3.3. Tra On Bridge

1.Quantity of Superstructure

Superstructure-Approach Bridge

Item		Work Item		Unit	Quantity	Remarks
Concrete	CLASS B	Girder		cu.m	1004.6	σck=40Mpa
	CLASS D-1	Deck Slab		cu.m	637.7	σck=30Mpa
		Diaphragm		cu.m	175.9	
		Total		cu.m	813.7	
Form		Deck Slab		sq.m	739.5	
		Girder		sq.m	5619.7	
		Diaphragm		sq.m	485.0	
		Total		sq.m	6844.2	
Re-bar		Deck Slab	- D14	ton	40.1	
			D14 - D25	ton	113.4	
			D25 -	ton		
			Total	ton	153.5	
		Girder	- D14	ton	30.0	
			D14 - D25	ton	164.7	
			D25 -	ton	-	
			Total	ton	194.8	
		Diaphragm	- D14	ton	6.2	
			D14 - D25	ton	13.2	
			D25 -	ton	-	
			Total	ton	19.4	
		Total	- D14	ton	76.4	
			D14 - D25	ton	291.3	
			D25 -	ton	0.0	
			Total	ton	367.7	
PC Cable	12S12.7B			ton	54.3	SWPR7B
	3S12.7B	Transverse Tendons		ton	1.7	
Sheathing	Φ80/85			m	5845.2	
	Φ50/55			m	723.6	
	Segment Grout in Sheathing			m3	30.8	
Expansion Joint		Type A		m	43.0	
Pavement	t=70mm	Asphalt concrete surface course		sq.m	2758.5	
	t=5mm	Water proofing		sq.m	2758.5	
		Concrete		cu.m	4.3	
		Road Marking		sq.m	129.7	
Bearing		Product layer rubber bearing		nos	80	
		Anchor Bar	Φ75 L=1500	nos	160	
		Anchor Cap	Φ95 L=800	nos	48	
			Φ100 L=800	nos	8	
			Φ125 L=800	nos	8	
Concrete Form				sq.m	439.3	
				cu.m	35.1	
		D14		ton	5.0	
Shear Key				nos	450	
Erection				ton	69.9	per one girder (MAX)
				ton	2511.5	

Item	Formula	Quantity

1. Girder Concrete
CLASS "B"

1) Girder

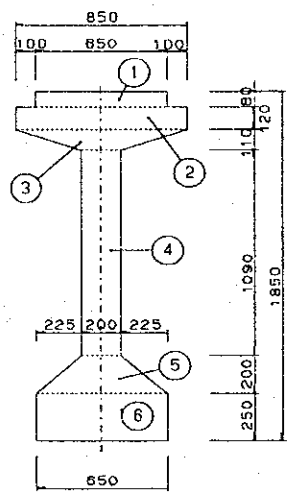
(1) Calculation of Sectional Area

[1] Middle Section

Summary of Sectional Area — For ONE GIRDER

No	Formula					(m2)
1	0.650	× 0.080			=	0.052
2	0.850	× 0.120			=	0.102
3	1/2	× 0.325	× 0.110	× 2	=	0.036
	0.200	× 0.110			=	0.022
4	1.090	× 0.200			=	0.218
5	1/2	× 0.225	× 0.200	× 2	=	0.045
	0.200	× 0.200			=	0.040
6	0.650	× 0.250			=	0.163

Total Area 0.678 m²

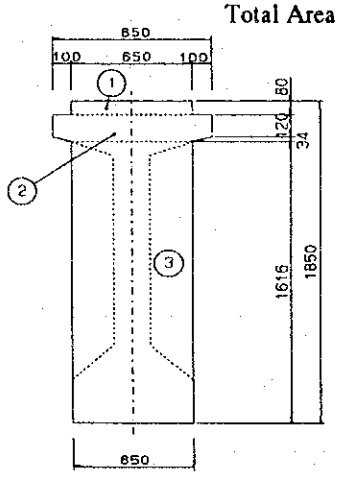


[2] End Section

Summary of Sectional Area — For ONE GIRDER

No	Formula					(m2)
1	0.650	× 0.080			=	0.052
2	0.120	× 0.850			=	0.102
	1/2	× 0.100	× 0.034	× 2	=	0.003
	0.650	× 0.034			=	0.022
3	0.650	× 1.616			=	1.050

Total Area 1.229 m²



Item	Formula	Quantity

(2) Calculation of Concrete Volume

Girder Length 36.000 m

Section No.	Section (m2)	Average of (m2)	Length of (m)	Concrete (m3)	Remark
END	1.229				
END	1.229	1.229	0.500	0.615	
MIDDLE	0.678	0.954	5.400	5.152	
MIDDLE	0.678	0.678	24.200	16.408	
END	1.229	0.954	5.400	5.152	
END	1.229	1.229	0.500	0.615	
Total			36.000	27.942	

No. of Girder 5 × 2 = 10

V1= 27.942 × 10 = 279.420 m^3

Girder Length 31.600 m

Section No.	Section (m2)	Average of (m2)	Length of (m)	Concrete (m3)	Remark
END	1.229				
END	1.229	1.229	0.500	0.615	
MIDDLE	0.678	0.954	4.800	4.579	
MIDDLE	0.678	0.678	21.000	14.238	
END	1.229	0.954	4.800	4.579	
END	1.229	1.229	0.500	0.615	
Total			31.600	24.626	

No. of Girder 5 × 2 = 10

V2= 24.626 × 10 = 246.260 m^3

Girder Length 28.600 m

Section No.	Section (m2)	Average of (m2)	Length of (m)	Concrete (m3)	Remark
END	1.229				
END	1.229	1.229	0.500	0.615	
MIDDLE	0.678	0.954	4.300	4.102	
MIDDLE	0.678	0.678	19.000	12.882	
END	1.229	0.954	4.300	4.102	
END	1.229	1.229	0.500	0.615	
Total			28.600	22.316	

No. of Girder 5 × 2 = 10

V3= 22.316 × 10 = 223.160 m^3

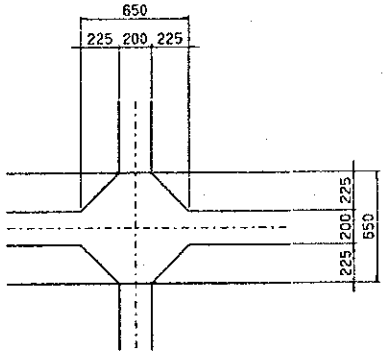
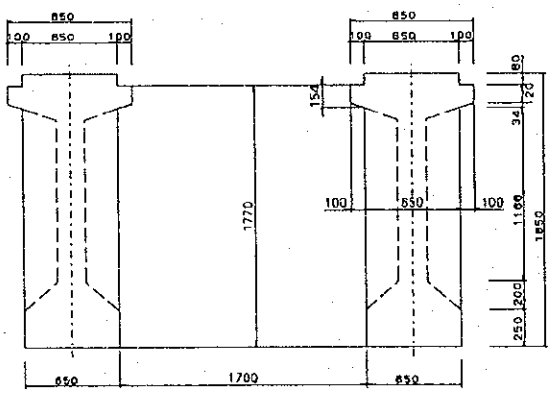
Girder Length 33.000 m

Section No.	Section (m2)	Average of (m2)	Length of (m)	Concrete (m3)	Remark
END	1.229				
END	1.229	1.229	0.500	0.615	
MIDDLE	0.678	0.954	4.800	4.579	
MIDDLE	0.678	0.678	22.400	15.187	
END	1.229	0.954	4.800	4.579	
END	1.229	1.229	0.500	0.615	
Total			33.000	25.575	

No. of Girder 5 × 2 = 10

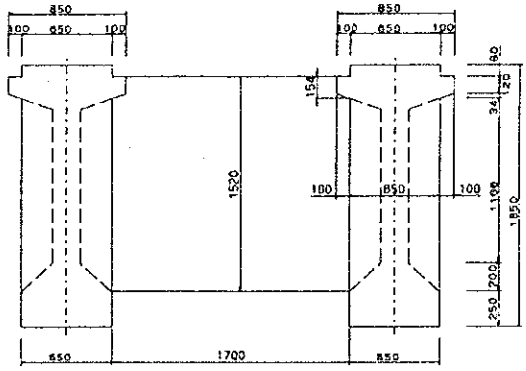
V4= 25.575 × 10 = 255.750 m^3

ΣA = 1004.590 m^3 1004.59 m^3

Item	Formula	Quantity
2. Diaphragm Concrete CLASS "D-1"		
1) Diaphragm		
	V= (0.200 + 0.650) × 1/2 × 0.225 × (1.090 + 1.366) × 1/2 × 2 = 0.235	
	N1 = 5 × 3 × 2 = 30 N2 = 5 × 3 × 2 = 30 N3 = 5 × 2 × 2 = 20 N4 = 5 × 3 × 2 = 30 N = 110	
	V1 = 0.235 × 110 = 25.850 m³	
2) Cross Beam	(1) End Cross Beam	
		
	V2-1= { 1.770 × 1.700 - (0.120 + 0.154) × 1/2 × 0.100 × 2)× 0.5 × 4 × 2 × 4 = 47.706 m³	

Item	Formula	Quantity

(2) Intermediate Cross Beam

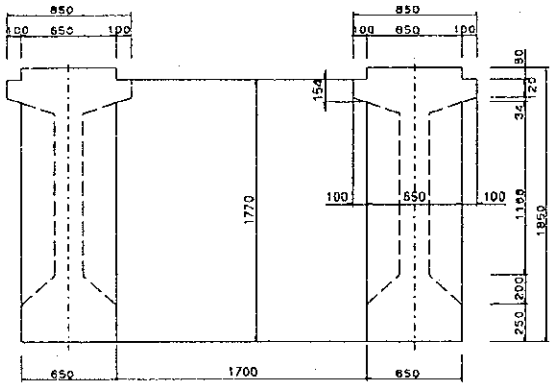


V= { 1.520 × 1.700 - (0.120 + 0.154) × 1/2 × 2
× 0.100)× 0.2 × 4 = 2.045 m³

N1 = 4 × 3 × 2 = 24
N2 = 4 × 3 × 2 = 24
N3 = 4 × 2 × 2 = 16
N4 = 4 × 3 × 2 = 24
N = 88

V2-2= 2.045 × 88 = 179.960 m³

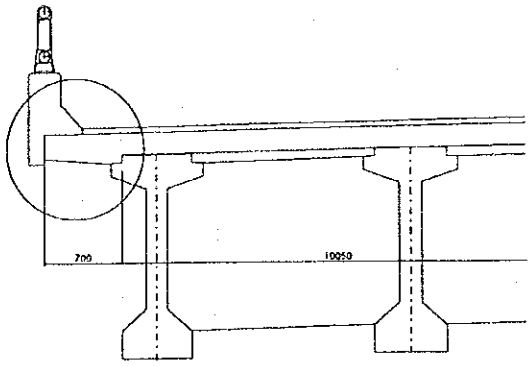
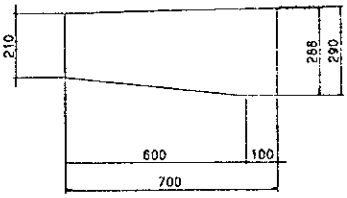
(3) Connection Cross Beam



V2-3= { 1.770 × 1.700 - (0.120 + 0.154) × 1/2 × 0.100
× 2)× 2.000 × 4 + 1.229 × 5 × 0.200
× 4 Girder section area
= 100.327 m³

V2 = 47.706 + 2.045 + 100.33
= 150.078 m³

Total 175.928 m³ 175.928 m³

Item	Formula	Quantity
3. Deck Slab Concrete CLASS "D-1"	 	

A 1= (0.21 + 0.288) × 1/2 × 0.600 × 2 = 0.299
A 2= (0.288 + 0.290) × 1/2 × 0.100 × 2 = 0.058
A 3= 10.050 × 0.210 = 2.111
ΣA = 2.468 m²

L1= 72.400 − 0.200 × 2 = 72.000
L2= 57.600 − 0.200 × 2 = 57.200
L3= 63.600 − 0.200 × 2 = 63.200
L4= 66.400 − 0.200 × 2 = 66.000
L = 258.400

V = 2.468 × 258.400 = 637.731

637.731 m³

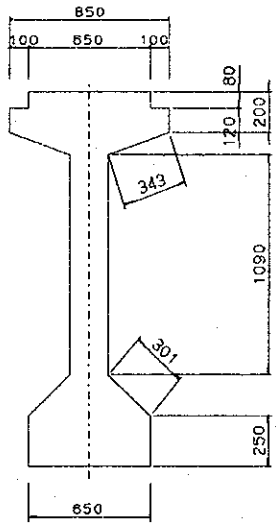
Item	Formula	Quantity
1. Girder		
1) Girder	(1) Calculation of Sectional Area	

[1] Middle Section

Summary of Sectional Length For ONE GIRDER

No	Formula			(m)
1	0.080 ×	2	=	0.160
2	0.120 ×	2	=	0.240
3	0.343 ×	2	=	0.686
4	1.090 ×	2	=	2.180
5	0.301 ×	2	=	0.602
6	0.250 ×	2	=	0.500

Total Area 4.368 m

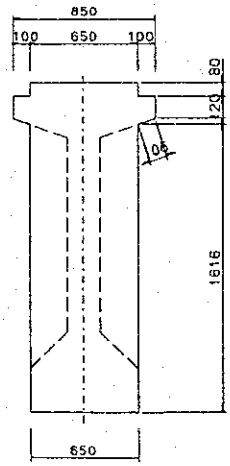


[2] End Section

Summary of Sectional Length For ONE GIRDER

No	Formula			(m)
1	0.080 ×	2	=	0.160
2	0.120 ×	2	=	0.240
3	0.106 ×	2	=	0.212
4	1.616 ×	2	=	3.232

Total Area 3.844 m



Item	Formula	Quantity

(2) Calculation of Form Area

Girder Length 36.000 m

Section No.	Section Length (m)	Average of Section (m)	Length of Block (m)	Form Area (m2)	Remark
END	3.844			1.229	End-sec
END	3.844	3.844	0.500	1.922	
MIDDLE	4.368	4.106	5.400	22.172	
MIDDLE	4.368	4.368	24.200	105.706	
END	3.844	4.106	5.400	22.172	
END	3.844	3.844	0.500	1.922	
				1.229	End-sec
Total			36.000	156.352	

No. of Girder 5 × 2 = 10

A1 = 156.352 × 10 = 1563.520 m²

Girder Length 31.600 m

Section No.	Section Length (m)	Average of Section (m)	Length of Block (m)	Form Area (m2)	Remark
END	3.844			1.229	End-sec
END	3.844	3.844	0.500	1.922	
MIDDLE	4.368	4.106	4.800	19.709	
MIDDLE	4.368	4.368	21.000	91.728	
END	3.844	4.106	4.800	19.709	
END	3.844	3.844	0.500	1.922	
				1.229	End-sec
Total			31.600	137.448	

No. of Girder 5 × 2 = 10

A2 = 137.448 × 10 = 1374.480 m²

Girder Length 28.600 m

Section No.	Section Length (m)	Average of Section (m)	Length of Block (m)	Form Area (m2)	Remark
END	3.844			1.229	End-sec
END	3.844	3.844	0.500	1.922	
MIDDLE	4.368	4.106	4.300	17.656	
MIDDLE	4.368	4.368	19.000	82.992	
END	3.844	4.106	4.300	17.656	
END	3.844	3.844	0.500	1.922	
				1.229	End-sec
Total			28.600	124.606	

No. of Girder 5 × 2 = 10

A3 = 124.606 × 10 = 1246.060 m²

Girder Length 33.000 m

Section No.	Section Length (m)	Average of Section (m)	Length of Block (m)	Form Area (m2)	Remark
END	3.844			1.229	End-sec
END	3.844	3.844	0.500	1.922	
MIDDLE	4.368	4.106	4.800	19.709	
MIDDLE	4.368	4.368	22.400	97.843	
END	3.844	4.106	4.800	19.709	
END	3.844	3.844	0.500	1.922	
				1.229	End-sec
Total			33.000	143.563	

