REPUBLIC OF INDONESIA

MINISTRY OF COMMUNICATIONS
DIRECTORATE GENERAL OF LAND TRANSPORT
AND INLAND WATERWAYS

TENDER DOCUMENTS
FOR
NEW RAILWAY LINE FOR CENGKARENG AIRPORT CONSTRUCTION PROJECT

QUANTITIES CALCULATION SHEETS

PACKAGE I : CIVIL AND ARCHITECTURAL WORK

4 of 5

AUGUST 1984

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

QUANTITIES CALCULATION SHEETS

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§ 23. PIER (2 OF 2)

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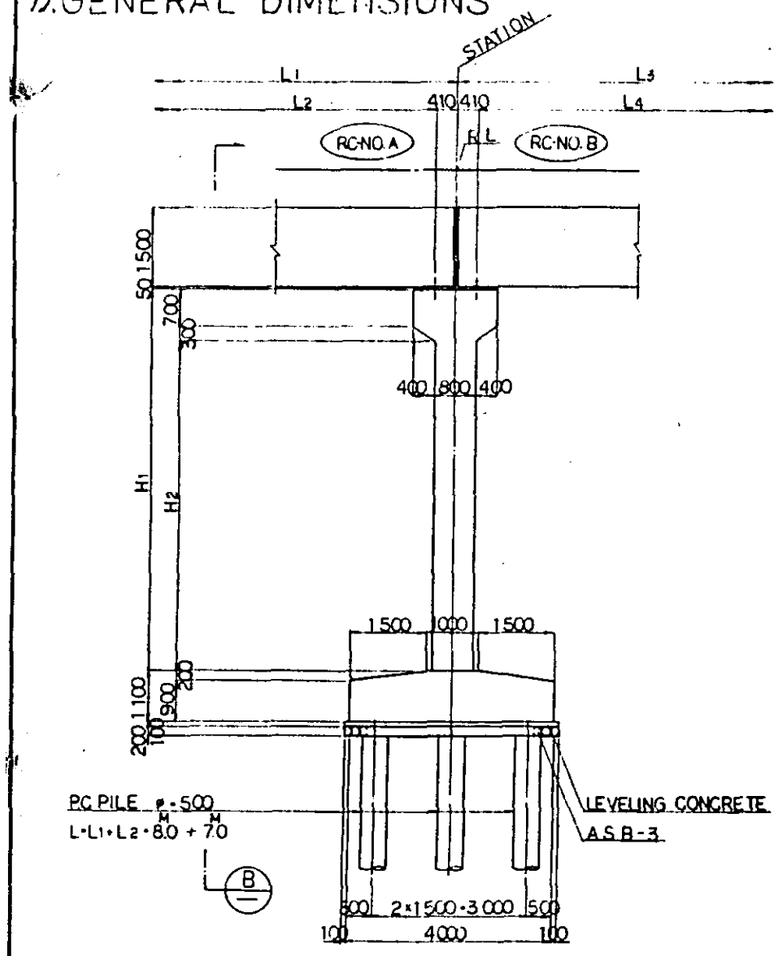
1. PIER . 101

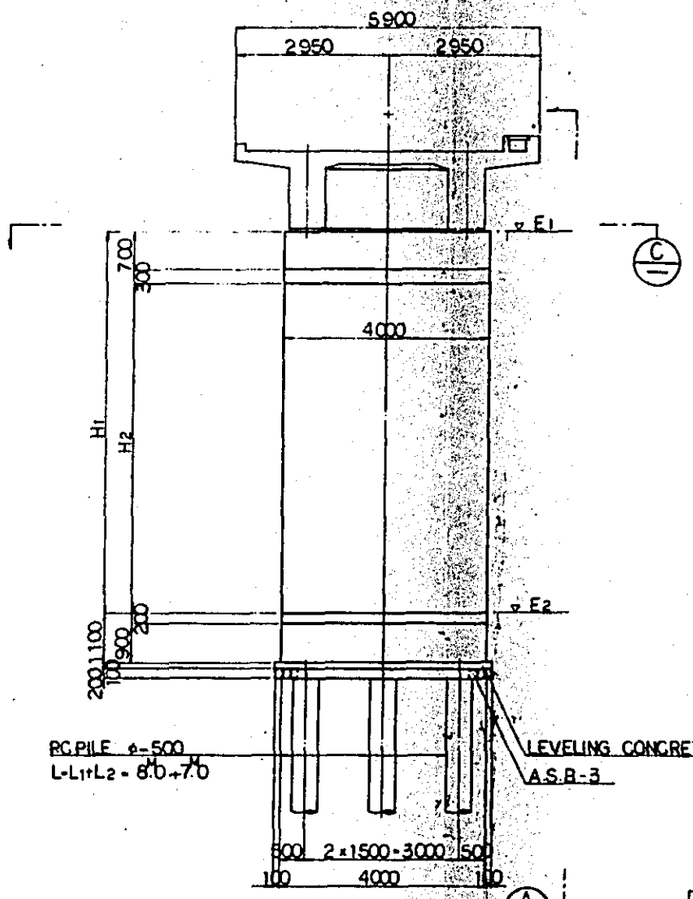
	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (Kg)	RATIO (Kg/m^3)
BEAM	5.9	12.6	519.7	88.1
COLUMN	20.5	61.4	2584.7	126.1
TOTAL	26.4	74.0	3104.4	117.6
FOOTING	16.4	15.4	1376.5	83.9

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B-3
EXCAVATION	m^3	30.5	
BEARING BASEMORTAR	m^3	0.025	$f_{ck} = 400\ kg/cm^2$
PILE	m × NUMBER	7 × 9 8 × 9	φ500-A φ500-B

1. GENERAL DIMENSIONS



SECTION (A)



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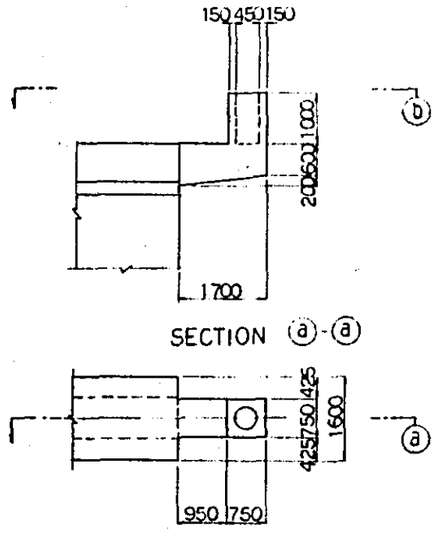
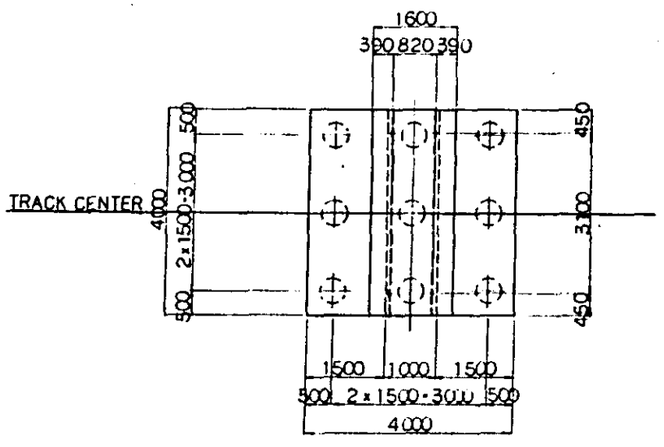


SECTION (a)-(a)

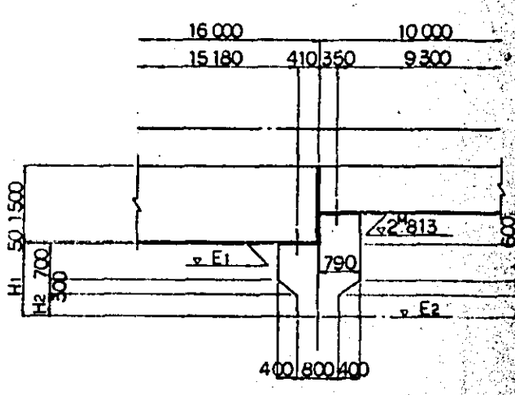
SECTION (b)-(b)

BEAM OF CATENARY POLE

FOR P-104. P-106. P-108. P-111
P-114 , P-117 ONLY



SECTION (C)



BEAM OF P-120

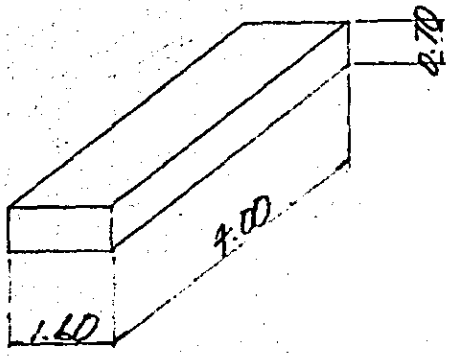
DIMENSION SCHEDULE

PIER NO	STATION	RC NO A	RC NO B	R.L	E1	E2	L1	L2	L3	L4	H1	H2
P.101	19M 133M 253	101	102	10.554	8.294	0.894	16 023	15 203	16 001	15 181	7400	6 400
P.102	149M 254	102	103	10.553	8.293	0.893	16 001	15 181	16 000	15 180	7400	6400
P.103	165M 254	103	104	10.498	8.238	0.838	16 000	15 180	"	"	7400	6400
P.104	181M 254	104	105	10.358	8.098	0.898	"	"	"	"	7200	6 200
P.105	197M 254	105	106	10.137	7.877	0.877	"	"	15000	14 180	7000	6000
P.106	212M 254	106	107	9.853	7.593	0.893	15 000	14 180	"	"	6 700	5 700
P.107	227M 254	107	108	9.498	7.238	0.838	"	"	"	"	6 400	5400
P.108	242M 254	108	109	9.123	6.863	0.863	"	"	"	"	6000	5 000
P.109	257M 254	109	110	8.748	6.488	0.888	"	"	16 000	15 180	5600	4 600
P.110	273M 254	110	111	8.348	6.088	0.888	16 000	15 180	"	"	5 200	4 200
P.111	289M 254	111	112	7.948	5.688	0.888	"	"	"	"	4 800	3 800
P.112	305M 254	112	113	7.548	5.288	0.888	"	"	"	"	4 400	3 400
P.113	321M 254	113	114	7.148	4.888	0.888	"	"	15 000	14 180	4 000	3 000
P.114	336M 254	114	115	6.773	4.513	0.813	15 000	14 180	16 000	15 180	3 700	2 700
P.115	352M 254	115	116	6.373	4.113	0.813	16 000	15 180	14 000	13 180	3300	2300
P.116	366M 254	116	117	6.023	3.763	0.863	14 000	13 180	16 000	15 180	2900	1900
P.117	382M 254	117	118	5.623	3.363	0.863	16 000	15 180	15 000	14 180	2 500	1500
P.118	397M 254	118	119	5.248	2.988	0.888	15 000	14 180	"	"	2 100	1100
P.119	412M 254	119	120	4.873	2.613	0.813	"	"	16 000	15 180	1600	800
P.120	428M 254	120	121	4.473	2.213	0.813	16 000	15 180	10 000	9 300	1400	400

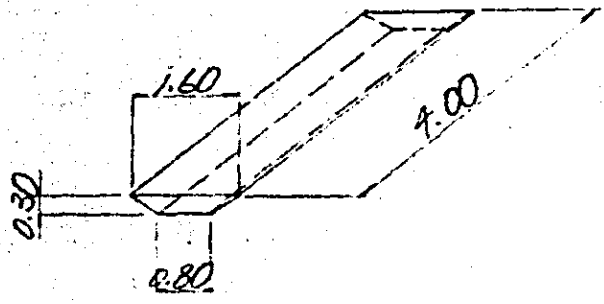
GENERAL VIEW OF P-101 ~ P-120 SCALE 1:60

2.) CONCRETE VOLUME

(1) BEAM



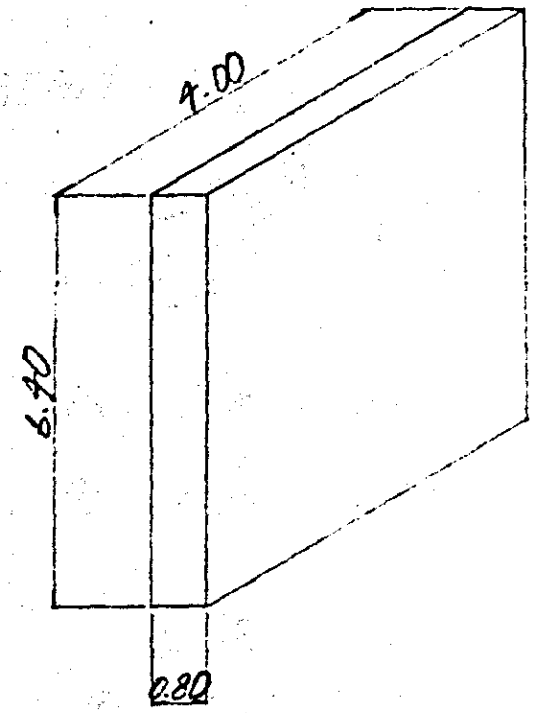
$Va = 1.60 \times 0.70 \times 4.00 = 4.480\ m^3$



$Vb = \frac{1}{2} \times (0.80 + 1.60) \times 0.30 \times 4.00 = 1.440\ "$

SEAT TOTAL = $5.920\ m^3$

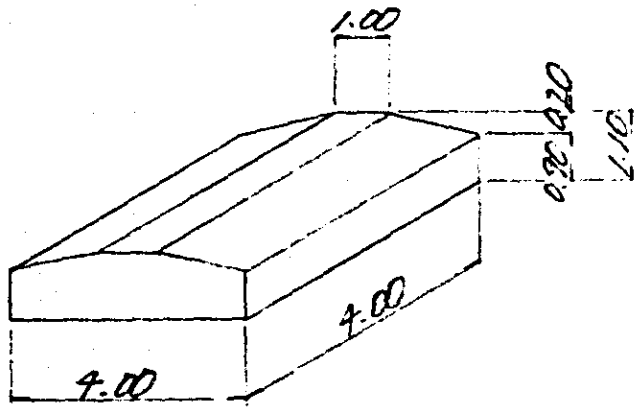
(2) COLUMN



$Va = 0.80 \times 6.90 \times 4.00 = 20.480\ m^3$

COLUMN TOTAL = 20.480 "

(3) FOOTING.



