stem	2	0.55	0.500	0.28	3.00	1.00	0.83
stem	3	0.55	0.500	0.14	3.00	1.00	0.41
	4	1.15	0.500	0.58	3.00	1.00	1.72
stem	5	1.15	0.500	0.29	3.00	1.00	0.86
stem	6	1.00	4.800	4.80	3.00	1.00	14.40
footing	7	1.20	0.300	0.18	3.00	1.00	0.54
footing	8	1.60	0.300	0.24	3.00	1.00	0.72
footing	9	3.80	1.000	3.80	3.00	1.00	11.40
wingwall	10	3.00	1.200	3.60	0.40	2.00	2.88
wingwall	11	3.30	1.800	5.94	0.40	2.00	4.75
wingwall	12	1.60	2.700	4.32	0.40	2.00	3.46
wingwall	13	1.00	1.000	0.50	0.40	2.00	0.40
wingwall	14	1.60	0.300	0.24	0.40	2.00	0.19
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.126	x	6.00	x	0.10	(0.075)
						sum	51.09

Abutment & Pier

thick of pipe	=	0.07500	m			
inner diameter	=	0.400	–	0.150		
	=	0.250	m			
area	=	0.250	x	3.142	x	0.063
	=	0.0490	m2			
depth	=	2.000	m			
nos	=	6.000				
volume	=	0.049	x	2.000	x	6.00
	=	**0.59**	m3			
volume in side pipe piles	=	**0.5890**	x	4.000	m3	
	=	**2.3561**	m3			
sub total	=	51.088	m3			
	=	51.088	+	51.088	m3	
Total Abutmentt	=	**102.17**	m3			

Description	nos	Side	Depth	total	Remark
Supply and Driving of PC dia.400 mm for Abutment and Pier	24.00	R / L	10.00	240.00	

1/3

abF8–co

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Direcktorate General of Water Resources Development Directorate of River Medan Flood Control Project	Lean Concrte and Rubble Stone Br F8 DU 19 + 00 m Pendestrian Br	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Lean concrete (m3)

diameter of concrete pile = 0.400 m

area = 0.126 m2

Lean Concrete 0.10

4.1 m

width	length	area	depth	volume
m	m	m2	m	m3
4.10	3.30	13.53	0.10	1.35

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.10	m			
nos	=	6				
volume	=	0.126	x	0.10	x	6
	=	0.075	m3			
net volume	=	1.35	-	0.075		
	=	1.28	m3			
nos	=	4.00				
Total volume	=	4.00	x	1.28		
Grand Total	=	5.11	m3		(Abutment L & R)	

Rubble stone (m3)

diameter of concrete pile = 0.400 m

area = 0.126 m2

Rubble Stone 0.200

4.1 m

width	length	area	depth	volume
m	m	m2	m	m3
4.10	3.30	13.53	0.20	2.71

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.20	m			
nos	=	6				
volume	=	0.126	x	0.20	x	6
	=	0.151	m3			
net volume	=	2.71	-	0.151		
	=	2.56	m3			
nos	=	4.00				
Total volume	=	4.00	x	2.56		
Grand Total	=	10.22	m3		(Abutment L & R)	

lc-f8

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Pier BR – F8 (Gg. Seksama Br) DU : 19 + 00	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles dia. = 0.400 m
area = 0.126 m2

describtion	part	width m	depth m	area m2	length m	nos	volume m3
footing	1	3.800	1.000	3.800	3.800	1.000	14.440
footing	2	2.900	0.300	0.870	3.800	1.000	3.306
column	3	1.250	7.000	8.750	2.000	1.000	17.500
cap	4	1.750	0.500	0.875	2.000	1.000	1.750
cap	5	1.250	0.500	0.625	2.000	1.000	1.250
cap	6	1.250	1.200	1.500	2.000	1.000	3.000
block out	7	0.400	0.250	0.100	2.000	1.000	0.200
cap	8	1.625	1.000	1.625	1.250	1.000	2.031
Reduced by End block	9	0.500	1.000	0.500	1.250	1.000	(0.625)
cap	10	1.625	1.700	2.762	1.250	1.000	3.453
Reduced by End block	11	0.750	1.700	1.275	1.250	1.000	(1.594)
pipe reducing		area	x	nos pipe	x	depth	
		0.126	x	12.000	x	0.100	(0.151)
						sum	44.561
		Grand Total	2.00	x	44.561		89.122

co–pif8

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br F8 DU 19 + 00 m (Pendestrian Br) (Gg. Saksama Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing stell inside pile (kg)

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.25	2.30			2.55	6.00	8	20.40	1.560	31.824
2.	R1	13		0.55				0.55		12	6.60	0.995	6.567
3.	Ring	13											
												sum	38.39

Total weight	=	6.00	x	38.391	=	230.35	kg
Grand total	=	4.00	x	230.35	=	**921.38**	kg

inb-f8

Direktorat General of Water Resources Development Direktorat of River Medan Flood Control Project	Abutment,Wing Wall Br F8 (Pendestrian Br) (Gg. Saksama Br) DU : 19 + 00 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
wall	1	0.300	1.200	2.00	0.72
wall	1a	1.200	3.000	1.00	3.60
wall	1b	1.200	2.200	1.00	2.64
wall of beam	1c	1.900	1.800	2.000	6.84
wall of beam	1d	0.500	1.900	2.000	1.90
stem	2	0.500	0.550	2.00	0.55
stem	2a	0.500	2.200	1.00	1.10
stem	3	0.500	0.550	2.00	0.28
stem	3a	0.750	2.200	1.00	1.65
stem	4	0.500	2.150	2.00	2.15
	4a	0.500	3.000	1.00	1.50
stem	5	0.500	1.000	2.00	0.50
	5a	1.200	3.000	1.00	3.60
stem	6	1.000	4.800	2.00	9.60
stem	6a	4.500	3.000	1.00	13.50
stem	6b	4.500	3.000	1.00	13.50
footing	7	1.200	0.300	2.00	0.36
footing	8	1.600	0.300	2.00	0.96
footing	9	3.800	1.000	2.00	7.60
footing	10	1.000	3.000	2.00	6.00
wingwall	11	1.200	3.000	4.00	14.40
wingwall	11a	0.400	1.200	2.00	0.96
wingwall	12	3.300	1.800	4.00	22.94
wingwall	13	0.400	1.800	2.00	1.44
wingwall	14	1.000	1.000	4.00	2.00
wingwall	14a	1.600	2.700	4.000	17.280
wingwall	14b	0.400	1.000	2.000	0.800
wingwall	14c	0.300	2.300	4.000	1.38
			sum	=	139.74

Total = 2.00 x 139.74
= 279.48 sq.m

abF8-fw

Direktorat General Water Resources Development Direktorat General Medan Flood Control	DECK SLAB AND HAND RAIL Br F8 DU 19 + 08 m (Pendestrian Br)	japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Wooden form works with supporting frame (L = 60.00 m)

Section	Part	width m	length m	area m2	nos	total area m2
side walk						
L/s & R/s	(1)	0.00	3.00	0.00	2.00	0.00
end slab	(2)	0.30	3.00	0.90	6.00	5.40
	(3)	0.00	3.00	0.00	2.00	0.00
	(4)	0.00	1.50	0.00	4.00	0.00
out side walk	(5)	0.20	60.00	12.00	2.00	24.00
in side walk	(6)	0.47	60.00	28.20	2.00	56.40
out side walk	(7)	0.47	60.00	28.20	2.00	56.40
Railing post	(8)	0.10	0.92	0.09	60.00	5.52
Railing post	(9)	0.16	0.45	0.07	120.00	8.64
Railing post	(10)	0.14	0.45	0.06	120.00	7.29
					sum	163.65
					numbers of span =	1.00
total	=	163.65	x	1.00	=	163.65
	=	163.65	m2			

Scafolding (L = 60.00 m)

Section	Part	width m	length m	area each m2	nos	total area m2
side walk						
L/s & R/s	(1)	1.33	60.00	79.50	2.00	159.00
end slab	(2)	0.20	3.00	0.600	6.00	3.60
					sum	162.60
					numbers of span =	1.00
total	=	1.00	x	162.60	=	162.60
	=	162.60	m2			

Grand total form Work = 163.65 m2

Grand total Scafolding = 162.60 m2

Galvanized Hain rail = 4.00 x 60.00 = 2,707.20 Kg

f-wrkbF8

Direktorat General of Watrer Resources Development Direktorat of River Medan Flood Control	SUPERSTRUCTURE Br. F8 DU 19 + 00 m	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Structural concrete Class K 350 (for deck slab) (m3)

a.Slab deck K.350 **Length = 60.00 m**

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
slab perpendicular	(1)	0.200	3.000	0.600	1.000	0.600	60.400	36.240
End slab	(2)	0.000	0.500	0.000	2.000	0.000	4.250	0.000
End slab	(3)	0.150	0.200	0.030	6.000	0.180	3.000	0.540
							sum	**36.780**

b.Side walk K.350

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Left Side slab	(4)	0.000	1.500	0.000	1.000	0.000	60.400	0.000
Right Side slab	(5)	0.000	1.500	0.000	1.000	0.000	60.400	0.000
							sum	**0.000**

Total Volume K.350 = 36.780 + 0.000

= **36.780** m3

Structural concrete Class K 225 (for Side Walk) (m3)

Section	Part	depth	width	area	nos	tot.area	length	total
		m	m	m2		m2	m	m3
Railing post	(6)	0.100	0.160	0.016	62.000	0.992	0.550	0.546
Railing post	(7)	0.165	0.160	0.026	62.000	1.637	0.470	0.769
slab side Walk	(8)	0.000	1.266	0.000	2.000	0.000	60.400	0.000
Wall	(9)	0.470	0.100	0.047	2.000	0.094	55.200	5.189
							sum	**6.504**

Total Volume K.225 = **6.504** m3

Grand Total K.350 = **36.78** m3

Grand Total K.225 = **6.503696** m3

slab –F8

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	MAIN BEAM Br F8 DU 19 + 00 m (Gg. Saksama Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

Section	Shape steel Type	ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(1)	13	1.45		1.45	0.50		3.40	4	13.60	0.995	13.532	outer Beam
(l = 5.077 m)	(2)	16	0.45	0.70		0.70		1.85	7	12.95	1.560	20.202	and end Block
2 nos	(3)	13	1.32		1.32	0.55	0.40	3.59	4	14.36	0.995	14.288	
	(4)	13	1.80					1.80	2	3.60	0.995	3.582	
	(5)	13		0.30	0.55	0.30		1.15	3	3.45	0.995	3.433	
	(6)	16	1.45		1.45	1.50		4.40	2	8.80	1.560	13.728	
	(7)	13		0.46	0.55	0.46	0.30	1.77	7	12.39	0.995	12.328	
	(8)	16		1.75	0.55	1.75		4.05	7	28.35	1.560	44.226	
	(9)	13	4.98					4.98	6	29.86	0.995	29.713	
(I)	(10)	16		0.10	0.45	0.10	0.10	0.75	70	52.50	1.560	81.900	
	(11)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(12)	13		1.75	0.08	1.75		3.58	15	53.70	0.995	53.432	
	(13)	13	4.78					4.78	14	66.88	0.995	66.544	
	(14)	13		0.46	0.55	0.46	0.30	1.77	8	14.16	0.995	14.089	
	(15)	13	0.45	0.40		0.40	0.30	1.55	8	12.40	0.995	12.338	
	(16)	16	1.15	0.20	1.15	0.20	0.26	2.96	2	5.92	1.560	9.235	
	(17)	13		0.30		0.30		0.60	8	4.80	0.995	4.776	
											sum	410.449	
						sub total	:	410.449	x	2.000	=	820.898	

Section	Shape steel Type	ø	a	b	c	d	2 x e	length per each	total Nos.	total length	weight kg/m'	total weight kg	Remark
Segment	(18)	13		1.75	0.08	1.75		3.58	10	35.80	0.995	35.621	
(l = 4.500 m)	(19)	13	4.40					4.40	20	88.00	0.995	87.560	
2 nos	(20)	13	0.45	0.40		0.40	0.30	1.55	10	15.50	0.995	15.423	
	(21)	13		0.46	0.55	0.46	0.30	1.77	10	17.70	0.995	17.612	
(II)	(22)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(23)	13		0.30		0.30		0.60	10	6.00	0.995	5.970	
											sum	175.289	
						sub total	:	175.289	x	2.000	=	350.578	
Inner Beams	(24)	13		1.75	0.08	1.75		3.58	14	50.12	0.995	49.869	
(l = 6,466 m)	(25)	13	6.35					6.35	20	126.92	0.995	126.285	
1 nos	(26)	13	0.45	0.40		0.40	0.30	1.55	14	21.70	0.995	21.592	
(III)	(27)	13		0.46	0.55	0.46	0.30	1.77	14	24.78	0.995	24.656	
	(28)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(29)	16		0.30		0.30		0.60	14	8.40	0.995	8.358	
											sum	243.864	
						sub total	:	243.864	x	1.000	=	243.864	
	(30)	13		1.75	0.08	1.75		3.58	13	46.54	0.995	46.307	
Inner Beams	(31)	13	5.90					5.90	20	118.00	0.995	117.410	
(l = 6,000 m)	(32)	16	0.45	0.40		0.40	0.30	1.55	13	20.15	0.995	20.049	
1 nos	(33)	13		0.46	0.55	0.46	0.30	1.77	13	23.01	0.995	22.895	
(IV)	(34)	16		2.02	0.16	2.02		4.20	2	8.40	1.560	13.104	
	(35)	13		0.30		0.30		0.60	13	7.80	0.995	7.761	
											sum	227.527	
						sub total	:	227.527	x	1.000	=	227.527	
Exterior Beam	(36)	16	1.15	0.20	1.15		0.26	2.76	2	5.52	1.560	8.611	
(V)	(37)	16	0.55	0.15	0.55		0.26	1.51	5	7.55	0.995	7.512	
2 nos	(38)	13	0.75		0.75	0.08	0.16	1.74	5	8.70	0.995	8.657	
											sum	24.780	
						sub total	:	24.780	x	2.000	=	49.560	

Total 1 pcs (31.60 Span) = 1,692.427 Kg

Total 1 pcs (31.60 Span) = 1.00 x 1,692.43 Kg

= 1,692.43 Kg

mb–rf8

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Direktorat General of Water Resources Development Direktorat of River Medan Flood Control	MAIN BEAM Br F8 DU : 19 + 00 m (13.60 Span)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steel

		Shape steel						length	total	total	weight	total weight	Remark
Section	Type	ø	a	b	c	d	2 x e	per each	Nos.	length	kg/m'	kg	
Segment	B1	13	0.700	0.820	0.120	0.820		2.460	20	49.20	0.995	48.954	outer of Beam
(l = 5.0765 m)	B2	13		0.150	0.270	0.150		0.570	6	3.42	0.995	3.403	and end Block
2 nos	B3	13		0.820	0.570	0.820		2.210	6	13.26	0.995	13.194	
	B4	13		0.600	0.270	0.300		1.170	20	23.40	0.995	23.283	
	B5	13		0.680	0.570	0.300		1.550	20	31.00	0.995	30.845	
	B6	16	3.058	0.400		0.420		3.878	4	15.51	1.560	24.199	
	B7	16	5.026					5.026	9	45.23	1.560	70.565	
	B8	16	1.000			0.120		1.120	8	8.96	1.560	13.978	
	B9	13	0.900			0.200		1.100	2	2.20	0.995	2.189	
											sum	230.609	
					Sub Total		:	2.000	x	230.6089	=	461.218	
Segment	B10	13	0.700	1.170	0.120	1.170		3.160	14	44.24	0.995	44.019	
(l = 3.153 m)	B11	13		0.600	0.270	0.150		1.020	14	14.28	0.995	14.209	
1 nos	B12	13		0.680	0.570	0.300		1.550	14	21.70	0.995	21.592	
	B13	16	3.073					3.073	17	52.24	1.560	81.496	
	B14	13	1.000			0.120		1.120	16	17.92	0.995	17.830	
	B15	16		0.500		0.200		0.700	4	2.80	1.560	4.368	
	B16	13		0.550		0.220		0.770	4	3.08	0.995	3.065	
											sum	186.578	
					Sub Total		:	1.000	x	186.578	=	186.58	

Total for 1 pcs (13.60 m) = 647.796 Kg

Grand Total for 2 pcs (13.60 m) = 2 x 647.796 Kg

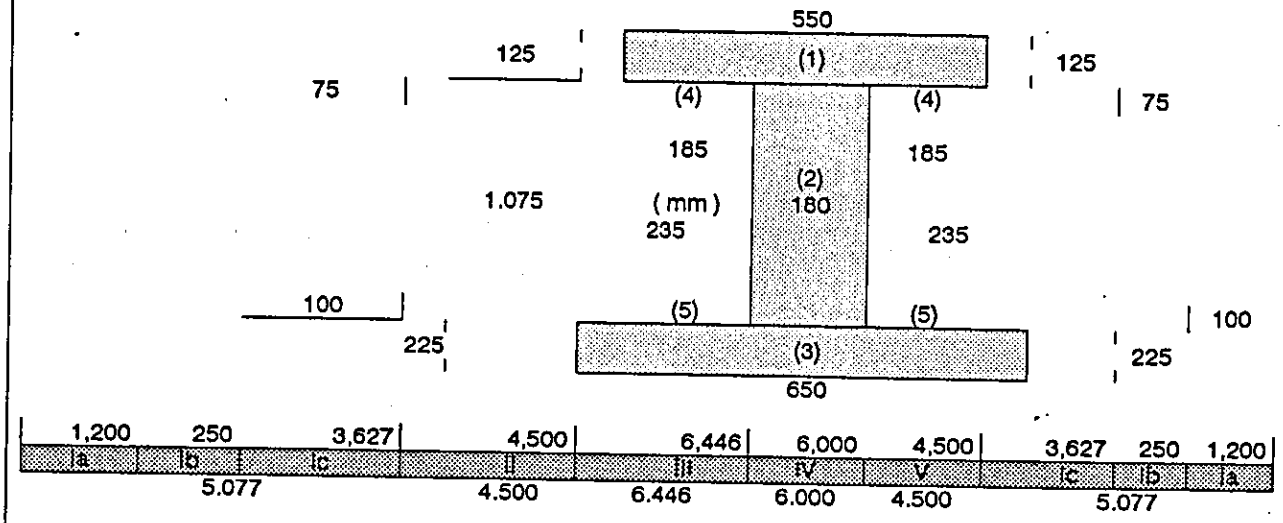
= 1,295.59 Kg

mb-rf8a

Directorate General Water Resources Development Directorate of River Medan Flood Control Project	Main Beam Br F8 DU 19 + 00 m (Pendestrian Br) (Gg. Saksama Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K–400,l = 31.60 m

Main Beam Section



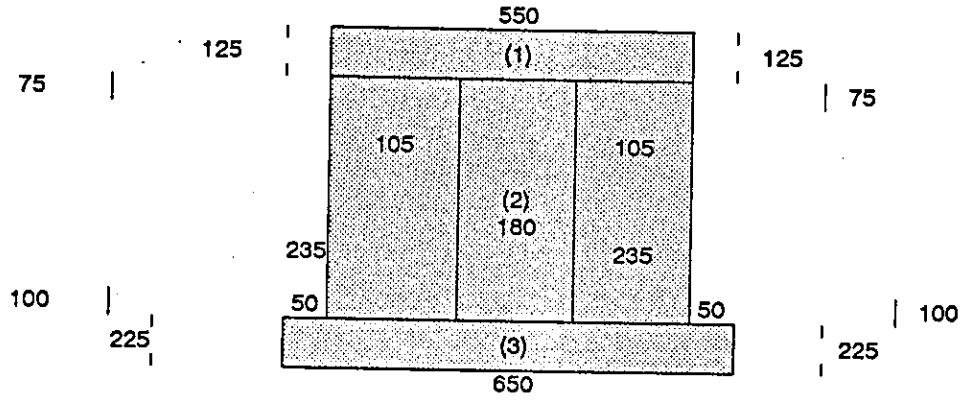
Total length = 31.60 m

1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.180	1.250	1.000	0.225
(3)	0.650	0.225	1.000	0.146
(4)	0.185	0.075	2.000	0.014
(5)	0.235	0.100	2.000	0.024
			sum	
	area section main beam		=	0.4774