No. of Girder 5 × 2 = 10

A4 = 143.563 × 10 = 1435.630 m²

A = 5619.69 | 5,619.7 m²

Item	Formula	Quantity

2. Diaphragm

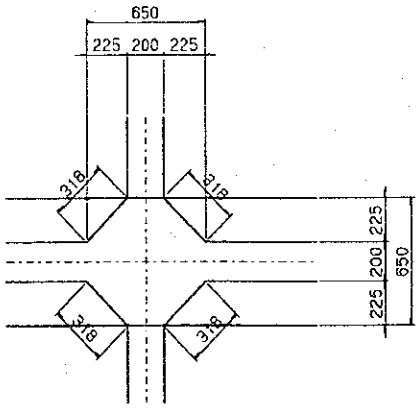
1) Diaphragm

a1= 0.318 × 2 × (1.090 + 1.366) × 1/2
+ 0.200 × 1.366) = 1.054 m²

a2= 0.318 × 2 × (1.090 + 1.366) × 1/2 = 0.781 m²

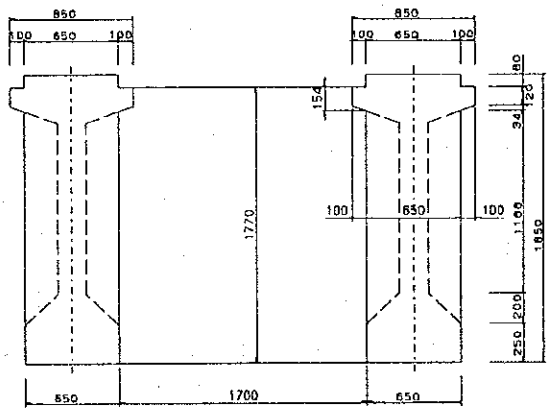
	N1	N2
L=72.4	12	18
L=63.6	12	18
L=57.6	8	12
L=66.4	12	18
Total	44	66

A1 = (1.054 × 44 + 0.781 × 66)
= 97.922 m²



2) Cross Beam

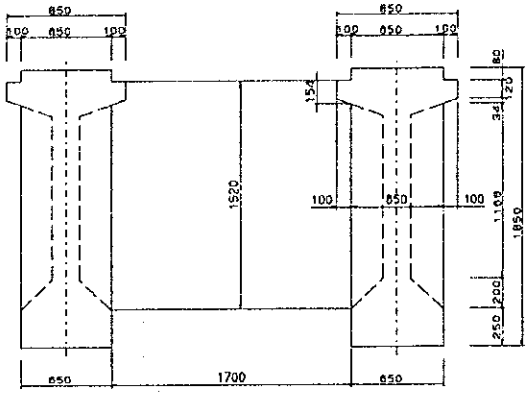
(1) End Cross Beam



A2-1= [(1.770 × 1.700 − (0.120 + 0.154) × 1/2 × 0.100
× 2 × 2)+ 1.700 × 0.500] × 4 × 2
× 4 = 121.734 m²

Item	Formula	Quantity

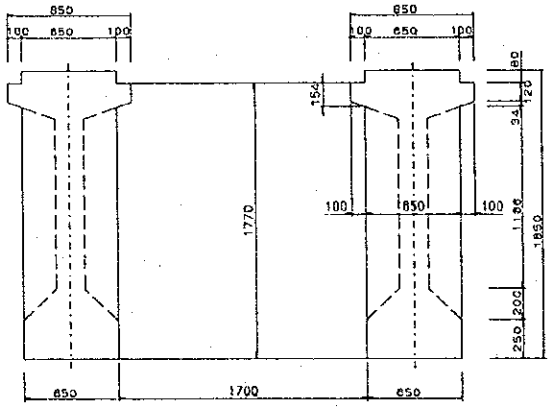
(2) Intermediate Cross Beam



	N
L=72.4	12
L=63.6	12
L=57.6	8
L=66.4	12
Total	44

A2-2= [(1.520 × 1.700 − (0.120 + 0.154) × 1/2 × 0.100
× 2)× 2 + 1.700 × 0.200] × 44
= 239.941 m²

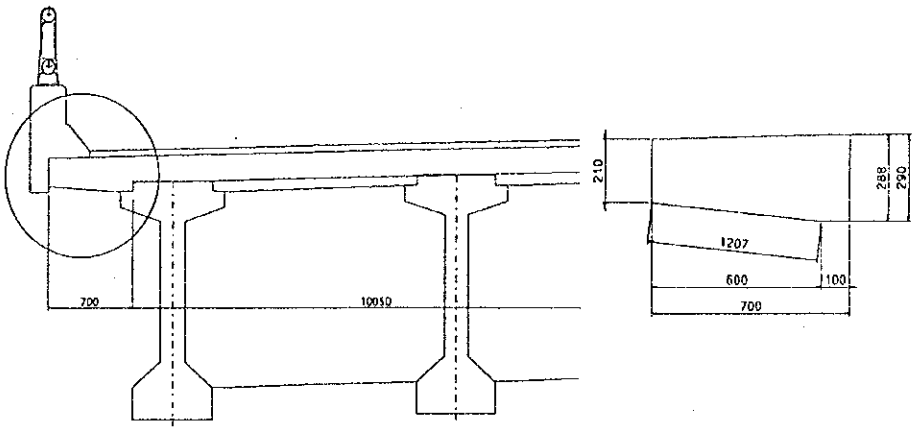
(3) Connection Cross Beam



A2-3= [(1.770 × 1.700 - (0.120 + 0.154) × 1/2 × 0.100
× 2 × 2)+ 1.700 × 2.000] × 4
= 25.417 m²

V2 = 121.734 + 239.941 + 25.417 = 387.092 m²

Total 485.014 m² 485.014 m²

Item	Formula	Quantity
3. Deck Slab	 L= 72.400 + 57.600 + 63.600 + 66.400 - 0.200 × 4 = 259.200 A1 = (0.210 + 1.207)× 2 × 259.200 = 734.573 m² A2= (0.200 + 0.288) × 1/2 × 0.600 × 4 = 0.586 m² A3= (0.288 + 0.290) × 1/2 × 0.100 × 4 = 0.116 m² A4= 10.050 × 0.210 × 2 = 4.221 m² A = 739.496 m²	739.496 m²

Item	Formula	Quantity

PC CABLE
1) 12S12.7

L=36.0m For One Girder

CABLE VAR.	EACH LENGTH	CABLE NO.	EACH	TOTAL LENGTH	UNIT WEIGHT	WEIGHT
1	35.702	C1	1	34.702	9.290	322.4
2	35.714	C2	1	34.714	9.290	322.5
3	35.754	C3	1	35.754	9.290	332.2
4	35.784	C4	1	35.784	9.290	332.4
5	35.822	C5	1	35.822	9.290	332.8
TOTAL			5	176.776		1642.3

SUB-TOTAL WEIGHT OF PC CABLES per BRIDGE

Wp= 1642 × 5 × 2 = 16,423.0 kgf
16.4 ton

TENSION UNIT

Ns= 5 × 2 × 2 = 20.0 nos

HEATING Φ80/85

L= 176.776 × 5 × 2 = 1,767.8 m

CENEBT GROUT

V= 0.888 × 5 × 2 = 8.9 m3

L=31.6m For One Girder

CABLE VAR.	EACH LENGTH	CABLE NO.	EACH	TOTAL LENGTH	UNIT WEIGHT	WEIGHT
1	31.302	C1	1	31.302	9.290	290.8
2	31.332	C2	1	31.332	9.290	291.1
3	31.394	C3	1	31.394	9.290	291.7
4	31.456	C4	1	31.456	9.290	292.2
TOTAL			4	125.484		1165.8

SUB-TOTAL WEIGHT OF PC CABLES per BRIDGE

Wp= 1166 × 5 × 2 = 11,658.0 kgf
11.7 ton

TENSION UNIT

Ns= 4 × 2 × 2 = 16.0 nos

HEATHING Φ80/85

L= 125.484 × 5 × 2 = 1,254.8 m

CENEBT GROUT

V= 0.630 × 5 × 2 = 6.3 m3

Item	Formula	Quantity

L=28.6m For One Girder

CABLE VAR.	EACH LENGTH	CABLE NO.	EACH	TOTAL LENGTH	UNIT WEIGHT	WEIGHT
1	28.302	C1	1	28.302	9.290	262.9
2	28.332	C2	1	28.332	9.290	263.2
3	28.394	C3	1	28.394	9.290	263.8
4	28.456	C4	1	28.456	9.290	264.4
TOTAL			4	113.484		1054.3

SUB-TOTAL WEIGHT OF PC CABLES per BRIDGE

Wp= 1054 × 5 × 2 = 10,543.0 kgf
10.5 ton

TENSION UNIT

Ns= 4 × 2 × 2 = 16.0 nos

HEATING

L= 113.484 × 5 × 2 = 1,134.8 m

CENEBT GROUT

V= 0.570 × 5 × 2 = 5.7 m3

L=33.2m For One Girder

CABLE VAR.	EACH LENGTH	CABLE NO.	EACH	TOTAL LENGTH	UNIT WEIGHT	WEIGHT
1	33.702	C1	1	33.702	9.290	313.1
2	33.714	C2	1	33.714	9.290	313.2
3	33.754	C3	1	33.754	9.290	313.6
4	33.784	C4	1	33.784	9.290	313.9
5	33.822	C5	1	33.822	9.290	314.2
TOTAL			5	168.776		1568.0

SUB-TOTAL WEIGHT OF PC CABLES per BRIDGE

Wp= 1568 × 5 × 2 = 15,680.0 kgf
15.7 ton

TENSION UNIT

Ns= 5 × 2 × 2 = 20.0 nos

HEATHING Φ80/85

L= 168.776 × 5 × 2 = 1,687.8 m

CENEBT GROUT

V= 0.848 × 5 × 2 = 8.5 m3

Total Wp = 54,304.0 kgf
54.3 ton

Ns = 72.0 nos

L = 5,845.2 m

V = 29.4 m3

Item	Formula	Quantity

2) 3S12.7

PC CABLE OF DIAPHRAGMS

LOCATION	EACH LENGTH	CABLE NO.	EACH	TOTAL LENGTH	UNIT WEIGHT	WEIGHT
Connection One	10.050		72	723.6	2.322	1680.199
TOTAL			72	723.600		1680.199

TOTAL WEIGHT OF PC CABLES per BRIDGE(A1-P12)

Wp= 1680.199 = 1,680.2 kgf
1.7 ton

TENSION UNIT

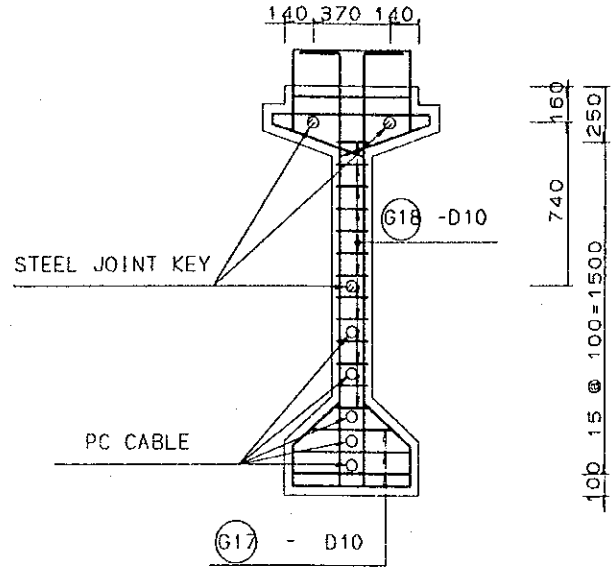
Ns= 72 × 2 = 144.0 nos

HEATHING Φ50/55

L= 723.600 = 723.6 m

CENEBT GROUT

V= 0.002 × 723.600 = 1.4 m3

Item	Formula	Quantity
Shear Key		

N1	3	×	4	×	10	×	3		=	360
N2	3	×	3	×	10	×	1		=	90
								Total		450

Item	Formula	Quantity
Erection		

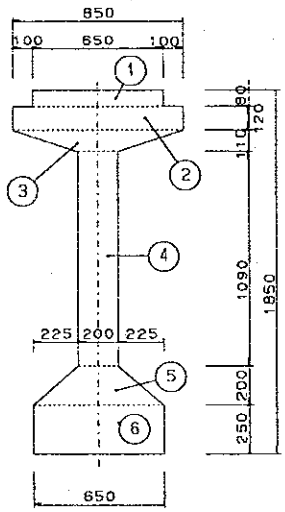
(1) Calculation of Sectional Area

[1] Middle Section

Summary of Sectional Area — For ONE GIRDER

No	Formula					(m2)
1	0.650 ×	0.080			=	0.052
2	0.850 ×	0.120			=	0.102
3	1/2 ×	0.325 ×	0.110 ×	2 =		0.036
	0.200 ×	0.110			=	0.022
4	1.090 ×	0.200			=	0.218
5	0.500 ×	0.225 ×	0.200 ×	2 =		0.045
	0.200 ×	0.200			=	0.040
6	0.650 ×	0.250			=	0.163

Total Area 0.678 m²

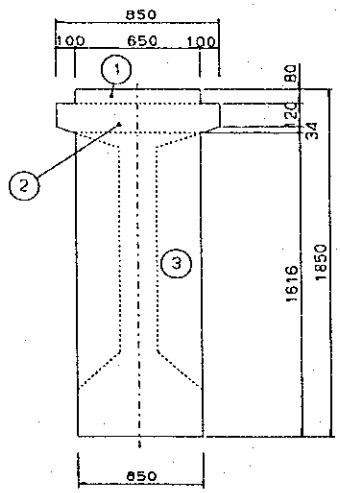


[2] End Section

Summary of Sectional Area — For ONE GIRDER

No	Formula					(m2)
1	0.650	×	0.080		=	0.052
2	0.120	×	0.850		=	0.102
	1/2 ×	0.100 ×	0.034 ×	2 =		0.003
	0.650	×	0.034		=	0.022
3	0.650	×	1.616		=	1.050

Total Area 1.229 m²



Item	Formula	Quantity

Concrete Volume

Girder Length 28.600 m

Section No.	Section Area (m2)	Average of Section (m2)	Length of Block (m)	Concrete Volume (m3)	Remark
END	1.229				
END	1.229	1.229	0.500	0.615	
MIDDLE	0.678	0.954	4.300	4.102	
MIDDLE	0.678	0.678	19.000	12.882	
END	1.229	0.954	4.300	4.102	
END	1.229	1.229	0.500	0.615	
Total			28.600	22.316	

Erection Weight per one girder

W 1 = 22.316 × 2500 = 55790.0 kgf

Girder Length 31.600 m

Section No.	Section Area (m2)	Average of Section (m2)	Length of Block (m)	Concrete Volume (m3)	Remark
END	1.229				
END	1.229	1.229	0.500	0.615	
MIDDLE	0.678	0.954	4.800	4.579	
MIDDLE	0.678	0.678	21.000	14.238	
END	1.229	0.954	4.800	4.579	
END	1.229	1.229	0.500	0.615	
Total			31.600	24.626	

Erection Weight per one girder

W 2 = 24.626 × 2500 = 61565.0 kgf

Girder Length 33.000 m

Section No.	Section Area (m2)	Average of Section (m2)	Length of Block (m)	Concrete Volume (m3)	Remark
END	1.229				
END	1.229	1.229	0.500	0.615	
MIDDLE	0.678	0.954	4.800	4.579	
MIDDLE	0.678	0.678	22.400	15.187	
END	1.229	0.954	4.800	4.579	
END	1.229	1.229	0.500	0.615	
Total			33.000	25.575	

Erection Weight per one girder

W 3 = 25.575 × 2500 = 63937.5 kgf

Girder Length 36.000 m

Section No.	Section Area (m2)	Average of Section (m2)	Length of Block (m)	Concrete Volume (m3)	Remark
END	1.229				
END	1.229	1.229	0.500	0.615	
MIDDLE	0.678	0.954	5.400	5.152	
MIDDLE	0.678	0.678	24.200	16.408	
END	1.229	0.954	5.400	5.152	
END	1.229	1.229	0.500	0.615	
Total			36.000	27.942	

Erection Weight per one girder

W 4 = 27.942 × 2500 = 69855.0 kgf

W = (55790.0 + 61565.0 + 63937.5 + 69855.0)× 5 × 2 = 2511475.0 kgf

2511.5 ton

Total Weight of Girder

	- D14	D14 - D25	Total	Note
L=36.0	8,279.8	45,929.0	54,208.8	
L=31.6m	7,463.8	40,517.0	47,980.8	
L=28.6m	6,581.2	35,806.0	42,387.2	
L=33.0m	7,715.8	42,468.0	50,183.8	
Total	30,040.6	164,720.0	194,760.6	(kgf)
	30.0	164.7	194.8	(ton)

LIST OF REINFORCEMENT L=36.0m

SIGN		DIAMETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	OTAL WEIGH	NOTE
G-	1	D14	4,411	190	1.208	5.330	1,012.7	
	2	D14	4,636	72	1.208	5.600	403.2	(AVE)
	3	D14	4,861	6	1.208	5.870	35.2	
	4	D14	4,861	6	1.208	5.870	35.2	
	5	D14	1,751	190	1.208	2.120	402.8	
	6	D14	1,243	190	1.208	1.500	285.0	
	7	D14	1,935	112	1.208	2.340	262.1	
	8	D14	1,635	72	1.208	1.980	142.6	(AVE)
	9	D14	1,345	6	1.208	1.620	9.7	
	10	D22	35,700	6	2.984	107.000	642.0	
	11	D14	35,700	22	1.208	43.100	948.2	
	12	D14	35,708	12	1.208	43.100	517.2	
	13	D14	987	36	1.208	1.190	42.8	
	14	D14	1,000	12	1.208	1.210	14.5	
	15	D16	1,600	84	1.579	2.530	212.5	Interior girder
	16	D16	1,100	84	1.579	1.740	146.2	Exterior girder
	17	D10	570	24	0.617	0.352	8.4	
	18	D10	150	104	0.617	0.093	9.7	
	19	D14	2,017	190	1.208	2.440	463.6	