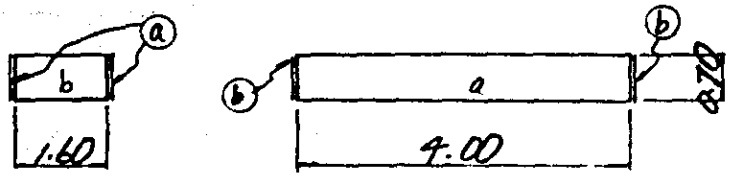
$Va = \frac{1}{2} \times (1.00 + 4.00) \times 0.20 \times 4.00 = 2.000\ m^3$

$Vb = 4.00 \times 0.90 \times 4.00 = 14.400$

FOOTING TOTAL = $16.400\ m^3$

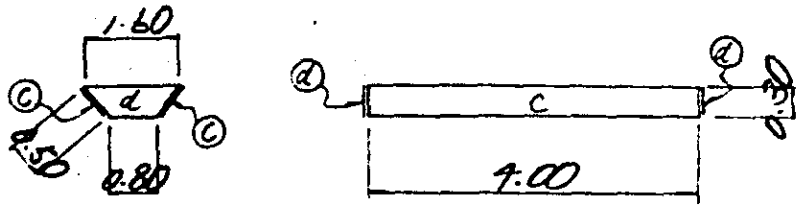
3) FORM AREA

(1) BEAM



$A_a = 0.70 \times 4.00 \times 2 = 5.600\ m^2$

$A_b = 0.70 \times 1.60 \times 2 = 2.240\ "$

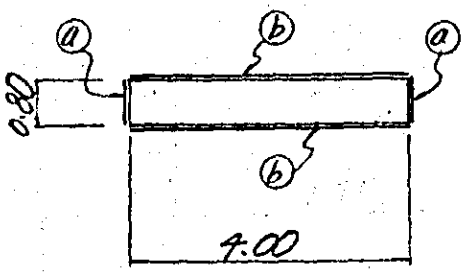


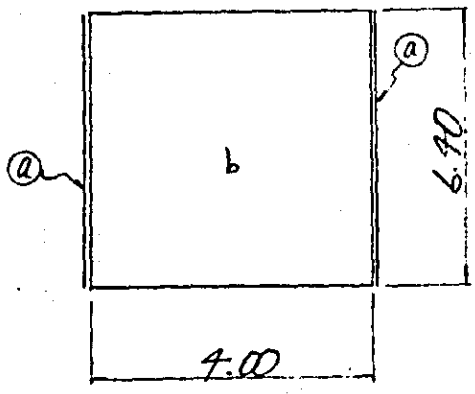
$A_c = 0.50 \times 4.00 \times 2 = 4.000\ "$

$A_d = \frac{1}{2} \times (1.60 + 0.80) \times 0.30 \times 2 = 0.720\ "$

BEAM TOTAL = $12.560\ m^2$

(2) COLUMN



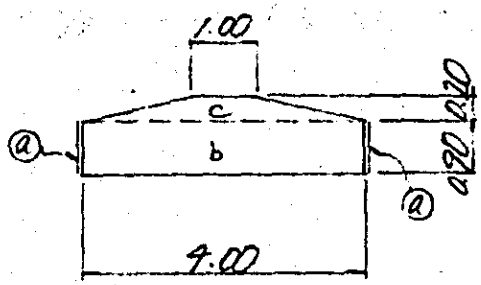


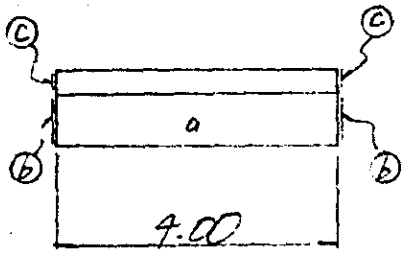
$A_a = 0.80 \times 6.40 \times 2 = 10.240\ m^2$

$A_b = 4.00 \times 6.40 \times 2 = 51.200$

COLUMN TOTAL = $61.440\ m^2$

(3) FOOTING.



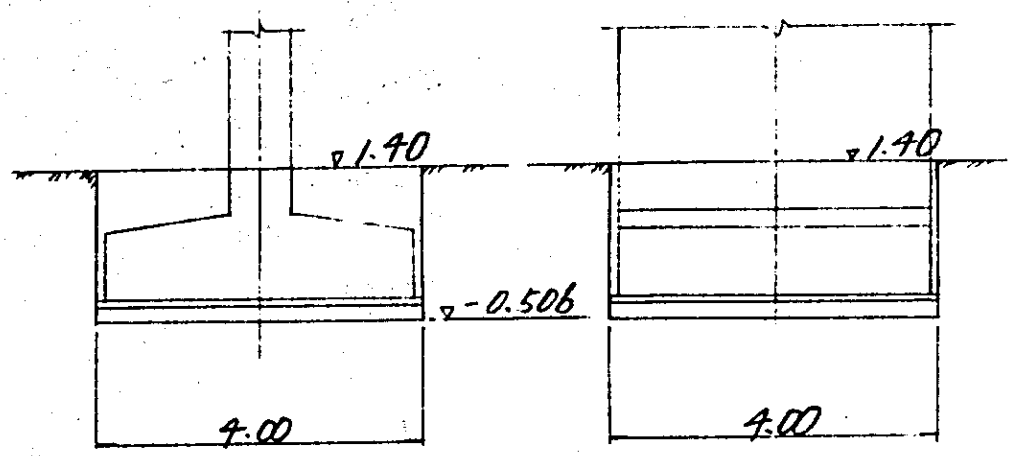


$A_{a.b} = 0.90 \times 4.00 \times 4 = 14.400\ m^2$

$A_c = \frac{1}{2} \times (1.00 + 4.00) \times 0.20 \times 2 = 1.000$

FOOTING TOTAL = $15.400\ m^2$

4) EXCAVATION

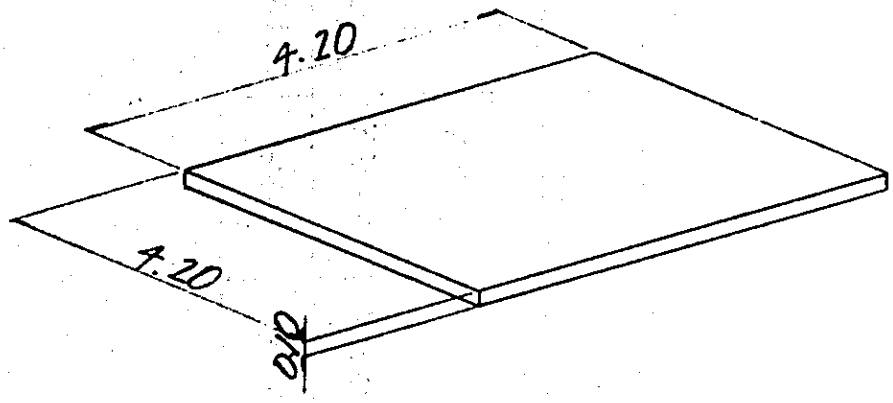


$$Va = 4.00 \times 4.00 \times (1.40 + 0.506) = 30.496 \ m^3$$

5) BEARING BASE MORTAR

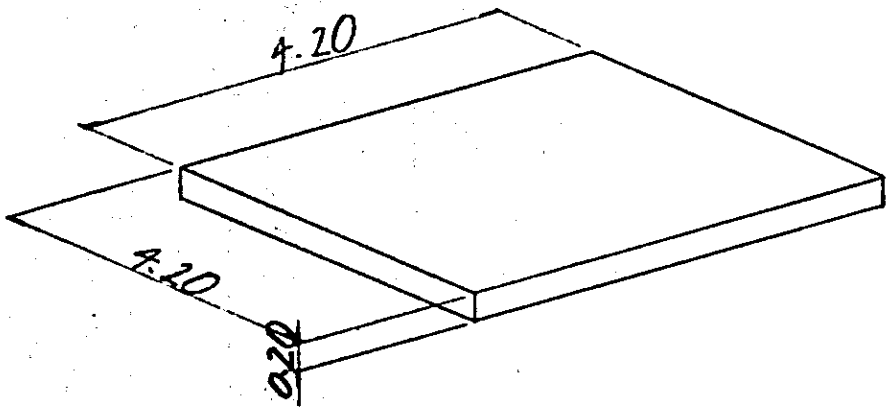
$$Va = \frac{1}{2} \times (0.83 \times 0.53 + 0.80 \times 0.50) \times 0.015 \times 4 = 0.025 \ m^3$$

6) LEVELING CONCRETE



$$Va = 4.20 \times 4.20 \times 0.10 = 1.764\ m^3$$

7) AGGREGATE SUBBASE



$$Va = 4.20 \times 4.20 \times 0.20 = 3.528\ m^3$$

8) PILE

$\phi = 500$

TYPE - A $7^{m} \times 9$

TYPE - B $8^{m} \times 9$

9) REINFORCING BAR

	D32	D29	D25	D22	D19	D16	D13	TOTAL
BEAM	—	—	—	—	—	405.6	114.1	519.7
COLUMN	—	—	1 671.6	—	—	—	913.1	2 584.7
TOTAL	—	—	1 671.6	—	—	405.6	1027.2	3 104.4
FOOTING	—	710.3	—	—	158.5	507.7	—	1 376.5

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	REINFORCING BAR					
	BEAM					
B 1	D 16	1.56	5 140	11	88 2	⌐¬
2	D 13	0.995	3 900	4	15 5	—
3	〃	〃	4 980	6	29 7	⌙ (VARIES)
4	〃	〃	2 250	8	17 9	]
B° 1	D 16	1.56	3 140	25	122 5	⌐¬
2	〃	〃	2 780	25	108 4	⌣
3	D 13	0.995	2 330	22	51 0	⊏
		SUB TOTAL				
			D 16	319.1 kg		
			D 13	114.1 〃		
				433.2 kg		
	COLUMN					
C 1	D 25	3.98	8 450	30	1008 9	⌊
2	〃	〃	5 550	30	662 7	〃
3	D 13	0.995	3 880	84	324 3	—
4	〃	〃	1 460	84	122 1	⊏
C° 1	D 13	0.995	2 020	143	287.4	⊔
2	〃	〃	1 260	143	179 3	⊓
		SUB TOTAL				
			D 25	1671.6 kg		
			D 13	913.1 〃		
				2584.7 kg		

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	FOOTING					
F 1	D 29	5.04	5 220	27	710.3	⌴
2	D 19	2.25	5 030	14	158.5	⌒
3	D 16	1.56	5 520	7	60.3	⌴
4	〃	〃	5 300	20	165.4	〃 (VARIES)
5	〃	〃	4 820	12	90.2	⌐
6	〃	〃	4 460	4	27.8	⌴
7	〃	〃	4 470	4	27.9	〃
F° 1	D 16	1.56	2 690	20	83.9	⌴ (VARIES)
2	〃	〃	2 390	14	52.2	〃 (〃)
		SUB TOTAL				
			D 29	710.3 kg		
			D 19	158.5 〃		
			D 16	507.7 〃		
				1 376.5 kg		
G 1	D 16	1.56	1 590	16	39.7	⌐
2	〃	〃	1 250	24	46.8	〃
		SUB TOTAL				
			D 16	86.5 kg		
		TOTAL				
			D 29	710.3 kg		
			D 25	1671.6 〃		
			D 19	158.5 〃		
			D 16	913.3 〃		
			D 13	1027.2 〃		
				4480.9 kg		

2. PIER . 102

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
BEAM	5.9	12.6	519.7	88.1
COLUMN	20.5	61.4	2 584.7	126.1
TOTAL	26.4	74.0	3 104.4	117.6
FOOTING	16.4	15.4	1 376.5	83.9

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B. - 3
EXCAVATION	m^3	30.5	
BEARING BASEMORTAR	m^3	0.025	σck = 400 kg/cm^2
PILE	m x NUMBER	7 x 9 8 x 9	ϕ 500 - A ϕ 500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 101 V= 5.920 m^3

(2) COLUMN

REFER TO PIER 101 V= 20.480 m^3

(3) FOOTING

REFER TO PIER 101 V= 16.700 m^3

2) FORM AREA

(1) BEAM

REFER TO PIER 101 A= 12.560 m^2

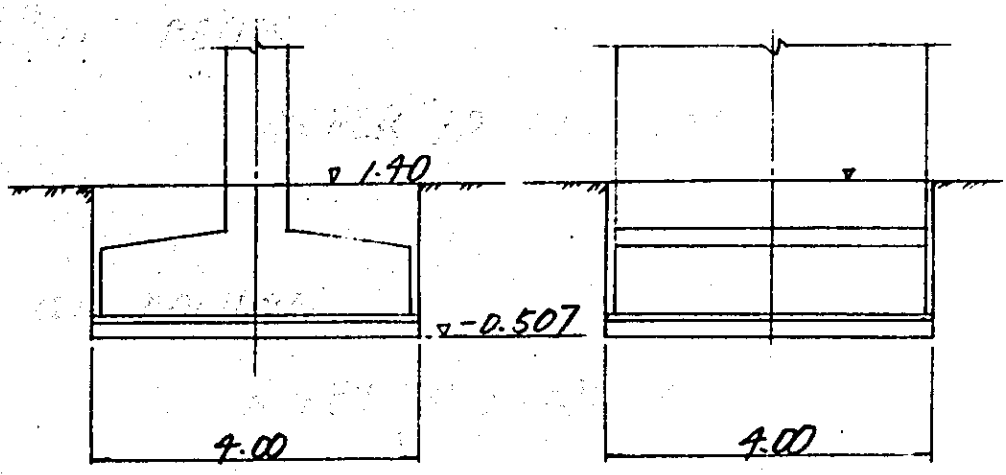
(2) COLUMN

REFER TO PIER 101 A= 61.440 m^2

(3) FOOTING

REFER TO PIER 101 A= 15.400 m^2

3) EXCAVATION



$V_a = 4.00 \times 4.00 \times (1.40 + 0.507) = 30.512\ m^3$

4) BEARING BASE MORTAR

REFER TO PIER 101 V = 0.025 m^3

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.764 m^3

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m^3

7) PILE

ϕ=500

TYPE - A 7 m × 9

TYPE - B 8 m × 9

8) REINFORCING BAR

(1): BEAM

REFER TO PIER 101 TOTAL- 519.7 kg

(2) COLUMN

REFER TO PIER 101 TOTAL- 2 584.7 kg

(3) FOOTING

REFER TO PIER 101 TOTAL - 1376.5

3 PIER 103

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (Kg)	RATIO (Kg/m^3)
BEAM	5.9	12.6	519.7	88.1
COLUMN	20.5	61.4	2 584.7	126.1
TOTAL	26.4	74.0	3 104.4	117.6
FOOTING	16.4	15.4	1 376.5	83.9