Volume 1 = area x length
= 0.477 x 31.60
= 15.09 m3

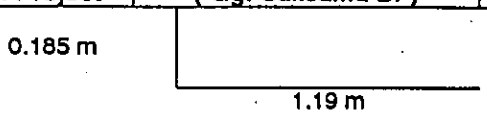
End Block Section L = 1.200 m



2. Bearing Block Area

piece	width m	depth m	nos	total area m2
(1)	0.550	0.125	1.000	0.069
(2)	0.550	1.250	1.000	0.688
(3)	0.650	0.225	1.000	0.146
		1.600	sum	0.903

1075
1250



End Block Section L = 0.25 m

depth = (1.075 + 1.30) : 2
= 1.19 m
area = width x depth
= 0.185 x 1.19
= 0.220 m2

section	area	length	nos	volume
	m2	m		m3
Ia	0.9025	1.200	1.00	1.083
Ib	0.2197	0.250	1.00	0.055
Ic	0.4774	3.627	1.00	1.731
II	0.4774	4.500	1.00	2.148
III	0.4774	6.446	1.00	3.077
IV.	0.4774	6.000	1.00	2.864
V	0.4774	4.500	1.00	2.148
Ic	0.4774	3.627	1.00	1.731
Ib	0.2197	0.250	1.00	0.055
Ia	0.9025	1.200	1.00	1.083
	sum	31.60		15.9765

Block out Cross beam

width		depth	area	length	nos	volume
top	bottom					
m	m	m	m2	m	m	m3
0.400	0.60	0.185	0.0925	1.1875	4	0.439

volume per beam = 15.9765 + 0.439 = 16.416 m3

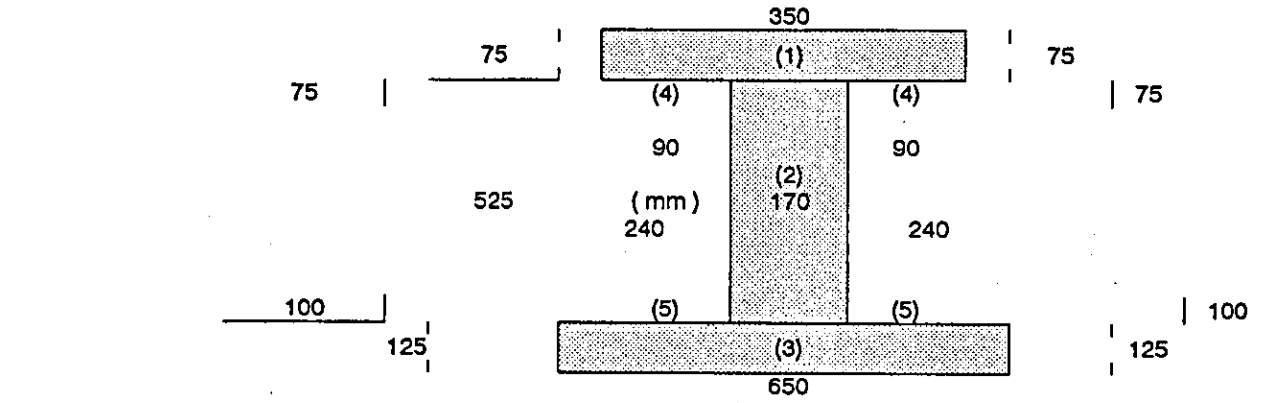
Grand Total = 1.00 x 16.416 m3

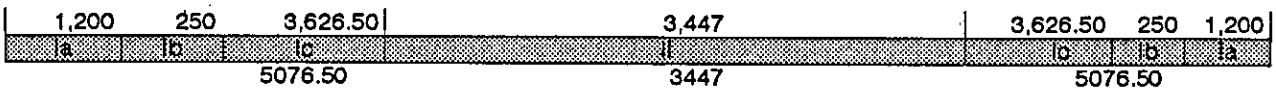
= 16.42 m3

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br F8 DU 19 + 00 m (Gg. Saksama Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :

Precast Prestressed Concrete K–400,l = 13.60 m

Main Beam Section





Total length = 13.60 m

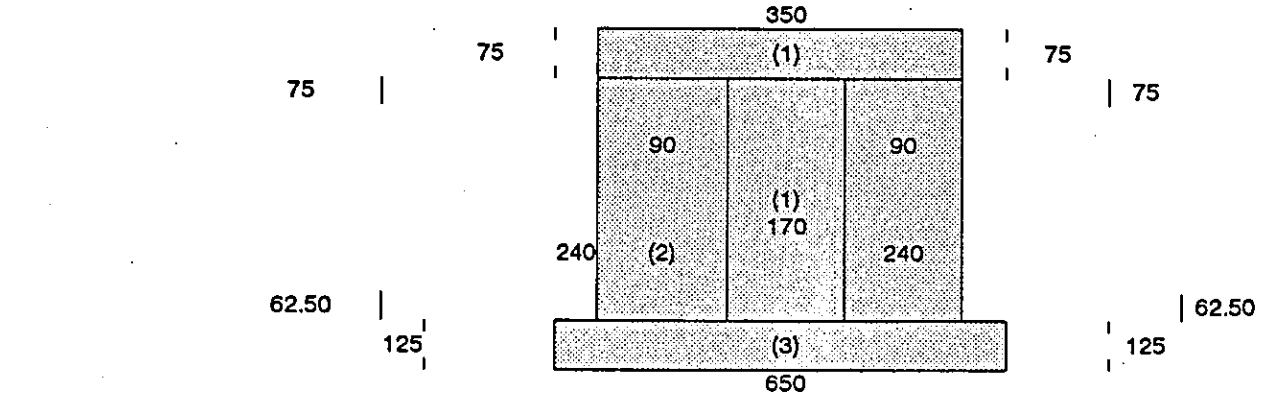
1. Main Beam Area

piece	width m	depth m	nos	area m2
(1)	0.350	0.075	1.000	0.026
(2)	0.170	0.525	1.000	0.089
(3)	0.650	0.125	1.000	0.081
(4)	0.090	0.075	2.000	0.007
(5)	0.240	0.100	2.000	0.024
			sum	

area section main beam = 0.22750

Volume 1 = area x length
= 0.22750 x 13.60
= 3.094 m3

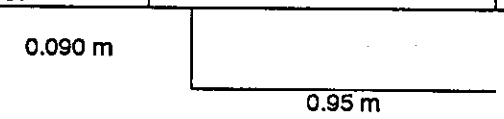
End Block Section L = 1.200 m



2. Bearing Block Area

piece	width m	depth m	nos	total area m2
(1)	0.350	0.713	1.000	0.249
(2)	0.240	0.063	1.000	0.015
(3)	0.650	0.125	1.000	0.081
		0.900	sum	0.3456

Direktorat General Water Resources Development Direktorat of River Medan Flood Control	Main Beam Br F8 DU 19 + 00 m (Gg. Saksama Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated :



length = 0.25 m

End Block Section L = 0.25 m

depth = (0.525 + 0.725) : 2
= 0.63 m

area = width x depth
= 0.09 x 0.63
= 0.0562 m2

section	area	length	nos	volume
	m2	m		m3
Ia	0.34563	1.200	1.00	0.415
Ib	0.05625	0.250	1.00	0.014
Ic	0.22750	3.627	1.00	0.825
II	0.08925	3.447	1.00	0.308
Ic	0.22750	3.627	1.00	0.825
Ib	0.05625	0.250	1.00	0.014
Ia	0.34563	1.200	1.00	0.415
	sum	13.60		2.815

Total volume = 2.815 m3

Grand Total volume = 2.00 x 2.81532 m3

= 5.630654 m3

mb-cf8

2/2

	MAIN BEAM (L = 13.60 m) Br F8 DU : 19 + 00 m (Gg. Saksama Br)	

Tendom (H.T.W) diameter 13 mm

$$S = -l^2/8.f \times [\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}] - [\{2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2.ln.[\{4.f/l\}+@sqrt(4.f/l)^2+1)$$

(a)	=	$l^2/8.f$			
(b)	=	$2.f/l$			
(c)	=	$4.f/l$			
(d)	=	$(4.f/l)^2$			
(e)	=	$(4.f/l)^2 + 1$			
(f)	=	$@sqrt((4.f/l)^2 + 1)$	=	@sqrt (e)	
(g)	=	$-2.f/l.@sqrt((4.f/l)^2+1)$	=	−(b) x (f)	
(h)	=	$-4f/l+@sqrt(4f/l)^2+1$	=	(−c) + (f)	
(i)	=	$1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$	=	1/2xln (h)	
S1	=	$[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$		=	(g) + (i)
(k)	=	$-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\}$	=	(b) x (f)	
(l)	=	$[\{4.f/l\}+@sqrt(4.f/l)^2+1)$	=	(c) + (f)	
(m)	=	$1/2.ln.[\{4.f/l\}+@sqrt(4.f/l)^2+1)$	=	1/2 x ln(l)	
S2	=	$-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l\}+@sqrt(4.f/l)^2+1)$		=	(k) + (m)

$$S = (-a) \times [(S1) - (S2)]$$

S is length of parabola curve

1/2

M A I N B E A M (L = 13.60 m)
Br F8 DU : 19 + 00 m
(Gg. Saksama Br)

Tendom (H.T.W) diameter 13 mm

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.276	15.600	110.417	0.035	0.071	0.005	1.005	1.002	(0.035)	0.932	(0.035)	(0.071)	0.035	1.073	0.035	0.071	15.613
2	0.276	15.600	110.417	0.035	0.071	0.005	1.005	1.002	(0.035)	0.932	(0.035)	(0.071)	0.035	1.073	0.035	0.071	15.613
3	0.276	15.600	110.417	0.035	0.071	0.005	1.005	1.002	(0.035)	0.932	(0.035)	(0.071)	0.035	1.073	0.035	0.071	15.613
																total	46.84

f = Average

nos wire per tendon = 6 nos

sum of tendon length = 6 x 46.838 = 281.03 m

Total per beam = 0.8 x 281.0 x 1.00 = 224.82 kg

Grand Total per beam = 2.00 x 224.83 = 449.65 kg

Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR F8 DU 19 + 00 M (Pendestrian Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

$$S = -l^2/8.f \times [\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}] - [\{2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$$

(a) = $l^2/8.f$
(b) = $2.f/l$
(c) = $4.f/l$
(d) = $(4.f/l)^2$
(e) = $(4.f/l)^2 + 1$

(f) = $@sqrt((4.f/l)^2 + 1)$ = $@sqrt(e)$
(g) = $-2.f/l.@sqrt((4.f/l)^2+1)$ = $-(b) \times (f)$
(h) = $-4f/l+@sqrt(4f/l)^2+1$ = $(-c) + (f)$
(i) = $1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = $1/2 x ln\ (h)$
S1 = $[\{-2.f/l.@sqrt((4.f/l)^2+1)\} + 1/2\ ln[\{-4f/l+@sqrt(4f/l)^2+1\}]$ = $(g) + (i)$

(k) = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\}$ = $(b) \times (f)$
(l) = $[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = $(c) + (f)$
(m) = $1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = $1/2 \times ln(l)$
S2 = $-[\{2.f/l.@sqrt((4.f/l)^2 + 1)\} + 1/2.ln.[\{4.f/l)+@sqrt(4.f/l)^2+1)$ = $(k) + (m)$

S = $(-a) \times [(S1) - (S2)]$

S is length of parabola curve

te−F8

1/2

Dikcorate General of Water Resources Development Dikcorate of River Medan Flood Control Project	MAIN BEAM BR F8 DU 19 + 00 M (Pendestrian Br)	Japan International Cooperartion Agency Date Nos of Sheet Preparated by

Tendom (H.T.W) diameter 13 mm

Tendom (H.T.W) diameter 13 mm (L = 31.60 m)

tendon no	f m	l m	(a) m	(b) m	(c) m	(d) m	(e) m	(f) m	(g) m	(h) m	(i) m	S1 m	(k) m	(l) m	(m) m	S2 m	S m
1	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
2	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
3	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
4	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
5	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
6	0.547	33.600	257.989	0.033	0.065	0.004	1.004	1.002	(0.033)	0.937	(0.033)	(0.065)	0.033	1.067	0.033	0.065	33.624
					total												201.742

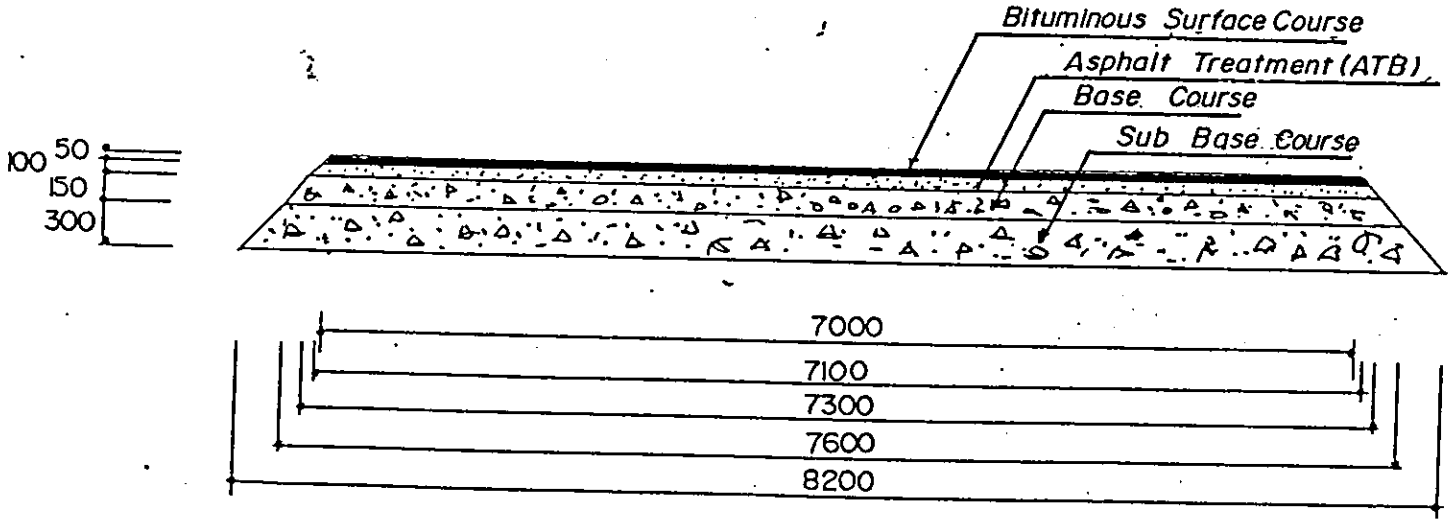
f = Average

nos wire per tendon	=	7	nos				
sum of tendon length	=	7	x	201.742	=	1,412.20	m
Total per beam	=	0.8	x	1,412	=	1,129.76	kg
Grand Total (1 Beam)	=	1.00	x	1,129.76	=	1,129.76	kg

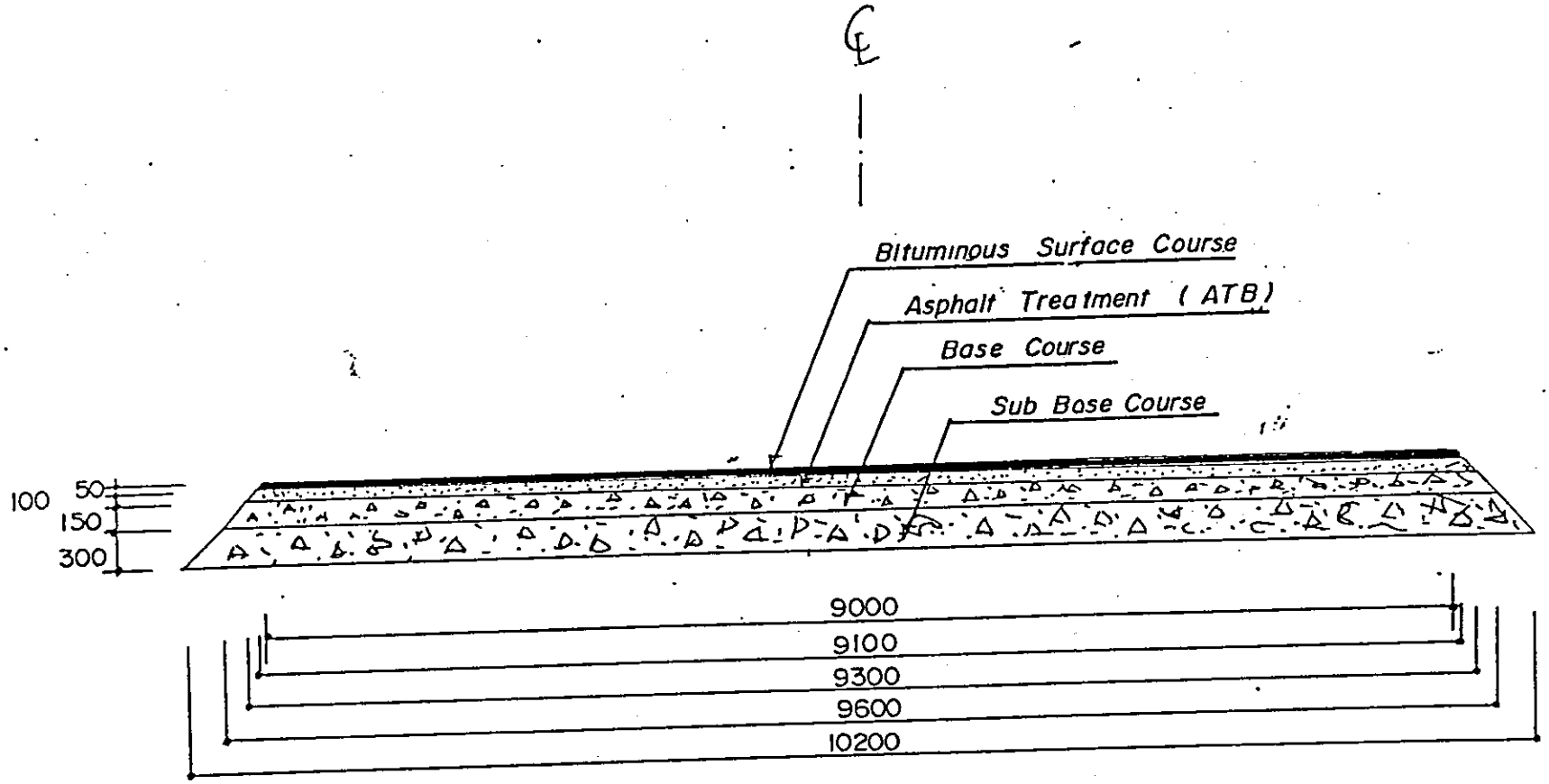
te-F8

2/2

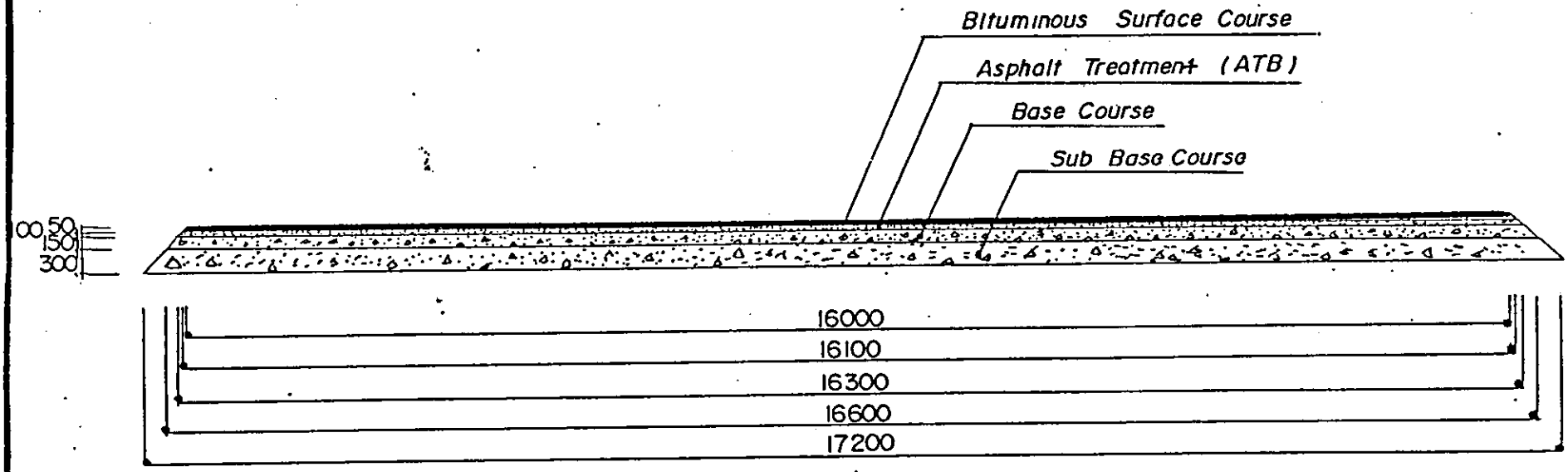
Scale 1 : 50


Bituminous Surface Course
Asphalt Treatment (ATB)
Base Course
Sub Base Course
100
50
150
300
7000
7100
7300
7600
8200

Scale 1 : 50


℄
Bituminous Surface Course
Asphalt Treatment (ATB)
Base Course
Sub Base Course
100
50
150
300
9000
9100
9300
9600
10200

Scale 1 : 75


Bituminous Surface Course
Asphalt Treatment (ATB)
Base Course
Sub Base Course
50
150
300
16000
16100
16300
16600
17200

(2)

200
250
100
Wet masonry
Concrete. type C,
200
250
Variable
Back fill Gravel
Concrete type C,
550
1.00
550
Lean Concrete type E.