				Interior	Exterior	Total	
				6 nos.	4 nos.		
			D22	642.0	642.0	6,420.0	
			D16	212.5	146.2	1,859.8	
			D14	4,574.8	4,574.8	45,748.0	
			D10	18.1	18.1	181.0	
			Sub-Total	5,447.4	5,381.1	27,104.4	
				- D14		8,280	for one span
				D14 - D25		45,929	

LIST OF REINFORCEMENT L=31.6m

SIGN	DIAMETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	OTAL WEIGH	NOTE
G- 1	D14	4,411	166	1.208	5.330	884.8	
2	D14	4,636	66	1.208	5.600	369.6	(AVE)
3	D14	4,861	6	1.208	5.870	35.2	
4	D14	4,861	6	1.208	5.870	35.2	
5	D14	1,751	166	1.208	2.120	351.9	
6	D14	1,243	166	1.208	1.500	249.0	
7	D14	1,935	94	1.208	2.340	220.0	
8	D14	1,635	66	1.208	1.980	130.7	(AVE)
9	D14	1,345	6	1.208	1.620	9.7	
10	D22	31,300	6	2.984	93.400	560.4	
11	D14	31,300	22	1.208	37.800	831.6	
12	D14	31,308	12	1.208	37.800	453.6	
13	D14	987	36	1.208	1.190	42.8	
14	D14	1,000	12	1.208	1.210	14.5	
15	D16	1,600	84	1.579	2.530	212.5	Interior girder
16	D16	1,100	84	1.579	1.740	146.2	Exterior girder
17	D10	570	24	0.617	0.352	8.4	
18	D10	150	104	0.617	0.093	9.7	
19	D14	2,017	166	1.208	2.440	405.0	

	Interior	Exterior	Total	
	6 nos.	4 nos.		
D22	560.4	560.4	5,604.0	
D16	212.5	146.2	1,859.8	
D14	4,033.6	4,033.6	40,336.0	
D10	18.1	18.1	181.0	
Sub-Total	4,824.6	4,758.3	23,990.4	
	- D14		7,464	for one span
	D14 - D25		40,517	

LIST OF REINFORCEMENT L=28.6m

SIGN	DIAMETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
G- 1	D14	4,411	146	1.208	5.330	778.2	
2	D14	4,636	60	1.208	5.600	336.0	(AVE)
3	D14	4,861	6	1.208	5.870	35.2	
4	D14	4,861	4	1.208	5.870	23.5	
5	D14	1,751	146	1.208	2.120	309.5	
6	D14	1,243	146	1.208	1.500	219.0	
7	D14	1,935	80	1.208	2.340	187.2	
8	D14	1,635	60	1.208	1.980	118.8	(AVE)
9	D14	1,345	6	1.208	1.620	9.7	
10	D22	28,360	6	2.984	84.600	507.6	
11	D14	28,360	22	1.208	34.300	754.6	
12	D14	27,370	12	1.208	33.100	397.2	
13	D14	987	23	1.208	1.190	27.4	
14	D14	1,000	12	1.208	1.210	14.5	
15	D16	1,600	68	1.579	2.530	172.0	Interior girder
16	D16	1,100	68	1.579	1.740	118.3	Exterior girder
17	D10	570	18	0.617	0.352	6.3	
18	D10	150	78	0.617	0.093	7.3	
19	D14	2,017	146	1.208	2.440	356.2	

	Interior	Exterior	Total	
	6 nos.	4 nos.		
D22	507.6	507.6	5,076.0	
D16	172.0	118.3	1,505.2	
D14	3,567.0	3,567.0	35,670.0	
D10	13.6	13.6	136.0	
Sub-Total	4,260.2	4,206.5	21,193.6	
	- D14		6,581	for one span
	D14 - D25		35,806	

LIST OF REINFORCEMENT L=33.0m

SIGN	DIAMETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	OTAL WEIGH	NOTE
G- 1	D14	4,411	176	1.208	5.330	938.1	
2	D14	4,636	66	1.208	5.600	369.6	(AVE)
3	D14	4,861	6	1.208	5.870	35.2	
4	D14	4,861	6	1.208	5.870	35.2	
5	D14	1,751	176	1.208	2.120	373.1	
6	D14	1,243	176	1.208	1.500	264.0	
7	D14	1,935	104	1.208	2.340	243.4	
8	D14	1,635	66	1.208	1.980	130.7	(AVE)
9	D14	1,345	6	1.208	1.620	9.7	
10	D22	32,700	6	2.984	97.600	585.6	
11	D14	32,700	22	1.208	39.500	869.0	
12	D14	32,706	12	1.208	39.500	474.0	
13	D14	987	36	1.208	1.190	42.8	
14	D14	1,000	12	1.208	1.210	14.5	
15	D16	1,600	84	1.579	2.530	212.5	Interior girder
16	D16	1,100	84	1.579	1.740	146.2	Exterior girder
17	D10	570	24	0.617	0.352	8.4	
18	D10	150	104	0.617	0.093	9.7	
19	D14	2,017	176	1.208	2.440	429.4	

	Interior	Exterior	Total	
	6 nos.	4 nos.		
D22	585.6	585.6	5,856.0	
D16	212.5	146.2	1,859.8	
D14	4,228.7	4,228.7	42,287.0	
D10	18.1	18.1	181.0	
Sub-Total	5,044.9	4,978.6	25,091.9	
	- D14		7,716	for one span
	D14 - D25		42,468	

LIST OF REINFORCEMENT

Diaphragm

SIGN		DIAMETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
D	1	D16	1,700	576	1.579	2.680	1,543.7	
	2	D14	1,700	224	1.208	2.050	459.2	(AVE)
E	1	D16	4,724	1,408	1.579	7.460	10,503.7	
	2	D14	3,924	616	1.208	4.740	2,919.8	
C	1	D16	1,700	384	1.579	2.680	1,029.1	
	2	D14	2,400	192	1.208	2.900	556.8	
	3	D14	5,442	224	1.208	6.570	1,471.7	
	4	D14	5,514	112	1.208	6.660	745.9	(AVE)
	5	D16	9,900	8	1.579	15.600	124.8	
						TOTAL	19,354.7	

				END	INTERMEDIATE	CONNECTION	
		D16	1543.7	10503.7	1153.9		
		D14	459.2	2919.8	2774.4		
		Total	2,002.9	13423.5	3928.3		
					(kg)	(ton)	
				- D14	6,153.4	6.2	
				D14 - D25	13,201.30	13.2	

Total Weight of Slab

	- D14	D14 - D25	Total	Note
L=28.6m	8,702.7	25,489.4	34,192.1	
L=31.6m	9,826.6	27,900.6	37,727.2	
L=33.0m	10,308.4	28,996.6	39,305.0	
L=36.0m	11,311.8	30,969.4	42,281.2	
Total	40,149.5	113,356.0	153,505.5	(kgf)
	40.1	113.4	153.5	(ton)

LIST OF REINFORCEMENT L=57.4

SIGN	DIAMETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
S 1	D20	11,350	353	2.466	28.000	9,884.0	
2	D20	10,850	353	2.466	26.800	9,460.4	(AVE)
3	D14	963	766	1.208	1.160	888.6	
4	D22	12,000	100	2.984	35.800	3,580.0	
5	D14	22,780	100	1.208	27.500	2,750.0	
5'	D14	25,206	100	1.208	30.400	3,040.0	
6	D25	11,350	30	3.854	43.700	1,311.0	(AVE)
7	D25	10,850	30	3.854	41.800	1,254.0	
8	D12	565	4,032	0.888	0.502	2,024.1	
					TOTAL	34,192.1	

					D25	2565.0	
					D22	3580.0	
					D20	19344.4	
					D14	6678.6	
					D12	2024.1	
					Total	34,192.1	
						(kgf)	
				- D14		8,702.7	
				D14 - D25		25,489.4	
					Total	34,192.1	

LIST OF REINFORCEMENT L=63.4

SIGN	DIAMETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
S 1	D20	11,350	397	2.466	28.000	11,116.0	
2	D20	10,850	397	2.466	26.800	10,639.6	(AVE)
3	D14	963	854	1.208	1.160	990.6	
4	D22	12,000	100	2.984	35.800	3,580.0	
5	D14	26,206	100	1.208	31.700	3,170.0	
5'	D14	28,206	100	1.208	34.100	3,410.0	
6	D25	11,350	30	3.854	43.700	1,311.0	(AVE)
7	D25	10,850	30	3.854	41.800	1,254.0	
8	D12	565	4,494	0.888	0.502	2,256.0	
					TOTAL	37,727.2	

					D25	2565.0	
					D22	3580.0	
					D20	21755.6	
					D14	7570.6	
					D12	2256.0	
					Total	37727.2	
						(kgf)	
				- D14		9,826.6	
				D14 - D25		27,900.6	
					Total	37,727.2	

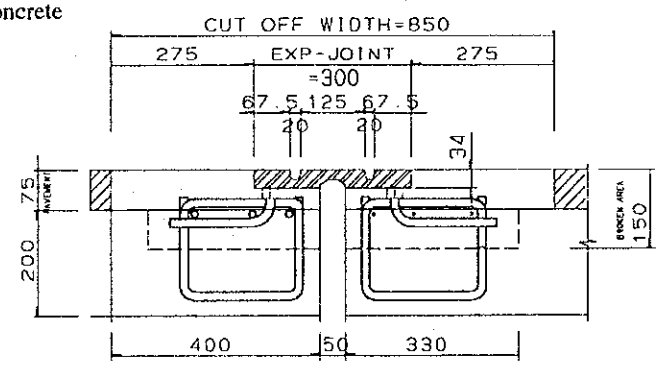
LIST OF REINFORCEMENT L=66.2

SIGN	DIAMETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
S 1	D20	11,350	417	2.466	28.000	11,676.0	
2	D20	10,850	417	2.466	26.800	11,175.6	(AVE)
3	D14	963	894	1.208	1.160	1,037.0	
4	D22	12,000	100	2.984	35.800	3,580.0	
5	D14	27,606	100	1.208	33.300	3,330.0	
5'	D14	29,606	100	1.208	35.800	3,580.0	
6	D25	11,350	30	3.854	43.700	1,311.0	(AVE)
7	D25	10,850	30	3.854	41.800	1,254.0	
8	D12	565	4,704	0.888	0.502	2,361.4	
					TOTAL	39,305.0	
					D25	2565.0	
					D22	3580.0	
					D20	22851.6	
					D14	7947.0	
					D12	2361.4	
					Total	39,305.0	
						(kgf)	
				- D14		10,308.4	
				D14 - D25		28,996.6	
					Total	39,305.0	

LIST OF REINFORCEMENT L=72.2

SIGN	DIAMETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
S 1	D20	11,350	453	2.466	28.000	12,684.0	
2	D20	10,850	453	2.466	26.800	12,140.4	(AVE)
3	D14	963	966	1.208	1.160	1,120.6	
4	D22	12,000	100	2.984	35.800	3,580.0	
5	D14	30,606	100	1.208	37.000	3,700.0	
5'	D14	32,606	100	1.208	39.400	3,940.0	
6	D25	11,350	30	3.854	43.700	1,311.0	(AVE)
7	D25	10,850	30	3.854	41.800	1,254.0	
8	D12	565	5,082	0.888	0.502	2,551.2	
					TOTAL	42,281.2	
					D25	2565.0	
					D22	3580.0	
					D20	24824.4	
					D14	8760.6	
					D12	2551.2	
					Total	42,281.2	
						(kgf)	
				- D14		11,311.8	11.3
				D14 - D25		30,969.4	31.0
					Total	42,281.2	42.3

Item	Formula	Quantity
9 Pavement		
1)	**Pavement t=75㎜**	
	L = 72.400 + 63.600 + 57.600 + 66.400 = 260.0 m	
	A = 10.750 × (260.00 − 0.850 × Exp 4) = 2758.5 ㎡	2758.5 ㎡
2)	Water Proofing t=5mm	
	A = = 2758.5 ㎡	2758.5 ㎡
3)	Concrete	



per one side

A1 =	0.400	×	0.075	-	0.1	×	0.034
						=	0.027
A2 =	0.075	×	0.300			=	0.023
					Total		0.050 ㎡
V =	0.050	×	10.750	×	8	=	4.300 ㎥

4.300 ㎥

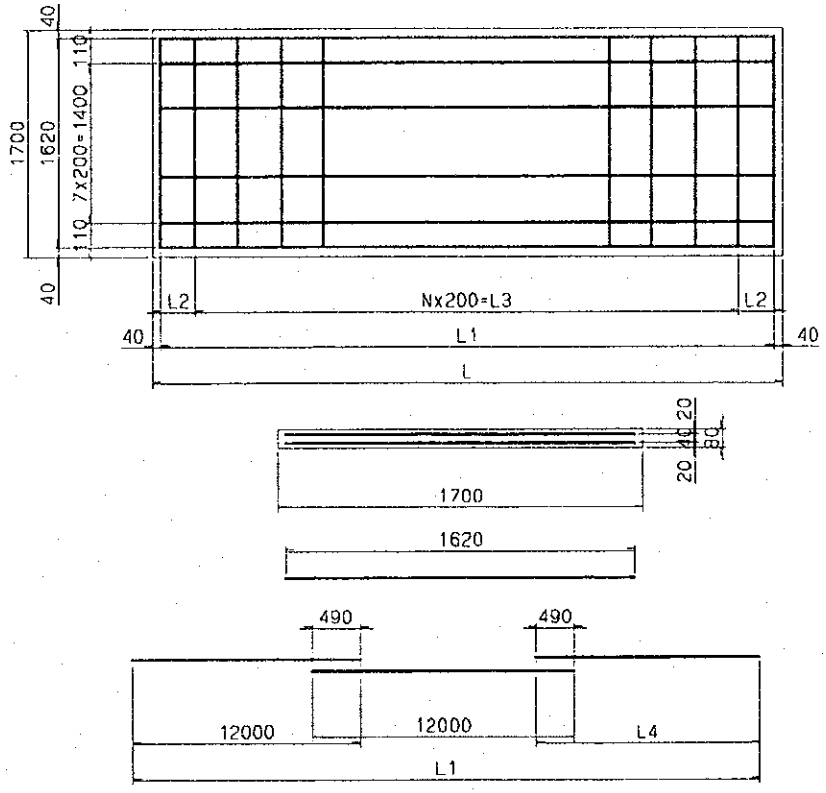
4)	Road marking						
	Bridge Length	L=	260.000	-	0.600	=	259.400 m
	Side Line						
	A1 =	259.400	×	0.100	×	4	= 103.760 ㎡
	Center Line						
	L =	259.400	/	5.000			= 51.9 m
	A2 =	2.500	×	0.100	×	51.9	× 2
							= 25.950 ㎡
	Total	103.760	+	25.950			= 129.7 ㎡

129.7 ㎡

A1-P4

Item	Formula	Quantity
1. Expansion Joint (TYPE A)		
	EACH LENGTH	
	L = 10.750	
	N = 1 × 4 = 4	
	TOTAL LENGTH	
	L = 10.750 × 4 =	43.000 m
2. BEARING PAD	ELASTOMERIC 600*300*57	
	EACH for One SPAN	
	N = 5	
	TOTAL EACH	
	N = 5 × 4 × 4 =	80 nos
3. ANCHOR BAR		
	Φ75 L=1520 (MOVE)	nos
	N = 4 × 8 × 2 =	64
	Φ75 L=1520 (FIX)	nos
	N = 8 × 3 × 4 =	96
	Total =	160 nos
4. ANCHOR CAP (SGP)		
	Φ95 L=800 (FIX)	nos
	N = 4 × 3 × 4 =	48
	Φ125 L=800 (MOVE)	nos
	N = 4 × 2 =	8
	Φ150 L=800 (MOVE)	nos
	N = 4 × 2 =	8
5.Railing	L = 72.400 + 63.600 + 57.600 + 66.400 = 260.0 m	
	L= 260.000 × 2 × 2 =	1040 m

Item	Formula	Quantity
Concrete Form	L= 28.600 + 31.600 + 33.000 + 36.000 = 129.200	
	A = 1.700 × 129.200 × 2 =	439.280 m²
	V = 439.28 × 0.080 =	35.142 m³



L	L1	L2	L3	L4	N
28,600	28,520	160	28,200	5,500	141
31,600	31,520	160	31,200	8,500	156
33,000	32,920	160	32,600	9,900	163
36,000	35,920	160	35,600	12,900	178