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B. - 3
EXCAVATION	m^3	31.4	
BEARING BASEMORTAR	m^3	0.025	5cm = 400 Kg/m^2
PILE	m × NUMBER	7 × 9 8 × 9	φ 500 - A φ 500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 101 V= 5.920 m^3

(2) COLUMN

REFER TO PIER 101 V= 20.480 m^3

(3) FOOTING

REFER TO PIER 101 V= 16.400 m^3

2) FORM AREA

(1) BEAM

REFER TO PIER 101 A= 12.560 m^2

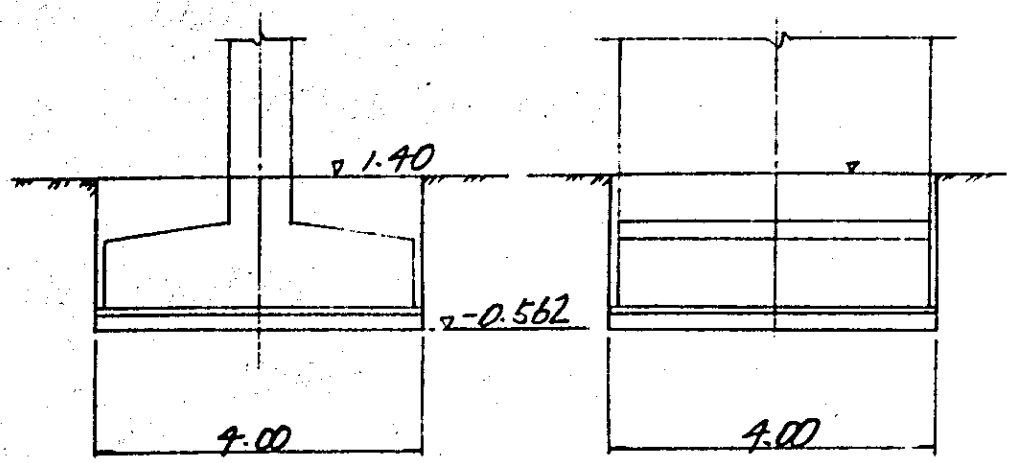
(2) COLUMN

REFER TO PIER 101 A= 61.440 m^2

(3) FOOTING

REFER TO PIER 101 A= 15.400 m^2

3) EXCAVATION



$V_a = 4.00 \times 4.00 \times (1.40 + 0.562) = 31.392\ m^3$

4) BEARING BASE MORTAR

REFER TO PIER 101 V = 0.025 m^3

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.764 m^3

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m^3

7) PILE

ϕ=500

TYPE - A 7 m × 9

TYPE - B 8 m × 9

8) REINFORCING BAR

(1). BEAM

REFER TO PIER 101 TOTAL= 519.7 kg

(2) COLUMN

REFER TO PIER 101 TOTAL= 2 584.7 kg

(3) FOOTING

REFER TO PIER 101 TOTAL = 1376.5

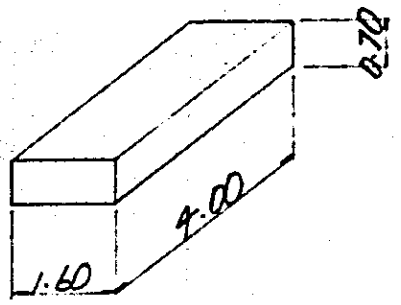
4) PIER: 104

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
BEAM	7.2	20.5	847.6	117.7
COLUMN	19.8	59.5	2 496.4	126.1
TOTAL	27.0	80.0	3 344.0	123.9
FOOTING	16.4	15.4	1376.5	83.9

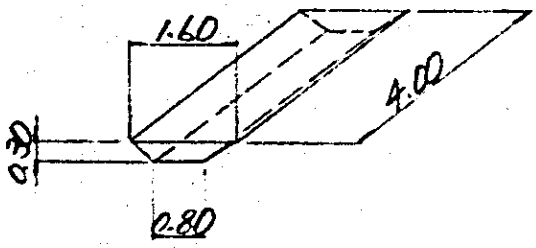
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B. - 3
EXCAVATION	m^2	30.4	
BEARING BASEMORTAR	m^3	0.025	Sck = 400 kg/cm²
PILE	m ×NUMBER	7 × 9 8 × 9	φ500 - A φ500 - B

1) CONCRETE VOLUME

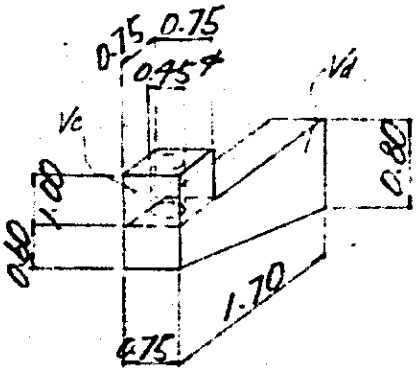
(1) BEAM



$Va = 1.60 \times 0.70 \times 4.00 = 4.480\ m^3$



$Vb = \frac{1}{2} \times (0.80 + 1.60) \times 0.30 \times 4.00 = 1.440$ "

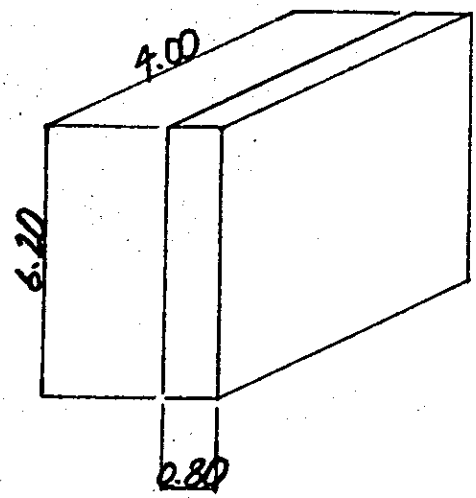


$Vc = (0.75 \times 0.75 - \frac{1}{4} \times 3.142 \times 0.75^2) \times 1.00 = 0.403$ "

$Vd = \frac{1}{2} \times (0.60 + 0.80) \times 1.70 \times 0.75 = 0.893$ "

BEAM TOTAL = $7.216\ m^3$

(2) COLUMN



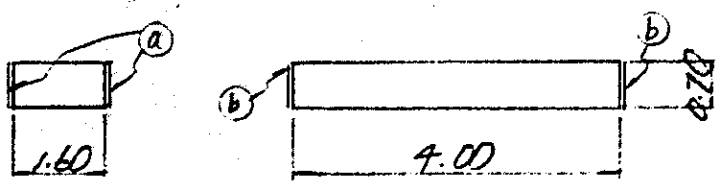
$Va = 0.80 \times 4.00 \times 6.20 = 19.840\ m^3$

(3) FOOTING

REFER TO PIER 101 = 16.400 m^3

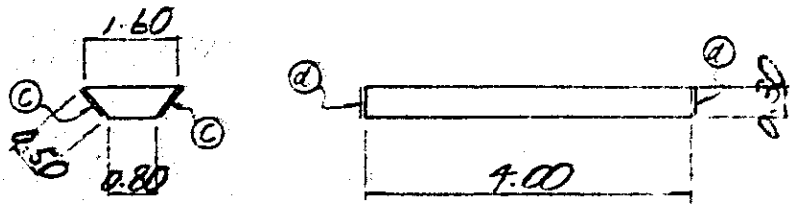
2) FORM AREA

(1) BEAM



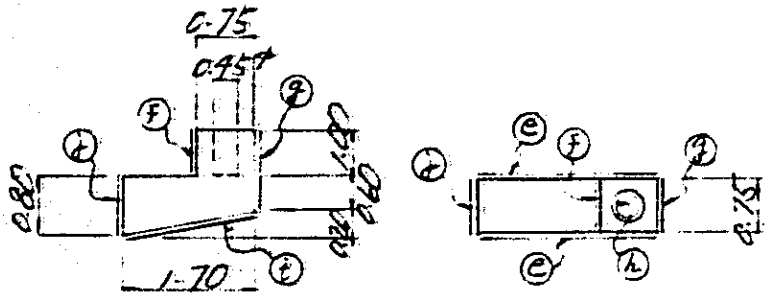
$Aa = 0.70 \times 4.00 \times 2$ = 5.600 m²

$Ab = 0.70 \times 1.60 \times 2$ = 2.240 "



$Ac = 0.50 \times 4.00 \times 2$ = 4.000 "

$Ad = \frac{1}{2} \times (1.60 - 0.80) \times 0.30 \times 2$ = 0.720 "



$Ae = \{0.75 \times 1.00 - \frac{1}{2} \times (0.60 - 0.80) \times 1.70\} \times 2$ = 3.830 "

$Af = 0.75 \times 1.00$ = 0.750 "

$Ag = 0.75 \times 1.60$ = 1.200 "

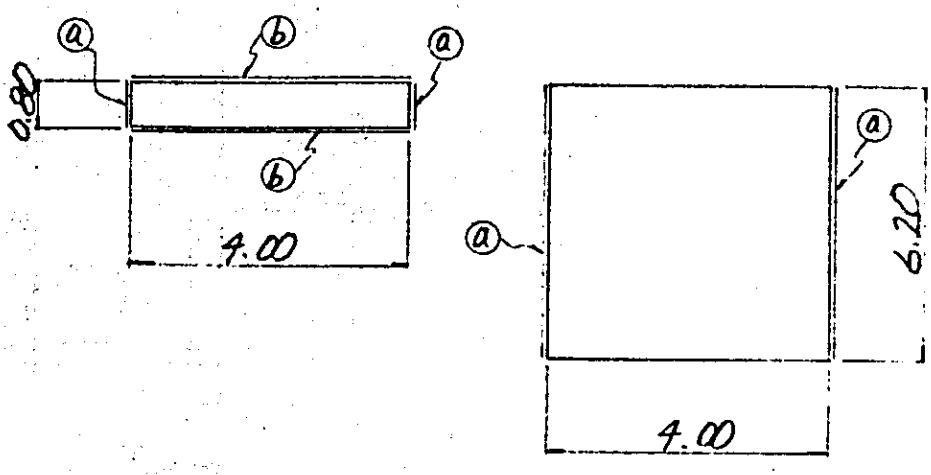
$Ah = 3.142 \times 0.45 \times 1.00$ = 1.414 "

$Ai = \sqrt{0.20^2 + 1.70^2} \times 0.75$ = 1.284 "

$Aj = -0.75 \times 0.80$ = - 0.600 "

BEAM TOTAL = 20.488 m²

(2) COLUMN



$A_a = 0.80 \times 6.20 \times 2 = 9.920\ m^2$

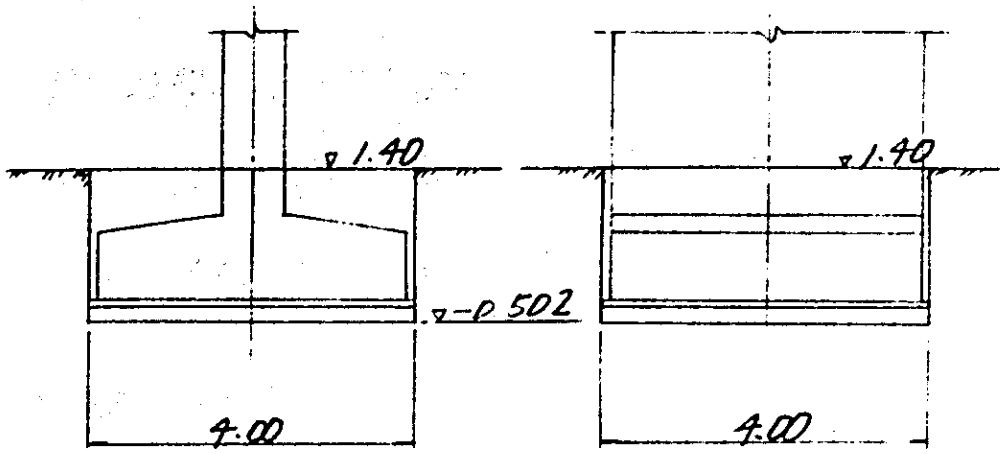
$A_b = 4.00 \times 6.20 \times 2 = 49.600\ "$

COLUMN TOTAL = $59.520\ m^2$

(3) FOOTING

REFER TO PIER 101 = $15.900\ m^2$

3) EXCAVATION



$V_a = 4.00 \times 4.00 \times (1.40 + 0.502) = 30.432\ m^3$

4) BEARING BASE MORTAR

REFER TO PIER 101 V = 0.025 m^3

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.764 m^3

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m^3

7) PILE

ϕ=500

TYPE - A 7 m × 9

TYPE - S 2 m × 7

8) REINFORCING BAR

(1) BEAM

R = BEAM OF PIER 101

+ BEAM SEAT OF ELCTRIC POLE

= 519.7 + 327.9 = 847.6 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 104}$$

$$= \frac{2\,584.7}{20.5} \times 19.8 = 2\,496.4 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL = 1 376.5 kg

REINFORCING BAR

	D32	D29	D25	D22	D19	D16	D13	TOTAL
BEAM	—	—	—	196.7	—	429.5	221.4	847.6
COLUMN	—	—	—	—	—	—	—	2 496.4
TOTAL	—	—	—	—	—	—	—	3 344.0
FOOTING	—	—	—	—	—	—	—	1 376.5

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	BEAM SEAT OF ELCTRIC POLE					
B 51	D 22	3.04	3 680	5	55.9	⌐¬
52	〃	〃	3 180	4	38.7	⌐⌐
53	D 16	1.56	2 500	4	15.6	—
54	〃	〃	2 650	2	8.3	⊐
B° 51	D 13	0.995	2 250	7	15.7	⊓ (VARIES)
52	〃	〃	1 930	7	13.4	〃 (〃)
53	〃	〃	1 600	7	11.1	⊓
54	〃	〃	1 280	7	8.9	〃
		SUB TOTAL				
			D 22	94.6	kg	
			D 16	23.9	〃	
			D 13	49.1	〃	
				167.6	kg	
E 1	D 22	3.04	2 100	16	102.1	⌐
2	D 13	0.995	1 550	8	12.3	↓
E° 1	D 13	0.995	3 020	9	27.0	□
2	〃	〃	2 110	9	18.9	○
		SUB TOTAL				
			D 22	102.1	kg	
			D 13	58.2	〃	
				160.3	kg	
		TOTAL	D 22	196.7	kg	
			D 16	23.9	〃	
			D 13	107.3	〃	
				327.9	kg	