7-337

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Water Pipe Bridge (WB 1 Sta PE 255 + 10 m Percut River	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Sheet :

FIGURE	CALCULATION

Part									
					Weight	nos			
1. Steel pipe dia. 600 mm									
	= 48.00	x	1.00	x	187	2.00	=	17,952.00	Kg
2. Profile Steel 130 x 130 x 16									
	= 38.50	x	1.00	x	30.90	x 4.00	=	4,758.60	Kg
3. Profile Steel 100 x 100 x 20									
	= 41.00	x	1.00	x	28.40	x 4.00	=	4,657.60	Kg
4. Profile Plate									
	= 0.30	x	0.14	x	0.08	x 108.00	=	2,848.61	Kg
5. Profile Steel 80 x 80 x 14									
	= 1.80	x	1.00	x	16.10	x 52.00	=	1,506.96	Kg
Profile Steel 80 x 80 x 14									
	= 1.80	x	1.00	x	16.10	x 52.00	=	1,506.96	Kg
6. Profile Steel 60 x 60 x 9									
	= 2.40	x	2.00	x	8.690	x 28.00	=	1,167.94	Kg
Profile Steel 60 x 60 x 9									
	= 2.40	x	2.00	x	8.690	x 28.00	=	1,167.94	Kg
7. Profile Steel 50 x 30 ---> t = 16 mm (50 nos)									
	= 0.50	x	0.30	x	0.016	x 54.00	=	1,017.36	Kg
8. Profile Steel 50 x 50 x 9 mm (WIND BRACING) -> top									
	= 2.75	x	1.00	x	8.690	x 6.00	=	143.39	Kg
Profile Steel 50 x 50 x 9 mm (WIND BRACING) -> Bottom									
	= 2.75	x	1.00	x	8.690	x 6.00	=	143.39	Kg
8.a Profile Steel 50 x 50 x 9 mm (WIND BRACING) -> top									
	= 2.40	x	1.00	x	8.690	x 14.00	=	291.98	Kg
Profile Steel 50 x 50 x 9 mm (WIND BRACING) -> Bottom									
	= 2.40	x	1.00	x	8.690	x 14.00	=	291.98	Kg
9. Profile Steel WF 100 x 50 mm									
	= 2.30	x	1.00	x	9.30	x 28.00	=	598.92	Kg
10. Ring Tightening									
	= 4.80	x	0.05	x	0.005	x 14.00	=	118.69	Kg
11. Bolt / Nut Average dia. 20 mm (25 pcs per site)									
	= 0.25	x	0.0013	x	0.075	x 54.00	=	9.98	Kg
	Grand total						=	38,182.29	Kg

st-wb1

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br WB1 PE 255 + 10 m (Water Pipe Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steil inside pile (kg)

Diameter of pipe = dp	=	40	cm					
thick of pipe = t	=	1.031	cm					
Diameter of spiral = ds	=	1.30	cm					
covering of concrete = d'	=	5	cm					
dc	=	40 − 2 x (1.031 + 5)						
	=	27.938	cm					
(dc − ds)	=	27.938	−	5				
	=	22.938	cm					
Ag	=	0.25 x @pi x dp ^ 2						
	=	1,256.64	cm2					
Ac	=	0.25 x @pi x dc ^ 2						
	=	613.028	cm2					
f'c	=	225	kg/cm2					
fsy	=	4,000	kg/cm2					
Ag/Ac	=	2.050						
f'c/fsy	=	0.056						
ps	=	0.45 x (Ag/Ac − 1) x f'c/fsy						
ps	=	0.027						
Area of spiral = as	=	0.25*@pi x ds ^ 2						
	=	1.327	cm2					
spacing of spiral = s	=	as x @pi x (dc−ds) / ps x @pi x dc ^ 2/4						
		1.327	x	3.142	x	22.938		
s	=	0.027	x	3.142	x	195.133		
		95.649						
	=	16.291	cm					
	=	5.87	cm					
say	=	7.00	cm					
Length of spiral per picth	=	@sqrt((@pi x dc) ^ 2 + s ^ 2)						
	=	88.05	cm					
length of culumn	=	700	cm					
nos of pitch	=	100.00						
length of spiral	=	88.05	x	100.00				
	=	8,804.85	cm					
	=	88.05	m					
Radius of steel ring								
Outer diameter of pile	=	40.64	cm					
Thick of pile	=	1.031	cm					
Inner diameter of pile	=	40.64	−	2.062				
	=	38.578	cm					
Concrete covering	=	5	cm					
Diameter of steel bar	=	1.6	cm					
Diameter of ring	=	1.3	cm					
Inner diameter of pile	=	38.578						
Distance outside to ring	=	5	+	0.65	+	1.6	+	0.65
	=	7.90	cm					
Inner diameter of ring	=	38.578	−	7.90				
	=	30.678	cm					
Radius of ring steel	=	30.678	:	2				
	=	15.339	cm					
	=	0.153	m					

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br WB1 PE 255 + 10 m (Water Pipe Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steel inside pile (kg)

Length of each = 2 x @pi x r
= 2 x 3.14159 x 0.153 m
= 0.964 m

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	7.00		0.36	7.71	4.00	8	61.68	1.560	96.22
2.	R1	13									88.05	0.995	87.61
3.	Ring	13						0.964		6	5.78	0.995	5.75
												sum	189.58

Total weight = 4.00 x 189.582 = 758.33 kg

Grand total = 2.00 x 758.33 = 1,516.66 kg

inb-WB1

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment BR – WB1 (Water Pipe Br) PE : 255 + 10 m (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.406	m
area	=	0.129	m2
H	=	3.600	m
W	=	3.200	m
L	=	3.200	m

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
footing	1	3.20	0.500	1.60	3.20	1.00	5.12
column	2	0.40	3.100	1.24	3.20	1.00	3.97
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	4.00	x	0.10	(0.052)
						sum	9.04

concrete filling in piles

thick of pipe	=	0.01036	m				
inner diameter	=	0.406	–	0.021			
	=	0.385	m				
area	=	0.250	x	3.142	x	0.148	
	=	0.1165	m2				
depth	=	7.000		--->	0.333	x	21.000 m
nos	=	4.000					
volume	=	0.117	x	7.000	x	4.00	
	=	3.26	m3				
sub total	=	9.0362	+	3.26			
	=	12.300	+	12.300	m3		
Total							
	=	**24.601**	m3				

supply and Driving SP pile dia. 400 mm 8 x 21 = 168.00 m

1 / 2

abwb1–co

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Br WB1 (Water Pipe Br) PE : 255 + 10 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
footing	1	3.200	0.500	2.00	3.20
footing	2	3.200	0.500	2.00	3.20
Culomn	3	0.400	3.100	2.00	2.48
Culomn	3	3.200	3.200	2.00	20.48
			sum	=	29.36

Total = 2.00 x 29.36

= 58.72 sq.m

abWB1-fk

Direcktorate General of Water Resources Development Directorate of River Medan Flood Control Project	Lean Concrte and Rubble Stone Br WB1 PE 255 + 10 m Percut River	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Lean concrete (m3)

diameter of concrete pile = 0.400 m

area = 0.126 m2

Lean Concrete 0.10

3.5 m

width	length	area	depth	volume
m	m	m2	m	m3
3.50	3.50	12.25	0.10	1.23

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.10	m			
nos	=	4				
volume	=	0.126	x	0.10	x	4
	=	0.050	m3			
net volume	=	1.23	–	0.050		
	=	1.17	m3			
nos	=	2.00				
Total volume	=	2.00	x	1.17		
Grand Total	=	2.35	m3		(Abutment L & R)	

Rubble stone (m3)

diameter of concrete pile = 0.400 m

area = 0.126 m2

Rubble Stone 0.200

3.5 m

width	length	area	depth	volume
m	m	m2	m	m3
3.50	3.50	12.25	0.20	2.45

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.20	m			
nos	=	4				
volume	=	0.126	x	0.20	x	4
	=	0.101	m3			
net volume	=	2.45	–	0.101		
	=	2.35	m3			
nos	=	2.00				
Total volume	=	2.00	x	2.35		
Grand Total	=	4.70	m3		(Abutment L & R)	

lc-wb1

ITEM NO.	CP. NO.							LOCATION	BQ-ITEMS (DRAFT)	UNIT	QUANTITY	F.C.		L.C.		TOTAL
	1	2	3	4	5	6	7					UNIT COST (RP.)	AMOUNT (RP.)	UNIT COST (RP.)	AMOUNT (RP.)	
H9-9				1					Pipe Works							
H9-9.1				1					Supply and Installation of Water Pipe, Dia.300 mm, including Air Valve, Joints and Pipe Supports	L.S.						
H9-9.2				1					Supply and Installation of Water Pipe, Dia.175 mm, including Air Valve, Joints and Pipe Supports	L.S.						
H9-9.3				1					Supply and Installation of Water Pipe, Dia.143 mm, including Air Valve, Joints and Pipe Supports	L.S.						
H9-9.4				1					Supply and Installation of Cable Pipes for Telephone, Dia.175 mm, including Air Valve, Joints and	L.S.						
H10				1				PE255+10	WATER PIPE BRIDGE (WB1)							
H10-1				1					PREPARATION WORKS							
H10-1.1				1					Coffering and Dewatering	L.S.						
H10-1.2				1					Clearing and Grubbing	m2	180.00					
H10-2				1					Abatment, Pier and Connecting Channel Works							
H10-2.1				1					Excavation (Common)	m3	777.60					
H10-2.2				1					Gravel Bedding, 200 mm thick	m3	4.69					
H10-2.3				1					Backfill with Selected Soil	m3	320.00					
H10-2.4				1					Supply and Driving of PC Piles, Dia.7	m	168.00					
H10-2.5				1					Concrete, Type C1	m3	25.00					
H10-2.6				1					Concrete, Type E	m3	2.35					
H10-2.7				1					Reinforcing Steel Bars	kg	4,828.00					
H10-2.8				1					Formwork FW1, less than 2.5m high	m2	58.75					
H10-3				1					Metal Works							
H10-3.1				1					Supply and Installation of Water Pipe, Dia.600 mm, including Air Valve, Joints and Pipe Supports	L.S.						
H10-3.2				1					Truss Bridge	L.S.						

br7-11.wk1

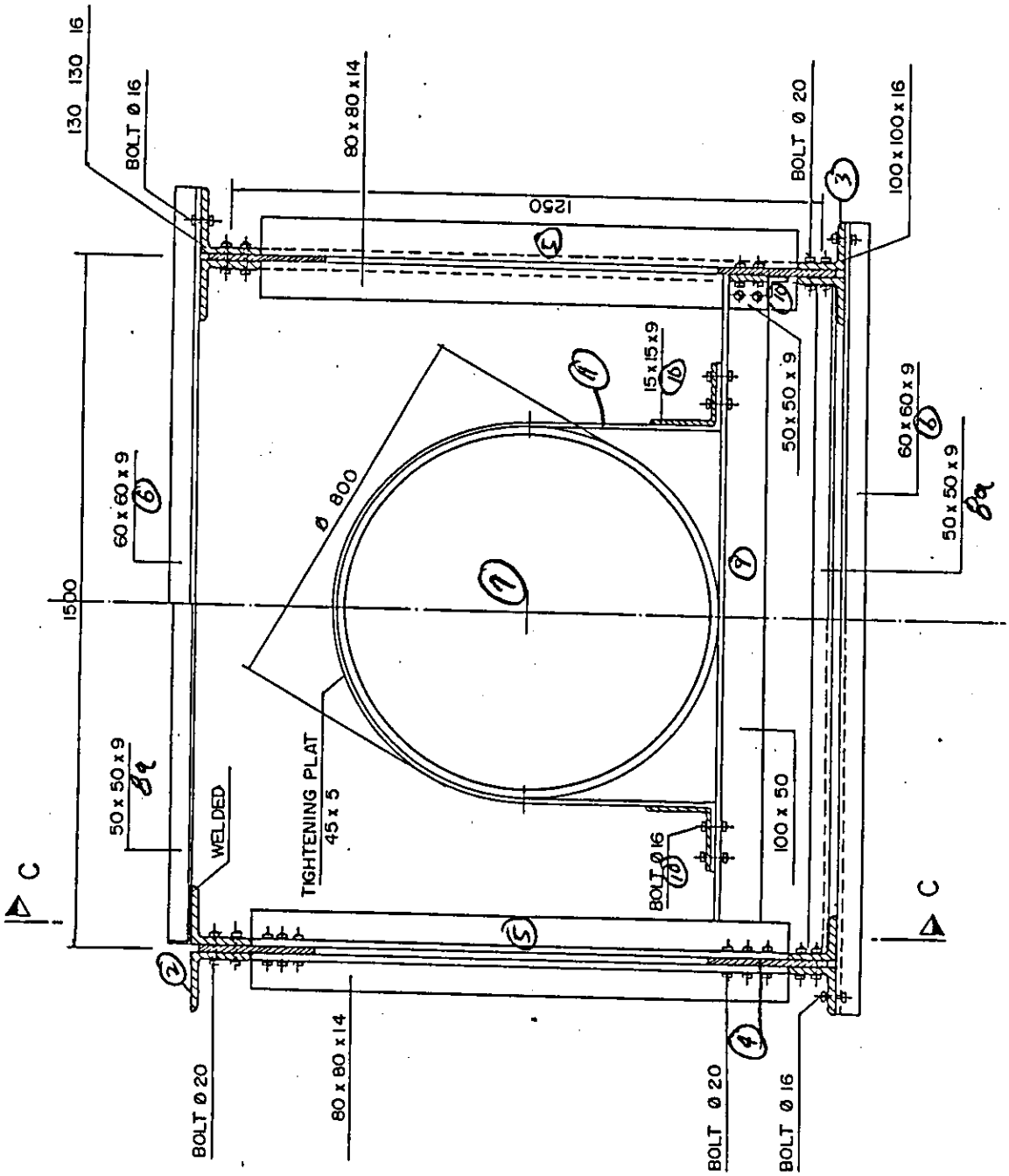
Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Water Pipe Bridge (WB 2 Sta FW 20 + 55 m Medan Flood Way	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Sheet :

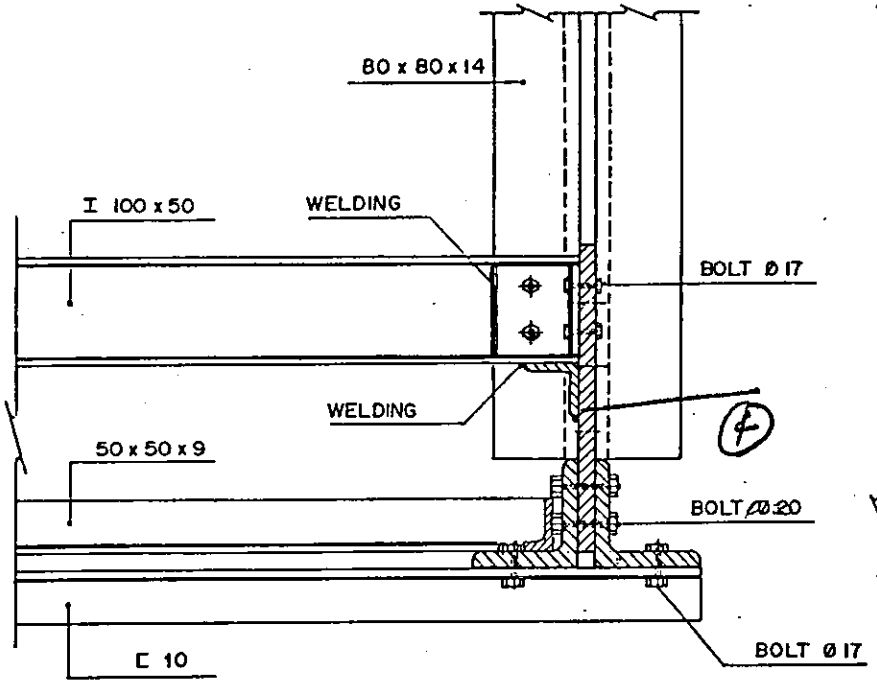
FIGURE	CALCULATION

Part									
				Weight		nos			
1. Steel pipe dia. 800 mm									
=	40.00	x	1.00	x	312	1.00	=	12,480.00	Kg
2. Profile Steel 130 x 130 x 16									
=	27.50	x	4.00	x	30.90	x 1.00	=	3,399.00	Kg
3. Profile Steel 100 x 100 x 20									
=	30.00	x	4.00	x	28.40	x 1.00	=	3,408.00	Kg
4. Profile Plate									
=	0.25	x	0.14	x	0.08	x 96.00	=	2,110.08	Kg
5. Profile Steel 80 x 80 x 14									
=	1.80	x	1.00	x	16.10	x 48.00	=	1,391.04	Kg
Profile Steel 80 x 80 x 14									
=	1.80	x	1.00	x	16.10	x 48.00	=	1,391.04	Kg
6. Profile Steel 60 x 60 x 9									
=	1.75	x	2.00	x	8.690	x 24.00	=	729.96	Kg
Profile Steel 60 x 60 x 9									
=	1.75	x	2.00	x	8.690	x 24.00	=	729.96	Kg
7. Profile Steel 50 x 30 ---> t = 16 mm (50 nos)									
=	0.50	x	0.30	x	0.016	x 50.00	=	942.00	Kg
8. Profile Steel 50 x 50 x 9 mm (WIND BRACING) -> top									
=	2.75	x	2.00	x	8.690	x 6.00	=	286.77	Kg
Profile Steel 50 x 50 x 9 mm (WIND BRACING) -> Bottom									
=	2.75	x	2.00	x	8.690	x 6.00	=	286.77	Kg
8.a Profile Steel 50 x 50 x 9 mm (WIND BRACING) -> top									
=	1.75	x	1.00	x	8.690	x 13.00	=	197.70	Kg
Profile Steel 50 x 50 x 9 mm (WIND BRACING) -> Bottom									
=	1.75	x	1.00	x	8.690	x 13.00	=	197.70	Kg
9. Profile Steel WF 100 x 50 mm									
=	1.50	x	1.00	x	9.30	x 24.00	=	334.80	Kg
10. Profile Steel 50 x 50 x 9 mm									
=	0.15	x	0.15	x	0.090	x 52.00	=	826.60	Kg
11. Ring Tightening									
=	3.00	x	0.05	x	0.005	x 13.00	=	68.88	Kg
12. Bolt / Nut Average dia. 20 mm (25 pcs per site)									
=	0.25	x	0.0013	x	0.075	x 50.00	=	9.24	Kg
Grand total							=	28,789.55	Kg