Item	Formula	Quantity

Re-bar — Per 28.6m

BAR MARK	SIZE (mm)	LENGTH (mm)	WEIGHT/M (kgf/m)	WEIGHT /One (kgf)	NO. of BARS	WEIGHT (kgf)
S1	D 14	1620	1.042	1.688	144	243
S2	D 14	12000	1.042	12.504	20	250
S3	D 14	5500	1.042	5.731	10	57
						550

w 1 = 550.0 × 2 = 1100 kgf

Re-bar — Per 31.6m

BAR MARK	SIZE (mm)	LENGTH (mm)	WEIGHT/M (kgf/m)	WEIGHT /One (kgf)	NO. of BARS	WEIGHT (kgf)
S1	D 14	1620	1.042	1.688	159	268
S2	D 14	12000	1.042	12.504	20	250
S3	D 14	8500	1.042	8.857	10	89
						607

w 2 = 607.0 × 2 = 1214 kgf

Re-bar — Per 33.0m

BAR MARK	SIZE (mm)	LENGTH (mm)	WEIGHT/M (kgf/m)	WEIGHT /One (kgf)	NO. of BARS	WEIGHT (kgf)
S1	D 14	1620	1.042	1.688	166	280
S2	D 14	12000	1.042	12.504	20	250
S3	D 14	9900	1.042	10.316	10	103
						633

w 3 = 633.0 × 2 = 1266 kgf

Re-bar — Per 36.0m

BAR MARK	SIZE (mm)	LENGTH (mm)	WEIGHT/M (kgf/m)	WEIGHT /One (kgf)	NO. of BARS	WEIGHT (kgf)
S1	D 14	1620	1.042	1.688	181	306
S2	D 14	12000	1.042	12.504	20	250
S3	D 14	12900	1.042	13.442	10	134
						690

w4 = 690.0 × 2 = 1380 kgf

W = 4960 kgf — 4,960 kgf
5.0 ton

1.Quantity of Superstructure

Supersuructure Main Bridge — per one side

Item		Work Item		Unit	Quantity	Remarks
Concrete	CLASS B	Total		cn.m	1439.9	
Form		External	Cantilever	sq.m	1420.4	
			Pier Head	sq.m	322.6	
			Support	sq.m	369.3	
			Total	sq.m	2112.4	
		Internal	Cantilever	sq.m	1033.6	
			Pier Head	sq.m	295.7	
			Support	sq.m	169.3	
			Total	sq.m	1498.6	
		Total		sq.m	3611.0	
Re-bar		Total	~D14	ton	64.0	
			D14~D25	ton	264.5	
			D25~	ton		
			Total	ton	328.5	
PC Steel	12S12.7B	Internal Longitudinal Prestressing Ten		ton	68.8	SWPR7B
	19S15.2B	External Longitudinal Prestressing Ten		ton	22.7	SWPR7B
	3S12.7	Internal Transverse Tendons		ton	3.6	
Duct	12S12.7B			nos	428	
	19S15.2B			nos	108	
	3S12.7			nos	272	
	Φ80/85			m	4963.8	
	Φ90/100			m	2448.0	
	FlatDuct25x80			m	1557.5	
Cement grout in sheathng				m3	40.6	
Bearing	Product layer rubber bearing		660*560*125	nos	4	
			1400*1500*214	nos	4	
	Anchor Bar		Φ75 L=1250	nos	8	
			Φ75 L=2500	nos	8	
	Anchor Cap		Φ80 L=1350	nos	8	
			Φ150 L=850	nos	8	
Expansion joint		100mm		m	21.5	
Pavement	t=75mm	Aspfalt concrete surface course		sq.m	1386.8	
	t= 5mm	Water Proofing		sq.m	115.6	
		Concrete		cu.m	1.054	
		Road Marking		sq.m	58.1	

1. Concrete

Total Quantity

Item	Quantity						(m^3)
	Main part	Diaphragm	Manhole	Haunch	Expansiom	Anchorage	Total
Cantilever part	824.136	17.180				14.528	855.844
Pier Head part	222.606	149.368		1.640			373.614
Supporting Part	193.452	18.825	-1.650	0.828	-1.011		210.444
Total	1240.194	185.373	-1.650	2.468	-1.011	14.528	1439.902

(1) Supporting Part on P2 Side

Block	Section	Section Area (m^2)	Ave. of Area (m2)	Length of (m)	Concrete (m^3)		Total of each (m^3)
1	1	16.930					
	2	16.930	16.930	1.650	27.935		27.935
	3	8.150	12.540	0.000	0.000		0.000
	4	7.120	7.635	5.000	38.175		38.175
	5	7.120	7.120	2.800	19.936		19.936
Total				9.450	86.046		86.046

(2) Cantilever part on P2 -> P3

Block	Section	Section Area (m^2)	Average of (m^2)	Length of (m)	Concrete (m^3)		Total of each (m^3)
	5	7.120					
2	6	7.408	7.264	3.500	25.424		25.424
3	7	8.332	7.870	3.500	27.545		27.545
4	8	8.850	8.591	3.500	30.069		30.069
5	9	9.410	9.130	3.000	27.390		27.390
6	10	10.031	9.721	3.000	29.162		29.162
7	11	11.137	10.584	3.000	31.752		31.752
8	12	11.991	11.564	3.000	34.692		34.692
Total				22.500	206.034		206.034

(3) Pier Head part on P3

Block	Section	Section Area (m^2)	Average of (m^2)	Length of (m)	Concrete (m^3)		Total of each (m^3)
	12	11.991					
9	13	12.555	12.273	3.000	36.819		36.819
	14	12.555	12.555	0.000			
10	15	12.555	12.555	3.000	37.665		37.665
	16	12.555	12.555	0.000			
9	17	11.991	12.273	3.000	36.819		36.819
Total				9.000	111.303		111.303

(4) Cantilever part on P3 -> P4

Block	Section	Section Area (m^2)	Average of (m^2)	Length of (m)	Concrete (m^3)		Total of each (m^3)
	17	11.991					
8	18	11.137	11.564	3.000	34.692		34.692
7	19	10.031	10.584	3.000	31.752		31.752
6	20	9.410	9.721	3.000	29.162		29.162
5	21	8.850	9.130	3.000	27.390		27.390
4	22	8.332	8.591	3.500	30.069		30.069
6	23	7.408	7.870	3.500	27.545		27.545
2	24	7.120	7.264	3.500	25.424		25.424
Total				22.500	206.034		206.034

(5) Supporting Part on center of Span

Block	Section	Section Area (m^2)	Average of (m^2)	Length of (m)	Concrete (m^3)		Total of each (m^3)
	24	7.120					
11	24	7.120	7.120	3.000	21.360		21.360
Total				3.000	21.360		21.360

(6) Cantilever part on P3 -> P4

Block	Section	Section Area (m^2)	Average of (m^2)	Length of (m)	Concrete (m^3)		Total of each (m^3)
	24	7.120					
2	23	7.408	7.264	3.500	25.424		25.424
3	22	8.332	7.870	3.500	27.545		27.545
4	21	8.850	8.591	3.500	30.069		30.069
5	20	9.410	9.130	3.000	27.390		27.390
6	19	10.031	9.721	3.000	29.162		29.162
7	18	11.137	10.584	3.000	31.752		31.752
8	17	11.991	11.564	3.000	34.692		34.692
Total				22.500	206.034		206.034

(7) Pier Head part on P4

Block	Section	Section Area (m^2)	Average of (m^2)	Length of (m)	Concrete (m^3)		Total of each (m^3)
	17	11.991					
9	16	12.555	12.273	3.000	36.819		36.819
	15	12.555	12.555	0.000			
10	14	12.555	12.555	3.000	37.665		37.665
	13	12.555	12.555	0.000			
9	12	11.991	12.273	3.000	36.819		36.819
Total				9.000	111.303		111.303

(8) Cantilever part on P4 -> P5

Block	Section	Section Area (m^2)	Average of (m^2)	Length of (m)	Concrete (m^3)		Total of each (m^3)
	12	11.991					
8	11	11.137	11.564	3.000	34.692		34.692
7	10	10.031	10.584	3.000	31.752		31.752
6	9	9.410	9.721	3.000	29.162		29.162
5	8	8.850	9.130	3.000	27.390		27.390
4	7	8.332	8.591	3.500	30.069		30.069
3	6	7.408	7.870	3.500	27.545		27.545
2	5	7.120	7.264	3.500	25.424		25.424
Total				22.500	206.034		206.034

(9) Supporting Part on P6 Side

Block	Section	Section Area (m^2)	Ave. of Area (m2)	Length of (m)	Concrete (m^3)		Total of each (m^3)
	5	7.120					
	4	7.120	7.120	2.800	19.936		19.936
1	3	8.150	7.635	5.000	38.175		38.175
	2	16.930	12.540	0.000	0.000		0.000
	1	16.930	16.930	1.650	27.935		27.935
Total				9.450	86.046		86.046

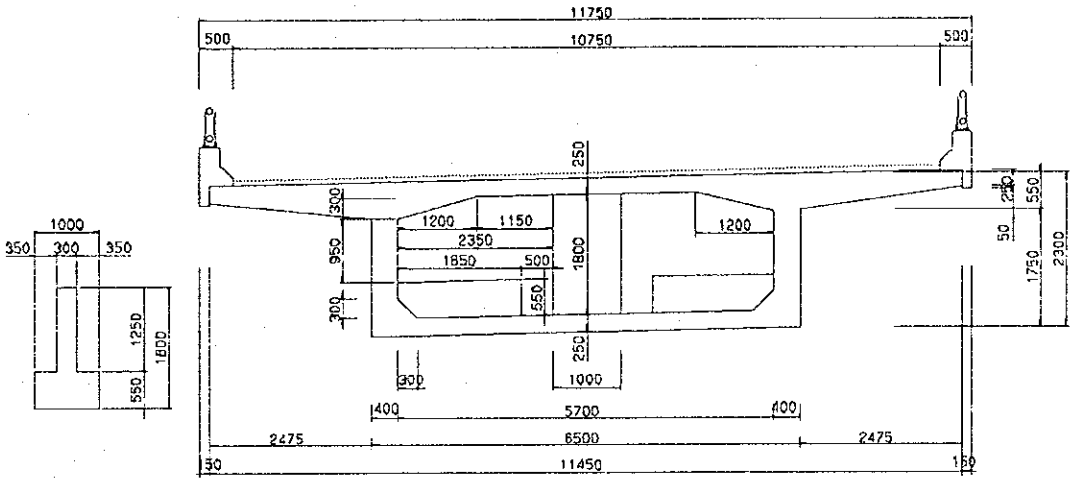
Total

Item	Sub-Total
Pier Head part	222.606
Cantilever part	824.136
Supporting Part	193.452
Total	1240.194

Concrete

Item	Formula	Quantity
2) Diaphragm,manhole Anchorage etc	(1) Center Diaphragm	

· Supporting Part on center of Span

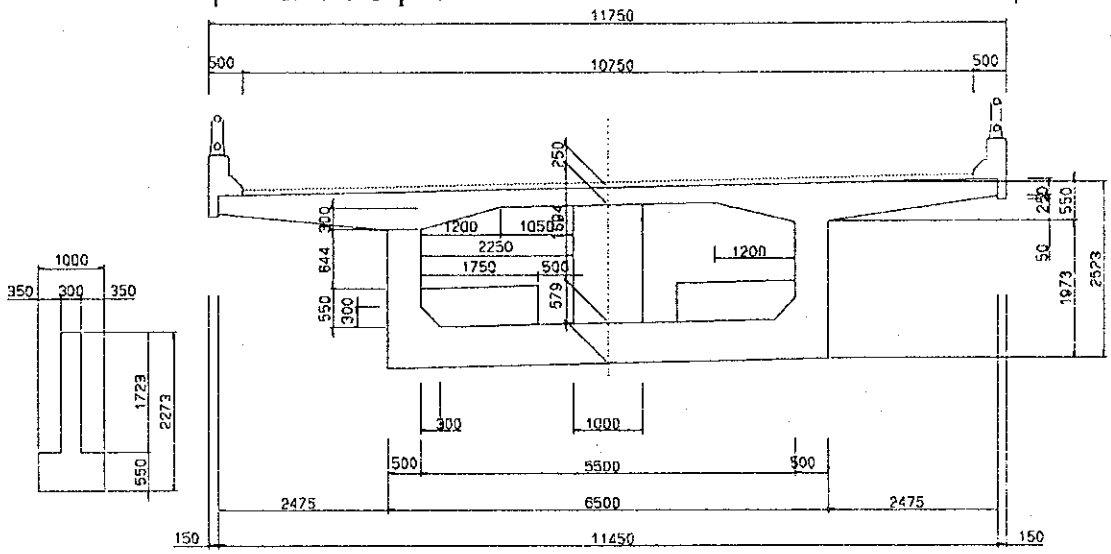


V1 = (	1.150	+	2.350	)×	1/2	×	0.300	
×	0.300	×	2			=	0.315 m^3	
V2 =	2.350	×	0.950	×	2	×	0.300	
						=	1.340 m^3	
V3 =	0.550	×	0.500	×	0.300	×	2	
						=	0.165 m^3	
V4 = (	1.850	×	0.550	-	1/2	×	0.300	
×	0.300	)×	2	×	1.000	=	1.945 m^3	
					Total		3.765 m^3	3.765 m^3
								Total
V =	3.765 ×		5			=	18.825 m^3	18.825 m^3

Concrete

Item	Formula	Quantity

· Cantilever part



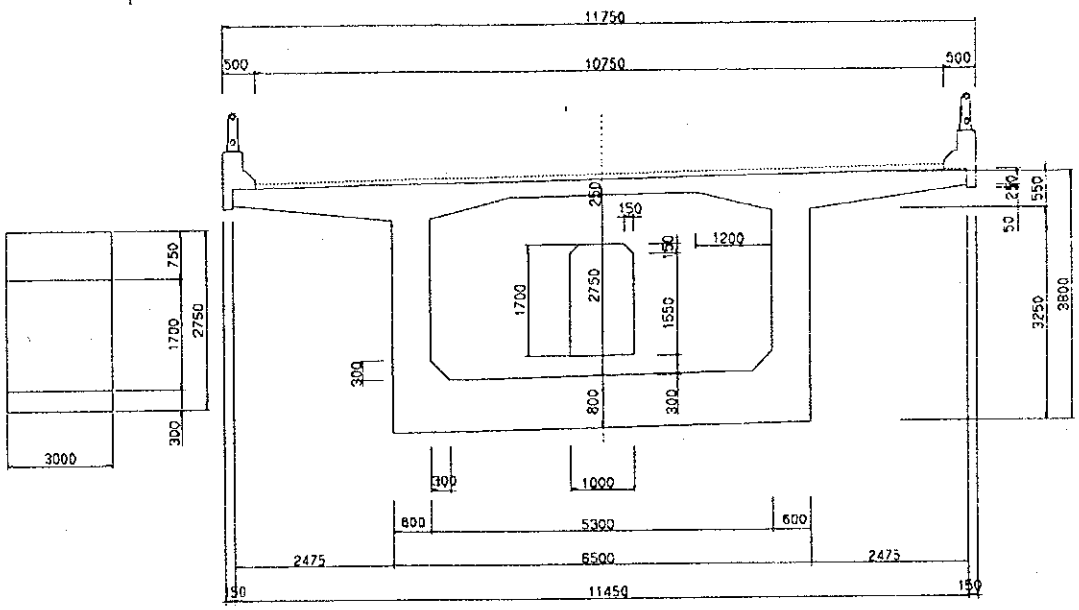
V1 = (	1.050	+	2.250	)×	1/2	×	0.300		
×	0.300	×	2			=	0.297	m^3	
V2 =	2.250	×	0.844	×	2	×	0.300		
						=	1.139	m^3	
V3 =	0.500	×	0.550	×	0.300	×	2		
						=	0.165	m^3	
V4 = (	1.750	×	0.550	-	1/2	×	0.300		
×	0.300	)×	2	×	1.000	=	1.835	m^3	
					Total		3.436	m^3	3.436 m^3
									Total
V =	3.436	×	5			=	17.18	m^3	17.180 m^3

Concrete

Item	Formula	Quantity

(2) Intermediate Cross Beam on Pier Head

・Cross Beam

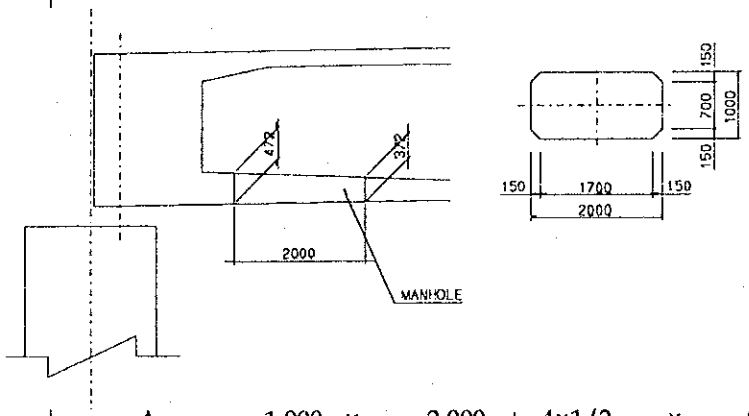


V1 =	5.300	×	2.750	×	3.000			
						=	43.725 m³	
V2 = -	1.200	×	0.300	×	1/2	×	3.000	
×	2					=	-1.080 m³	
V3 = -	0.300	×	0.300	×	1/2	×	3.000	
×	2					=	-0.270 m³	
V4 = -((	0.700	+	1.000	)×	1/2	×	0.150	
+	1.550	×	1.000	)×	3.000			
						=	-5.033 m³	
					Total		37.342 m³	per each 37.342 m³
V =	37.342 ×		4			=	149.368 m³	Total 149.368 m³