5 PIER 105

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
BEAM	5.9	12.6	519.7	88.1
COLUMN	19.2	57.6	2 420.8	126.1
TOTAL	25.1	70.2	2 940.5	117.2
FOOTING	16.4	15.4	1 376.5	83.9

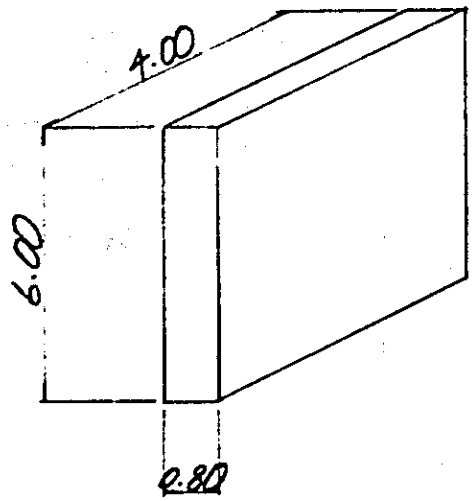
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B. - 3
EXCAVATION	m^2	30.8	
BEARING BASEMORTAR	m^3	0.025	σ_{ck} = 400 kg/cm²
PILE	m ×NUMBER	7 × 9 8 × 9	φ500 - A φ500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 101 $V = 5.920\ m^3$

(2) COLUMN



$V_a = 0.80 \times 4.00 \times 6.00 = 19.200\ m^3$

(3) FOOTING

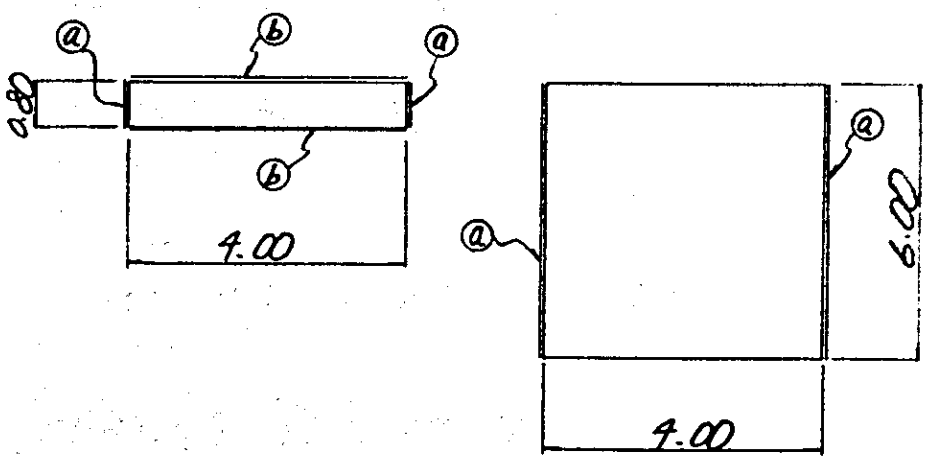
REFER TO PIER 101 $V = 16.400\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 101 $A = 12.560\ m^2$

(2) COLUMN



$A_a = 0.80 \times 6.00 \times 2 = 9.600\ m^2$

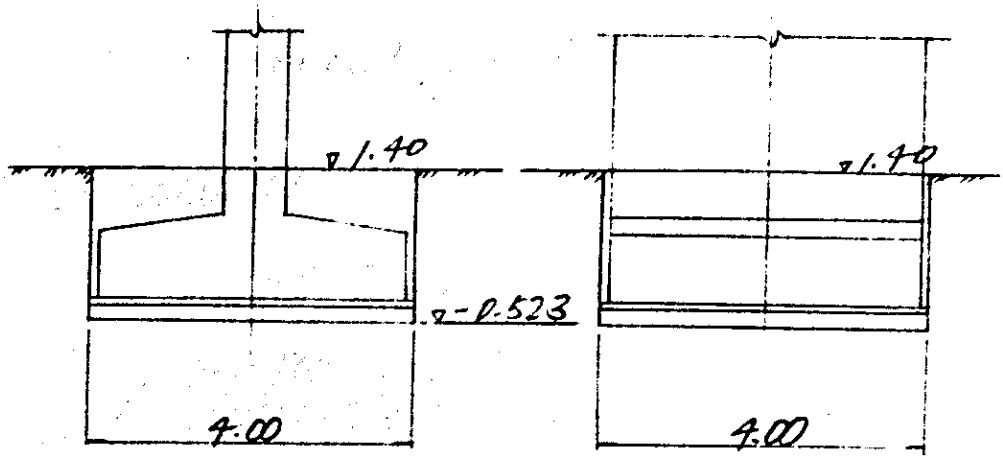
$A_b = 4.00 \times 6.00 \times 2 = 48.000\ "$

COLUMN TOTAL $= 57.600\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.400\ m^2$

3) EXCAVATION



$Va = 4.00 \times 4.00 \times (1.40 + 0.523) = 30.768\ m^3$

4) BEARING BASE MORTAR

REFER TO PIER 101 $V = 0.025\ m^3$

5) LEVELING CONCRETE

REFER TO PIER 101 $V = 1.764\ m^3$

6) AGGREGATE SUBBASE

REFER TO PIER 101 $V = 3.528\ m^3$

7) PILE

$\phi = 500$

TYPE - A 7m × 7

TYPE - B 2m × 7

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 101 TOTAL= 519.7 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 105}$$

$$= \frac{2\,584.7}{20.5} \times 19.2 = 2\,420.8 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL= 1 376.5 kg

6 PIER. 106

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (Kg)	RATIO (Kg/m^3)
BEAM	7.2	20.5	847.6	117.7
COLUMN	18.2	54.7	2294.7	126.1
TOTAL	25.4	75.2	3 142.3	123.7
FOOTING	16.4	15.4	1 376.5	83.9

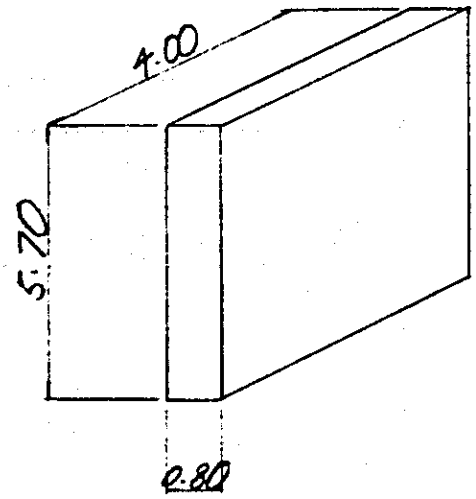
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B. 3
EXCAVATION	m^2	30.5	
BEARING BASEMORTAR	m^3	0.025	σ_{ck} = 400 Kg/cm^2
PILE	m ×NUMBER	7 × 9 8 × 9	φ 500 - A φ 500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 104 $V = 7.216\ m^3$

(2) COLUMN



$V_c = 0.80 \times 4.00 \times 5.70 = 18.240\ m^3$

(3) FOOTING

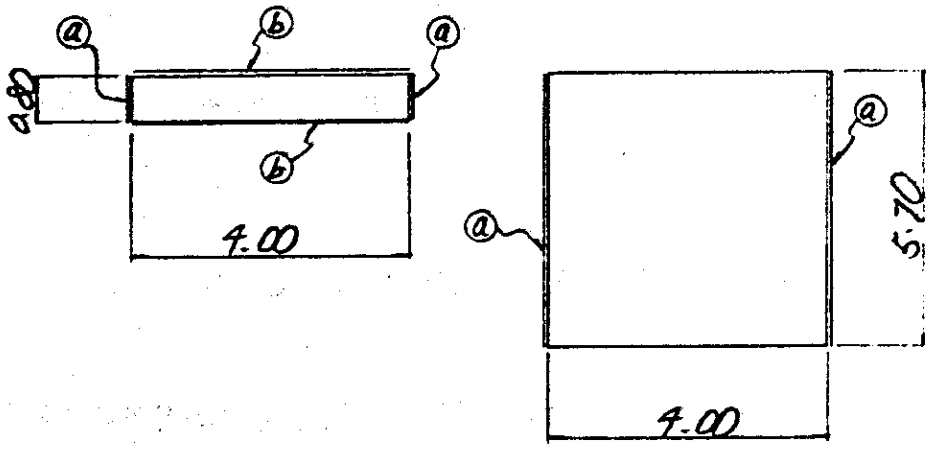
REFER TO PIER 101 $V = 16.400\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 104 $A = 20.488\ m^2$

(2) COLUMN



$A_a = 0.80 \times 5.70 \times 2 = 7.120\ m^2$

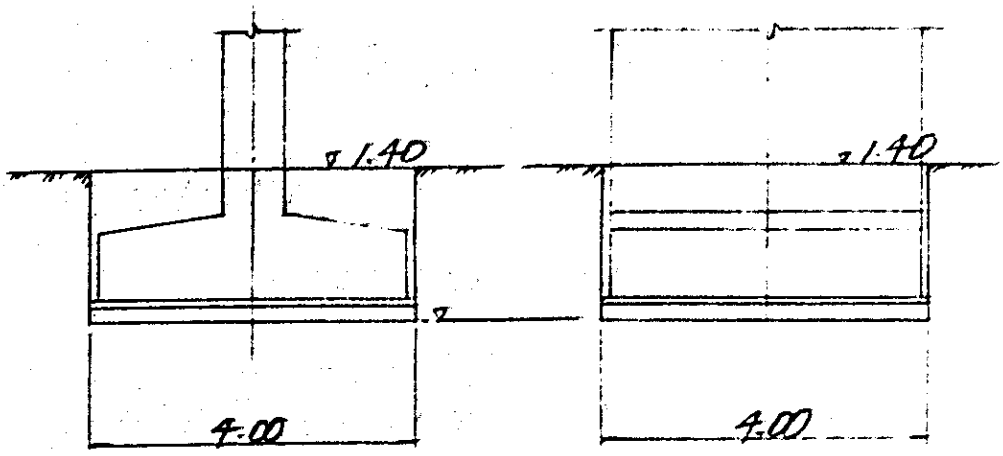
$A_b = 4.00 \times 5.70 \times 2 = 45.600$

COLUMN TOTAL $= 54.720\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.400\ m^2$

3) EXCAVATION



$Va = 4.00 \times 4.00 \times (1.40 + 0.507) = 30.512\ m^3$

4) BEARING BASE MORTAR

REFER TO PIER 101 V = 0.025 m^3

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.764 m^3

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m^3

7) PILE

ϕ=500

TYPE-A 7 m

TYPE-B 2 m

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 104 TOTAL= 847.6 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 106}$$

$$= \frac{2\,584.7}{20.5} \times 18.2 = 2294.7 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL= 1376.5 kg

7 PIER. 107

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (Kg)	RATIO (Kg/m^3)
BEAM	5.9	12.6	519.7	88.1
COLUMN	17.3	51.8	2181.2	126.1
TOTAL	23.2	64.4	2700.9	116.4
FOOTING	16.4	15.4	1376.5	83.9

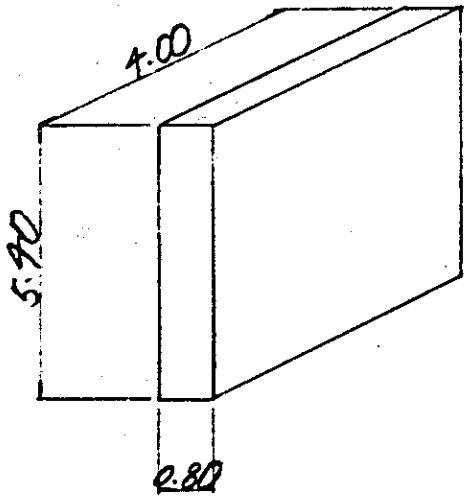
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B. - 3
EXCAVATION	m^3	33.0	
BEARING BASEMORTAR	m^3	0.025	1 bag = 40kg / [illegible]
PILE	m ×NUMBER	7 × 9 8 × 9	φ500 - A φ500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 101 $V = 5.920\ m^3$

(2) COLUMN



$V_c = 0.80 \times 4.00 \times 5.40 = 17.280\ m^3$

(3) FOOTING

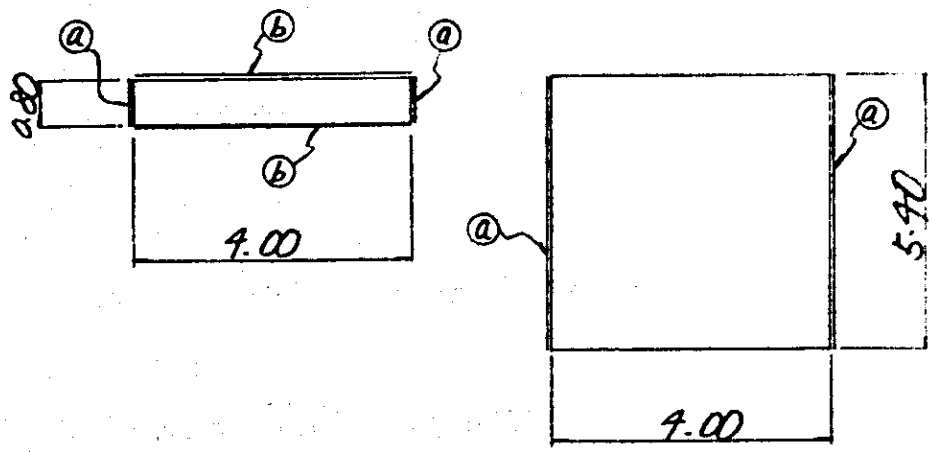
REFER TO PIER 101 $V = 16.400\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 101 $A = 12.560\ m^2$

(2) COLUMN



$A_a = 0.80 \times 5.40 \times 2 = 8.640\ m^2$

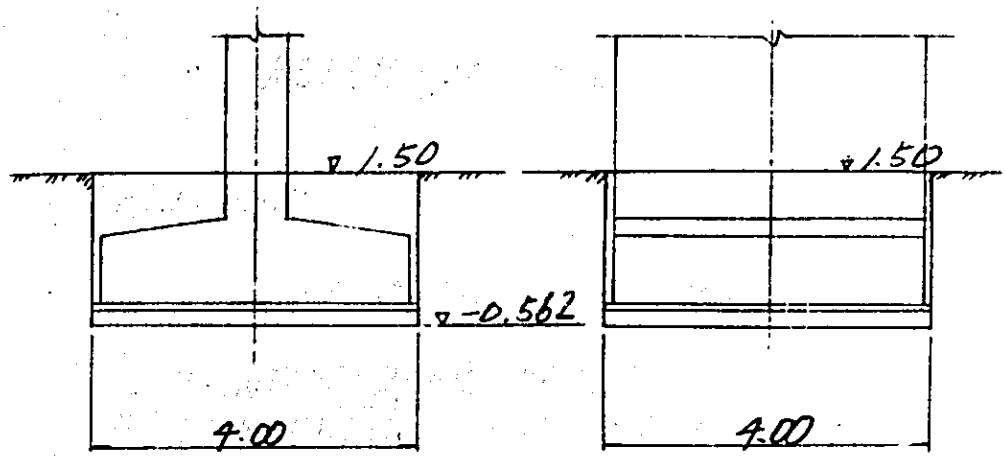
$A_b = 4.00 \times 5.40 \times 2 = 43.200$ "