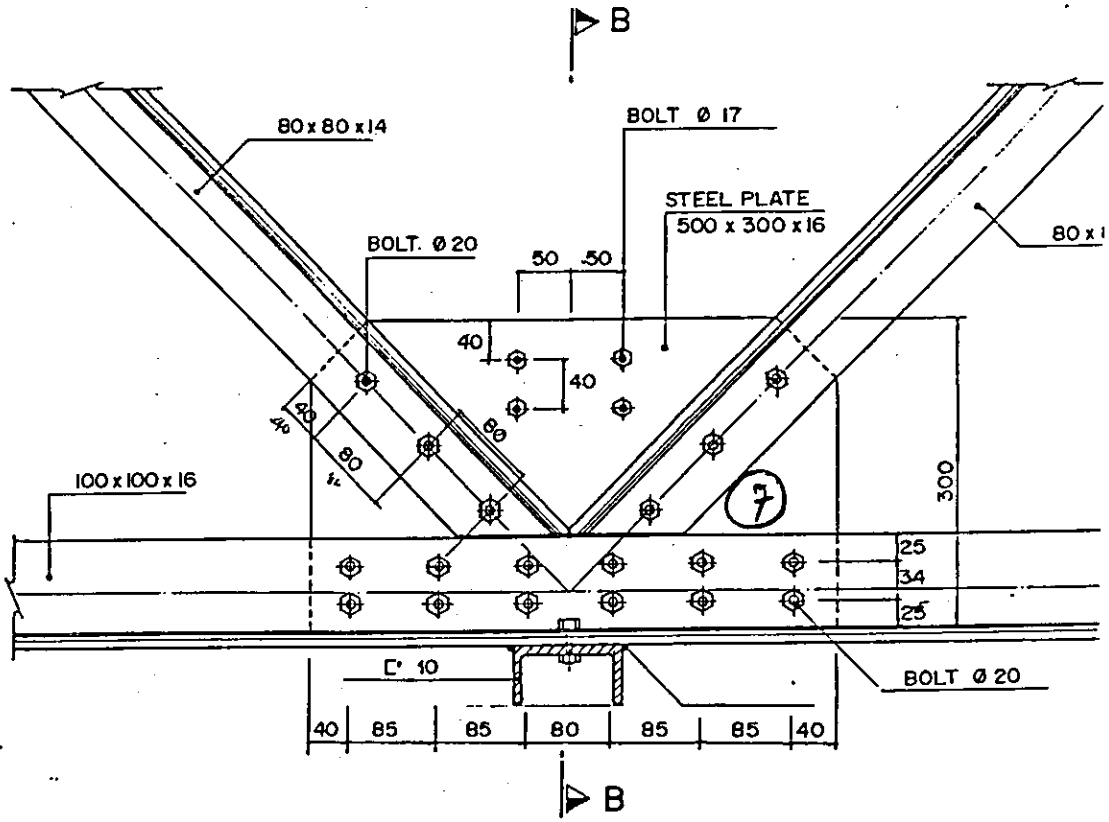
st-wb2



SECTION.B-B
SCALE. C



SECTION. B - B
SCALE . A



DETAIL OF NODE AT BOTTOM CHORD
SCALE . A

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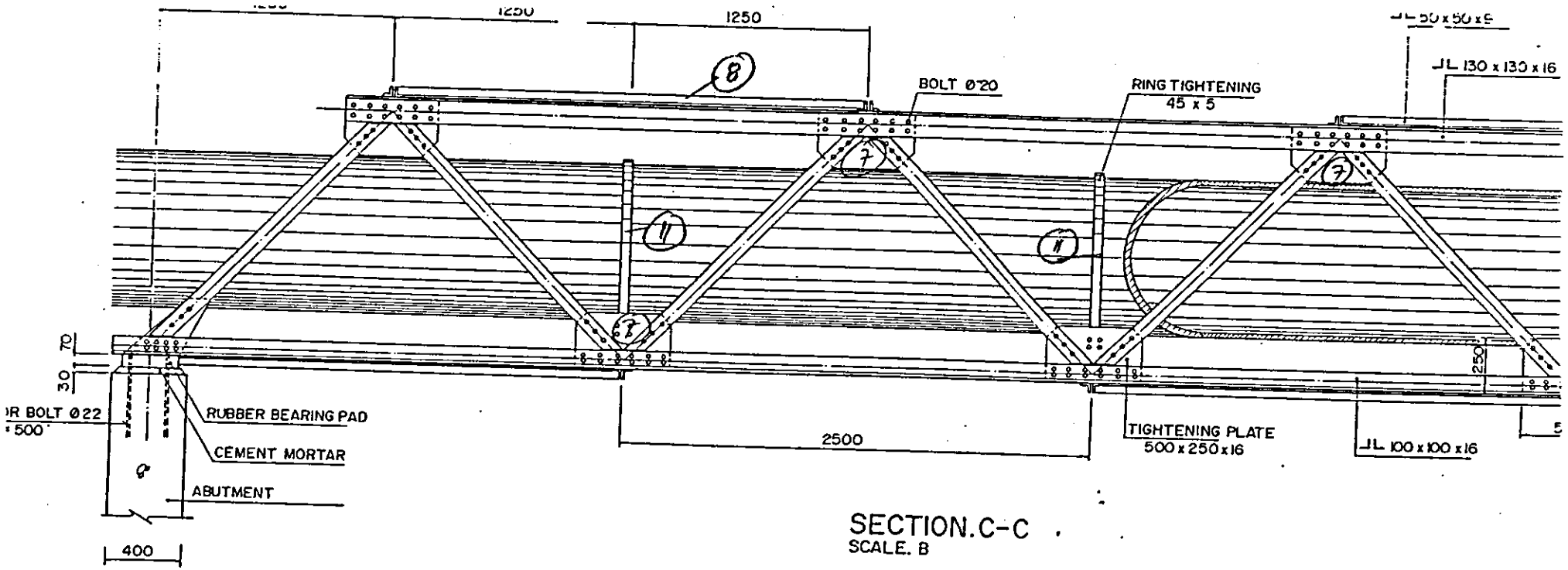
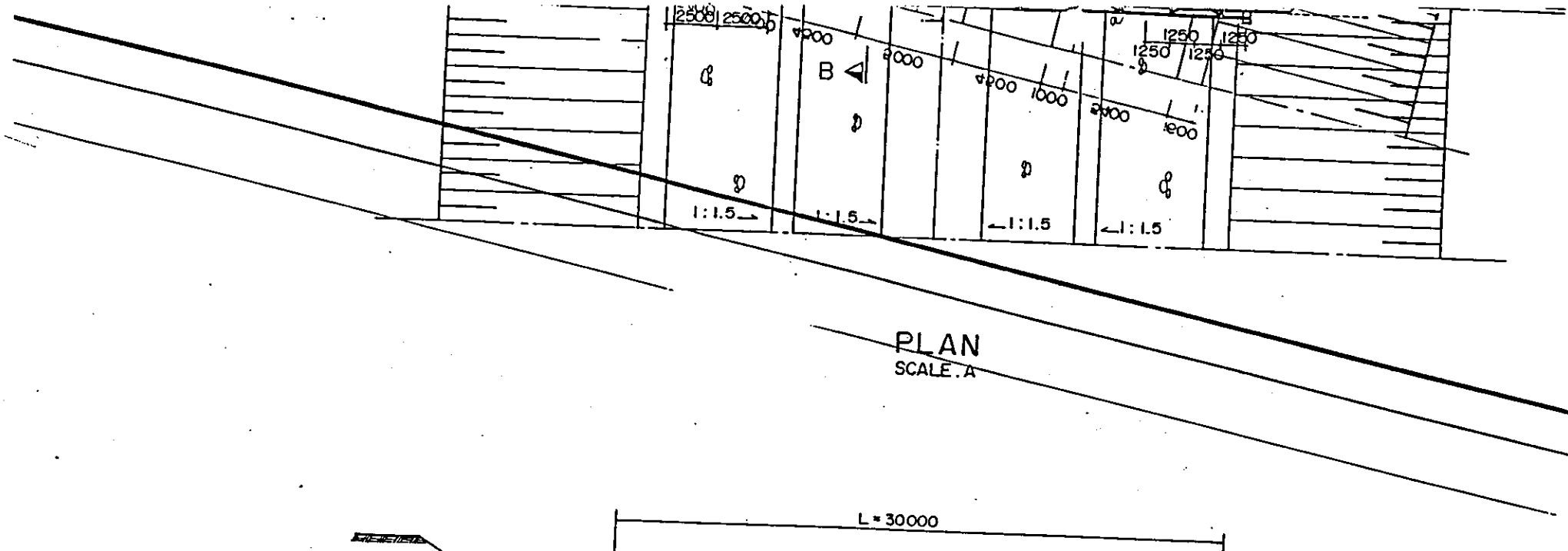
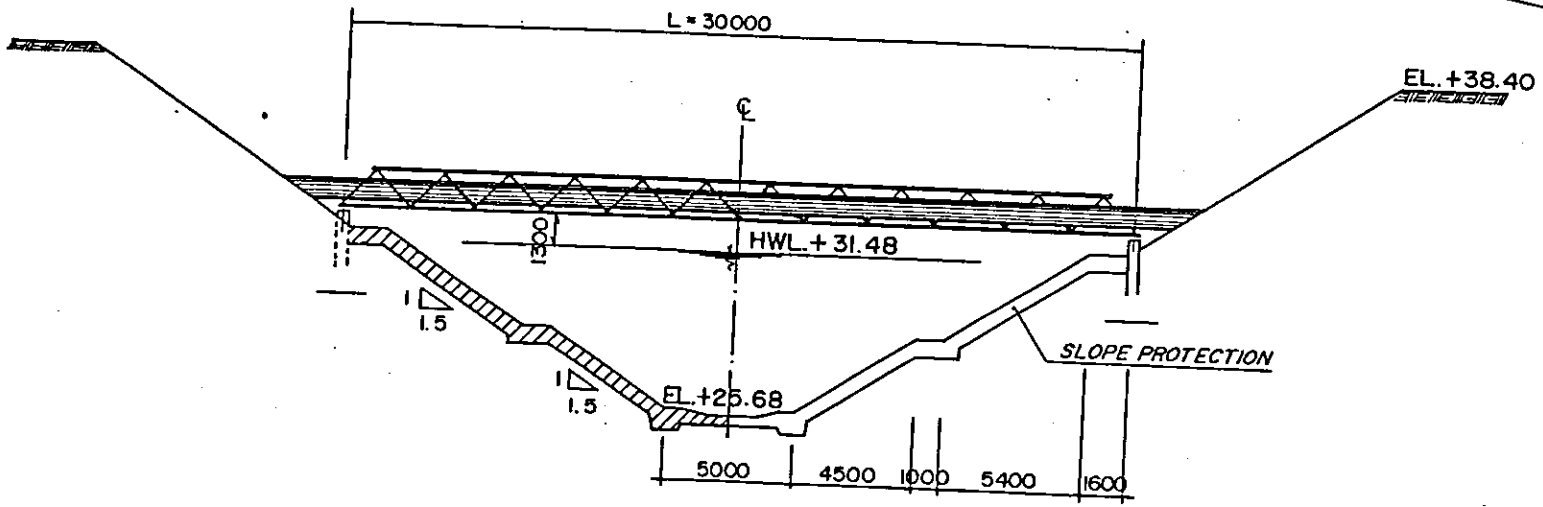
MEDAN FLOOD CONTROL



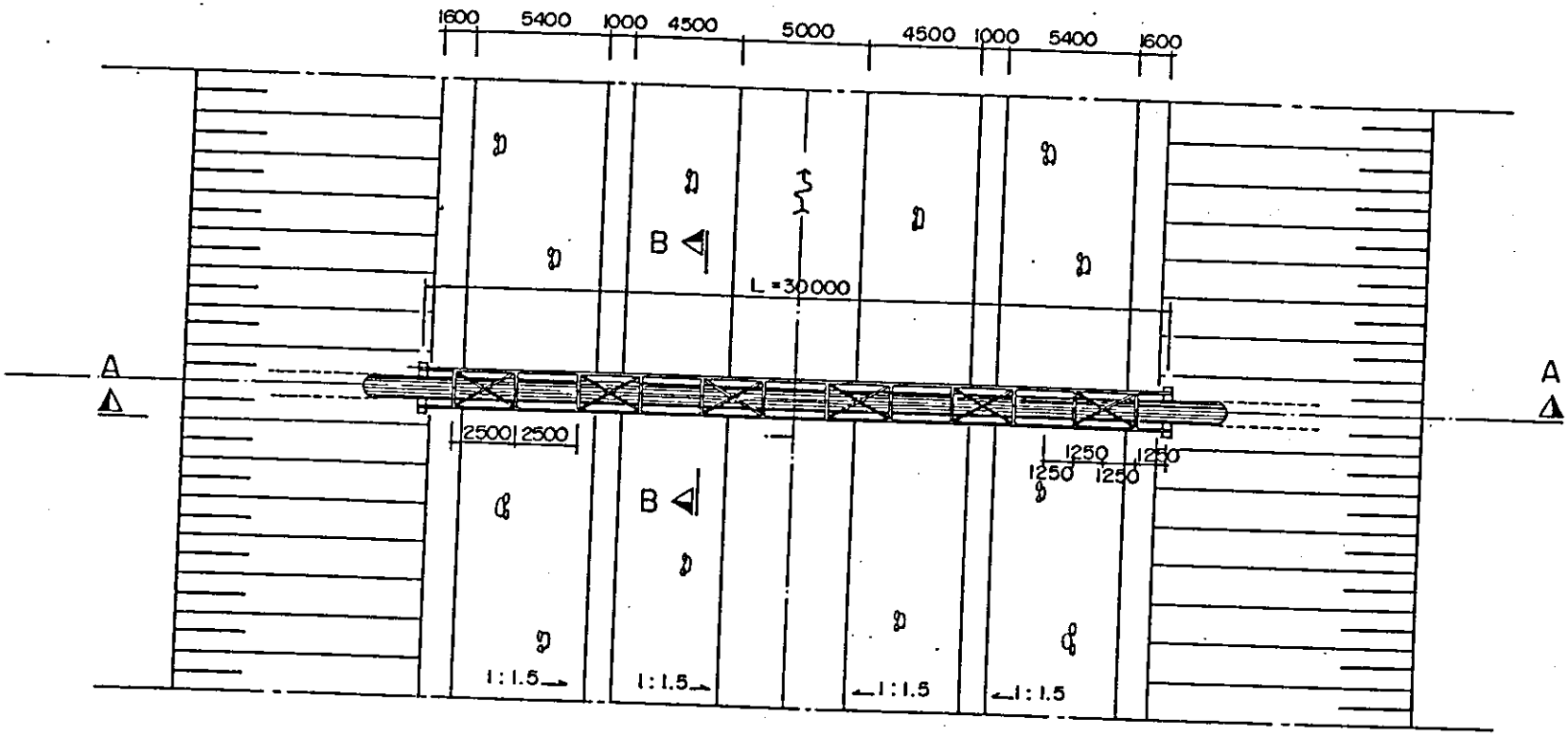
SECTION.C-C
SCALE. B



PLAN
SCALE. A



SECTION. A - A
SCALE. A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5000
4500
1000
5400
1600
B
L=30000
A
A
2500
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1250
1250
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B
1:1.5
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1:1.5
1:1.5

PLAN
SCALE. A

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br WB2 FW 20 + 55 m (Water Pipe Br)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Reinforcing steil inside pile (kg)

Diameter of pipe = dp	=	40	cm					
thick of pipe = t	=	1.031	cm					
Diameter of spiral = ds	=	1.30	cm					
covering of concrete = d'	=	5	cm					
dc	=	40 − 2 x (1.031 + 5)						
	=	27.938	cm					
(dc − ds)	=	27.938	−	5				
	=	22.938	cm					
Ag	=	0.25 x @pi x dp ^ 2						
	=	1,256.64	cm2					
Ac	=	0.25 x @pi x dc ^ 2						
	=	613.028	cm2					
f'c	=	225	kg/cm2					
fsy	=	4,000	kg/cm2					
Ag/Ac	=	2.050						
f'c/fsy	=	0.056						
ps	=	0.45 x (Ag/Ac − 1) x f'c/fsy						
ps	=	0.027						
Area of spiral = as	=	0.25*@pi x ds ^ 2						
	=	1.327	cm2					
spacing of spiral = s	=	as x @pi x (dc−ds) / ps x @pi x dc ^ 2/4						
s	=	1.327 x 3.142 x 22.938 / 0.027 x 3.142 x 195.133						
	=	95.649 / 16.291	cm					
	=	5.87	cm					
say	=	7.00	cm					
Length of spiral per picth	=	@sqrt((@pi x dc) ^ 2 + s ^ 2)						
	=	88.05	cm					
length of culumn	=	700	cm					
nos of pitch	=	100.00						
length of spiral	=	88.05	x	100.00				
	=	8,804.85	cm					
	=	88.05	m					
Radius of steel ring								
Outer diameter of pile	=	40.64	cm					
Thick of pile	=	1.031	cm					
Inner diameter of pile	=	40.64	−	2.062				
	=	38.578	cm					
Concrete covering	=	5	cm					
Diameter of steel bar	=	1.6	cm					
Diameter of ring	=	1.3	cm					
Inner diameter of pile	=	38.578						
Distance outside to ring	=	5	+	0.65	+	1.6	+	0.65
	=	7.90	cm					
Inner diameter of ring	=	38.578	−	7.90				
	=	30.678	cm					
Radius of ring steel	=	30.678	:	2				
	=	15.339	cm					
	=	0.153	m					

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Foundation Br WB2 FW 20 + 55 m (Water Pipe Br)	Japan International Cooperation Agency Date : Nos of Sheet : Preparated by :

Reinforcing steil inside pile (kg)

Length of each = 2 x @pl x r
= 2 x 3.14159 x 0.153 m
= 0.964 m

No.			shape of steel bar					length	nos of	total	tot.length	weight	weight
	Type	ø	a	b	c	d	2 x e	each	pile	nos.	(m)	kg/m'	kg
1.	P1	16		0.35	7.00		0.36	7.71	4.00	8	61.68	1.560	96.22
2.	R1	13									88.05	0.995	87.61
3.	Ring	13						0.964		6	5.78	0.995	5.75
												sum	189.58

Total weight = 4.00 x 189.582 = 758.33 kg

Grand total = 2.00 x 758.33 = 1,516.66 kg

Inb-WB2

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment BR – WB2 (Water Pipe Br) FW : 20 + 55 m (R & L)	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Structural concrete class K225 (m3)

diameter of steel pipe piles

dia.	=	0.406	m	
area	=	0.129	m2	
H	=	3.600	m	
W	=	3.200	m	
L	=	3.200	m	

describtion	part	width	depth	area	length	nos	volume
		m	m	m2	m		m3
footing	1	3.20	0.500	1.60	3.20	1.00	5.12
column	2	0.40	2.500	1.00	2.00	1.00	2.00
pipe reducing	=	area	x	nos pipe	x	depth	
	=	0.129	x	4.00	x	0.10	(0.052)
						sum	7.07

concrete filling in piles

thick of pipe	=	0.01036	m				
inner diameter	=	0.406	–	0.021			
	=	0.385	m				
area	=	0.250	x	3.142	x	0.148	
	=	0.1165	m2				
depth	=	7.000		--->	0.333	x	21.000 m
nos	=	4.000					
volume	=	0.117	x	7.000	x	4.00	
	=	3.26	m3				
sub total	=	7.0682	+	3.26			
	=	10.332	+	10.332	m3		
Total							
	=	20.665	m3				

supply and Driving SP pile dia. 400 mm 8 x 21 = 168.00 m

1 / 2

abwb2–co

Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Abutment Br WB2 (Water Pipe Br) FW : 20 + 55 m	japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Wooden form work with supporting frame

decription	part	width	length	nos	area
		m	m		m2
footing	1	3.200	0.500	2.00	3.20
footing	2	3.200	0.500	2.00	3.20
Culomn	3	0.400	2.500	2.00	2.00
Culomn	3	2.000	2.500	2.00	10.00
			sum	=	18.40

Total = 2.00 x 18.40

= 36.80 sq.m

abWB2-fk

Direcktorate General of Water Resources Development Directorate of River Medan Flood Control Project	Lean Concrte and Rubble Stone Br WB2 FW 20 + 55 m Medan Flood Way	Japan International Cooperation Agency Date : Nos of Sheet : Preparet by :

Lean concrete (m3)

diameter of concrete pile = 0.400 m
area = 0.126 m2

Lean Concrete 0.10
3.5 m

width	length	area	depth	volume
m	m	m2	m	m3
3.50	3.50	12.25	0.10	1.23

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.10	m			
nos	=	4				
volume	=	0.126	x	0.10	x	4
	=	0.050	m3			
net volume	=	1.23	–	0.050		
	=	1.17	m3			
nos	=	2.00				
Total volume	=	2.00	x	1.17		
Grand Total	=	2.35	m3		(Abutment L & R)	

Rubble stone (m3)

diameter of concrete pile = 0.400 m
area = 0.126 m2

Rubble Stone 0.200
3.5 m

width	length	area	depth	volume
m	m	m2	m	m3
3.50	3.50	12.25	0.20	2.45

reducing volume by pile

area	=	0.25	x	3.141	x	0.160
	=	0.126	m2			
depth	=	0.20	m			
nos	=	4				
volume	=	0.126	x	0.20	x	4
	=	0.101	m3			
net volume	=	2.45	–	0.101		
	=	2.35	m3			
nos	=	2.00				
Total volume	=	2.00	x	2.35		
Grand Total	=	4.70	m3		(Abutment L & R)	

lc-wb2

IRRIGATION PIPE BRIDGE.