Item	Formula	Quantity

(3) Supporting Part on Side of Span (Manhole,Haunch etc)

· Manhole-A (Subtraction) -Bottom Slab

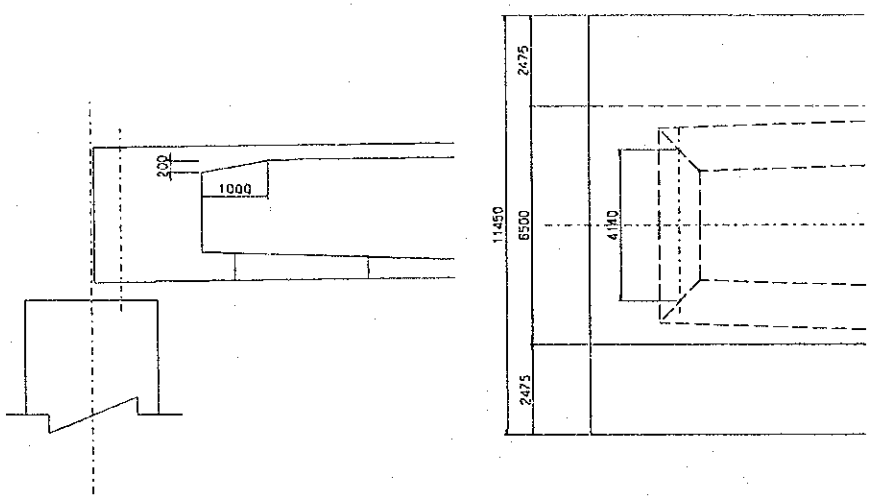


A = -1.000 × 2.000 + 4×1/2 × 0.150
× 0.150 = -1.955 ㎡ per each
V = -1.955 × 1/2 ×(0.472 + 0.372)= -0.825 m^3

Total

V = -0.825 × 2 = -1.65 m^3 -1.650 m^3

· Haunch (Top Slab)

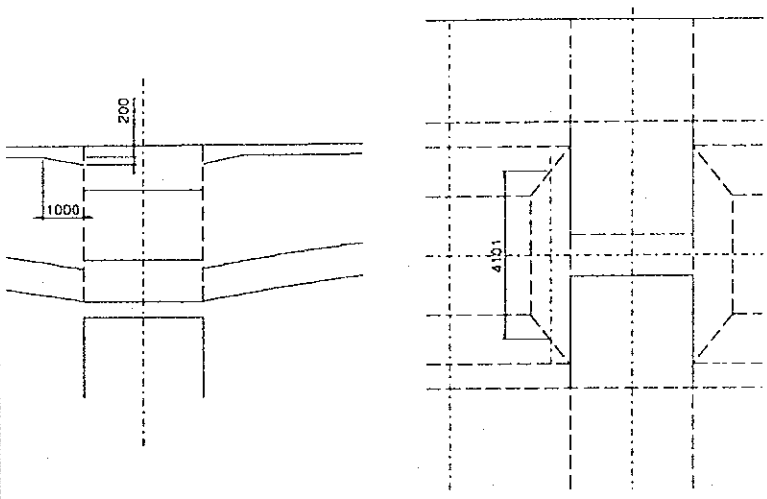


A = 1/2 × 1.000 × 0.200 = 0.100 ㎡ per each
V = 0.100 × 4.140 = 0.414 m^3

Total

V = 0.414 × 2 = 0.828 m^3 0.828 m^3

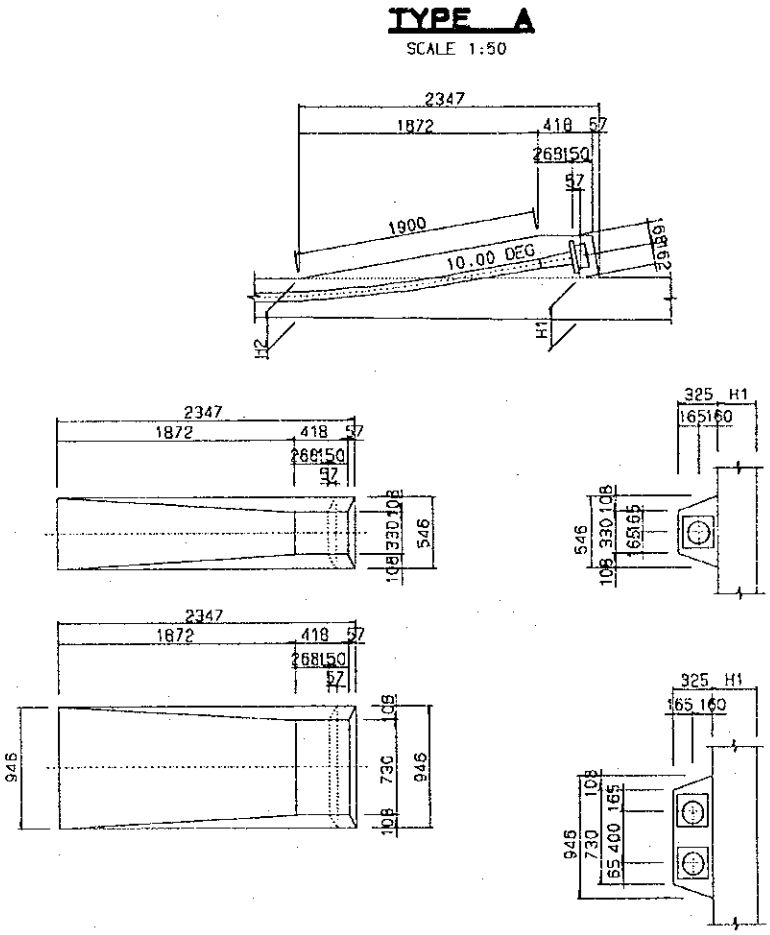
Concrete

Item	Formula	Quantity
		
	A = 1/2 × 1.000 × 0.200 = 0.100 m²	per each
	V = 0.100 × 4.101 =	0.410 m³
		Total
	V = 0.410 × 4 = 1.6404 m³	1.640 m³
	· Expansion Joint Part	
	V = -10.750 × 0.336 × 0.070 × 4 = -1.011	-1.011 m³

Concrete

Item	Formula	Quantity

(4)Anchorage



· TYPE-A1

V	=	1/6	×	0.325	×(	2.347	×	0.546
	+(	2.347	+	0.418	)×(	0.546	+	0.330)
	+	0.418	×	0.330)			=	0.208 m^3

per each 0.208 m^3

· TYPE-A2

V	=	1/6	×	0.325	×(	2.347	×	0.946
	+(	2.347	+	0.418	)×(	0.946	+	0.730)
	+	0.418	×	0.730)			=	0.388 m^3

per each 0.388 m^3

Block No.	Anchorage Type A1(0.208m3)	Anchorage Type A2(0.388m3)	Concrete m^3	Remarks
1	4		0.832	
3	4		0.832	
5		4	1.552	
6	4		0.832	
7	4		0.832	
8	4	4	2.384	
Sub-Total	20	8	7.264	per 1-11 block

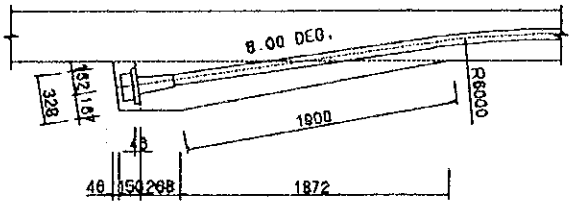
Total	7.264	×	2	=	14.528	14.528 m^3

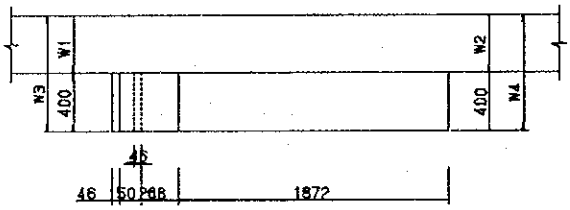
0

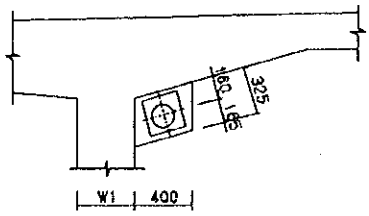
Item	Formula	Quantity

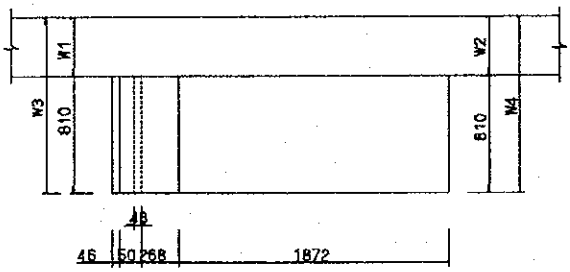
TYPE B

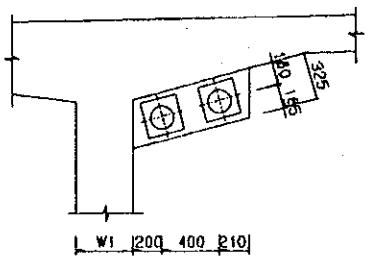
SCALE 1:25

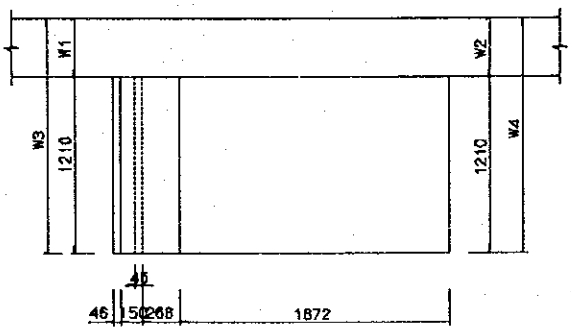


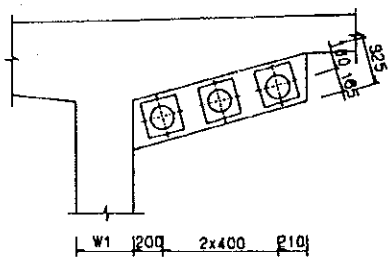












Concrete

Item	Formula	Quantity
	· TYPE-B1 V = 1/6 × 0.325 ×(2.339 × 0.400 +(2.339 + 0.418)×(0.400 + 0.400) + 0.418 × 0.400) = 0.179 m^3	per each 0.179 m^3
	· TYPE-B2 V = 1/6 × 0.325 ×(2.336 × 0.810 +(2.336 + 0.418)×(0.810 + 0.810) + 0.418 × 0.810) = 0.362 m^3	per each 0.362 m^3
	· TYPE-B3 V = 1/6 × 0.325 ×(2.336 × 1.210 +(2.336 + 0.418)×(1.210 + 1.210) + 0.418 × 1.210) = 0.542 m^3	per each 0.542 m^3

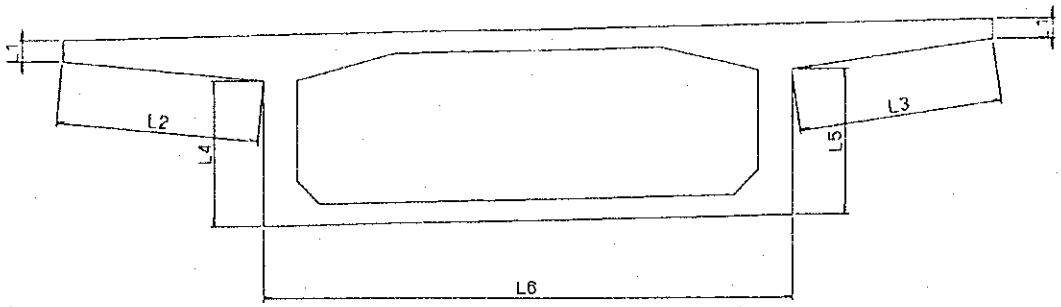
Block No.	Anchorage Type			Concrete m^3
	B1(0.179m3)	B2(0.362m3)	B3(0.542m3)	
3	4	4		2.164
4	4		4	2.884
5	4	4		2.164
6	4		4	2.884
7	4	4		2.164
8		4		1.448
9	4			0.716
Sub-Total	20	16	8	12.260

Total 12.260 × 2 = 24.520 — 24.520 m^3

2. Form

2-1. External Form

1) Dimension Table of Girder



Section	L1	L2	L3	L4	L5	L6	Σ L
1,2	0.250	2.488	2.500	1.750	1.750	6.500	15.238
3	0.250	2.488	2.500	1.754	1.754	6.500	15.246
4	0.250	2.488	2.500	1.781	1.781	6.500	15.300
5	0.250	2.488	2.500	1.855	1.855	6.500	15.448
6	0.250	2.488	2.500	1.978	1.978	6.500	15.694
7	0.250	2.488	2.500	2.156	2.156	6.500	16.050
8	0.250	2.488	2.500	2.421	2.421	6.500	16.580
9	0.250	2.488	2.500	2.780	2.780	6.500	17.298
10	0.250	2.488	2.500	3.250	3.250	6.500	18.238

2) Total Quantity

Item	Quantity					
	Main part	Haunch	Man Hole			Total
Cantilever part	1420.431					1420.431
Pier Head part	322.644					322.644
Supporting Part	367.572	0.856	0.856			369.284
Total	2110.647	0.856	0.856			2112.359

3) Calculation of Girder Form

(1) Supporting Part on P2 Side

Block No.	Section No.	Form Length (m)	Average of Form Length (m)	Length of Block (m)	Form Area (㎡)	Bulkhead Cross Beam (㎡)	Total of each Block (㎡)
	Girder End				16.930		16.930
1	1	15.238					
	2	15.238	15.238	9.450	143.999		143.999
Total				9.450	143.999		160.929

(2) Cantilever part on P2 -> P3

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (㎡)	Bulkhead (㎡)	Total of each (㎡)
	2	15.238					
2	3	15.246	15.242	3.500	53.347		53.347
3	4	15.300	15.273	3.500	53.456		53.456
4	5	15.448	15.374	3.500	53.809		53.809
5	6	15.694	15.571	3.000	46.713		46.713
6	7	16.050	15.872	3.000	47.616		47.616
7	8	16.580	16.315	3.000	48.945		48.945
8	9	17.298	16.939	3.000	50.817		50.817
Total				22.500	354.703		354.703

(3) Pier Head part on P3

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (㎡)	Bulkhead (㎡)	Total of each (㎡)
	9	17.298					
9	10	18.238	17.768	3.000	53.304		53.304
	10	18.238	18.238	0.000			
10	10	18.238	18.238	3.000	54.714		54.714
	10	18.238	18.238	0.000			
9	9	17.298	17.768	3.000	53.304		53.304
Total				9.000	161.322		161.322

(4) Cantilever part on P3-> P4

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (㎡)	Bulkhead (㎡)	Total of each (㎡)
	9	17.298					
8	8	16.580	16.939	3.000	50.817		50.817
7	7	16.050	16.315	3.000	48.945		48.945
6	6	15.694	15.872	3.000	47.616		47.616
5	5	15.448	15.571	3.000	46.713		46.713
4	4	15.300	15.374	3.500	53.809		53.809
3	3	15.246	15.273	3.500	53.456		53.456
2	2	15.238	15.242	3.500	53.347		53.347
Total				22.500	354.703		354.703

(5) Supporting Part on center of Span

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (㎡)	Bulkhead (㎡)	Total of each (㎡)
	2	15.238					
11	2	15.238	15.238	3.000	45.714		45.714
Total				3.000	45.714		45.714

(6) Cantilever part on P3 -> P4

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (m²)	Bulkhead (m²)	Total of each (m²)
	2	15.238					
2	3	15.246	15.242	3.000	45.726		45.726
3	4	15.300	15.273	3.000	45.819		45.819
4	5	15.448	15.374	3.000	46.122		46.122
5	6	15.694	15.571	3.000	46.713		46.713
6	7	16.050	15.872	3.500	55.552		55.552
7	8	16.580	16.315	3.500	57.103		57.103
8	9	17.298	16.939	3.500	59.287		59.287
Total				22.500	356.322		356.322

(7) Pier Head part on P4

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (m²)	Bulkhead (m²)	Total of each (m²)
	9	17.298					
9	10	18.238	17.768	3.000	53.304		53.304
	10	18.238	18.238	0.000			
10	10	18.238	18.238	3.000	54.714		54.714
	10	18.238	18.238	0.000			
9	9	17.298	17.768	3.000	53.304		53.304
Total				9.000	161.322		161.322