COLUMN TOTAL $= 51.840\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.400\ m^2$

3) EXCAVATION



$$Va = 4.00 \times 4.00 \times (1.50 + 0.562) = 32.992 \ m^3$$

4) BEARING BASE MORTAR

REFER TO PIER 101 V= 0.025 m^3

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.764 m^3

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m^3

7) PILE

ϕ=500

TYPE - A 7 m × 9

TYPE - B 8 m × 9

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 101 TOTAL= 519.7 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 107}$$

$$= \frac{2\,584.7}{20.5} \times 17.3 = 2\,181.2 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL= 1 376.5 kg

8 PIER No.108

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
BEAM	7.2	20.5	847.6	117.7
COLUMN	16.0	48.0	2017.3	126.1
TOTAL	23.2	68.5	2864.9	123.5
FOOTING	16.4	15.4	1376.5	83.9

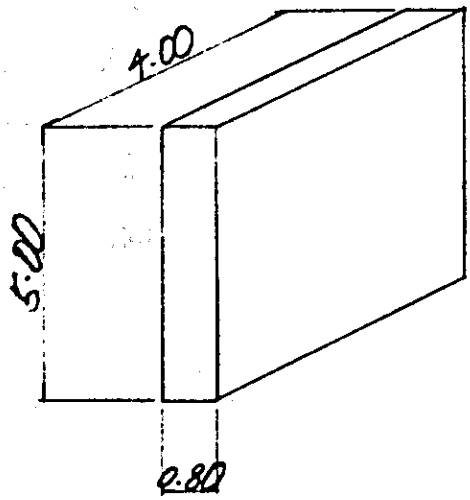
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B.-3
EXCAVATION	m^2	32.6	
BEARING BASEMORTAR	m^3	0.025	σ_{ck} = 4.00 kg/cm²
PILE	m × NUMBER	7 × 9 8 × 9	φ500 -A φ500 -B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 104 $V = 7.216\ m^3$

(2) COLUMN



$V_2 = 0.80 \times 4.00 \times 5.00 = 16.000\ m^3$

(3) FOOTING

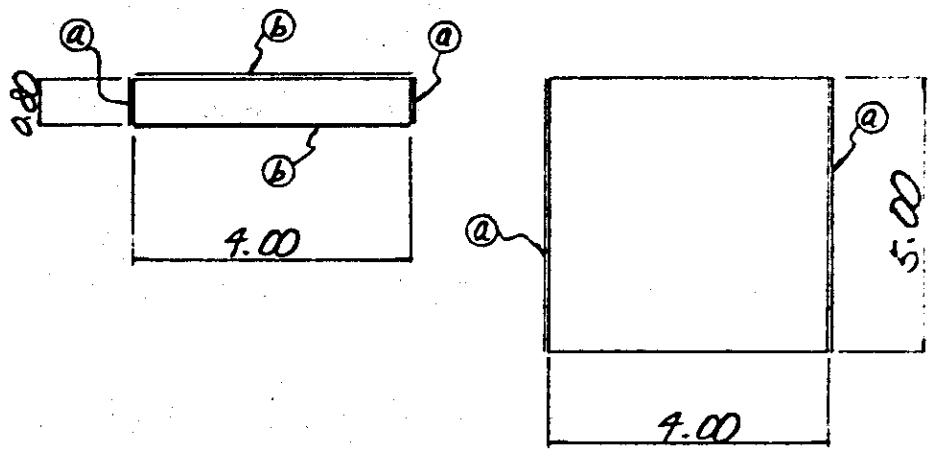
REFER TO PIER 101 $V = 16.400\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 104 $A = 20.488\ m^2$

(2) COLUMN



$A_a = 0.80 \times 5.00 \times 2 = 8.000\ m^2$

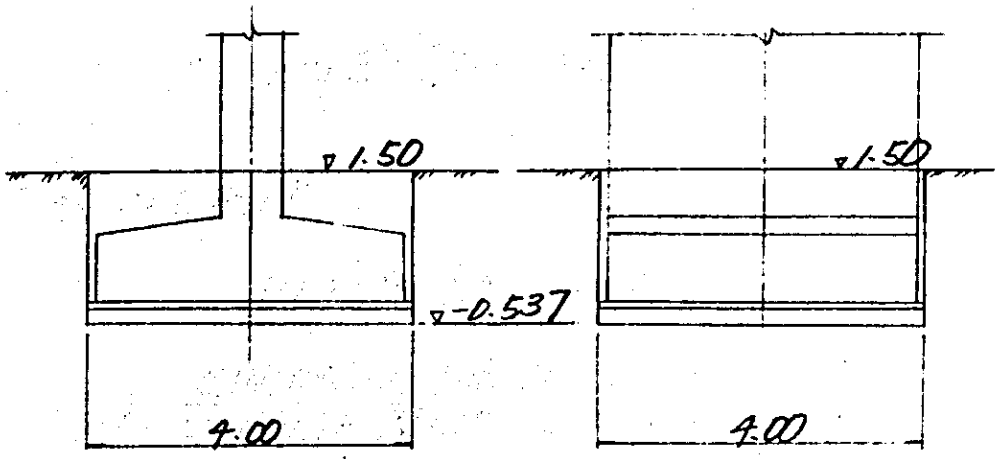
$A_b = 4.00 \times 5.00 \times 2 = 40.000$

COLUMN TOTAL $= 48.000\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.400\ m^2$

3) EXCAVATION



$$Va = 4.00 \times 4.00 \times (1.50 + 0.537) = 32.592\ m^3$$

4) BEARING BASE MORTAR

REFER TO PIER 101 V = 0.025 m^3

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.764 m^3

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m^3

7) PILE

ϕ=500

TYPE - A 7 m × 9

TYPE - B 9 m × 7

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 104 TOTAL= 847.6 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 108}$$

$$= \frac{2\,584.7}{20.5} \times 16.0 = 2017.3 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL = 1 376.5 kg

9 PIER. 109

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
BEAM	5.9	12.6	519.7	88.1
COLUMN	14.7	44.2	1 853.4	126.1
TOTAL	20.6	56.8	2 373.1	115.2
FOOTING	16.4	15.4	1 376.5	83.9

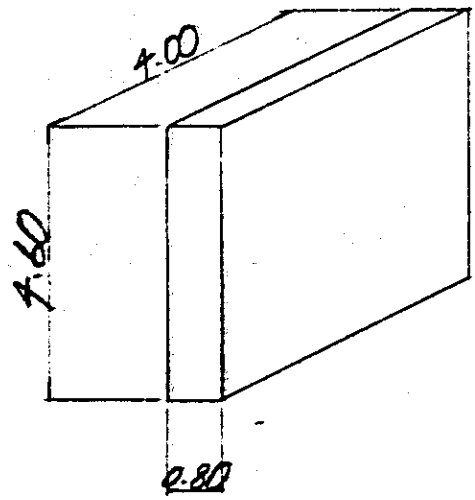
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B. - 3
EXCAVATION	m^3	32.2	
BEARING BASEMORTAR	m^3	0.025	[illegible] = 400 kg/cm²
PILE	m ×NUMBER	7 × 9 8 × 9	φ500 - A φ500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 101 $V = 5.920\ m^3$

(2) COLUMN



$V_c = 0.80 \times 4.00 \times 4.60 = 14.720\ m^3$

(3) FOOTING

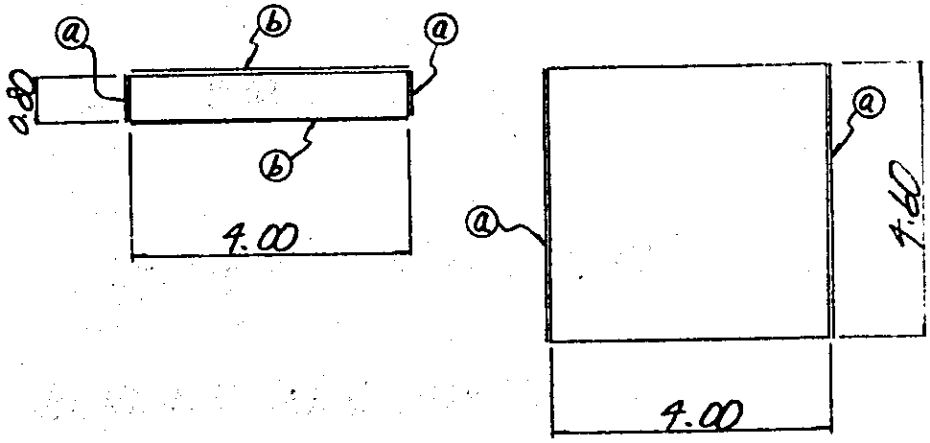
REFER TO PIER 101 $V = 16.400\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 101 $A = 12.560\ m^2$

(2) COLUMN



$A_a = 0.80 \times 4.60 \times 2 = 7.360\ m^2$

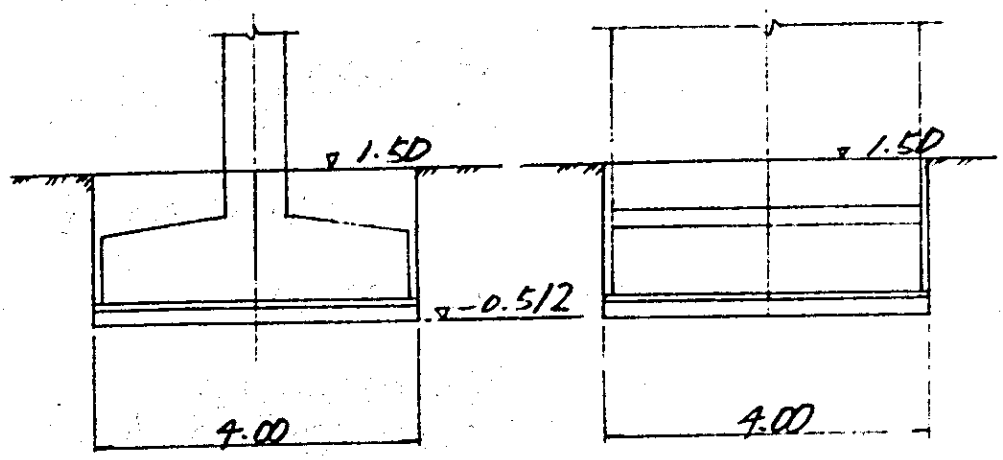
$A_b = 4.00 \times 4.60 \times 2 = 36.800$

COLUMN TOTAL $= 44.160\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.400\ m^2$

3) EXCAVATION



$V_a = 4.00 \times 4.00 \times (1.50 + 0.512) = 32.192\ m^3$

4). BEARING BASE MORTAR

REFER TO PIER 101 V = 0.025 m^3

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.764 m^3

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m^3

7) PILE

ϕ=500

TYPE - A 7 m × 9

TYPE - B 2 m × 9

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 101 TOTAL = 519.7 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 109}$$

$$= \frac{2\,584.7}{20.5} \times 14.7 = 1\,853.4 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL = 1 376.5 kg

10 PIER-110

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
BEAM	5.9	12.6	519.7	88.1
COLUMN	13.4	40.3	1 689.5	126.1
TOTAL	19.3	52.9	2 209.2	114.5
FOOTING	16.4	15.4	1 376.5	83.9

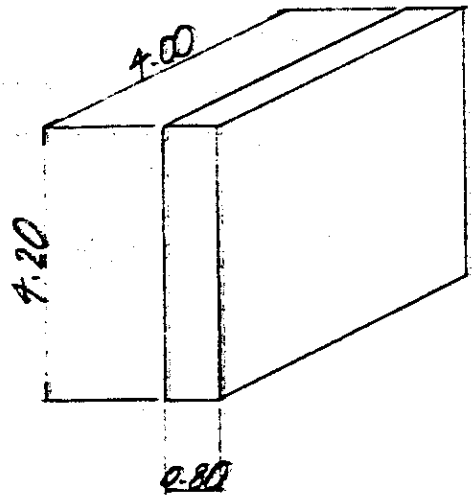
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B. - 3
EXCAVATION	m^2	32.2	
BEARING BASEMORTAR	m^3	0.025	σ_{ck} = 400 kg/cm²
PILE	m x NUMBER	7 x 9 8 x 9	φ500 - A φ500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 101 $V = 5.920\ m^3$

(2) COLUMN



$V_c = 0.80 \times 4.00 \times 4.20 = 13.440\ m^3$

(3) FOOTING

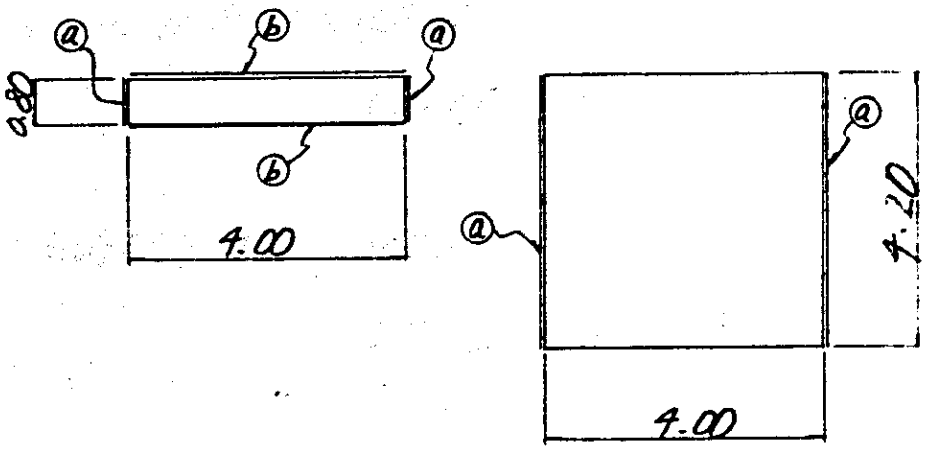
REFER TO PIER 101 $V = 16.400\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 101 $A = 12.560\ m^2$