1. EARTH WORKS.

(1) EXCAVATION

$(5.1+0.5) \times 2.3/2 \times 10\,m \times 2\ (L \& R) \times 1.2 = 129 \fallingdotseq \underline{130\,m^3}$

(2) Backfill by Selected Soil. $\underline{130\,m^3}$

(3). Sand Bedding.

$(0.9+0.5) \times 0.2/2 \times 10 \times 2 \times 1.2 = 2.8m^3 \fallingdotseq \underline{3.0m^3}$

(4). Gravel Bedding.

END BLOCK.

$2.8 \times 1.8 \times 0.1 \times 2 = 1.0m^3$

CATCH Basin

$1.8 \times 1.8 \times 0.1 \times 2 = 0.65m^3$

Total $1.65 \fallingdotseq \underline{2\,m^3}$

2. Pile Works.

(1). PC PILE $\phi 300$ TYPE B. $L=12m \times 4 = 48\,m$ (Driving 35m).

(2) Log PILE $\phi 150$ $L=3000$ $L=3m \times 6 \times 2 = 36\,m$

3. Concrete Works.

(1) END BLOCK.

$1.967m^2 \times 1.6 \times 2\ (\times 1.1) = 6.9\,m^3$

(2). PIAR BLOCK

$1.8 \times 1.0 \times 0.6 \times 2\ (\times 1.1) = 2.4\,m^3$

(3) CATCH BASIN

wing. $2.34m^2 \times 0.3 = 0.702$
side. $1.33m^2 \times 1.0 = 1.33$
END $1.7 \times 0.3 \times 1.6 = 1.09$

$3.122\ (\times 1.1) \times 2 = 6.9\,m^3$.

TYPE C1 $16.2\,m^3$

4. Wet Stone Masonry.

0.83 m² × 20 m. = 17 m³

Top Conc. (Type C2)

0.354 × 0.1 × 2 × 20 = 1.416 m³ = 2 m³

5 PIPE.

SGP STEEL PIPE (φ300). L = 55 m.

6. Re-Bars.

D16 (

• END BLOCK

R-1.	ℓ = 7.149 m	n = 5 nos	L = 12.2 m
R-2	ℓ = 1.5 m	n = 25 nos.	L = 37.5 m

• PIAR BLOCK

R-3.	ℓ = 2.8 m	n = 13	L = 36.4 m
R-4.	ℓ = 4.4 m	n = 5	L = 22.0 m
R-5	ℓ = (1.7+0.9)×2 = 5.2.	n = 3.	L = 15.6 m

• Catch Basin.

R-6	ℓ = 1.5.	n = 14.	L = 21.0 m
R-7	ℓ = 1.6×2+0.2 = 3.4.	n = 13.	L = 44.2 m

D13.

R-8.	ℓ = 1.5	n = 4×5 = 20	L = 30. m.

$W = (188.9^{m}_{D16} \times 1.56\ kg/m + 30m_{D13} \times 0.995) \times 1.2 = 390\ kg.$

7. FORM.

FW1

• END BLOCK.

1.967 × 2 + 0.783 × 1.6 + 1.2 × 1.6 + 0.5 × 1.6 = 7.91 m²

• CATCH BASIN:

outside 4.2 × 1.7m + 2.34 m² + 0.704 × 0.704/2 × 2 = 9.98 m².

Inside 1.44 × 3m + 0.5.3 m² + 1.145 × 0.3 × 2 = 5.54 m².

Total = 23.43 × 1.1 = 26 m²

0.1KL

FW2.

· Piar BLOCK.

$\{0.6 \times (1.8+1.0) \times 2 + 1.8 \times 1.0\} \times 2 =$ 10.32. $(\times 1.1) = 12 m^2$

8. M. Steel.

SUPPORT

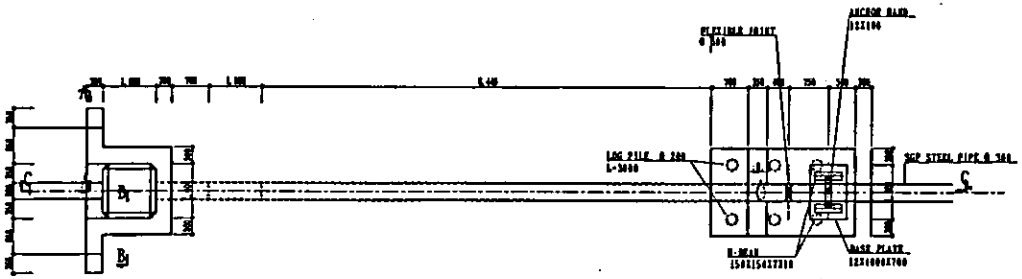
			weight
H-BEAM. 150×150.	$\ell = 0.5 \times 2 = 1.0m$.	31.1 kg/m	31.1 kg
BASE PLATE $t=12$	$A = 0.7 m^2$	9.42 kg/m²	6.6 kg
Support PL. $t=10$	$A = 0.05 m^2$.	7.85 kg/m²	0.4 kg
Anchor Band. $t=12$	$A = 0.35 m^2$	9.42 kg/m²	3.3 kg
			41.4kg/unit

Seculity Fence.

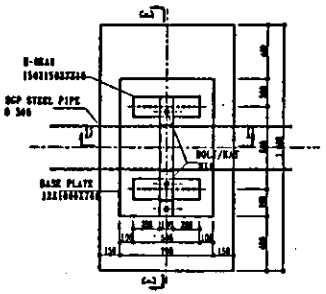
PL 12.	$A = (2 \times \pi \times 1.0/2 + 2\pi \times 0.6/2) \times 0.05$ (3.14, 0.6284) $= 0.251$	9.42kg/m²	2.4kg
ϕ 25	$\ell = 0.9 \times 9 = 8.1m$	3.85kg/m	31.2kg
			33.6kg

Total $(41.4 \times 4 + 33.6) \times 1.1 = 218.$ ≒ 220kg.

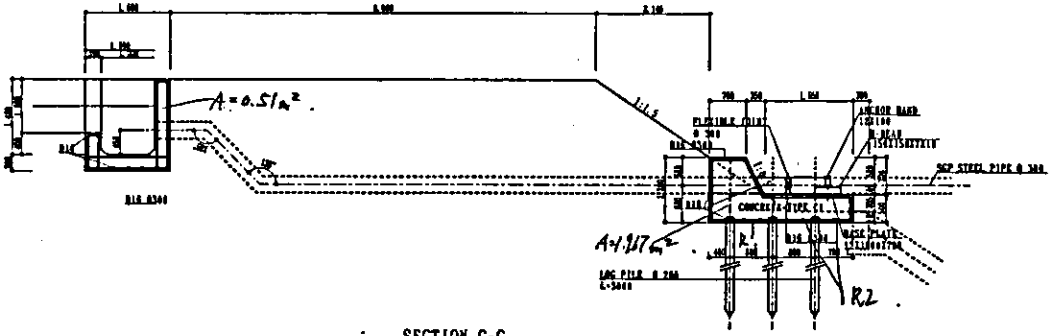
※ Clearing 20m 5m = 100m².



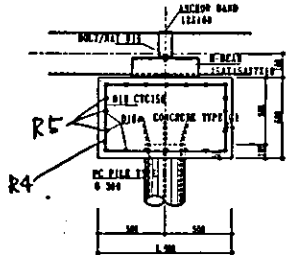
PLAN OF END BLOCK & CATCH BASIN
SCALE A



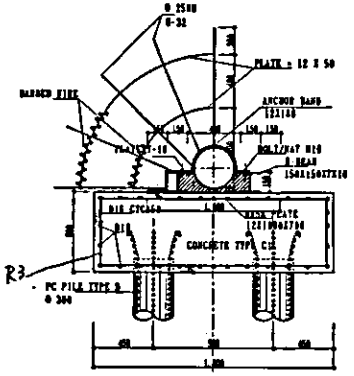
PLAN
SCALE B



SECTION C-C
SCALE A

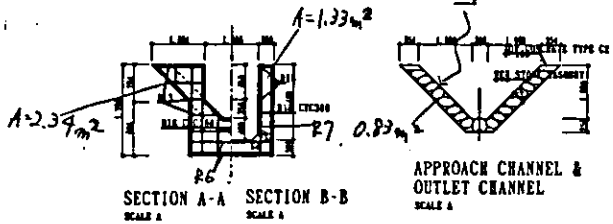


SECTION D-D
SCALE B



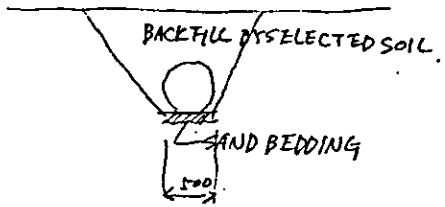
LEFT SIDE RIGHT SIDE

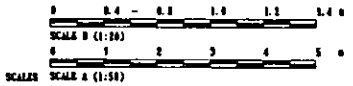
SECTION E-E
SCALE B



SECTION A-A SECTION B-B
SCALE A SCALE A

APPROACH CHANNEL &
OUTLET CHANNEL
SCALE A





SCALE B (1:20)
SCALE A (1:50)

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REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
DIRECTOTATE OF TECHNICAL GUIDANCE

MEDAN FLOOD CONTROL PROJECT

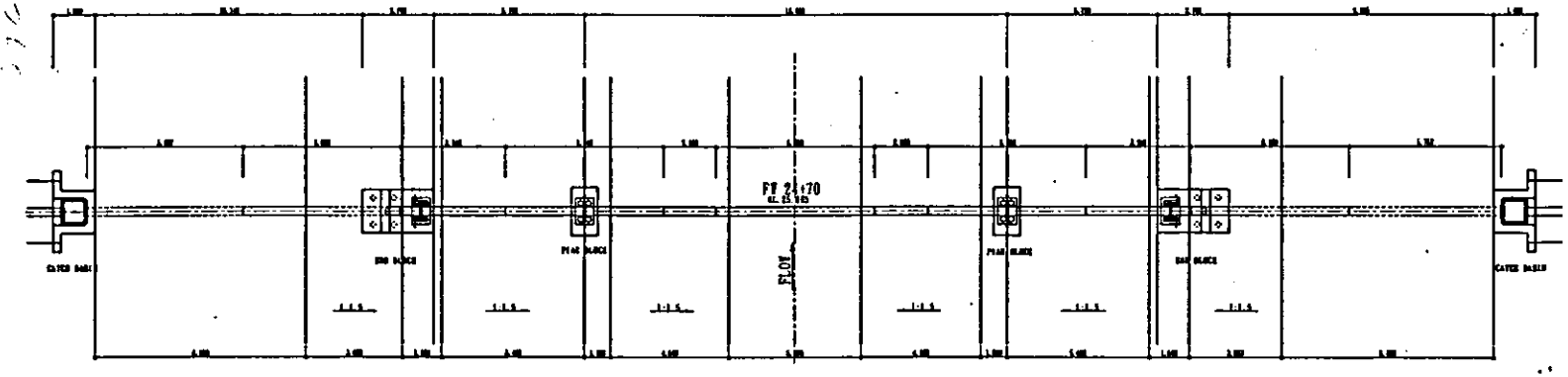
PREPARED	CHECKED	SUBMITTED	CERTIFIED	APPROVED	DRAWING NO.

JAPAN INTERNATIONAL COOPERATION AGENCY
CTI ENGINEERING CO., LTD

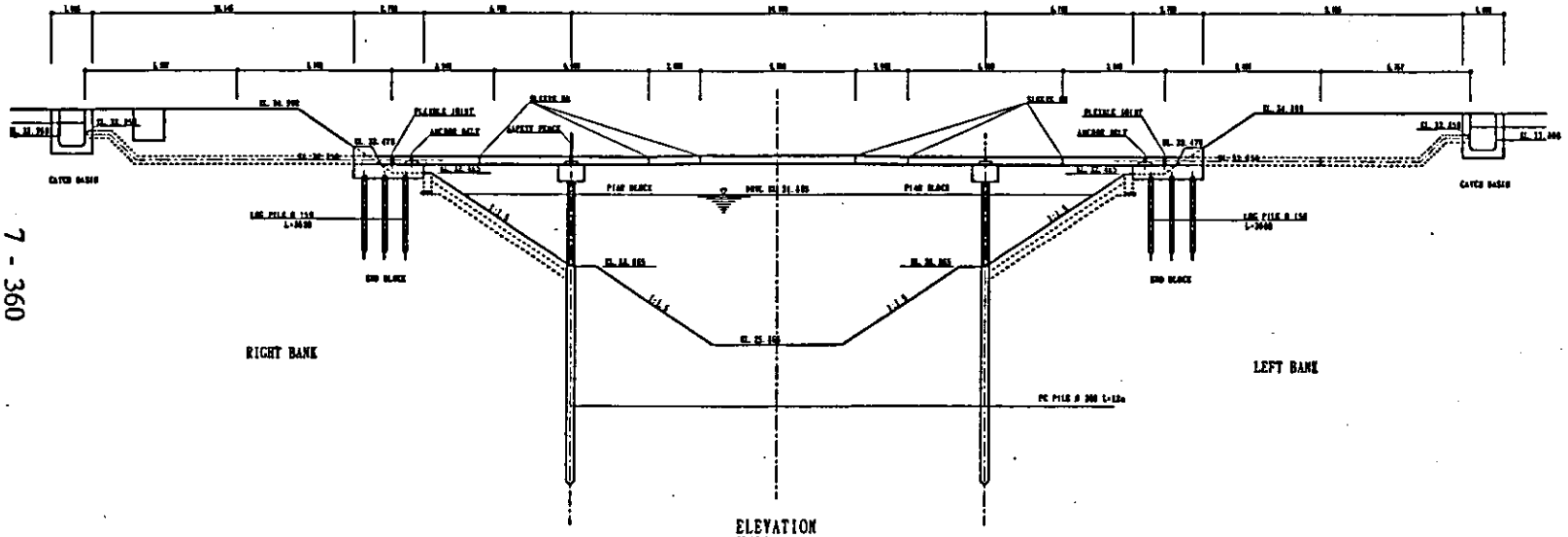
PROYEK PENGEMBANGAN SUMBER AIR DAN PENGENDALIAN BANJIR SUMATERA UTARA

SHEET NO. | REV.

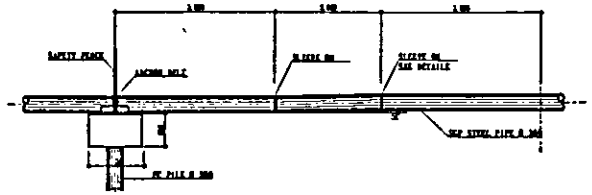
NO.	DATE	REVISIONS	ORIGINATED	APPROVED



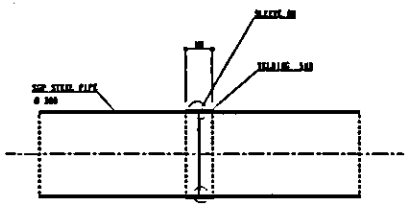
PLAN
SCALE A



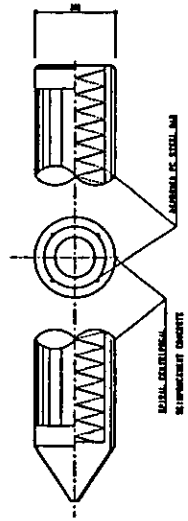
ELEVATION
SCALE A



DETAIL OF PIPE JOINT
SCALE B



DETAIL OF SLEEVE ON
SCALE C



DETAIL OF PILE
SCALE C

REPUBLIC OF INDONESIA

MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMEN
DIRECTOTATE OF TECHNICAL GUIDANCE

MEDAN FLOOD CONTROL PROJECT

PREPARED	CHECKED	SUBMITTED	CERTIFIED	APPROVED	DRAWING NO.

JAPAN INTERNATIONAL COOPERATION AGENCY
CTI ENGINEERING CO., LTD

SHEET NO. | REV.

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Directorate General of Water Resources Development Directorate of River Medan Flood Control Project	Water Pipe Bridge (WB 4) FW 32 + 10 m Medan Flood Control	Japan International Cooperation Agency Date : Nos of Sheet : Prepared by :

Sheet :

FIGURE	CALCULATION

Part									
					Weight	nos			
1.	Steel pipe dia. 600 mm								
	= 40.00	x	1.00	x	187	2.00	=	14,960.00	Kg
1a.	Steel pipe dia. 325 mm								
	= 40.00	x	1.00	x	53	2.00	=	4,240.00	Kg
2.	Profile Steel 130 x 130 x 16								
	= 27.50	x	1.00	x	30.90	x 4.00	=	3,399.00	Kg
3.	Profile Steel 100 x 100 x 20								
	= 30.00	x	1.00	x	28.40	x 4.00	=	3,408.00	Kg
4.	Profile Plate								
	= 0.30	x	0.14	x	0.08	x 108.00	=	2,848.61	Kg
5.	Profile Steel 80 x 80 x 14								
	= 1.80	x	1.00	x	16.10	x 52.00	=	1,506.96	Kg
	Profile Steel 80 x 80 x 14								
	= 1.80	x	1.00	x	16.10	x 52.00	=	1,506.96	Kg
6.	Profile Steel 60 x 60 x 9								
	= 2.40	x	2.00	x	8.690	x 28.00	=	1,167.94	Kg
	Profile Steel 60 x 60 x 9								
	= 2.40	x	2.00	x	8.690	x 28.00	=	1,167.94	Kg
7.	Profile Steel 50 x 30 ---> t = 16 mm (50 nos)								
	= 0.50	x	0.30	x	0.016	x 54.00	=	1,017.36	Kg
8.	Profile Steel 50 x 50 x 9 mm (WIND BRACING) -> top								
	= 2.75	x	1.00	x	8.690	x 6.00	=	143.39	Kg
	Profile Steel 50 x 50 x 9 mm (WIND BRACING) -> Bottom								
	= 2.75	x	1.00	x	8.690	x 6.00	=	143.39	Kg
8.a	Profile Steel 50 x 50 x 9 mm (WIND BRACING) -> top								
	= 2.40	x	1.00	x	8.690	x 14.00	=	291.98	Kg
	Profile Steel 50 x 50 x 9 mm (WIND BRACING) -> Bottom								
	= 2.40	x	1.00	x	8.690	x 14.00	=	291.98	Kg
9.	Profile Steel WF 100 x 50 mm								
	= 2.30	x	1.00	x	9.30	x 28.00	=	598.92	Kg
10.	Ring Tightening								
	= 4.00	x	0.05	x	0.005	x 14.00	=	98.91	Kg
11.	Bolt / Nut Average dia. 20 mm (25 pcs per site)								
	= 0.25	x	0.0013	x	0.075	x 54.00	=	9.98	Kg
	Grand total						=	36,801.31	Kg

st-wb4

	CTI ENGINEERING CO., LTD. PIPE BRIDGE (NB4) Indonesia

BILL OF MATERIALS

PAY ITEM NO.	DESCRIPTION	Q'TITY	UNIT	UNIT COST	TOTAL AMOUNT
1000	EARTHWORKS				
1001	Excavation	350.00	cu.m.		
1002	Backfill	340.00	cu.m.		
1003	Gravel bedding	6.70	cu.m.		
2000	CONCRETE WORKS				
2001	Class "A" Concrete	62.00	cu.m.		
2002	Lean Concrete	3.40	cu.m.		
2003	Reinforcing steel bars				
	12 mm dia.	780.00	kgs		
	16 mm dia	780.00	kgs		
	25 mm dia.	1860.00	kgs		
	32 mm dia.	2460.00	kgs		
2004	400x400x15.00m Long Pre-cast RC Piles	24.00	pieces		
2005	Non-shrink grout	0.02	cu.m.		
3000	METAL WORKS				
3001	W6x25, A36 steel	4780.00	kgs		
3002	C6x10, A36 steel	1450.00	kgs		
3003	L 3 1/2" x 3 1/2" x 5/16", A36 steel	1950.00	kgs		
3004	10 mm thk. plate, A36 steel	1400.00	kgs		
3005	35 mm thk. plate, A36 steel	110.00	kgs		
3006	45 mm x 5 mm thk. strap, A36 steel	45.00	lm		
3007	16 mm. dia. x 400 mm long anchor bolts w/ nuts	16.00	pieces		
3008	M20 ASTM A-325 Bolts, heavy hex. head & nuts	300.00	kgs		
4000	300x350x28mm thk. NEOPRENE BEARING PAD	4.00	pieces		

8. Other Works

8.1 Fish Pond Intake

1. Earth Works

$\{20m^2 \times 3m + (20 + 0.5\times3.4)/2 \times (5.0+6.0)\} \times 1.2 = 215\ m^3$

2. Back Fill by Selected Soil

$\{16m^2 \times 3m + 16/2 \times (5+6.0)\} \times 1.2 = 163.2 \fallingdotseq 165\ m^3$

3. log Pile $\phi 150$, $\ell = 4.0m$.