(8) Cantilever part on P4 -> P5

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (m²)	Bulkhead (m²)	Total of each (m²)
	9	17.298					
8	8	16.580	16.939	3.000	50.817		50.817
7	7	16.050	16.315	3.000	48.945		48.945
6	6	15.694	15.872	3.000	47.616		47.616
5	5	15.448	15.571	3.000	46.713		46.713
4	4	15.300	15.374	3.500	53.809		53.809
3	3	15.246	15.273	3.500	53.456		53.456
2	2	15.238	15.242	3.500	53.347		53.347
Total				22.500	354.703		354.703

(9) Supporting Part on P5 Side

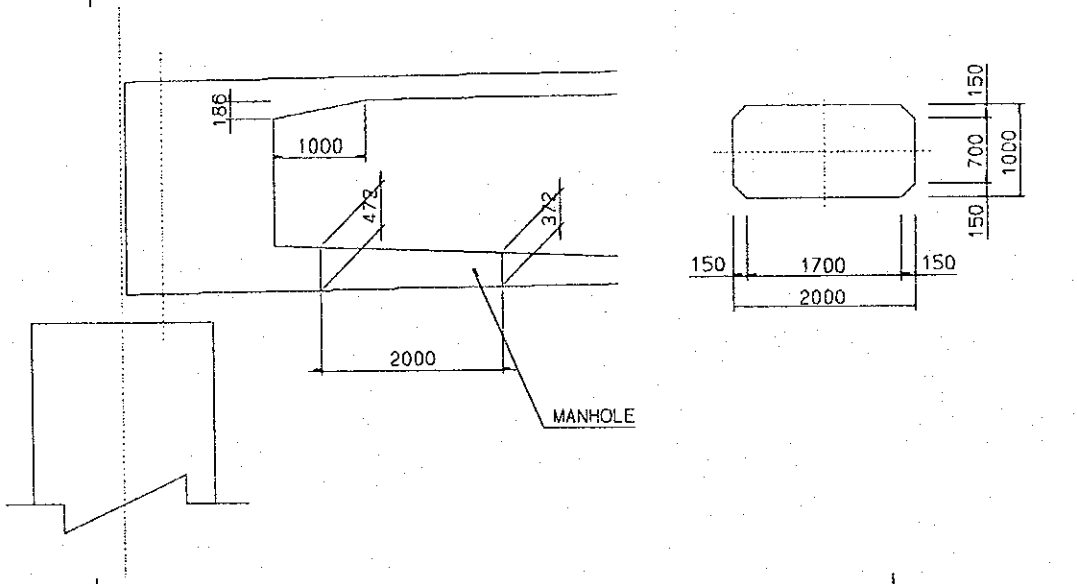
Block No.	Section No.	Form Length (m)	Average of Form Length (m)	Length of Block (m)	Form Area (m²)	Bulkhead Cross Beam (m²)	Total of each Block (m²)
1	2	15.238					
	1	15.238	15.238	9.450	143.999		143.999
	Girder end				16.930		16.930
Total				9.450	143.999		160.929

Total

Item	Quantity	Remark
Cantilever part	1420.431	
Pier Head part	322.644	
Supporting Part	367.572	
Total	2110.647	

External Form

Item	Formula	Quantity
4) Supporting Part on Side of Span		
	•Manhole	
	A1 = -1.000 × 2.000 + 4×1/2 × 0.150	
	× 0.150 = -1.955 ㎡	
	A2 = 0.422 ×(1.700 + 1.700 + 0.700	
	+ 0.700 + 0.212 × 4)	
	= 2.383 ㎡	per each
	ΣA = -1.955 + 2.383 = 0.428 ㎡	0.428 ㎡
		Total
	A = 0.428 × 2 = 0.856	0.856 ㎡



2. Internal Form

1) Total Quantity

Item	Quantity					
	Main part	Diaphragm	Hunch	Anchorage		Total
Cantilever part	799.378	133.664		100.536		1033.578
Pier Head part	120.216	160.932	14.592			295.740
Supporting Part	164.791	0.000	4.520			169.311
Total	1084.385	294.596	19.112	100.536		1498.629

2) Calculation of Girder Form

(1) Supporting Part on P2 Side

Block No.	Section No.	Form Length (m)	Average of Form Length (m)	Length of Block (m)	Form Area (㎡)	Bulkhead Cross Beam (㎡)	Total of each Block (㎡)
1	3	8.664					
	4	9.574	9.119	5.000	45.595		45.595
	5	9.574	9.574	2.800	26.807		26.807
Total				5.000	45.595		45.595

(2) Cantilever part on P2 -> P3

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (㎡)	Bulkhead (㎡)	Total of each (㎡)
	5	9.574					
2	6	8.932	9.253	3.500	32.386		32.386
3	7	8.586	8.759	3.500	30.657		30.657
4	8	8.574	8.580	3.500	30.030		30.030
5	9	8.650	8.612	3.000	25.836		25.836
6	10	8.856	8.753	3.000	26.259		26.259
7	11	9.026	8.941	3.000	26.823		26.823
8	12	9.512	9.269	3.000	27.807		27.807
Total				22.500	199.798		199.798

(3) Pier Head part on P3

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (㎡)	Bulkhead (㎡)	Total of each (㎡)
	12	9.512					
9	13	10.524	10.018	3.000	30.054		30.054
10							
	13	10.524	10.524	0.000			
9	12	9.512	10.018	3.000	30.054		30.054
Total				6.000	60.108		60.108

(4) Cantilever part on P3-> P4

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (㎡)	Bulkhead (㎡)	Total of each (㎡)
	12	9.512					
8	11	9.026	9.269	3.000	27.807		27.807
7	10	8.856	8.941	3.000	26.823		26.823
6	9	8.650	8.753	3.000	26.259		26.259
5	8	8.574	8.612	3.000	25.836		25.836
4	7	8.586	8.580	3.500	30.030		30.030
3	6	8.932	8.759	3.500	30.657		30.657
2	5	9.574	9.253	3.500	32.386		32.386
Total				22.500	199.798		199.798

(5) Supporting Part on center of Span

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (㎡)	Bulkhead (㎡)	Total of each (㎡)
	5	9.574					
11	5	9.574	9.574	3.000	28.722		28.722
Total				3.000	28.722		28.722

(6) Cantilever part on P3 -> P4

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (㎡)	Bulkhead (㎡)	Total of each (㎡)
	5	9.574					
2	6	8.932	9.253	3.000	27.759		27.759
3	7	8.586	8.759	3.000	26.277		26.277
4	8	8.574	8.580	3.000	25.740		25.740
5	9	8.650	8.612	3.000	25.836		25.836
6	10	8.856	8.753	3.500	30.636		30.636
7	11	9.026	8.941	3.500	31.294		31.294
8	12	9.512	9.269	3.500	32.442		32.442
Total				22.500	199.984		199.984

(7) Pier Head part on P4

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (㎡)	Bulkhead (㎡)	Total of each (㎡)
	12	9.512					
9	13	10.524	10.018	3.000	30.054		30.054
10							
	13	10.524	10.524	0.000			
9	12	9.512	10.018	3.000	30.054		30.054
Total				6.000	60.108		60.108

(8) Cantilever part on P4 -> P5

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (㎡)	Bulkhead (㎡)	Total of each (㎡)
	12	9.512					
8	11	9.026	9.269	3.000	27.807		27.807
7	10	8.856	8.941	3.000	26.823		26.823
6	9	8.650	8.753	3.000	26.259		26.259
5	8	8.574	8.612	3.000	25.836		25.836
4	7	8.586	8.580	3.500	30.030		30.030
3	6	8.932	8.759	3.500	30.657		30.657
2	5	9.574	9.253	3.500	32.386		32.386
Total				22.500	199.798		199.798

(9) Supporting Part on P5 Side

Block	Section	Form Length (m)	Average of (m)	Length of (m)	Form Area (㎡)	Bulkhead (㎡)	Total of each (㎡)
1	5	9.574					
	4	9.574	9.574	9.450	90.474		90.474
	3	8.664	9.119	9.450	86.175		86.175
Total				9.450	90.474		90.474

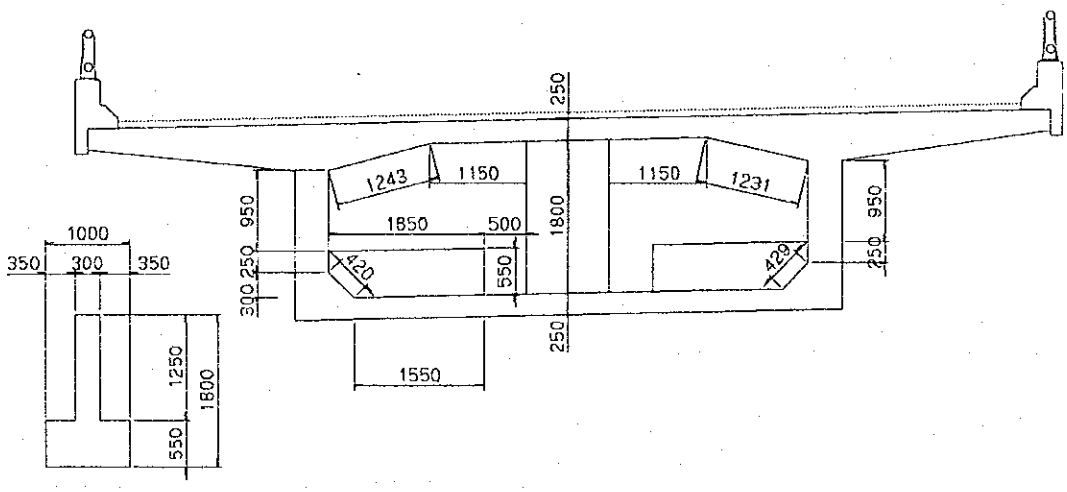
Total

Item	Quantity	Remark
Cantilever part	799.378	
Pier Head part	120.216	
Supporting Part	164.791	
Total	1084.385	

Internal Form

Item	Formula	Quantity
3) Diaphragm, manhole Anchorage etc	(1) Center Bulkhead	

· Supporting Part on center of Span

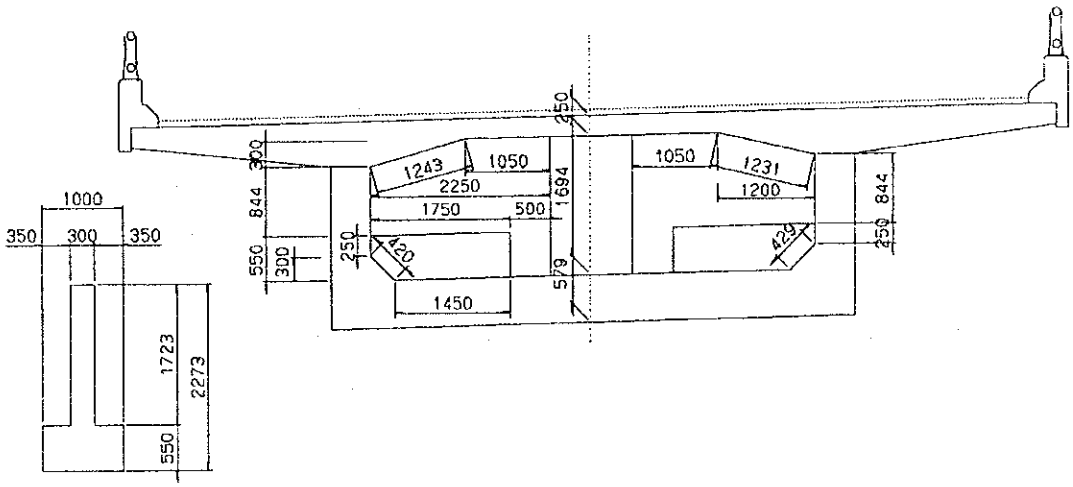


A1 = (	1.150	+	2.350	)×	1/2	×	0.300	
×	2	×	2			=	2.100	m^3
A2 =	2.350	×	0.950	×	2	×	2	
						=	8.930	m^3
A3 =	0.550	×	0.500	×	2	×	2	
						=	1.100	m^3
A4 = (	1.850	×	0.550	-	1/2	×	0.300	
×	0.300	)×	2	×	2	=	3.890	m^3
A5 =	0.350	×	0.550	×	2	×	2	
						=	0.770	m^3
A6 =	0.300	×	1.850	×	2			
						=	0.000	m^3
A7 =								

Internal Form

Item	Formula	Quantity

· Cantilever part



A1 = (	0.803	+	0.781	)×	1/2	×	1.102		
×	2					=	1.746	m^2	
A2 = (	0.781	+	0.515	)×	1/2	×	0.798		
×	2					=	1.034	m^2	
A3 = (	0.505	+	0.741	)×	1/2	×	0.708		
×	2					=	0.882	m^2	
A4 = (	0.741	+	0.720	)×	1/2	×	1.042		
×	2					=	1.522	m^2	
A5 = (	0.700	+	0.673	)×	1/2	×	1.374		
×	2					=	1.887	m^2	
A6 = (	0.673	+	0.433	)×	1/2	×	0.719		
×	2					=	0.795	m^2	
A7 = (	0.433	+	0.250	)×	1/2	×	0.079		
×	2					=	0.054	m^2	
A8 = (	1.900	×	0.800	-	1/2	×	0.200		
×	0.200	)×	2			=	3.000	m^2	
A9 = (	1.750	×	0.800	-	1/2	×	0.200		
×	0.200	)×	2			=	2.760	m^2	
A10 = (	2.093	×	0.800	-	1/2	×	0.401		
×	0.800	)×	2			=	3.028	m^2	
A11 = (	0.700	+	0.720	+	0.803	)×	2		
×	0.300	+	0.800	×	1.000	×	6		
+	1.000	×	0.300	×	3	=	7.034	m^2	

			Total	16.708	m^2

per each 16.708 m^2

A=	16.708	×	8	=	133.664 m^2

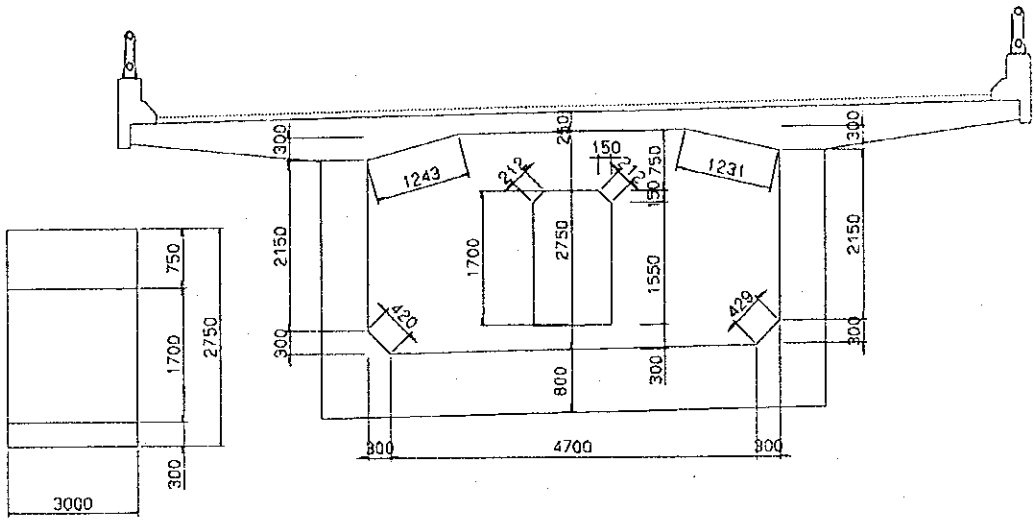
Total 133.664 m^2

Internal Form

Item	Formula	Quantity

(2) Intermediate Cross Beam on Pier Head

· Cross Beam



A1 =	0.300	×	3.700	×	2			
						=	2.220	m^2
A2 = (	3.700	+	3.676	)×	1/2	×	1.202	
×	2					=	8.866	m^2
A3 = ((	3.676	+	3.410	)×	1/2	×	0.798	
-	0.200	×	0.200	×	1/2	)×	2	
						=	5.615	m^2
A4 = ((	3.396	+	3.632	)×	1/2	×	0.708	
-	0.200	×	0.200	×	1/2	)×	2	
						=	4.936	m^2
A5 = (	3.632	+	3.585	)×	1/2	×	2.361	
×	2					=	17.039	m^2
A6 = (	3.585	+	2.106	)×	1/2	×	0.734	
×	2					=	4.177	m^2
A7 = (	2.106	+	0.250	)×	1/2	×	0.798	
×	2					=	1.880	m^2
A8 = -	1.500	×	1.000	×	3			
						=	-4.500	m^2
A9 = (	1.500	×	2	+	1.000	)×	3	
						=	12.000	m^2
					Total		40.233	m^2

per each 40.233 m^2

A=	40.233	×	4	=	160.932 m^2

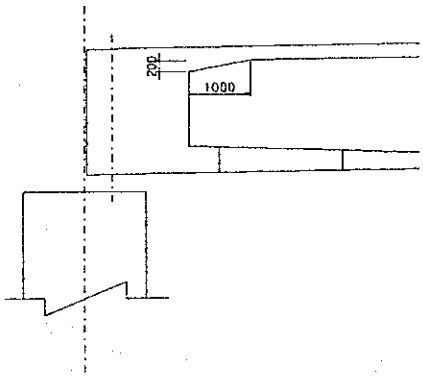
Total 160.932 m^2

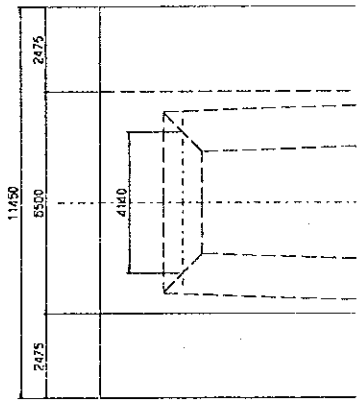
Internal Form

Item	Formula	Quantity

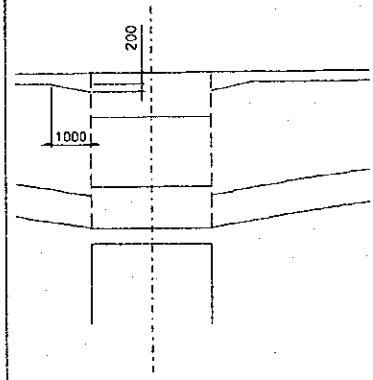
(3) Supporting Part on Side of Span (Manhole Haunch etc)