(2) COLUMN



$A_a = 0.80 \times 4.20 \times 2 = 6.720\ m^2$

$A_b = 4.00 \times 4.20 \times 2 = 33.600$

COLUMN TOTAL $= 40.320\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.900\ m^2$

3) EXCAVATION

REFER TO PIER 109 V = 32.192 m³

4) BEARING BASE MORTAR

REFER TO PIER 101 V = 0.025 m³

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.769 m³

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m³

7) PILE

φ=500

TYPE - A 7 m × 9

TYPE - B 8 m × 9

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 101 TOTAL= 519.7 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 110}$$

$$= \frac{1\,584.7}{20.5} \times 13.4 = 1\,689.5 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL= 1 376.5 kg

11 PIER. III

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
BEAM	7.2	20.5	847.6	117.7
COLUMN	12.2	36.5	1 538.2	126.1
TOTAL	19.4	57.0	2 385.8	123.0
FOOTING	16.4	15.4	1 376.5	83.9

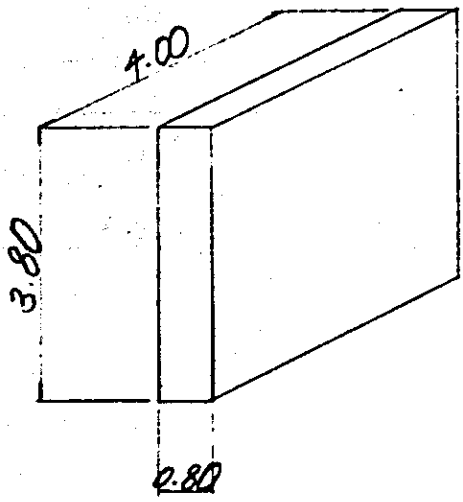
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B. - 3
EXCAVATION	m^2	32.2	S.F = 400 kg/m²
BEARING BASEMORTAR	m^3	0.025	
PILE	m x NUMBER	7 x 9 8 x 9	φ500 - A φ500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 104 $V = 7.216\ m^3$

(2) COLUMN



$V_c = 0.80 \times 4.00 \times 3.80 = 12.160\ m^3$

(3) FOOTING

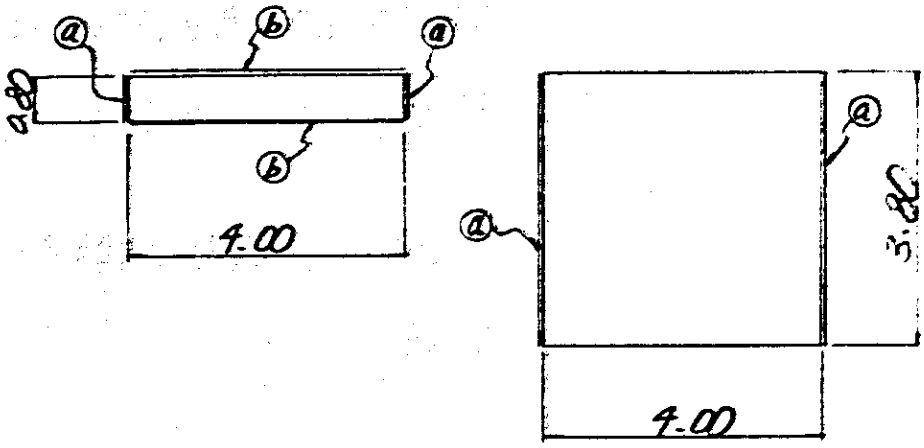
REFER TO PIER 101 $V = 16.400\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 104 $A = 20.488\ m^2$

(2) COLUMN



$A_a = 0.80 \times 3.80 \times 2 = 6.080\ m^2$

$A_b = 4.00 \times 3.80 \times 2 = 30.400$

COLUMN TOTAL $= 36.480\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.400\ m^2$

3) EXCAVATION

REFER TO PIER 109 V = 32.192 m³

4) BEARING BASE MORTAR

REFER TO PIER 101 V = 0.025 m³

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.769 m³

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m³

7) PILE

φ=500

TYPE - A 7 m × 9

TYPE - B 8 m × 9

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 104 TOTAL= 847.6 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 111}$$

$$= \frac{2\,584.7}{20.5} \times 12.2 = 1538.2 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL = 1 376.5 kg

12 PIER (SOLID)

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
BEAM	5.9	12.6	519.7	88.1
COLUMN	10.9	32.6	1 374.3	126.1
TOTAL	16.8	45.2	1 894.0	112.7
FOOTING	16.4	15.4	1 376.5	83.9

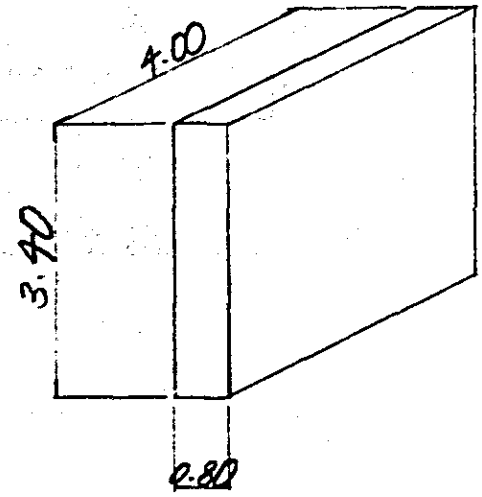
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS E
AGGREGATE SUBBASE	m^3	3.5	A.S.E. - 3
EXCAVATION	m^3	32.2	
BEARING BASEMORTAR	m^3	0.025	σ_{ck} = 400 kg/cm²
PILE	m x NUMBER	7 x 9 8 x 9	φ 500 - A φ 500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 101 $V = 5.920\ m^3$

(2) COLUMN



$V_2 = 0.80 \times 4.00 \times 3.40 = 10.880\ m^3$

(3) FOOTING

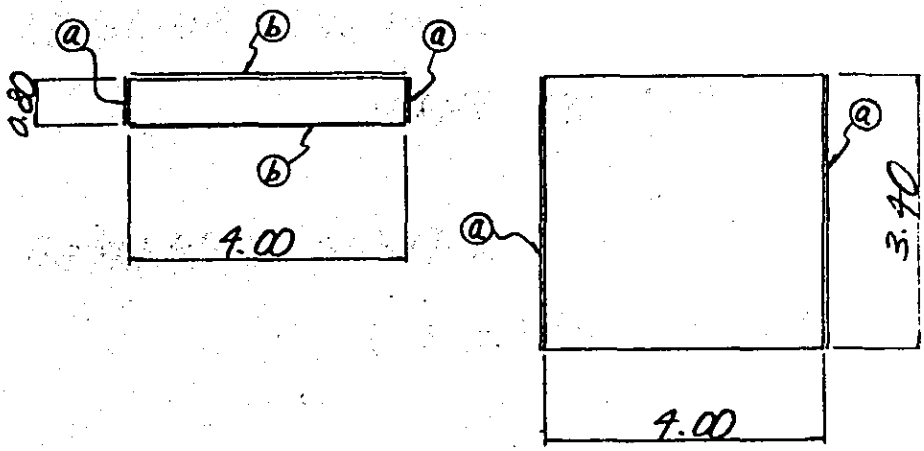
REFER TO PIER 101 $V = 16.400\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 101 $A = 12.560\ m^2$

(2) COLUMN



$A_a = 0.80 \times 3.40 \times 2 = 5.440\ m^2$

$A_b = 4.00 \times 3.40 \times 2 = 27.200\ "$

COLUMN TOTAL $= 32.640\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.400\ m^2$

3) EXCAVATION

REFER TO PIER 109 V = 32.192 m³

4) BEARING BASE MORTAR

REFER TO PIER 101 V = 0.025 m³

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.764 m³

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m³

7) PILE

ϕ=500

TYPE - A 7 m × 9

TYPE - B 8 m × 9

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 101 TOTAL= 519.7 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 112}$$

$$= \frac{2\,584.7}{20.5} \times 10.9 = 1374.3 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL= 1376.5 kg

13 PIER (113E VOLUME

1) BEAM

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (Kg)	RATIO (Kg/m^3)
BEAM	5.9	12.6	519.7	88.1
COLUMN	9.6	28.8	1 210.4	126.1
TOTAL	15.5	41.4	1 730.1	111.6
FOOTING	16.4	15.4	1 376.5	83.9

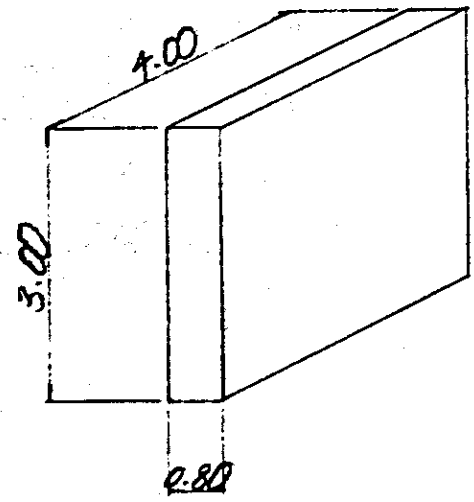
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS =
AGGREGATE SUBBASE	m^3	3.5	A.S.B. - 3
EXCAVATION	m^3	32.2	
BEARING BASEMORTAR	m^3	0.025	σ_{ck} = 400 Kg/cm^2
PILE	m x NUMBER	7 x 9 8 - 9	φ 500 - A φ 500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 101 $V = 5.920\ m^3$

(2) COLUMN



$V_c = 0.80 \times 4.00 \times 3.00 = 9.600\ m^3$

(3) FOOTING

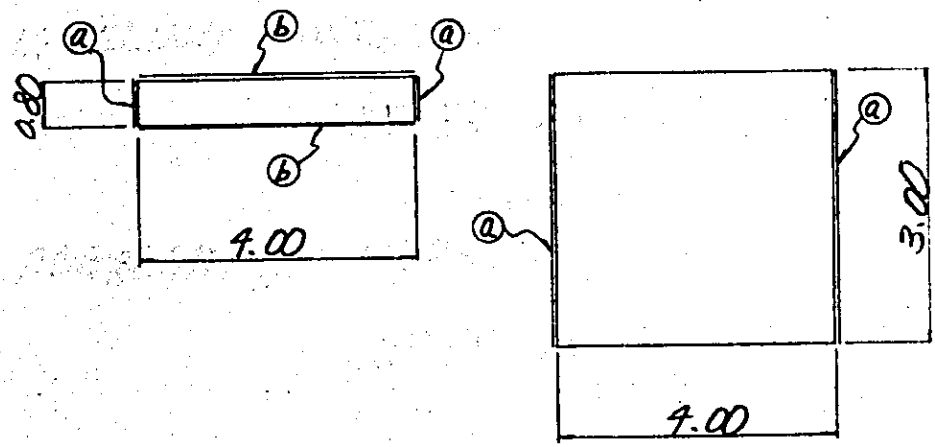
REFER TO PIER 101 $V = 16.400\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 101 $A = 12.560\ m^2$

(2) COLUMN



$Aa = 0.80 \times 3.00 \times 2 = 4.800\ m^2$

$Ab = 4.00 \times 3.00 \times 2 = 24.000$

COLUMN TOTAL $= 28.800\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.400\ m^2$

3) EXCAVATION

REFER TO PIER 109 V = 32.192 m^3

4) BEARING BASE MORTAR

REFER TO PIER 101 V = 0.025 m^3

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.769 m^3

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m^3

7) PILE

ϕ=500

TYPE - A 7 m × 9

TYPE - B 8 m × 9

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 101 TOTAL= 519.7 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 113}$$

$$= \frac{2\,584.7}{20.5} \times 9.6 = 1\,210.4 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL= 1 376.5 kg

14 PIER 114

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
BEAM	7.2	20.5	847.6	117.7
COLUMN	8.6	25.9	1084.3	126.1
TOTAL	15.8	46.4	1931.9	122.3
FOOTING	16.4	15.4	1376.5	83.9

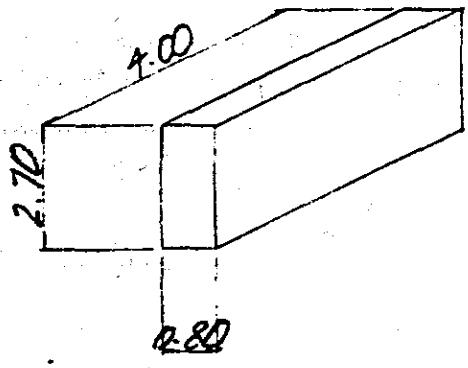
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B. - 3
EXCAVATION	m^3	35.0	
BEARING BASEMORTAR	m^3	0.025	σ_{ck} = 400 kg/cm²
PILE	m x NUMBER	7 x 9 8 x 9	φ500 - A φ500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 104 $V = 7.216\ m^3$

(2) COLUMN



$V_2 = 0.80 \times 4.00 \times 2.70 = 8.640\ m^3$

(3) FOOTING

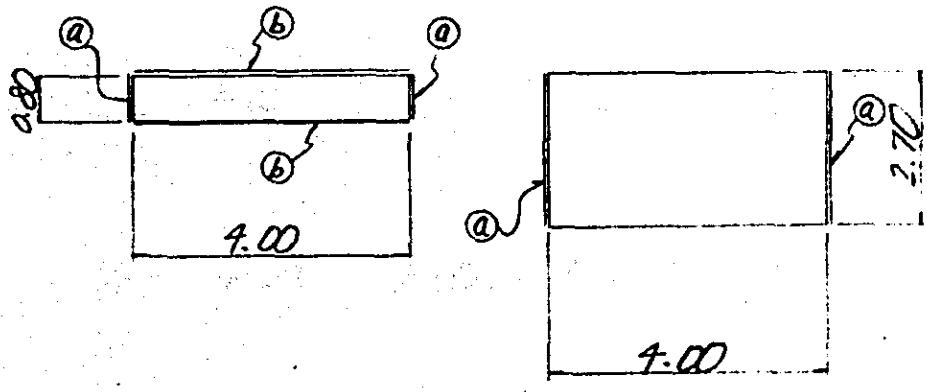
REFER TO PIER 101 $V = 16.400\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 104 $A = 20.488\ m^2$