19 nos. × 5 nos × 4.0m = 380 m.

4. Soil Foundation. (t=200). (Backfill with Selected Soil).

$1.7m^2$ (t=200)	$\ell = 6.4m$	=	$10.88\ m^3$
$2.8m^2$ (t=100)	$\ell = 7m + 2.1m$	=	$25.48\ m^3$
			36.36×1.2

$\therefore$ $44\ m^3$

5. Concrete Type C1.

Out let A_1 $0.951m^2$ (Section H-H)
A_2 $0.65m^2$ (I-I)

$0.951 \times (0.3 \times 2^{0.571} + 0.65^{m^2} \times 2.4^{1.560}m + 0.25 \times 2.4^{0.6} - 0.5^2\pi \times 0.5^{0.3925})$

$= 2.339m^3$.

Inlet

$A1 = 2.09m^2$.	(Base)	$V_1 = 2.09 \times 3.0m$	=	6.270
$A2 = 5.182$	(Wall)	$V_2 = 5.182 \times 0.3 \times 2$	=	3.109
$A3 = 1.760$.	(Center Post)	$V_3 = 1.760 \times 0.4$	=	0.704
$A4 = 0.42$	(Curtain Wall	$V_4 = 0.42 \times 1.0 \times 2$	=	0.840
				$10.923\ m^3$.

Total $(2.339 + 10.923) \times 1.1 =$ $14.6\ m^3$.

6. Leveling Concrete Type. Ⅱ.

Inlet. $\ell = 6.864$ m

outlet $\ell = 2.057$ m

$V = (6.864 + 2.057) \times 0.1 \times .3.2 \times 1.1 = 3.2\ m^3$

7. Re-Bars

D19.

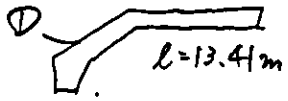
① $\ell_1 = 2.4 \times 4 + 2.9 \times 2 = 15.4$ m.

② $\ell_2 = 0.325 \times 4 + 2.9 \times 2 = 7.1$ m.

$L = 15.4 \times 5^{77} + (15.4+7.1)/2 \times 15 = 245.75$

$W = 245.75 \times 2.25 kg/m^2 = 553$ kg.

D13.



③ 13.41. × 14 = 187.8 m.

④ (4+0.7)/2 × 9 nos. ×4 = 84.6 m

⑤ 2.9 × ×18 nos = 52.2 m

⑥ 2.8 × 8 nos = 22.4 m

⑦ 2.9 × 12 nos = 34.8 m

outlet ⑧ 3.793 × .14 = 11.1 m

⑨ 2.9 × 17 nos. = 49.3.

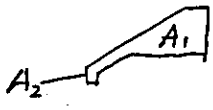
L = 442.2 m

$W = 442.2m \times 0.995 kg/m = 440$ kg.

Total $(553+440) \times 1.2 = 1191.6 \fallingdotseq 1200$ kg

8. Form FW 1

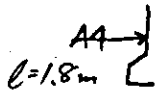
Inlet . Out Side . $A_1 = 7.6\,m^2 \times 2^{nos} = 15.2\,m^2$



Front . $A_2 = 0.5^{m} \times 3^{m} = 1.5\,m^2$

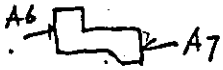
Inlet InSide . $A_3 = 11.8\,m^2 \times 4^{nos} = 47.2\,m^2$

$A_4 = 1.8^{m} \times 2^{m} = 3.6\,m^2$



Back Side $A_4' = 2.5 \times 3 - 0.5^2 \pi \times 2 = 5.9\,m^2$

Out let
Out Side .



$A_5 = 0.95^{m^2} \times 2^{nos} = 1.9\,m^2$.

Back Side . $A_6 = 0.5 \times 3 = 1.5\,m^2$

Front . $A_7 = 0.8^{m} \times 3\,m = 2.4\,m^2$.

$79.2\,m^2$

Total $79.2 \times 1.1 = \underline{87\,m^2}$.

9 Steel Gate.. $1m \times 1m$. 2Unit

10. Centrifugal. RC. Pipe $\phi 1000$ $L = 3.5\,m \times 2 = \underline{7m}$.

11. Gabion Mattress .

$3 \times 1.5 \times 0.5 \times 2 = 4.5\,m^3$

12 Gabion Cylinder .

$0.25^2 \times \pi \times 4.1 \times .6 = 4.8\,m^3 \fallingdotseq 5\,m^3$

Gate Weight. (Par Unit).

PL. t=8mm. 70.6kg/m²

L 60×60×6 5.89

[6 1/2 6.92 kg/m

L 100×50×8 10.6 kg.

Gate.	PL t=8.	1.2×1.08×70.6	=91.50
	L60×60	(1.2×2+0.88)×5.89.	=24.50
	[6 1/2.	1.0×6.92.	=6.92.
	L 60×100	0.88×10.6	=9.33
Rod.	φ 26.	3.85kg/m × 2.5m×2 =	19.25

Frame. L100×50×8 · (2.1×4+1.08+1.0×2)×10.6 = 121.69.

Total. 273.19.

Weight. 273.19×1.2 = 327.8. = 330kg/unit

5.76
3.79

8.2 Water Level Gauging Station

1. Steel Pipe Pile ϕ 600 t9. ℓ = 15.00 m. (Driving 8 m)

2. Steel Pipe ϕ400 t9. $\ell = 5.5 + 2.5 = 8.0$ m

3. Structural Steel.

(1) Observation Hoses.

Material		Unit Weight	Quantity		Weight
• FRAME					
H-Beam 100	①		2.2m×2 = 4.4m		
	②		2.0 × 2 = 4.0m		
	③		1.8 × 2 = 3.6m		
	④		1.6 × 5 = 8.0m		
	⑤		1.0m		
	⑥		0.5 × 2 = 1.0m		
	⑦		4.74 × 2 = 9.48 = 9.5m.		
		16.9 kg/m	Total	31.5m	533 kg.
L 75×75×6	L-1		(2.2+2.1)/2×4 = 8.6m		
	L-2	~~kg/m~~	1.6m×3×4 = 19.2m		
		6.85 kg/m	Total	27.8m	191 kg.
• Metal Siding PL t=3m			2.2×1.8	= 4.0m²	
			2.0×1.8	= 3.6m²	
			2.1×1.8×2	= 7.6m²	12 kg.
		0.787 kg/m	Total	15.2m²	

5.41

• Roof

H-Beam	16.9 kg/m	2.2 × 2	= 4.4m	75 kg
F-75 (75×40×5×7)	6.92 kg/m	2.2 × 4	= 8.8m	61 kg
METAL ROOF (t=4mm) N=27.5	4.2 kg/m²	2.214×2.2	= 4.9m²	21 kg

(2) LADDER & Hand Rail.

GSP. ϕ50.	R1	5.31 kg/m	2.4m × 2	= 4.8m	26 kg
	R2	5.31 kg/m	5.93m × 2	= 11.9m	63 kg
GSP ϕ35	R3	3.38 kg/m	0.4 × 2	= 0.8m	3 kg
ϕ19.	R4	2.23 kg/m	0.6m × 13 nos	= 7.8m	18 kg
PL 6mm	R5	4.71 kg/m²	0.2×0.2 × 2	= 0.08m²	1 kg

(3) CHECKER PL. t4.5

	2×2	=4m²	
	0.5×1	=0.5m²	
3.53 kg/m²	Total	4.5m²	16 kg

(4). Desk.

L50×50×t=4mm 1.0m×4 + 0.6×2 + 0.9×2 = 7m
7×3.06 kg/m 22kg

PL t=3.0. 0.9×0.6 (0.54) ×0.787 kg/m² = 0.43. 1kg.

Total Weight of Structural Steel. W = 1043 kg

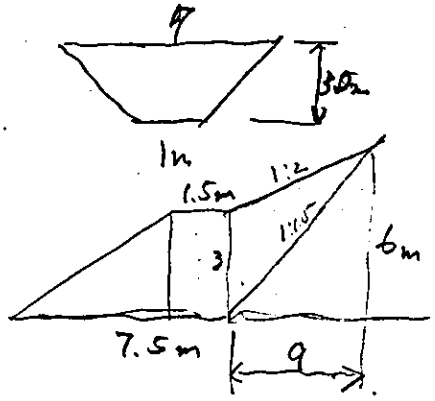
4. Base Concrete. Type C1.

V = 0.25×0.35×0.9 = 0.079 m³

5 Step. Wet Stone Masonry (1:4).

0.25×0.5×15 = 1.88 m³

6. Excavation



A = .3×6/2 + 1.5×3 + .3×9/2.
= 27 m²

V = 27×9/3 ×2 + 27×1.0
= 189 (×1.2)
= 230 m³.

$\frac{h}{1.5} = \frac{h}{2} + 3$

$\frac{2h}{3} + \frac{3}{2} = \frac{1.5h}{3}$

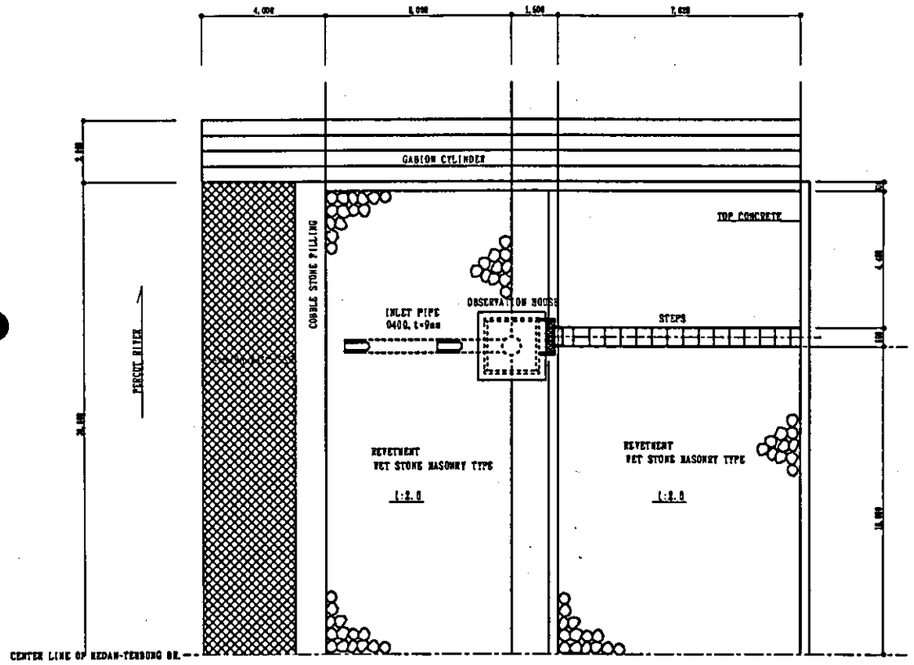
$\frac{0.5}{3}h = +\frac{3}{2}$

$0.5h = \frac{9}{2}$

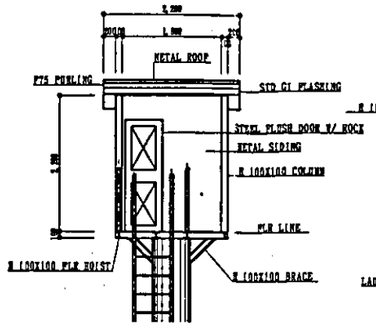
$h = 9$.

1.5)6/9

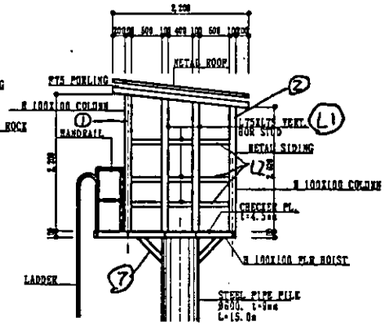
FW1 (0.9×0.25 + 0.35×0.25)×2 = 0.63.



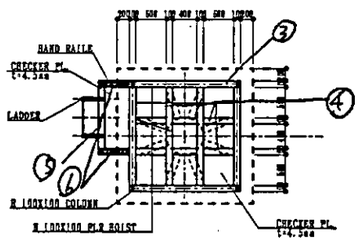
PLAN
SCALE A



FRONT VIEW

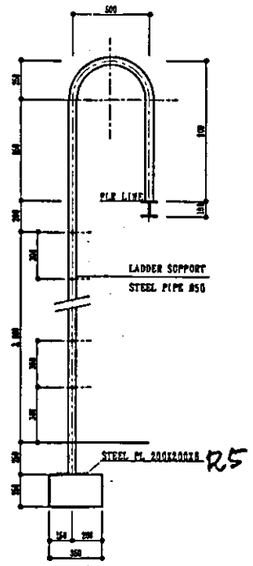


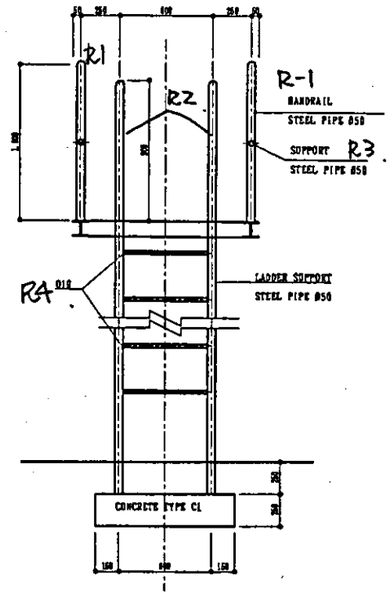
CROSS SECTION



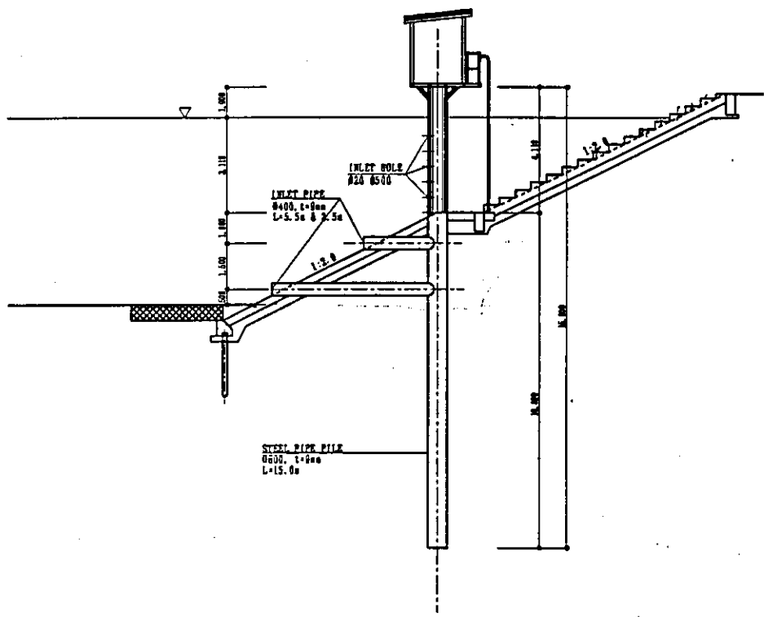
PLAN

DETAILE OF OBSERVATION HOUSE
SCALE B

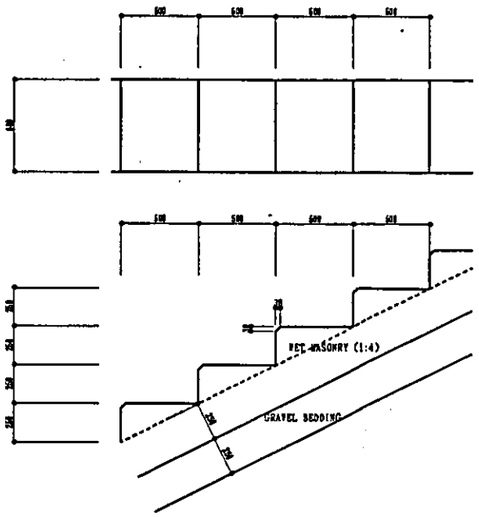




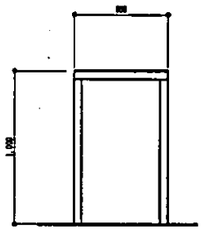
DETAILE OF LADDER
SCALE C

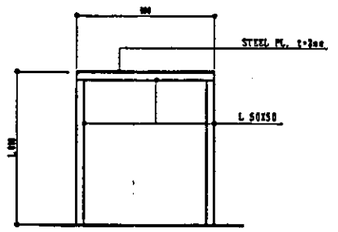


ELEVATION
SCALE A

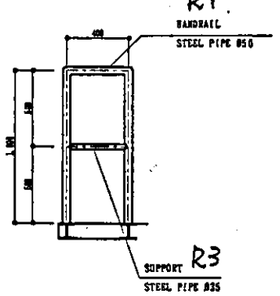


DETAIL OF STEPS
SCALE C





DESK FOR WATER LEVEL GUAGE
SCALE C



DETAIL OF HANDRAIL
SCALE C

REPUBLIC OF INDONESIA

MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
DIRECTOTATE OF TECHNICAL GUIDANCE

MEDAN FLOOD CONTROL PROJECT

NO.	DATE	REVISIONS	ORIGINATED	APPROVED

PREPARED	CHECKED	SUBMITTED	CERTIFIED	APPROVED	DRAWING NO.

JAPAN INTERNATIONAL COOPERATION AGENCY
CTI ENGINEERING CO., LTD

PROYEK PENGELOAAN SUMBER AIR DAN PENGENDALIAN BANJIR SUMATERA UTARA

SHEET NO.	REV.