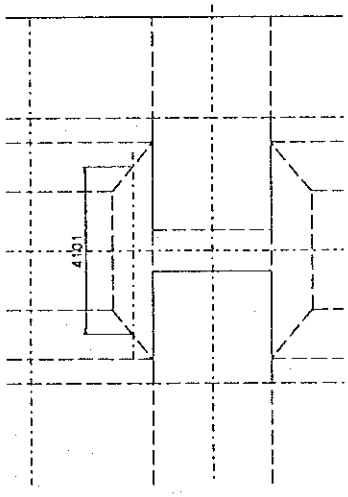
· Haunch (Top Slab)





L = (	0.15 ²×	0.500 ²)^1/2	=	0.522 m	per each	
A =	0.522 ×	4.330		=	2.260 m^2	
					Total	
A=	2.260 ×	2	=	4.52 m^2	4.520 m^2	





L = (	0.15 ²×	0.450 ²)^1/2	=	0.474 m	per each	
A =	0.474 ×	3.848		=	1.824 m^2	
					Total	
A=	1.824 ×	8	=	14.592 m^2	14.592 m^2	

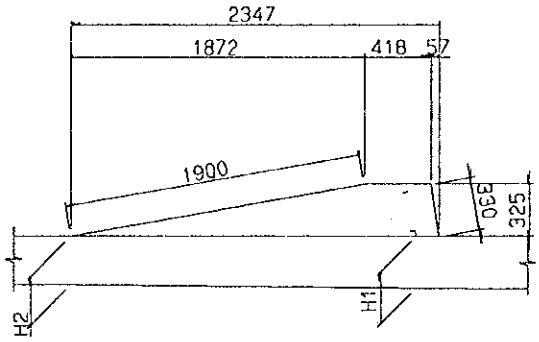
Internal Form

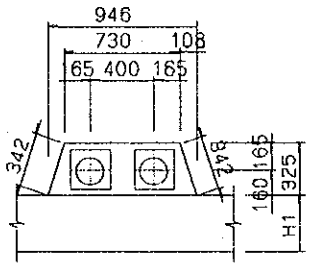
Item	Formula	Quantity

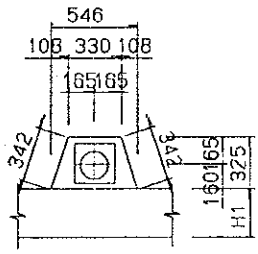
(4)Anchorage

TYPE A

SCALE 1:50







· TYPE-A1

A1	= (	0.33	+	0.546	)×	1/2	×	0.33	
							=	0.145 m^2	
A2	= (	0.418	+	0.475	)×	1/2	×	0.342	
	×	2					=	0.305 m^2	
A3	=	1.872	×	1/2	×	0.342	=	0.32 m^2	per each
						ΣA	=	0.77 m^2	0.770 m^3

· TYPE-A2

A1	= (	0.73	+	0.946	)×	1/2	×	0.33	
							=	0.277 m^2	
A2	= (	0.418	+	0.475	)×	1/2	×	0.342	
	×	2					=	0.305 m^2	
A3	=	1.872	×	1/2	×	0.342	=	0.32 m^2	per each
						ΣA	=	0.902 m^2	0.902 m^3

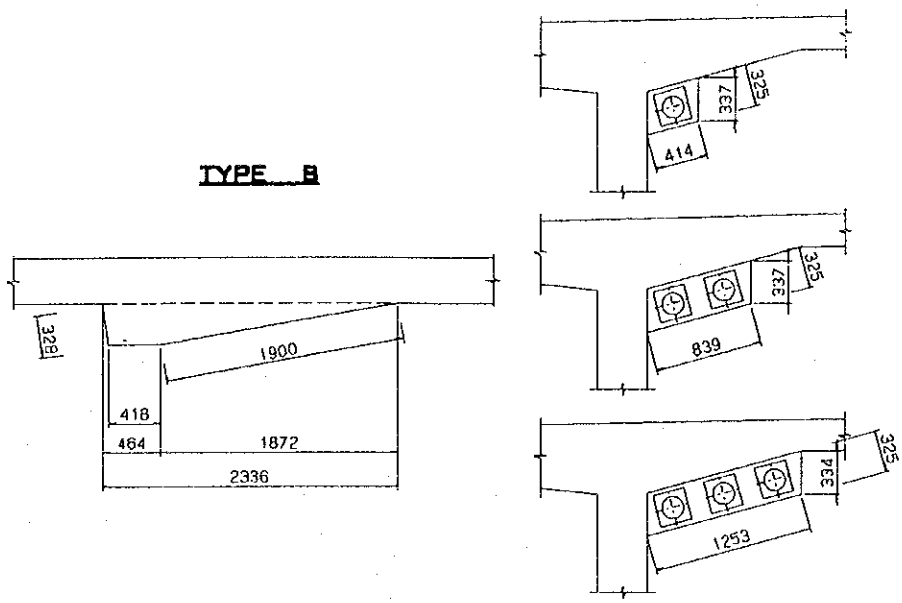
Block No.	Anchorage Type A1 .(0.770 m^3)	A2.(0.902 m^3)	Concrete m^3	Remarks
1	4		3.080	
3	4		3.080	
5		4	3.608	
6	4		3.080	
7	4		3.080	
8	4	4	6.688	
Sub-Total	20	8	22.616	

Total	22.616	×	2	=	45.232

45.232 m^3

Internal Form

Item	Formula	Quantity



· TYPE-B1

A1 = (	0.418	+	0.464	)×	1/2	×	0.334	
						=	0.147 m^2	
A2 =	1.872	×	1/2	×	0.334	=	0.313 m^2	
A3 =	0.414	×	1/2			=	0.135 m^2	per each
					ΣA	=	0.595 m^2	0.595 m^3

· TYPE-B2

A1 = (	0.418	+	0.464	)×	1/2	×	0.334	
						=	0.147 m^2	
A2 =	1.872	×	1/2	×	0.334	=	0.313 m^2	
A3 =	0.839	×	1/2			=	0.274 m^2	per each
					ΣA	=	0.734 m^2	0.734 m^3

· TYPE-B3

A1 = (	0.418	+	0.464	)×	1/2	×	0.334	
						=	0.147 m^2	
A2 =	1.872	×	1/2	×	0.334	=	0.313 m^2	
A3 =	1.253	×	1/2			=	0.408 m^2	per each
					ΣA	=	0.868 m^2	0.868 m^3

Block No.	Anchorage Type			Concrete
	B1(0.595m3)	B2(0.734m3)	B3(0.868m3)	m^3
3	4	4		5.316
4	4		4	5.852
5	4	4		5.316
6	4		4	5.852
7	4	4		5.316
8		4		2.936
9	4			2.380
Sub-Total	20	16	8	27.652

Total	27.652	×	2	=	55.304

55.304 m^3

4. Reinforcement Bar

4-1. Total Quantity

	- D14	D16-D25	Total
Segment 1	8930.4	42387.2	51317.6
Segment 2	10865.2	46529.2	57394.4
Segment 3	26499.2	91856.8	118356.0
Segment 4	11584.8	46949.6	58534.4
Segment 5	1394.2	6572.6	7966.8
Anchor A-1		5668.8	5668.8
Anchor A-2		3885.6	3885.6
Anchor B-1		2595.0	2595.0
Anchor B-2		2880.0	2880.0
Anchor B-3		1906.8	1906.8
Deviator 1		4742.0	4742.0
Deviator 2	1072.0	1163.6	2235.6
Deviator 3	1072.0	1264.0	2336.0
Deviator 4	1072.0	1160.0	2232.0
Deviator 5	1520.4	4905.6	6426.0
Total	64010.2	264466.8	328477.0

LIST OF REINFORCEMENT SEG-1

SIGN	DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
S 1- 1	D16	10,887	65	1.578	17.200	1,118.0	
1- 2	D16	9,887	65	1.578	15.600	1,014.0	
1- 3	D16	8,938	4	1.578	14.100	56.4	
1- 4	D16	6,148	2	1.578	9.700	19.4	
1- 5	D16	9,892	4	1.578	15.600	62.4	
3	D16	11,650	77	1.578	18.400	1,416.8	
4	D16	6,500	77	1.578	10.300	793.1	
6- 1	D16	3,050	77	1.578	4.810	370.4	(AVE)
6- 2	D16	3,050	77	1.578	4.810	370.4	(AVE)
7	D16	2,100	154	1.578	3.310	509.7	(AVE)
So- 1	D14	640	66	1.208	0.773	51.0	
2	D14	805	114	1.208	0.973	110.9	(AVE)
C- 1	D22	5,480	154	2.984	16.400	2,525.6	
2	D22	1,398	154	2.984	4.170	642.2	
Co- 1	D14	778	58	1.208	0.940	54.5	
4- 1	D14	10,802	12	1.208	13.100	157.2	
4- 2	D14	9,802	8	1.208	11.800	94.4	
4- 3	D14	5,457	4	1.208	6.590	26.4	
L1 1- 1	D16	10,442	38	1.578	16.500	627.0	(AVE)
1- 2	D16	10,387	38	1.578	16.400	623.2	(AVE)
1- 3	D16	6,334	18	1.578	10.000	180.0	(AVE)
1- 4	D16	7,540	8	1.578	11.900	95.2	(AVE)
1- 5	D16	4,632	4	1.578	7.310	29.2	(AVE)
1- 6	D16	4,912	2	1.578	7.750	15.5	
1- 7	D16	2,050	18	1.578	3.240	58.3	
1- 8	D16	11,090	4	1.578	17.500	70.0	
2- 1	D14	6,890	61	1.208	8.330	508.1	
2- 2	D14	3,120	32	1.208	3.770	120.6	
3- 1	D14	6,890	61	1.208	8.330	508.1	
3- 2	D14	3,120	32	1.208	3.770	120.6	
4- 1	D14	1,596	77	1.208	1.930	148.6	
4- 2	D14	1,617	77	1.208	1.950	150.2	
Lo- 1	D14	765	105	1.208	0.924	97.0	(AVE)
M 1	D14	2,600	8	1.208	3.140	25.1	
2	D14	2,300	16	1.208	2.780	44.5	
3	D14	1,600	8	1.208	1.930	15.4	
						12,829	

					D22	3167.8	
					D16	7429.0	
					D14	2232.6	
					TOTAL	12,829.4	
					-D14	2,233	
					D16-D25	10,597	
					Total/one	nos	Total
				-D14	2232.600	4	8,930.400
				D16-D25	10596.800	4	42,387.200
					Total		51,317.600

LIST OF REINFORCEMENT SEG-2

SIGN	DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
S- 1	D16	11,100	138	1.578	17.500	2,415.0	
3	D16	11,650	85	1.578	18.400	1,564.0	
4	D16	11,000	85	1.578	17.400	1,479.0	
So- 1	D14	640	56	1.208	0.773	43.3	
2	D14	805	96	1.208	0.973	93.4	(AVE)
S 6- 1	D16	2,950	85	1.578	4.660	396.1	
6- 2	D16	2,950	85	1.578	4.660	396.1	
7	D14	2,000	170	1.208	2.420	411.4	
C 1- 1	D22	5,484	58	2.984	16.400	951.2	(AVE)
1- 2	D22	5,566	56	2.984	16.600	929.6	(AVE)
1- 3	D22	5,716	56	2.984	17.100	957.6	(AVE)
2- 1	D22	1,398	58	2.984	4.170	241.9	
2- 2	D22	1,448	56	2.984	4.320	241.9	(AVE)
2- 3	D22	1,498	56	2.984	4.470	250.3	
Co- 1	D14	838	64	1.208	1.010	64.6	(AVE)
C- 4	D14	8,426	24	1.208	10.200	244.8	
L- 1	D16	11,000	104	1.578	17.400	1,809.6	
2	D14	6,890	85	1.208	8.330	708.1	
3	D14	6,890	85	1.208	8.330	708.1	
4- 1	D14	1,790	85	1.208	2.160	183.6	(AVE)
4- 2	D14	1,853	85	1.208	2.240	190.4	(AVE)
Lo- 1	D14	645	88	1.208	0.779	68.6	(AVE)

					D22	3572.5	
					D16	8059.8	
					D14	2716.3	
					TOTAL	14,348.6	
					-D14	2,716	
					D16-D25	11,632	
					Total/one	nos	Total
				-D14	2716.300	4	10,865.200
				D16-D25	11632.300	4	46,529.200
					Total		57,394.400

LIST OF REINFORCEMENT SEG-3

SIGN	DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
S- 1- 1	D16	12,500	136	1.578	19.700	2,679.2	
1- 2	D16	12,487	4	1.578	19.700	78.8	
3	D16	11,650	97	1.578	18.400	1,784.8	
4	D16	6,500	97	1.578	10.300	999.1	
So- 1	D14	640	56	1.208	0.773	43.3	
2	D14	805	96	1.208	0.973	93.4	(AVE)
S 6- 1	D16	3,000	97	1.578	4.740	459.8	
6- 2	D16	3,000	97	1.578	4.740	459.8	(AVE)
7	D14	2,050	194	1.208	2.480	481.1	(AVE)
C 1- 1	D22	6,092	56	2.984	18.200	1,019.2	(AVE)
1- 2	D22	6,708	30	2.984	20.000	600.0	(AVE)
1- 3	D22	7,382	36	2.984	22.000	792.0	(AVE)
2- 1	D22	1,498	56	2.984	4.470	250.3	
2- 2	D22	1,548	30	2.984	4.620	138.6	(AVE)
2- 3	D22	1,598	36	2.984	4.770	171.7	
Co- 1	D14	878	72	1.208	1.060	76.3	(AVE)
C 4- 1	D14	12,500	20	1.208	15.100	302.0	
4- 2	D14	9,288	4	1.208	11.200	44.8	
4- 3	D14	3,618	4	1.208	4.370	17.5	
4- 4	D14	1,830	4	1.208	2.210	8.8	
L1 1- 1	D16	12,500	102	1.578	19.700	2,009.4	
1- 2	D16	12,487	2	1.578	19.700	39.4	
2	D14	6,890	97	1.208	8.330	808.0	
3	D14	6,890	97	1.208	8.330	808.0	
4- 1	D14	2,667	97	1.208	3.220	312.3	(AVE)
4- 2	D14	2,073	97	1.208	2.510	243.5	(AVE)
Lo- 1	D14	690	88	1.208	0.834	73.4	(AVE)

D22	2971.8		
D16	8510.3		
D14	3312.4		
TOTAL	14,794.5		
-D14	3,312		
D16-D25	11,482		
Total/one	nos	Total	
-D14	3312.400	8	26,499.200
D16-D25	11482.100	8	91,856.800

LIST OF REINFORCEMENT SEG-4

SIGN	DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGH	NOTE
S- 0- 1	D14	640	63	1.208	0.773	48.7	
0- 2	D14	810	109	1.208	0.979	106.7	
1- 1	D16	8,900	90	1.578	14.000	1,260.0	
1- 2	D16	9,490	90	1.578	15.000	1,350.0	
3	D16	11,650	73	1.578	18.400	1,343.2	
4	D16	6,500	73	1.578	10.300	751.9	
6- 1	D16	3,060	73	1.578	4.830	352.6	
6- 2	D16	3,060	73	1.578	4.830	352.6	
7	D16	2,100	146	1.578	3.310	483.3	
C 0- 1	D14	980	114	1.208	1.180	134.5	
1- 1	D22	8,170	96	2.984	24.400	2,342.4	
1- 2	D22	8,670	50	2.984	25.900	1,295.0	
2	D22	1,600	146	2.984	4.770	696.4	
4- 1	D14	8,900	32	1.208	10.800	345.6	
4- 2	D14	9,440	32	1.208	11.400	364.8	
4- 3	D14	6,440	12	1.208	7.780	93.4	
L1 0- 1	D14	1,190	33	1.208	1.440	47.5	
0- 2	D14	1,130	66	1.208	1.370	90.4	
1	D16	9,560	100	1.578	15.100	1,510.0	
2	D14	6,890	73	1.208	8.330	608.1	
3	D14	6,890	73	1.208	8.330	608.1	
4- 1	D14	2,610	50	1.208	3.150	157.5	(AVE)
4- 2	D14	2,510	96	1.208	3.030	290.9	(AVE)