(2) COLUMN



$A_a = 0.80 \times 2.70 \times 2 = 4.320\ m^2$

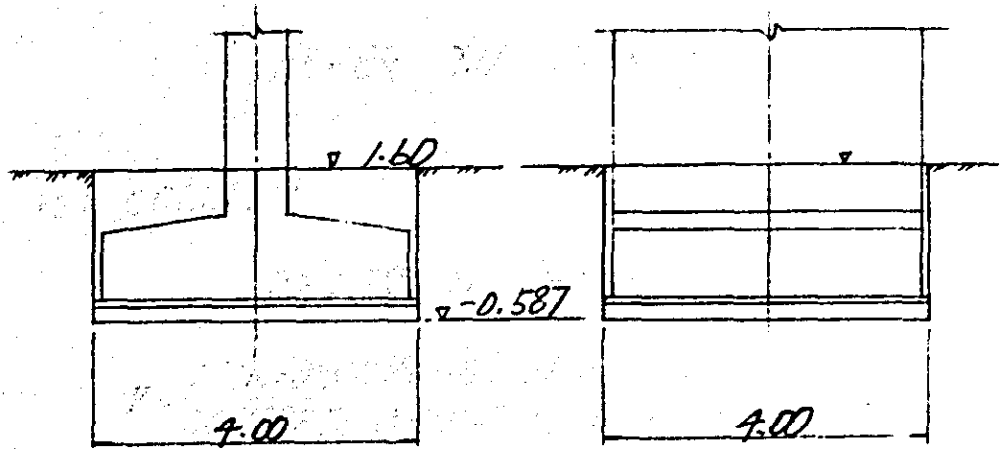
$A_b = 4.00 \times 2.70 \times 2 = 21.600$

COLUMN TOTAL $= 25.920\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.900\ m^2$

3) EXCAVATION



$Va = 4.00 \times 4.00 \times (1.60 + 0.587) = 34.992\ m^3$

4) BEARING BASE MORTAR

REFER TO PIER 101 V= 0.025 m^3

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.764 m^3

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m^3

7) PILE

ϕ=500

TYPE - A 7 m × 9

TYPE - B 8 m × 7

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 104 TOTAL= 847.6 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 114}$$

$$= \frac{2\,584.7}{20.5} \times 8.6 = 1\,084.3 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL= 1 376.5 kg

15 PIER. 115

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
BEAM	5.9	12.6	519.7	88.1
COLUMN	7.4	22.1	933.0	126.1
TOTAL	13.3	34.7	1452.7	109.2
FOOTING	16.4	15.4	1376.5	83.9

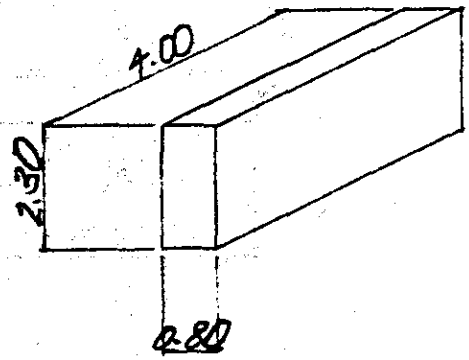
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B. - 3
EXCAVATION	m^3	35.0	
BEARING BASEMORTAR	m^3	0.025	σ_{ck} = 400 kg/cm²
PILE	m ×NUMBER	7 × 9 8 × 9	φ500 - A φ500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 101 $V = 5.920\ m^3$

(2) COLUMN



$V_a = 0.80 \times 4.00 \times 2.30 = 7.360\ m^3$

(3) FOOTING

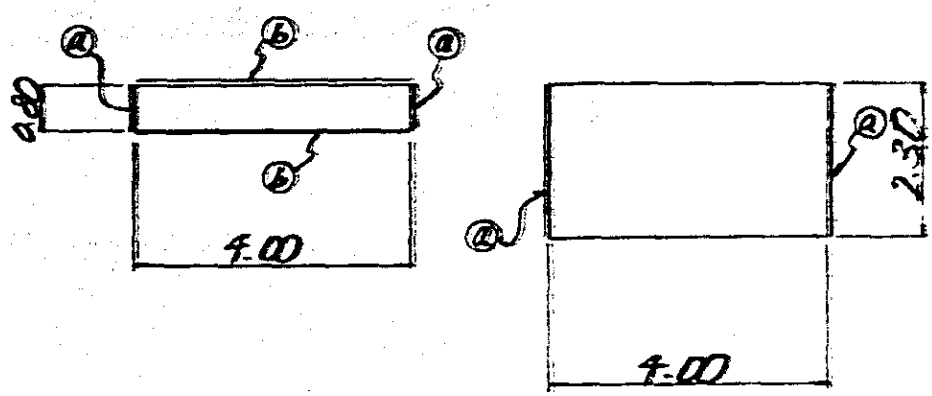
REFER TO PIER 101 $V = 16.400\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 101 $A = 12.560\ m^2$

(2) COLUMN



$A_a = 0.80 \times 2.30 \times 2 = 3.680\ m^2$

$A_b = 4.00 \times 2.30 \times 2 = 18.400$

COLUMN TOTAL $= 22.080\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.400\ m^2$

3) EXCAVATION

REFER TO PIER 114 V = 34.992 m^3

4) BEARING BASE MORTAR

REFER TO PIER 101 V = 0.025 m^3

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.769 m^3

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m^3

7) PILE

ϕ=500

TYPE - A 7 m × 9

TYPE - B 8 m × 9

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 101 TOTAL = 519.7 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 115}$$

$$= \frac{2\,584.7}{20.5} \times 7.4 = 933.0 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL = 1 376.5 kg

16 PIER 116

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
BEAM	5.9	12.6	519.7	88.1
COLUMN	6.1	18.2	769.1	126.1
TOTAL	12.0	30.8	1 288.8	107.4
FOOTING	16.4	15.4	1 376.5	83.9

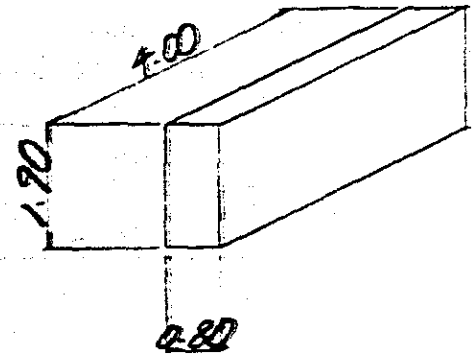
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B. - 3
EXCAVATION	m^2	34.2	
BEARING BASEMORTAR	m^3	0.025	$\bar{\sigma}_{cm}$ = 400 kg/cm²
PILE	m ×NUMBER	7 × 9 8 × 9	φ 500 − A φ 500 − B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 101 $V = 5.920\ m^3$

(2) COLUMN



$V_2 = 0.80 \times 4.00 \times 1.90 = 6.030\ m^3$

(3) FOOTING

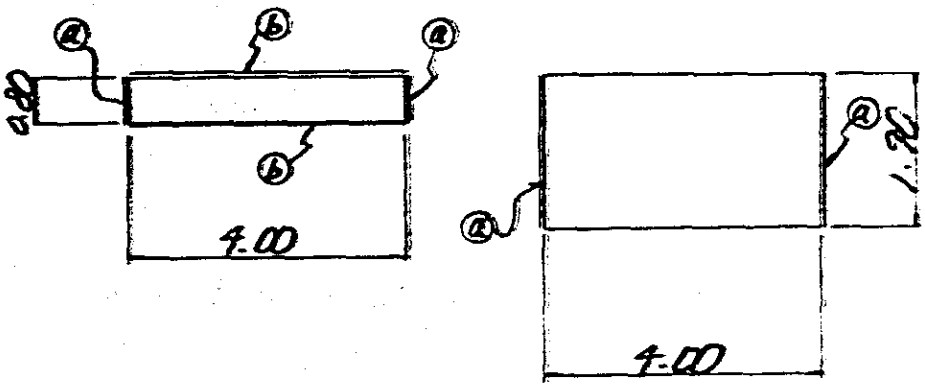
REFER TO PIER 101 $V = 16.400\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 101 $A = 12.560\ m^2$

(2) COLUMN



$A_a = 0.80 \times 1.90 \times 2 = 3.040\ m^2$

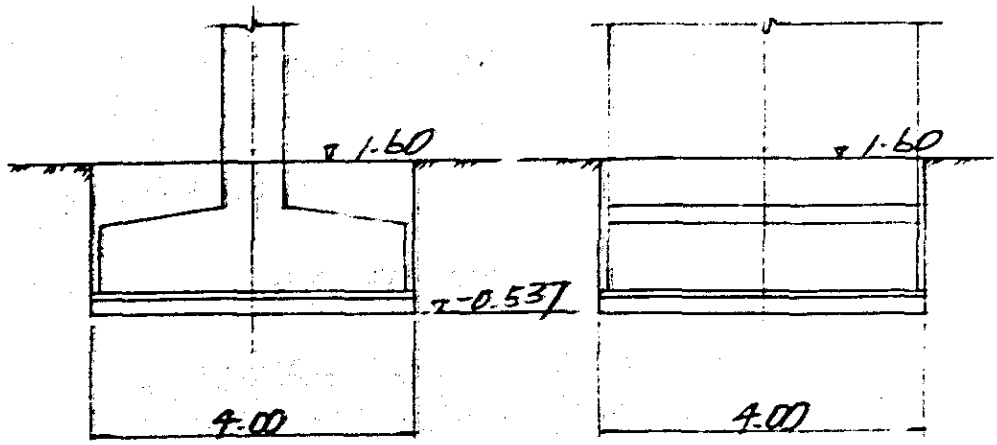
$A_b = 4.00 \times 1.90 \times 2 = 15.200$

COLUMN TOTAL $= 18.240\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.400\ m^2$

3) EXCAVATION



$$V_a = 4.00 \times 4.00 \times (1.60 + 0.537) = 34.192\ m^3$$

4) BEARING BASE MORTAR

REFER TO PIER 101 V = 0.025 m^3

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.764 m^3

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m^3

7) PILE

ϕ=500

TYPE-A 7 m × 7

TYPE-S 2 m × 7

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 101 TOTAL= 519.7 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 116}$$

$$= \frac{2\,584.7}{20.5} \times 6.1 = 769.1 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL= 1 376.5 kg

17 PIER : 117

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (Kg)	RATIO (Kg/m^3)
BEAM	7.2	20.5	847.6	117.7
COLUMN	4.8	14.4	605.2	126.1
TOTAL	12.0	34.9	1452.8	121.1
FOOTING	16.4	15.4	1376.5	83.9

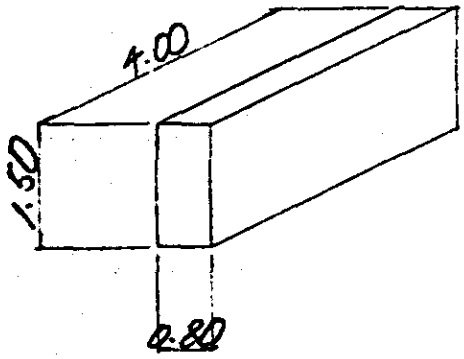
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B.-3
EXCAVATION	m^2	34.2	
BEARING BASEMORTAR	m^3	0.025	$\bar{\sigma}_{ck}$ = 400 Kg/cm^2
PILE	m ×NUMBER	7 × 9 8 × 9	φ 500 - A φ 500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 104 $V = 7.216\ m^3$

(2) COLUMN



$V_a = 0.80 \times 4.00 \times 1.50 = 4.800\ m^3$

(3) FOOTING

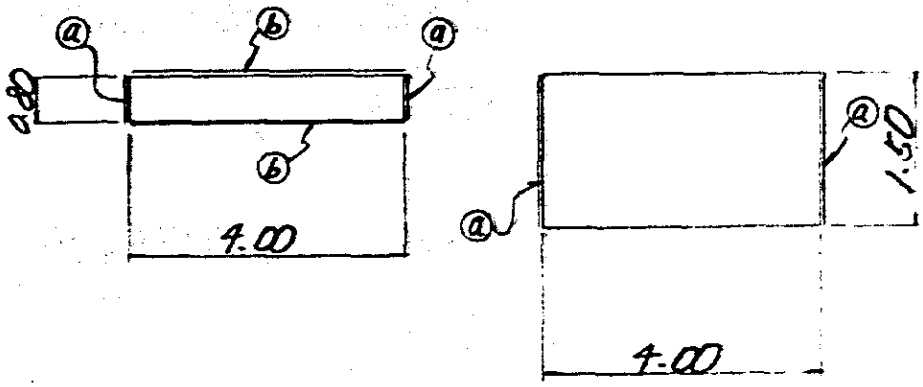
REFER TO PIER 101 $V = 16.400\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 104 $A = 20.488\ m^2$

(2) COLUMN



$A_a = 0.80 \times 1.50 \times 2 = 2.400\ m^2$

$A_b = 4.00 \times 1.50 \times 2 = 12.000$

COLUMN TOTAL $= 14.400\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.400\ m^2$

3) EXCAVATION

REFER TO PIER 116 V = 34.192 m³

4) BEARING BASE MORTAR

REFER TO PIER 101 V = 0.025 m³

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.764 m³

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m³

7) PILE

ϕ=500

TYPE - A 7 m × 9

TYPE - B 8 m × 9

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 104 TOTAL= 847.6 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 117}$$

$$= \frac{2\,584.7}{20.5} \times 4.8 = 605.2 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL= 1 378.5 kg

18 PIER P18

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (Kg)	RATIO (Kg/m^3)
BEAM	5.9	12.6	519.7	88.1
COLUMN	3.5	10.6	441.3	126.1
TOTAL	9.4	23.2	961.0	102.2
FOOTING	16.4	15.4	1376.5	83.9

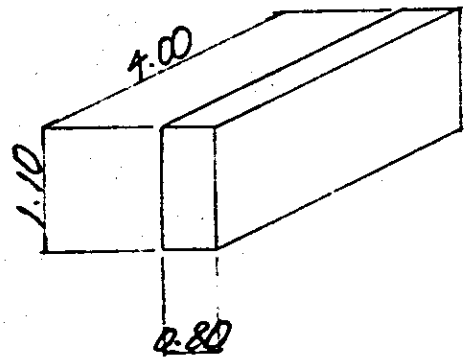
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B - 3
EXCAVATION	m^3	33.8	
BEARING BASEMORTAR	m^3	0.025	σ_{ck} = 400 Kg/cm²
PILE	m ×NUMBER	7 × 9 8 × 9	φ 500 - A φ 500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 101 $V = 5.920\ m^3$