8.3 Environmental Improvement Facilities

(1) Percut River

- Relocation of Existing Form Road
- Side Ditch Alongside Inspection Road
- Drainage Outlet
- Planting

(2) Floodway

- Inspection Road
- Fence
- Side Ditch
- Planting
- Kabupaten Road Pavement
- Approach Road for Maintenance

(3) Deli River Retarding Channel

- Boulder Pitching
- Drainage Side Ditch
- Fence
- Planting
- Approach Road to Retarding Channel
- Information Board
- Road Gate
- Roofed Bench

STRIPPING, CLEARING & GRUBBING, SODDING, AND EMBANKMENT OF PERCUT RIVER FOR ROAD

RIGHT BANK

STATION NO.	Partial Distance (m)	STRIPPING				CLEARING & GRUBBING			SODDING					EMBANKMENT (m^3)		
		L (m)	A (m^2)	Av. (m^2)	V (m^3)	L (m)	Av. (m)	A (m^2)	L_1 (m)	L_2 (m)	L_1+L_2 (m)	Av. (m)	A (m^2)	A (m^2)	Av. (m^2)	V (m^3)
PE 82	0.00	6.4	0.00	0.00	0.00	6.4	3.20	0.00	2.00	0.67	2.67	0.00	0.00	1.50	0.75	0.00
PE 83	95.00	5.2	494.00	247.00	61.75	5.2	5.80	551.00	2.00	0.67	2.67	2.67	253.73	0.64	1.07	101.65
PE 84+28	125.00	0.0	0.00	247.00	61.75	0.0	2.60	325.00	2.00	0.67	2.67	2.67	333.85	0.00	0.32	40.00
PE 85	72.00	6.2	446.40	223.20	55.80	6.2	3.10	223.20	2.00	0.56	2.56	2.61	515.14	1.54	0.77	55.44
PE 86	94.50	6.0	567.00	506.70	126.68	6.0	6.10	576.45	2.00	0.45	2.45	2.50	236.54	1.25	1.40	131.83
PE 87	98.50	7.4	728.90	647.95	161.99	7.4	6.70	659.95	2.00	2.01	4.01	3.23	318.14	6.00	3.63	357.06
PE 88	105.00	8.4	882.00	805.45	201.36	8.4	7.90	829.50	2.00	2.46	4.46	4.24	444.79	8.75	7.38	774.38
PE 89	90.50	7.8	705.90	793.95	198.49	6.6	7.50	678.75	2.00	0.45	2.45	3.45	312.54	1.70	5.23	472.86
PE 90	100.00	5.8	580.00	642.95	160.74	5.8	6.20	620.00	2.00	0.45	2.45	2.45	244.72	1.25	1.48	147.50
PE 91	98.00	5.8	568.40	574.20	143.55	5.8	5.80	568.40	2.00	0.34	2.34	2.39	234.35	1.00	1.13	110.25
PE 92	98.00	5.6	548.80	558.60	139.65	5.6	5.70	558.60	2.00	0.34	2.34	2.34	228.87	1.00	1.00	98.00
PE 93	112.00	6.0	672.00	610.40	152.60	6.0	5.80	649.60	2.00	0.67	2.67	2.50	280.35	1.50	1.25	140.00
PE 94	87.00	5.6	487.20	579.60	144.90	5.6	5.80	504.60	2.00	0.56	2.56	2.61	227.50	1.25	1.38	119.63
PE 95	113.00	6.2	700.60	593.90	148.48	6.2	5.90	666.70	2.00	0.89	2.89	2.73	308.12	1.50	1.38	155.38
PE 96	84.50	6.0	507.00	603.80	150.95	6.0	6.10	515.45	2.00	0.89	2.89	2.89	244.58	1.00	1.25	105.63
Total :	1,373.00			1,908.68				7,927.20					4,183.21			2,809.59

Gravel Pavement $V = 3.0 \times 0.2 \times 1,355^{m} = 813\ m^3$

u) Percut River

STRIPPING, CLEARING & GRUBBING, SODDING, AND EMBANKMENT OF PERCUT RIVER FOR ROAD

LEFT BANK

STATION NO.	Partial Distance (m)	STRIPPING				CLEARING & GRUBBING			SODDING					EMBANKMENT (m^3)		
		L (m)	A (m^2)	Av. (m^2)	V (m^3)	L (m)	Av. (m)	A (m^2)	L_1 (m)	L_2 (m)	L_1+L_2 (m)	Av. (m)	A (m^2)	A (m^2)	Av. (m^2)	V (m^3)
PE 85	0.00	5.6	0.00	0.00	0.00	5.6	2.80	0.00	0.67	2.00	2.67	1.34	263.08	1.25	0.63	0.00
PE 86	94.50	5.0	472.50	236.25	59.06	5.0	5.30	500.85	0.94	2.00	2.94	2.80	265.07	2.10	1.68	158.29
PE 87	98.50	5.6	551.60	512.05	128.01	5.6	5.30	522.05	0.56	2.00	2.56	2.75	270.78	1.25	1.68	164.99
PE 88	105.00	5.6	588.00	569.80	142.45	5.6	5.60	588.00	0.67	2.00	2.67	2.61	274.57	1.50	1.38	144.38
PE 89	90.50	5.6	506.80	547.40	136.85	5.6	5.60	506.80	0.58	2.00	2.58	2.63	237.66	1.30	1.40	126.70
PE 90	100.00	5.6	560.00	533.40	133.35	6.0	5.80	580.00	0.94	2.00	2.94	2.76	276.03	2.10	1.70	170.00
PE 91	98.00	0.0	0.00	280.00	70.00	0.0	3.00	294.00	0.00	0.00	0.00	1.47	144.02	0.00	1.05	102.90
PE 92	98.00	0.0	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PE 93	112.00	7.0	784.00	392.00	98.00	8.8	4.40	492.80	1.48	2.00	3.48	1.74	194.65	3.30	1.65	184.80
PE 94	87.00	6.2	539.40	661.70	165.43	6.2	7.50	652.50	1.07	2.00	3.07	3.27	284.89	2.40	2.85	247.95
PE 95	113.00	5.0	565.00	552.20	138.05	5.0	5.60	632.80	0.67	2.00	2.67	2.87	324.54	1.25	1.83	206.23
Total :	**996.50**			**1,071.20**			**4,769.80**					**2,535.28**			**1,506.23**	

Gravel Pavement $V = 3.0 \times 0.2 \times 1.030^{m} = 618\ m^3$

PACKAGE : MFC-3 / MFC-4
WORK ITEM : ENVIRONMENTAL IMPROVEMENT WORKS AND DRAINAGE WORK
T Y P E : SIDE DITCH , PLANTING

NO	WORK ITEM	Unit	MFC-3		MFC-4		TOTAL
			Per unit quantity	Quantity	Per unit quantity	Quantity	
			Left and Right Banks L = 12,512.0		Left and Right Banks L = 11,976.0		
I	**SIDE DITCH (Wet masonry type)**						
1.	Excavation (Common)	m^3	0.63	7,932.6	0.63	7,544.9	15,477.5
2.	Backfill with Soil	m^3	0.13	1,626.6	0.13	1,556.9	3,183.4
3.	Wet Stone Masonry (1:4)	m^3	0.24	3,002.9	0.24	2,874.2	5,877.1
4.	Cement Mortar Plastering, t=10	m^2	1.50	18,768.0	1.50	17,964.0	36,732.0
5.	Sand Bedding	m^3	0.07	875.8	0.07	778.4	1,654.3
II	**DRAINAGE OUTLET**		No. =	32	No. =	18	
1.	Excavation (Common)	m^3	23.590	754.9	23.590	424.6	1,179.5
2.	Crusher Run Bedding, t = 100 mm	m^3	1.730	55.4	1.730	31.1	86.5
3.	Concrete Type-C2	m^3	5.020	160.6	5.020	90.4	251.0
4.	Formwork FW1	m^2	26.00	832.0	26.00	468.0	1,300.0
5.	Reinforcing Bar	kg	377.00	12,064.0	377.00	6,786.0	18,850.0
6.	Wet Stone Masonry (1:3)	m^3	8.97	287.0	8.97	161.5	448.5
7.	Cement Mortar Plastering, t=10	m^2	7.02	224.6	7.02	126.4	351.0

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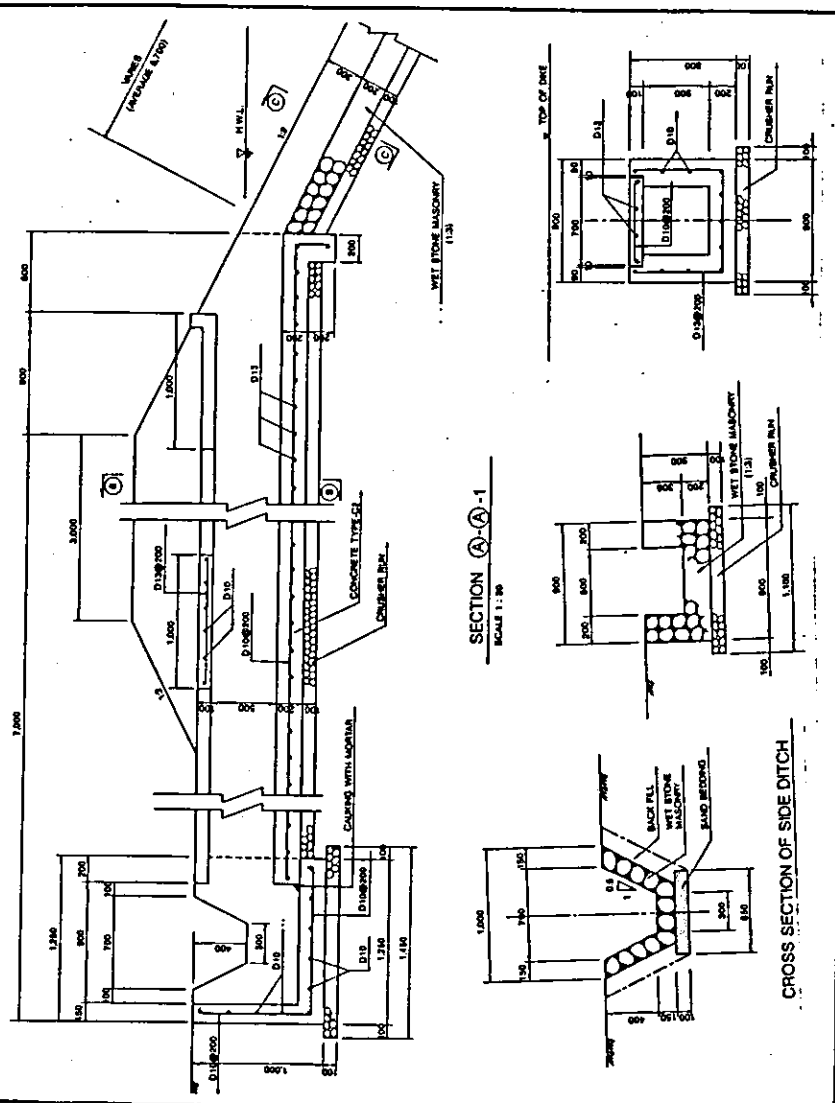
NO	WORK ITEM	Unit	MFC-3		MFC-4		TOTAL
			Per unit quantity	Quantity	Per unit quantity	Quantity	
			Left and Right Banks L = 12,512.0		Left and Right Banks L = 11,976.0		
8.	Backfill with selected soil	m^3	10.85	347.2	10.85	195.3	542.5
III	**PLANTING**		Total	1,252		1,200	2,452.0
1.	Clering and Grubbing	m^2	4.00	50,048.0	4.00	47,904.0	97,952.0
2.	Filling with Fertilized Soil	m^3	0.03	338	0.03	323	661.2
3.	Palem Hijau	tree	10	313	10	300	613.0
4.	Fillisium	tree	10	313	10	300	613.0
5.	Acasia Petandra	tree	10	313	10	300	613.0
6.	Tanjung	tree	10	313	10	300	613.0

NAME OF STRUCTRURE: Drainage Side Ditch and Outlet.
LOCATION : Percut River (Upstream) MFC-3 and 4

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
		I	Side Ditch (Per unit meter)		
			① Excavation		
		m^3	$V = Y_2 \times (0.65 + 1.30) \times 0.85 \times 1.0$	0.634	
			② Backfill with Selected Soil		
		m^3	$0.634 - Y_2 \times (0.6 + 1.0) \times 0.55 \div 0.65 \times 0.1$	0.129	
			③ Wet Stone Masonry (1:4)		
		m^3	$Y_2 \times (0.6 + 1.0) \times 0.55 - Y_2 \times (0.3 + 0.7) \times 0.4$	0.240	
			④ Cement Mortar Plastering		
		m^2	$0.497 \times 2 + 0.3 + 0.15 \times 2$	1.50	
			⑤ Sand Bedding		
		m^3	0.65×0.1	0.07	
		II	Drainage Outlet (1 unit)		
			① Excavation		
		m^3	$2.0 \times 2.0 \times 1.1 + 1.70 \times 0.90 \times 6.65$	14.58	
			$Y_2 \times (3.0 + 5.0) \times 0.5 \times 1.7 + 1.10 \times 0.6 \times 8.5$	9.01	23.59
			② Crusher Run Bedding		
		m^3	$(1.45^2 \times 0.1 + 1.10 \times 7.05 + 1.10 \times 8.5) \times 0.1$		1.73
			③ Concrete, Type C-2		
			$1.25 \times 1.20 \times 1.0 - 0.90 \times 1.10 \times 0.8$	0.71	
			$(0.90 \times 0.80 - 0.5 \times 0.5) \times 8.85$	4.16	
		m^3	$0.9 \times 0.2 \times 0.6 + 0.2 \times 0.2 \times 0.9$	0.15	5.02
			④ Reinforcing Bar		
		kg	$5.02 \times 2,500 \times 0.03$		377
			⑤ Formwork (FW1)		
			$1.0 \times (1.2 + 1.25 \times 2 + 0.2 \times 2) + 0.8 \times 0.9 \times 3$	6.3	
			$0.8 \times 6.65 \times 2 + 0.6 \times 6.85 \times 2 + 0.2 \times 0.6 \times 2 + 0.6 \times 0.9$	19.7	26.0

NAME OF STRUCTRURE :
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			⑥ Wet Stone Masonry (1:3)		
			(0.9×0.5 − 0.5×0.3) × 7.8		8.97
			⑦ Cement Mortar Plastering t=10		
			(0.2×2+0.5) × 7.8		7.02
			⑧ Back-fill with Selected Soil		
			½×(0.3+0.75)×0.9×8.5×2	8.04	
			0.3×0.6×7.8×2	2.81	10.85
		III	Planting		
			① Clearing and Grubbing		
			Average width = 3.0 m		

PACKAGE : MFC-5 / MFC-6 / MFC-7
WORK ITEM : ENVIRONMENTAL IMPROVEMENT WORKS AND DRAINAGE WORK
T Y P E : INSPECTION ROAD, SIDE DITCH , FENCE AND PLANTING

(2) Floodway

NO	WORK ITEM	Unit	MFC-5		MFC-6		MFC-7	
			Per unit quantity	Quantity	Per unit quantity	Quantity	Per unit quantity	Quantity
			Length (m) = L1 x 2 4,186.0		Length (m) = L2 x 2 2,028.0		Length (m) = L3 x 2 960.0	
I.	**INSPECTION ROAD**							
1.	Excavation (common)	m^3	0.90	3,767.4	0.90	1,825.2	0.90	864.0
2.	Gravel Pavement, 200 mm thick	m^3	0.60	2,511.6	0.60	1,216.8	0.60	576.0
3.	Maintenance Marker Post	nos.	200 m interval	42	200 m interval	22	200 m interval	10
II.	**FENCE**							
1.	Excavation (common)	m^3	0.25	512.8	0.25	248.4	0.25	117.6
2.	Backfill with Selected Soil	m^3	0.18	379.5	0.18	183.8	0.18	87.0
3.	Gravel Bedding 100 mm thick	m^3	0.03	52.3	0.03	25.4	0.03	12.0
4.	Concrete, Type - D	m^3	0.04	81.0	0.04	39.2	0.04	18.6
5.	Formwork FW1	m^2	0.48	1,004.6	0.48	486.7	0.48	230.4
6.	Galvanized Steel Fence	lin.m	1.00	4,186.0	1.00	2,028.0	1.00	960.0
III.	**SIDE DITCH (Wet masonry type) AND OUTLET**							
	Side Ditch							
1.	Excavation (Common)	m^3	0.63	1,326.4	0.63	642.6	0.63	304.2

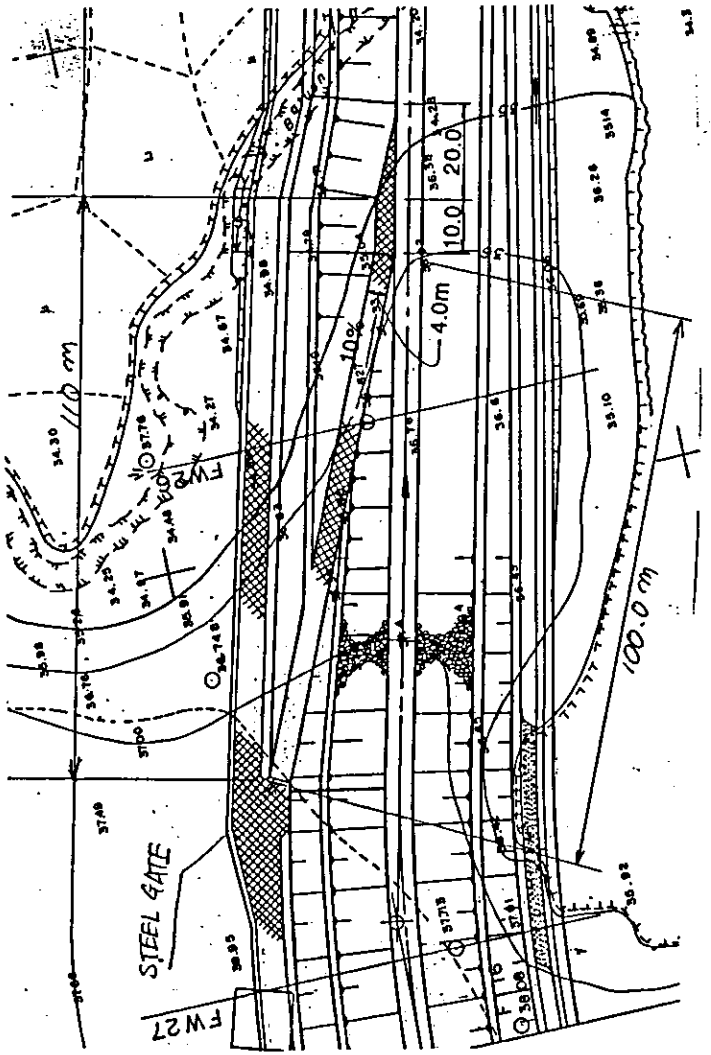
NO	WORK ITEM	Unit	MFC-5		MFC-6		MFC-7	
			Per unit quantity	Quantity	Per unit quantity	Quantity	Per unit quantity	Quantity
			Length (m) = L1 x 2 4,186.0		Length (m) = L2 x 2 2,028.0		Length (m) = L3 x 2 960.0	
2.	Backfill with Soil	m^3	0.28	578.2	0.28	280.1	0.28	132.6
3.	Wet Stone Masonry (1:4)	m^3	0.23	473.5	0.23	229.4	0.23	108.6
4.	Cement Mortar Plastering, t=10	m^2	1.18	2,469.7	1.18	1,196.5	1.18	566.4
5.	Sand Bedding	m^3	0.07	136.0	0.07	65.9	0.07	31.2
	Outlet		No. =	4	No. =	2	No. =	1
1.	Excavation (Common)	m^3	23.50	94.0	23.50	47.0	23.50	23.5
2.	Backfill with Soil	m^3	10.85	43.4	10.85	21.7	10.85	10.9
3.	Crusher Run Bedding	m^3	1.73	6.9	1.73	3.5	1.73	1.7
4.	Concrete Type-C2	m^3	5.02	20.1	5.02	10.0	5.02	5.0
5.	Reinforcing Steel Bar	kg	377.00	1,508.0	377.00	754.0	377.00	377.0
6.	Formwork (FW1)	m^2	26.00	104.0	26.00	52.0	26.00	26.0
7.	Wet Stone Masonry (1:3)	m^3	8.97	35.9	8.97	17.9	8.97	9.0
IV.	**PLANTING**							
1.	Excavation (Common)	m^3	0.250	1,046.5	0.250	507.0	0.250	240.0
2.	Sand Bedding, t = 100 mm	m^3	0.050	209.3	0.050	101.4	0.050	48.0
3.	Concrete Type-D	m^3	0.090	376.7	0.090	182.5	0.090	86.4

NO	WORK ITEM	Unit	MFC-5		MFC-6		MFC-7	
			Per unit quantity	Quantity	Per unit quantity	Quantity	Per unit quantity	Quantity
			Length (m) = L1 x 2 4,186.0		Length (m) = L2 x 2 2,028.0		Length (m) = L3 x 2 960.0	
4.	Formwork FW1	m^2	0.85	3,558.1	0.85	1,723.8	0.85	816.0
5.	Boulder Pitching, 200-300mm	m^2	1.00	4,186.0	1.00	928.0	-	-
6.	Filling with Fertilized Soil	m^3	0.09	376.7	0.09	182.5	0.09	86.4
7.	Palem Hijau	tree	10	105	10	51	10	24
8.	Fillisium	tree	10	105	10	51	10	24
9.	Acasia Petandra	tree	10	105	10	51	10	24
10.	Tanjung	tree	10	105	10	51	10	24
11.	Cemara Lilin (low)	tree	20	209	20	101	20	48
12.	Cemara Kipas (low)	tree	20	209	20	101	20	48
13.	Soka (low)	tree	20	209	20	101	20	48
14.	Bougainvillea (low)	tree	20	209	20	101	20	48
V.	KABUPATEN ROAD (ClassIII)		L (m)	342.0	L (m)	1,053.0	L (m)	0
1.	Excavation (Common)	m^3	1.58	538.65	1.58	1,658.48	-	-
2.	Sub-base Course (class C)	m^3	0.75	256.50	0.75	789.75	-	-
3.	Base Course (Class-B)	m^3	0.50	171.00	0.50	526.50	-	-
4.	Asphalt Treatment Base (A.T.B)	ton	0.65	222.30	0.65	684.45	-	-

floodway

NO	WORK ITEM	Unit	MFC-5		MFC-6		MFC-7	
			Per unit quantity	Quantity	Per unit quantity	Quantity	Per unit quantity	Quantity
			Length (m) = L1 x 2 4,186.0		Length (m) = L2 x 2 2,028.0		Length (m) = L3 x 2 960.0	
VI.	DRAINAGE SIDE DITCH (CONCRETE U-TYPE)							
1.	Excavation (Common)	m^3	2.60	5,441.8	2.60	2,636.4	2.60	1,248.0
2.	Backfill with Soil	m^3	1.44	3,013.9	1.44	1,460.2	1.44	691.2
3.	Concrete, Type - C2	m^3	0.69	1,444.2	0.69	699.7	0.69	331.2
4.	Reinforcing Steel Bars	kg	34.50	72,208.5	34.50	34,983.0	34.50	16,560.0
5.	Formwork (FW1)	m2	4.40	9,209.2	4.40	4,461.6	4.40	2,112.0
6.	Crusher Run Bedding	m^3	0.16	334.9	0.16	162.2	0.16	76.8