					D22	4333.8	
					D16	7403.6	
					D14	2896.2	
					TOTAL	14,633.6	
					-D14	2,896	
					D16-D25	11,737	
					Total/one	nos	Total
				-D14	2896.200	4	11,584.800
				D16-D25	11737.400	4	46,949.600

LIST OF REINFORCEMENT SEG-5

SIGN	DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
S- 0- 1	D14	640	21	1.208	0.773	16.2	
0- 2	D14	810	66	1.208	0.979	64.6	AVE
1- 1	D16	2,900	67	1.578	4.580	306.9	
1- 2	D16	1,410	67	1.578	2.230	149.4	
3	D16	11,650	25	1.578	18.400	460.0	
4	D16	6,500	25	1.578	10.300	257.5	
6- 1	D16	2,950	25	1.578	4.660	116.5	
6- 2	D16	2,950	25	1.578	4.660	116.5	
7	D16	2,000	50	1.578	3.160	158.0	
C 0- 1	D14	780	25	1.208	0.943	23.6	
4- 1	D14	3,000	12	1.208	3.630	43.6	
4- 2	D14	1,410	12	1.208	1.700	20.4	
1	D22	5,470	50	2.984	16.300	815.0	
2	D22	1,400	50	2.984	4.180	209.0	
L 0- 1	D14	650	18	1.208	0.785	14.1	
1- 1	D22	3,000	53	2.984	8.950	474.4	
1- 2	D22	1,410	53	2.984	4.210	223.1	
2	D14	6,890	25	1.208	8.330	208.3	
3	D14	6,890	25	1.208	8.330	208.3	
4	D14	1,620	50	1.208	1.960	98.0	

					D22	1721.5	
					D16	1564.8	
					D14	697.1	
					TOTAL	3,983.4	
					-D14	697	
					D16-D25	3,286	
					Total/one	nos	Total
				-D14	697.100	2	1,394.200
				D16-D25	3286.300	2	6,572.600

LIST OF REINFORCEMENT — FOR ONE ANCHOR BLOCK TYPE A

SIGN	DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
T 1	D16	2,012	12	1.578	3.180	38.2	
2	D16	1,606	28	1.578	2.530	70.8	
3	D16	2,490	4	1.578	3.930	15.7	
4	D16	3,000	12	1.578	4.740	56.9	
5	D16	1,106	26	1.578	1.750	45.5	
6	D16	1,446	4	1.578	2.280	9.1	
					D16	236.2	
				Total/one	nos	Total	
				236.2	24	5,668.8	

LIST OF REINFORCEMENT — FOR TWO ANCHOR BLOCK TYPE A

SIGN	DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
T 1 -1	D16	2,004	12	1.578	3.160	37.9	
1 -2	D16	1,979	12	1.578	3.120	37.4	
2 -1	D16	1,551	28	1.578	2.450	68.6	
2 -2	D16	1,526	28	1.578	2.410	67.5	
3	D16	2,490	8	1.578	3.930	31.4	
4	D16	3,000	20	1.578	4.740	94.8	
5	D16	1,506	26	1.578	2.380	61.9	
6	D16	1,133	8	1.578	1.790	14.3	
7	D16	2,500	6	1.578	3.950	23.7	
8	D16	2,177	14	1.578	3.440	48.2	
					D16	485.7	
				Total/one	nos	Total	
				485.7	8	3,885.6	

LIST OF REINFORCEMENT

FOR ONE ANCHOR BLOCK TYPE B

SIGN		DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
T	1	D16	2,257	6	1.578	3.560	21.4	
	2	D16	1,907	14	1.578	3.010	42.1	
	3	D16	2,490	4	1.578	3.930	15.7	
	4	D16	3,000	6	1.578	4.740	28.4	
	5	D16	1,770	26	1.578	2.790	72.5	
	6	D16	1,303	4	1.578	2.060	8.2	
	7	D16	2,258	20	1.578	3.560	71.2	
						D16	259.5	
					Total/one	nos	Total	
					259.5	10	2,595.0	

LIST OF REINFORCEMENT

FOR TWO ANCHOR BLOCK TYPE B

SIGN		DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
T	1	D16	2,257	12	1.578	3.560	42.7	
	2	D16	1,907	28	1.578	3.010	84.3	
	3	D16	2,490	7	1.578	3.930	27.5	
	4	D16	3,000	10	1.578	4.740	47.4	
	5	D16	1,770	26	1.578	2.790	72.5	
	6	D16	1,303	7	1.578	2.060	14.4	
	7	D16	2,258	20	1.578	3.560	71.2	
						D16	360.0	
					Total/one	nos	Total	
					360.0	8	2,880.0	

LIST OF REINFORCEMENT

FOR THREE ANCHOR BLOCK TYPE B

SIGN		DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
T	1	D16	2,156	18	1.578	3.400	61.2	
	2	D16	1,807	42	1.578	2.850	119.7	
	3	D16	2,490	10	1.578	3.930	39.3	
	4	D16	3,000	14	1.578	4.740	66.4	
	5	D16	2,170	26	1.578	3.420	88.9	
	6	D16	1,253	10	1.578	1.980	19.8	
	7	D16	2,578	20	1.578	4.070	81.4	
						D16	476.7	
					Total/one	nos	Total	
					476.7	4	1,906.8	

LIST OF REINFORCEMENT 1

SIGN	DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
D 1	D16	5,960	54	1.578	9.410	508.1	
2	D16	1,560	54	1.578	2.460	132.8	
3	D16	6,970	30	1.578	11.000	330.0	
4	D16	2,110	26	1.578	3.330	86.6	
5	D16	3,000	27	1.578	4.740	128.0	
					D16	1185.5	
				Total/one	nos	Total	
			D16-D25	1,185.5	4	4,742.0	

LIST OF REINFORCEMENT 2

SIGN	DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
D 1 -a	D16	4,110	8	1.578	6.490	51.9	
1 -b	D16	2,710	8	1.578	4.280	34.2	
2	D16	3,330	8	1.578	5.260	42.1	
3	D16	2,060	24	1.578	3.250	78.0	
4	D16	1,600	20	1.578	2.530	50.6	
5	D16	900	24	1.578	1.420	34.1	
6	D14	2,900	32	1.208	3.500	112.0	
7	D14	2,690	48	1.208	3.250	156.0	
					D14	268.0	
					D16	290.9	
					TOTAL	558.9	
					Total/one	nos	Total
				-D14	268.000	4	1,072.000
				D16-D25	290.900	4	1,163.600
					Total		2,235.600

LIST OF REINFORCEMENT 3

SIGN	DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
D 1 -a	D16	4,740	8	1.578	7.480	59.8	
1 -b	D16	2,170	8	1.578	3.420	27.4	
2	D16	3,330	8	1.578	5.260	42.1	
3	D16	2,690	24	1.578	4.250	102.0	
4	D16	1,600	20	1.578	2.530	50.6	
5	D16	900	24	1.578	1.420	34.1	
6	D14	2,900	32	1.208	3.500	112.0	
7	D14	2,690	48	1.208	3.250	156.0	

D14	268.0	
D16	316.0	
TOTAL	584.0	

	Total/one	nos	Total
-D14	268.000	4	1,072.000
D16-D25	316.000	4	1,264.000
	Total		2,336.000

LIST OF REINFORCEMENT 4

SIGN	DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
D 1 -a	D16	4,110	8	1.578	6.490	51.9	
1 -b	D16	2,710	8	1.578	4.280	34.2	
2	D16	3,260	8	1.578	5.150	41.2	
3	D16	2,060	24	1.578	3.250	78.0	
4	D16	1,600	20	1.578	2.530	50.6	
5	D16	900	24	1.578	1.420	34.1	
6	D14	2,900	32	1.208	3.500	112.0	
7	D14	2,690	48	1.208	3.250	156.0	

D14	268.0	
D16	290.0	
TOTAL	558.0	

	Total/one	nos	Total
-D14	268.000	4	1,072.000
D16-D25	290.000	4	1,160.000
	Total		2,232.000

LIST OF REINFORCEMENT

SIGN		DIACETER	LENGTH	NOS.	UNIT WEIGHT	PIECE WEIGHT	TOTAL WEIGHT	NOTE
D	1	D16	9,860	24	1.578	15.600	374.4	
	2	D16	4,900	4	1.578	7.730	30.9	
	3	D16	4,660	10	1.578	7.360	73.6	
	4	D16	2,460	34	1.578	3.880	131.9	
	5	D16	6,070	13	1.578	9.580	124.5	
	6	D16	6,960	14	1.578	11.000	154.0	
	7	D16	3,210	12	1.578	5.070	60.8	
	8	D16	3,460	26	1.578	5.460	142.0	
	9	D16	2,500	34	1.578	3.950	134.3	
	10	D14	2,750	52	1.208	3.320	172.6	
	11	D14	1,800	52	1.208	2.180	113.4	
	12	D14	1,500	52	1.208	1.810	94.1	

D14	380.1	
D16	1226.4	
TOTAL	1,606.5	

	Total/one	nos	Total
-D14	380.100	4	1,520.400
D16-D25	1226.400	4	4,905.600
	Total		6,426.000

4. PC Steel

1) Longitudinal Prestressing Internal Tendons

12S12.7B(SWPR7B)

Unit Weight: 9.288 kgf/m

(1) Tendons on Top Slab

PC Steel	Length of (m)	Unit (kgf)	Each	Weight of (kgf)	Remarks
S101	50.419	468.3	4	1873.2	
S102	46.925	435.8	4	1743.2	
S103	39.863	370.2	4	1480.8	
S104	39.953	371.1	4	1484.4	
S105	42.935	398.8	4	1595.2	
S106	32.848	305.1	4	1220.4	
S107	32.575	302.6	4	1210.4	
S108	27.348	254.0	4	1016	
S109	26.586	246.9	4	987.6	
S110	26.220	243.5	4	974	
S111	20.804	193.2	4	772.8	
S112	19.848	184.3	4	737.2	
S113	14.754	137.0	4	548	
S114	11.763	109.3	4	437.2	
S115	8.700	80.8	4	323.2	
Total	441.541		60	16403.6	

(2) Tendons on Top Slab

PC Steel	Length of (m)	Unit (kgf)	Each	Weight of (kgf)	Remarks
S201	50.419	468.3	4	1873.2	
S202	46.925	435.8	4	1743.2	
S203	39.863	370.2	4	1480.8	
S204	39.953	371.1	4	1484.4	
S205	42.935	398.8	4	1595.2	
S206	32.848	305.1	4	1220.4	
S207	32.575	302.6	4	1210.4	
S208	27.348	254.0	4	1016	
S209	26.586	246.9	4	987.6	
S210	26.220	243.5	4	974	
S211	20.804	193.2	4	772.8	
S212	19.848	184.3	4	737.2	
S213	14.754	137.0	4	548	
S214	11.763	109.3	4	437.2	
S215	8.700	80.8	4	323.2	
Total	441.541		60	16403.6	

(3) Tendons on Bottom Slab

PC Steel	Length of (m)	Unit (kgf)	Each	Weight of (kgf)	Remarks
S301	30.828	286.3	4	1145.2	
S302	30.828	286.3	4	1145.2	
S303	25.206	234.1	4	936.4	
Total	86.862		12	3226.8	

(4) Tendons on Bottom Slab

PC Steel	Length of (m)	Unit (kgf)	Each	Weight of (kgf)	Remarks
S401	46.036	427.6	4	1710.4	
S402	46.036	427.6	4	1710.4	
S403	46.036	427.6	4	1710.4	
S404	46.036	427.6	4	1710.4	
Total	184.144		16	6841.6	

(5) Tendons on Bottom Slab

PC Steel	Length of (m)	Unit (kgf)	Each	Weight of (kgf)	Remarks
S501	30.828	286.3	4	1145.2	
S502	30.828	286.3	4	1145.2	
S503	25.206	234.1	4	936.4	
Total	86.862		12	3226.8	

		(kgf)	(ton)
Sub-Total Weight of PC Cable Wp =		68840	68.8
Tension Unit	Ns =	214 × 2	= 428
Theating	L =	4963.8	m
Cement grout Φ80/85	V =	25.0	m3

2) Longitudinal Prestressing External Tendons

PC Steel	Length of (m)	Unit (kgf)	Each	Weight of (kgf)	Remarks
C11	37.940	352.4	6	2114.4	
C12	37.974	352.7	6	2116.2	
C13	37.974	352.7	6	2116.2	
C21	60.099	558.2	6	3349.2	
C22	60.099	558.2	6	3349.2	
C23	60.099	558.2	6	3349.2	
C31	37.940	352.4	6	2114.4	
C32	37.940	352.4	6	2114.4	
C33	37.940	352.4	6	2114.4	
Total	408.005		54	22737.6	

Sub-Total Weight of PC Cable Wp = 22737.6 22.7

Tension Unit Ns = 54 × 2 = 108

Theating L = 2448.03 m

Cement grout Φ90/100 V = 15.6 m3
(kgf) (ton)

3) Transverse Prestressing Tendons (Top Slab)

3S12.7

Unit Weight: 2.322 kgf/m

PC	Length of (m)	Unit (kgf)	Each	Weight of (kgf)	Remarks
3.0m Segment	11.452	26.6	48	1276.8	
3.5m Segment	11.452	26.6	49	1303.4	
Closure Segment	11.452	26.6	3	79.8	
Pier Segment	11.452	26.6	18	478.8	
End Segment	11.452	26.6	18	478.8	
Total	57.260		136	3617.6	

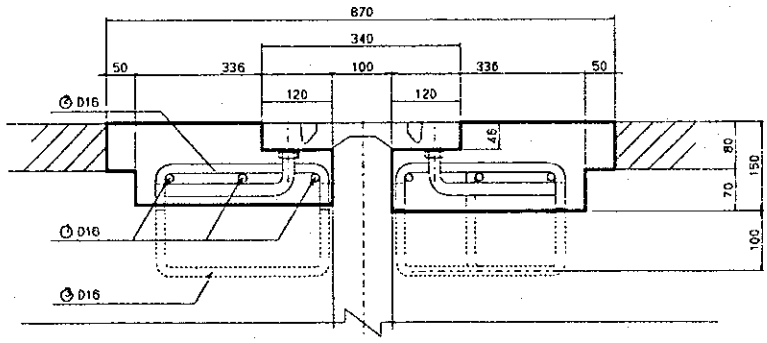
(kgf) (ton)

Sub-Total Weight of PC Cable Wp = 3617.6 3.6

Tension Unit Ns = 136 × 2 = 272

Theating L = 1557.472 m

Item	Formula		Quantity
5. Accessories			
1) Expansion Joint			
	EACH LENGTH L = 10.750		
	EACH = 2		
	TOTAL LENGTH		
	L = 10.750 × 2	=	21.500 m
2) BEARING PA ELASTOMERIC			
	660*560*125		
	n = 2 × 2	=	4 nos
	1400*1500*214		
	n = 2 × 2	=	4 nos
3) ANCHOR BAR			
	Φ75 L=1250 (MOVE)		
	EACH = 4 × 2	=	8 nos
	Φ75 L=2500 (FIX)		
	EACH = 4 × 2	=	8 nos
4) ANCHOR CAP (SGP)			
	Φ80 L=1350 (MOVE)		
	EACH = 4 × 2	=	8 nos
	Φ150 L=850 (FIX)		
	EACH = 4 × 2	=	8 nos

Item	Formula	Quantity
9 Pavement		
	L = 129.00 m	
1)	Pavement t=75㎜	
	A = 10.750 × 129.000 = 1,386.750 ㎡	1,386.8 ㎡
2)	Water Proofing t=5mm	
	A = 10.750 × 10.750 = 115.563 ㎡	115.6 ㎡
3)	Concrete	
		
	per one side	
	A1 = 0.336 × 0.150 - 0.12 × 0.046	
	= 0.045	
	A2 = 0.080 × 0.050 = 0.004	
	Total 0.049 ㎡	
	V = 0.049 × 10.750 × 2 = 1.054 m³	1.054 m³
2)	Road marking	
	Bridge Length L= 129.000 = 129.000 m	
	Side Line	
	A1 = 129.000 × 0.100 × 4 = 51.600 ㎡	
	L = 129.000 / 5.000 = 25.8 m	
	Center Line	
	A2 = 2.500 × 0.100 × 25.8 = 6.450 ㎡	
	Total 51.600 + 6.450 = 58.050 ㎡	58.1 ㎡