NAME OF STRUCTRURE: APPROAC ROAD FOR MAINENANCE
LOCATION :

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
					
		①	Excavation		
			4.0 × 9.0 ÷ 2 × 100.0	1800	
			4.0 × 8.3 × 10.0	332	
			4.0 ÷ 2 × 8.3 ÷ 2 × 20.0	166	2,300
		②	A.T.B Pavement		
			A = 4.0 × 100 + ½ × (10.0 + 30.0) × 4.0		
			= 480 m²		
			· A.T.B Asphalt		
			V = 480 × 0.065 = 31.2 m³		
			W = 31.2 × 2.2 = 68.7	ton	68.7
			· Base Course t = 100 (Class-A)		
			V = 480 × 0.10	m³	48.0
			· Sub-Base Course t = 150 (Class-C)		
			V = 480 × 0.15	m³	72.0
		③	Steel Gate H = 1.2 m, L = 4.0 m	L.S.	1

(3) Deli River Retarding Channel

Environmental Improvement Facilities

Deli River Retarding Channel

〔Boulder Pitching φ ~~200~300~~ 300~500〕

length (L)

zone A 70 m

zone B 240 +125 + 85 + 160 = 610 m

zone C 105 m

Total Length = 70 + 610 + 105 = 785 m

Width w = 2.0 m

- Area A = 785 x 2.0 =1,570 m^2
- Excavation 0.2 m Deep
  V = 1,570 x 0.2 = 314 m^3
- Backfill with Selected Soil , 0.1m Deep
  V = 1,570 x 0.1 = 157 m^3

〔Drainage Side Ditch (Wet Masonry Type)〕

Zone D Right Bank l = 642 m

Left Bank l = 515 m Total = 1,157 m

- Excavation (Common)
  V = 1/2 x (0.65 + 1.30) x 0.65 x 1,157 = 733.3 m^3
- Backfill with Selected Soil
  V = {0.634-1/2 x (0.55 + 1.0) x 0.55} x 1,157 = 240.4 m^3
- Sand Bedding 100 m thick
  V = 0.65 x 0.10 x 1,157 = 75.2 m^3
- Wet Stone Masonry
  V = {1/2 x (0.55 + 1.0) x 0.55 - 1/2 x (0.3 + 0.7) x 0.4} x 1,157
  = 377.5 m^3
- Cement Mortar Plastering 20 mm thick
  A = (0.447 x 2 + 0.3) x 1,157 = 1,381.5 m^2

〔FENCE〕 on Zone D and at Bend

- Total Length L = 505 + 632 + 110 = 1,247 m
- Excavation (2.0 m interval)
  V = 0.5 x 0.5 x 0.5 x 624 = 78.0 m^3
- Backfill with Selected Soil
  V = (0.5^3 - 0.3^2 x 0.4 - 0.5^2 x 0.1) x 624 = 40.0 m^3

- Crusher Run Bedding
  V = 0.5 x 0.5 x 0.1 x 624 = 15.6 m^3
- Concrete , Type D
  V = 0.3 x 0.3 x (0.4 + 0.03) x 624 = 24.2 m^3
- Galvanized Steel Fence , H = 1.20 m
  L = 1,247 m (lin. m)

〔Planting Alongside Walkway on Zone D〕

- Total Length L = 505 + 632 = 1,137 m
- Excavation for Concrete Curb
  V = 0.5 x 0.5 x 1,137 = 284.3 m^3
- Backfill with Selected Soil
  V = {0.5 x 0.5 - 1/2 x (0.15 + 0.3) x 0.4 - 0.5 x 0.1} x 1,137
  = 125.1 m^3
- Solid Sodding
  A = 2.0 x 1,137 = 2,274 m^2
- Sand Bedding , 100 mm thick
  V = 0.50 x 0.10 x 1,137 = 56.9 m^3
- Concrete , Type D
  V = 1/2 x (0.15 + 0.3) x 0.4 x 1,137 = 102.4 m^3
- Form Work (FW1)
  A = (0.4 + 0.43) x 1,137 = 944 m^2
- Palem Hijau
  n = 10 x (1137÷400) = 29
- Filllisium n = 29
- Acasia Petandra n = 29
- Tanjung n = 29

〔Approach Road to Retarding Channel (Class Ⅲ)〕

W = 4.0, L = 60 m, A.T.B Pavement : 3.0m

- Excavation
  V = 4.0 x 1.0 x 60.0 = 240 m^3
- Stripping of Top Soil
  V = 4.0 x 0.25 x 60.0 = 60 m^3
- Embankment
  V = 4.0 x 0.50 x 60.0 = 120 m^3

- Sub Base Course

  V = 0.15 x 4.0 x 60.0 = 36 m^3

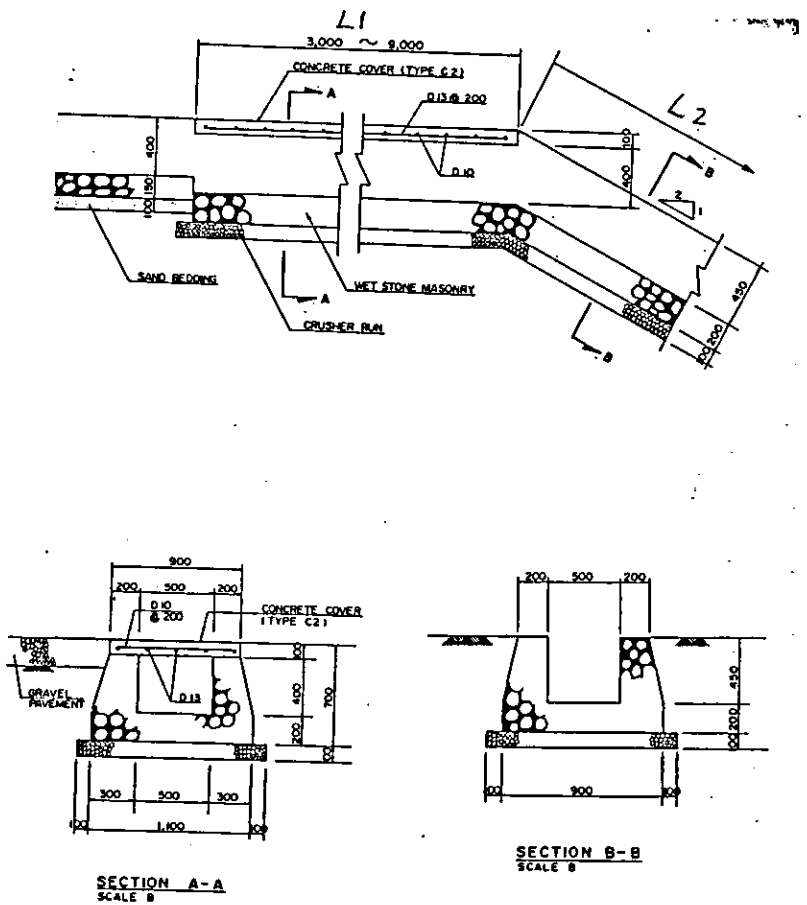
- Base Concrete

  V = 0.10 x 4.0 x 60.0 = 24 m^3

- A.T.B

  W = 0.065 x 3.0 x 60.0 x 2.5 = 11.7 ton

NAME OF STRUCTRURE: DRAINAGE OUTLET
LOCATION : DELI RETARDING CHANNEL

NO	SKETSA OF STRUCTURE
	

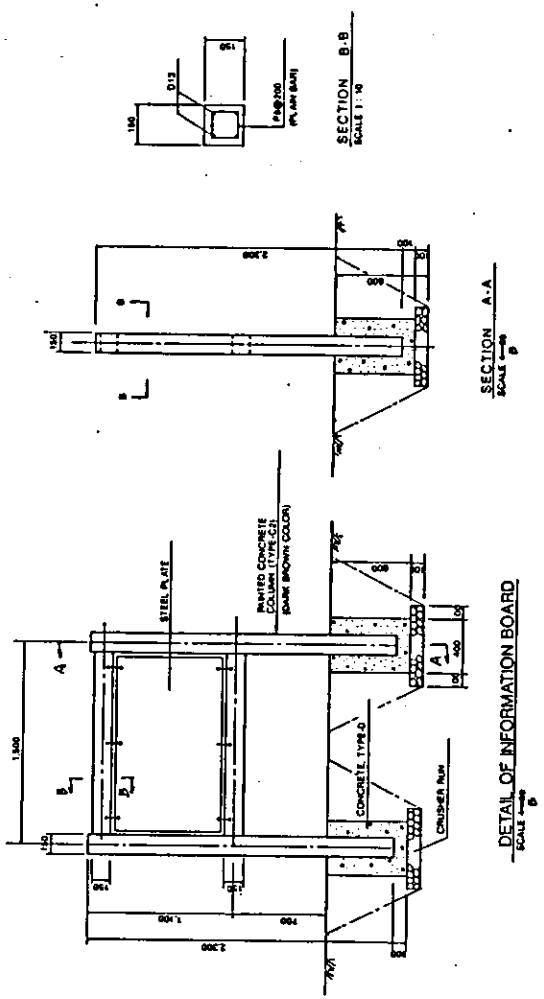
L1 : Average 6.0 m
L2 : Average 10 m

UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
(1)	Excavation		
	1.50 × 0.8 × 6.0 + 1.30 × 0.75 × 10.0	m^3	17.0
(2)	Backfill with Selected Soil		
	(1.50×0.8 - 1.1×0.8)×6.0 + (1.30×0.75 - 0.9×0.75)×10.0	m^3	4.9
(3)	Crusher Run Bedding		
	1.30×0.10×6.0 + 1.10×0.10×10.0	m^3	1.9
(4)	Wet Stone Masonry (1:3)		
	(1.10×0.6 - 0.5×0.4 - 0.1×0.4) × 6.0		
	(0.90×0.65 - 0.95×0.5 - 0.1×0.95) × 10.0	m^3	5.7
(5)	Cement Mortar Plastering 20 mm thick		
	0.4 × 4 × 6.0 + 0.45 × 4 × 10.0	m^2	27.6
	+		
(6)	Concrete Type - C2		
	0.90 × 0.10 × 6.0	m^3	0.54
(7)	Reinforcing Steel Bars		
	0.54 × 2,500 × 0.05	kg	68
(8)	Formwork (FW1)		
	0.9 × 6.0 + 0.1 × 2 × 6.0	m^2	6.6
	4 places		

NAME OF STRUCTRURE: INFORMATION BOARD

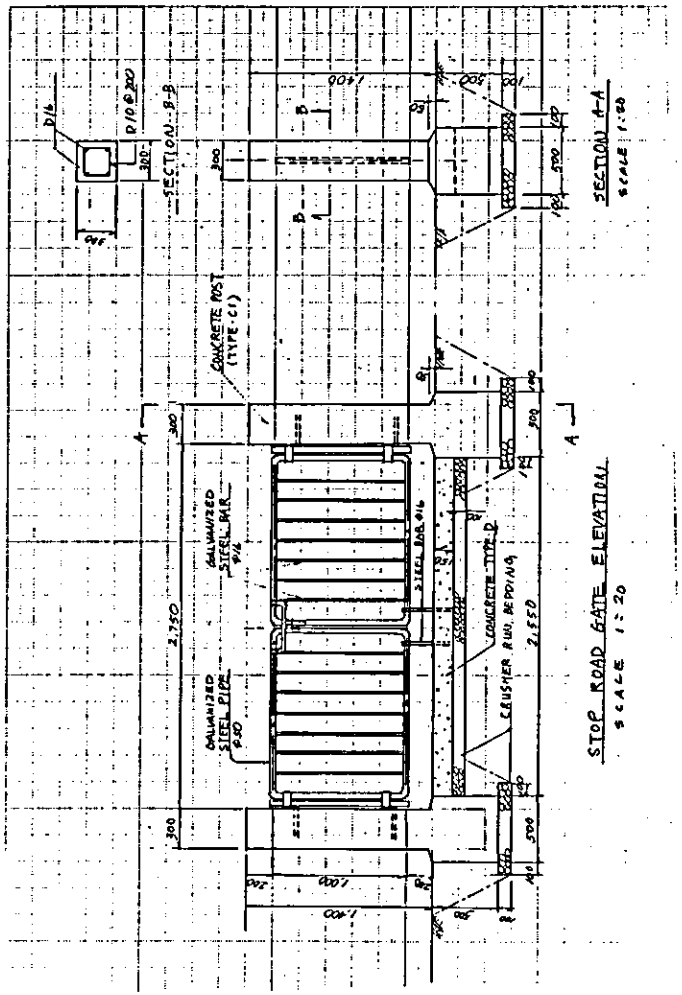
LOCATION :

1 UNIT

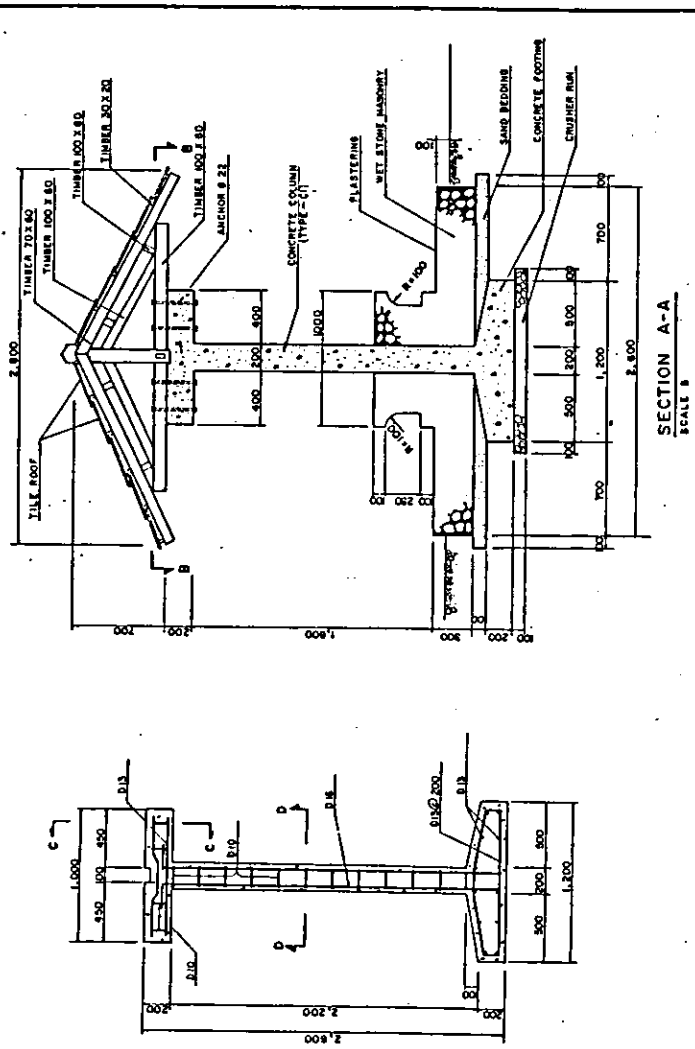
NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			(1) Excavation		
			$\frac{1}{2} \times (0.6^2 + 1.3^2) \times 0.7 \times 2$	m^3	1.49
			(2) Backfill with Selected Soil		
			$1.44 - 0.4^2 \times 0.6 \times 2 - 0.6^2 \times 0.1 \times 2$	m^3	1.18
			(3) Crusher Run Bedding		
			$0.6 \times 0.6 \times 0.1 \times 2$	m^3	0.08
			(4) Concrete Type-D		
			$0.4 \times 0.4 \times 0.6 \times 2 - 0.15^2 \times 0.5 \times 2$	m^3	0.17
			(5) Concrete Column, Type-C2		
			$0.15^2 \times 2.3 \times 2 + 0.15^2 \times 1.35 \times 2$	m^3	0.17
			(6) Reinforcing Steel Bar		
			$(2.2 \times 4 \times 2 + 1.50 \times 4 \times 2) \times 1.04$	kg 30.79	
			$(0.10 \times 4 \times 15 \times 2 + 0.10 \times 4 \times 11 \times 2) \times 0.395$	8.22	
			20% of the above	7.81	46.82
			(7) Formwork		
			$0.4 \times 0.6 \times 4 \times 2 + 1.8 \times 0.15 \times 4 \times 2$		
			$+ 1.50 \times 0.15 \times 4 \times 2$	m^2	5.88
			(8) Painting (Dark Brown Color)		
			$1.80 \times 0.15 \times 4 \times 2 + 1.50 \times 0.15 \times 4 \times 2$		
			$+ 0.15 \times 0.15 \times 2$	m^2	4.01
			(9) Steel Plate (Galvanized) $t = 0.8$ mm		
			$A = 1.45 \times 1.05 = 1.53\ m^2$ 1.53×6.286	kg	9.62

NAME OF STRUCTRURE: STOP ROAD GATE
LOCATION :

1 UNIT

NO	SKETSA OF STRUCTURE	UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
			(1) Excavation		
			$Y_2 \times (0.49 + 1.69) \times 0.6 \times 2 + 0.25 \times 2.55 \times 0.5$	m^3	1.63
			(2) Crusher Run Bedding		
			$0.7 \times 0.7 \times 0.1 \times 2 + 2.55 \times 0.50 \times 0.10$	m^3	0.23
			(3) Concrete Post (Type-C1)		
			$(0.5 \times 0.5 \times 0.55 + 0.3 \times 0.3 \times 1.4) \times 2$	m^3	0.53
			(4) Backfill with Selected Soil		
			$\{Y_2 \times (0.49 + 1.69) \times 0.6 - 0.5 \times 0.5 \times 0.5\} \times 2$		1.06
			(5) Reinforcing Steel Bar		
			D16 .. $1.80 \times 4 \times 1.58 \times 2$	kg 22.76	
			D10 .. $0.20 \times 4 \times 10 \times 0.617 \times 2$	2.88	
			20% of the above	0.51	26.2
			(6) Galvanized Steel Pipe ϕ50 mm and Steel Bar D16		
			$W_1 = (1.25 \times 4 + 1.00 \times 6) \times 2.73$	30.03	
			$W_2 = 1.00 \times 14 \times 1.58$	kg 22.12	52.15
			(7) Miscellaneous Steel		
			20% of (6) 52.15×0.2	kg	10.43
			(8) Concrete Type-D		
			$2.55 \times 0.15 \times 0.50$	m^3	0.20
			(9) Formwork (FW1)		
			$(1.4 \times 0.3 \times 4 + 0.5 \times 0.5 \times 4) \times 2$	m^2	3.68

NAME OF STRUCTRURE : Roofed Bench
LOCATION : Deli Retarding Channel

NO	SKETSA OF STRUCTURE
	

UNIT	QUANTITY CALCULATION	VOLUME SUB TOTAL	VOLUME TOTAL
(1)	Excavation		
	$V = 2.8 \times 2.8 \times 0.6$	m^3	4.71
(2)	Backfill with Selected Soil		
	$V = (2.8^2 - 1.2^2) \times 0.3 + \frac{1}{2} \times (0.3 + 0.45) \times 0.3 \times 10.4$	m^3	3.1
(3)	Crusher Run Bedding		
	$V = 1.40 \times 1.40 \times 0.1$	m^3	0.20
(4)	Sand Bedding		
	$V = (2.8^2 - 0.7^2) \times 0.1$	m^3	0.74
(5)	Wet Stone Masonry (1:3)		
	$V = (2.6^2 - 0.2^2) \times 0.3 + (1.0^2 - 0.2^2) \times 0.4$	m^3	2.40
(6)	Cement Mortar Plastering $t=20$		
	$A = 0.3 \times 2.6 \times 4 + 0.4 \times 1.0 \times 4 + 1.0^2 - 0.2^2$	m^2	5.68
(7)	Concrete, Type-C2		
	$V = 1.2^2 \times 0.3 + 0.2^2 \times 2.1 + 0.2^2 \times 0.4 \times 4$	m^3	0.58
(8)	Reinforcing Steel Bar		
	$0.58 \times 2,500 \times 0.05$	kg	73
(9)	Formwork (FW1)		
	$A = 1.0 \times 0.2 \times 4 + 1.9 \times 0.2 \times 4 + 0.4 \times 0.2 \times 12$	m^2	3.3
(10)	Roof	LS	1

2004.12.6
登録済
(阿部)