(2) COLUMN



$V_a = 0.80 \times 4.00 \times 1.10 = 3.520\ m^3$

3) FOOTING

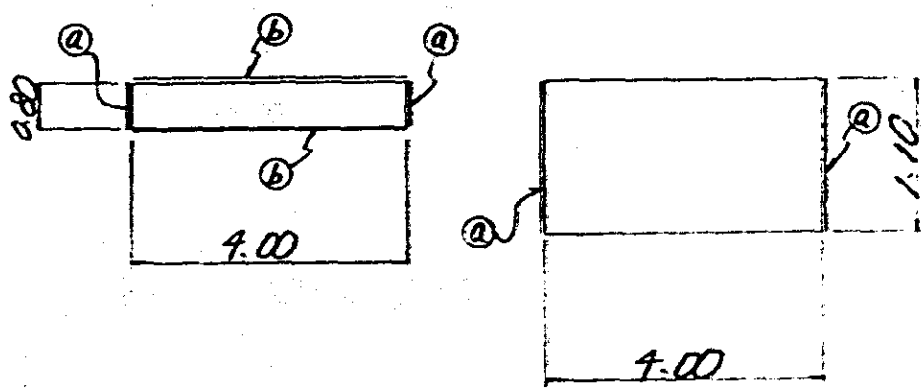
REFER TO PIER 101 $V = 16.400\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 101 $A = 12.560\ m^2$

(2) COLUMN



$A_a = 0.80 \times 1.10 \times 2 = 1.760\ m^2$

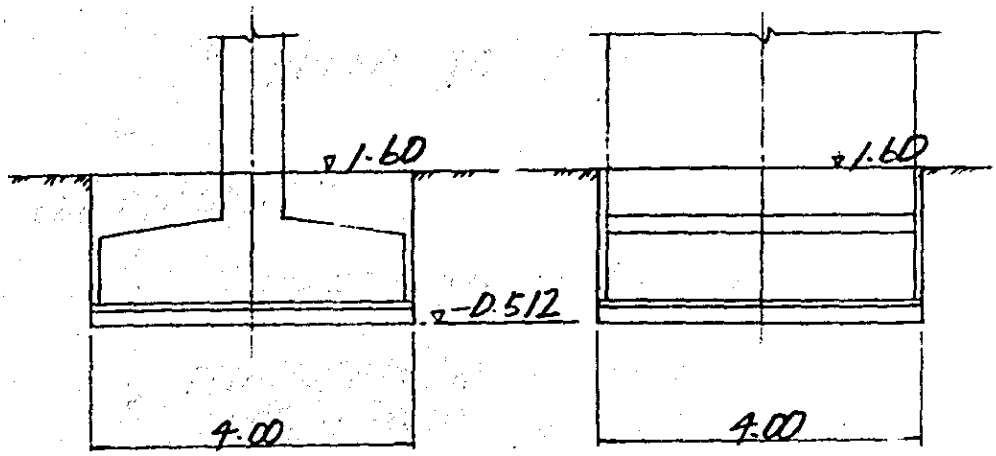
$A_b = 4.00 \times 1.10 \times 2 = 8.800$

COLUMN TOTAL $= 10.560\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.400\ m^2$

3) EXCAVATION



$Va = 4.00 \times 4.00 \times (1.60 + 0.512) = 33.792\ m^3$

4) BEARING BASE MORTAR

REFER TO PIER 101 V= 0.025 m^3

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.764 m^3

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m^3

7) PILE

ϕ=500

TYPE - A 7 m × 9

TYPE - B 8 m × 9

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 101 TOTAL = 519.7 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 118}$$

$$= \frac{2\,584.7}{20.5} \times 3.5 = 441.3 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL = 1 376.5 kg

19 PIER: 119

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
BEAM	5.9	12.6	519.7	88.1
COLUMN	2.6	7.7	327.8	126.1
TOTAL	8.5	20.3	847.5	99.7
FOOTING	16.4	15.4	1 376.5	83.9

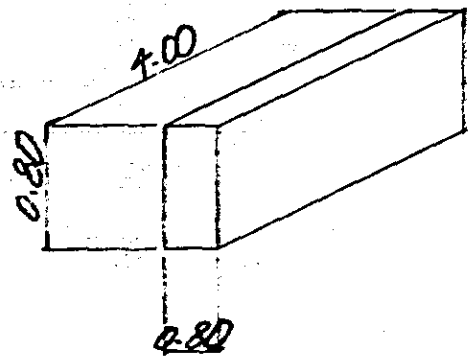
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A.S.B.-3
EXCAVATION	m^3	35.0	
BEARING BASEMORTAR	m^3	0.025	[illegible] = 400 [illegible]
PILE	m x NUMBER	7 x 9 8 x 9	φ 500 - A φ 500 - B

1) CONCRETE VOLUME

(1) BEAM

REFER TO PIER 101 $V = 5.920\ m^3$

(2) COLUMN



$V_a = 0.80 \times 4.00 \times 0.80 = 2.560\ m^3$

(3) FOOTING

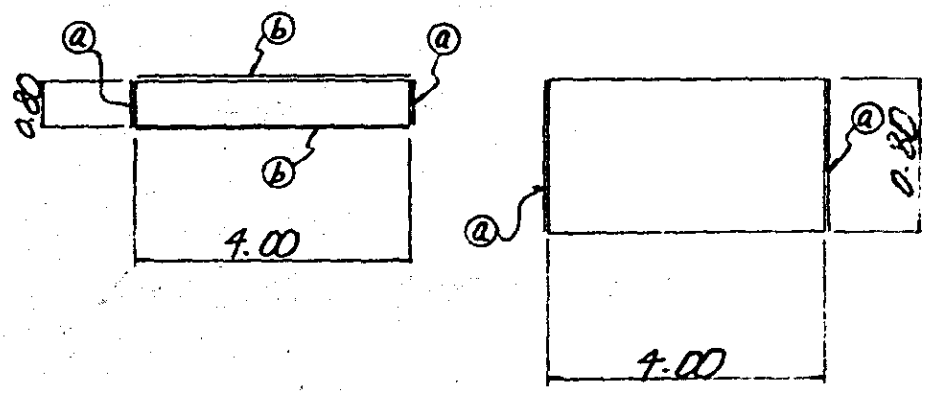
REFER TO PIER 101 $V = 16.900\ m^3$

2) FORM AREA

(1) BEAM

REFER TO PIER 101 $A = 12.560\ m^2$

(2) COLUMN



$A_a = 0.80 \times 0.80 \times 2 = 1.280\ m^2$

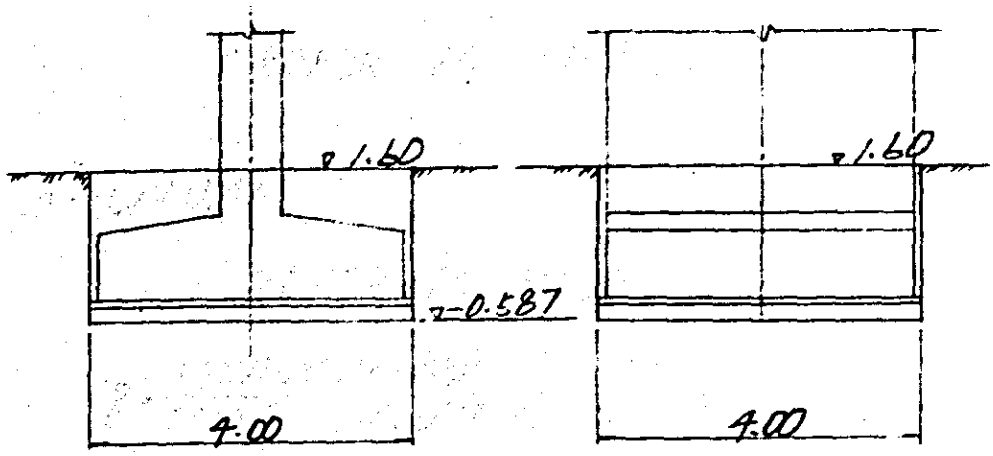
$A_b = 4.00 \times 0.80 \times 2 = 6.400$ "

COLUMN TOTAL $= 7.680\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.900\ m^2$

3) EXCAVATION



$$Va = 4.00 \times 4.00 \times (1.60 + 0.587) = 34.992\ m^3$$

4) BEARING BASE MORTAR

REFER TO PIER 101 V = 0.025 m^3

5) LEVELING CONCRETE

REFER TO PIER 101 V = 1.764 m^3

6) AGGREGATE SUBBASE

REFER TO PIER 101 V = 3.528 m^3

7) PILE

ϕ=500

TYPE - A 7 m × 9

TYPE - B 2 m × 9

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 101 TOTAL= 519.7 kg

(2) COLUMN

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 119}$$

$$= \frac{2\,584.7}{20.5} \times 2.6 = 327.8 \text{ kg}$$

(3) FOOTING

REFER TO PIER 101 TOTAL= 1 376.5 kg

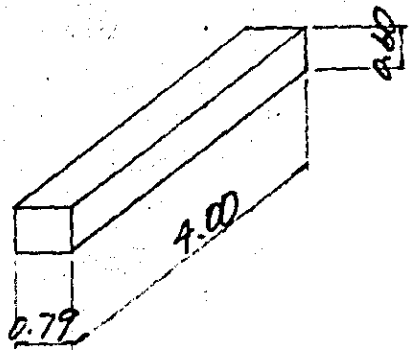
20 PIER 120

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (Kg)	RATIO (Kg/m^3)
BEAM	7.8	18.3	687.1	88.1
COLUMN	1.3	3.8	163.9	126.1
TOTAL	9.1	22.1	851.0	93.5
FOOTING	16.4	15.4	1 376.5	83.9

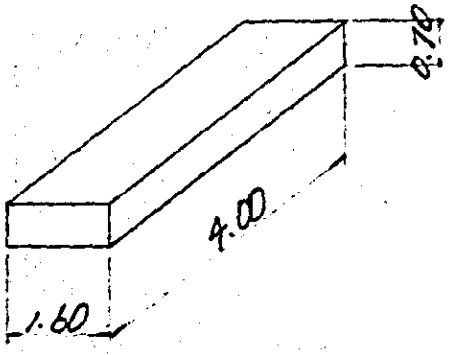
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	1.8	CLASS F
AGGREGATE SUBBASE	m^3	3.5	A. S. B. - 3
EXCAVATION	m^2	350	
BEARING BASE MORTAR	m^3	0.095	$\bar{\sigma}_{CK}$ = 400 Kg/cm^2
PILE	m × NUMBER	7 × 9 8 × 9	ϕ500 - A ϕ500 - B

1) CONCRETE VOLUME

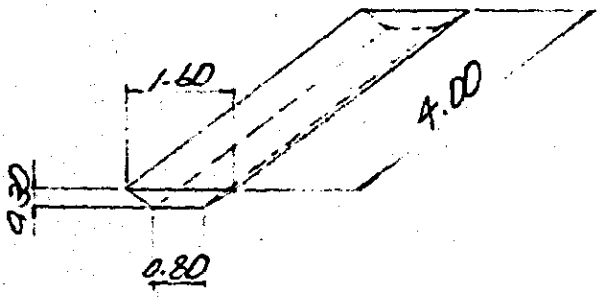
(1) BEAM



$Va = 0.79 \times 0.60 \times 4.00 = 1.896\ m^3$



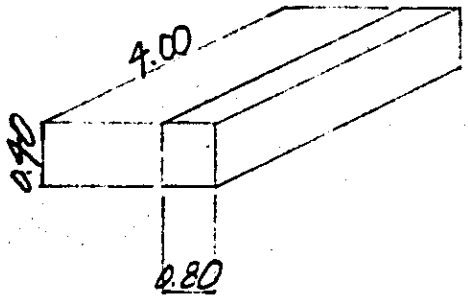
$Vb = 1.60 \times 0.70 \times 4.00 = 4.480$ "



$Vc = \frac{1}{2} \times (0.80 + 1.60) \times 0.30 \times 4.00 = 1.440$ "

BEAM TOTAL = $7.816\ m^3$

(2) COLUMN



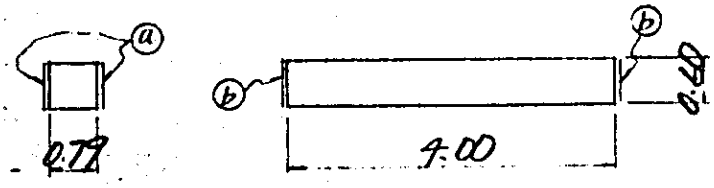
$$Va = 0.80 \times 4.00 \times 0.40 = 1.280\ m^3$$

(3) FOOTING

REFER TO PIER 101 = 16.400 m^3

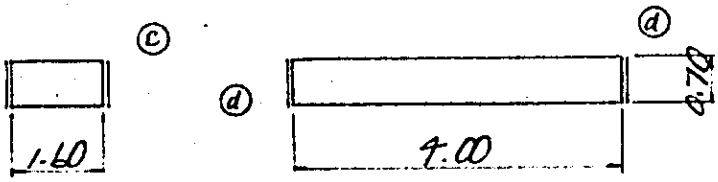
2.) FORM AREA

(1) BEAM



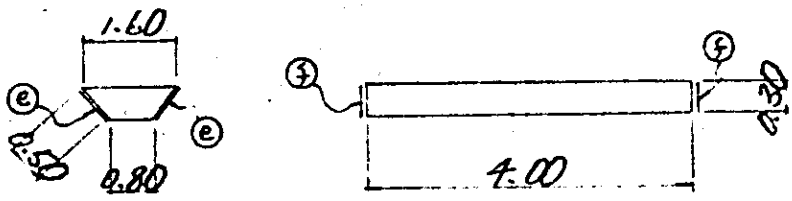
Aa = 0.60 × 4.00 × 2 = 4.800 m²

Ab = 0.60 × 0.79 × 2 = 0.948 "



Ac = 0.70 × 4.00 × 2 = 5.600 "

Ad = 0.70 × 1.60 × 2 = 2.240 "

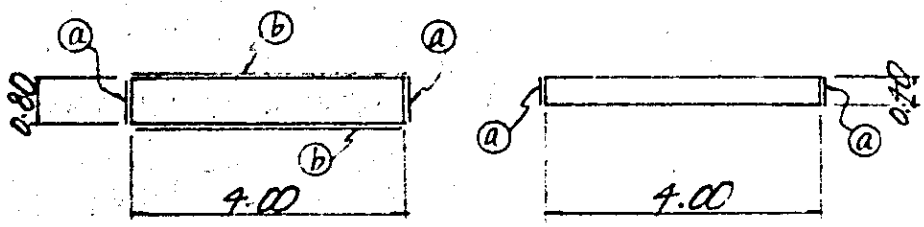


Ae = 0.50 × 4.00 × 2 = 4.000 "

Af = $\frac{1}{2}$ × (1.60 + 0.80) × 0.30 × 2 = 0.720 "

BEAM TOTAL = 18.308 m²

(2) COLUMN



$A_a = 0.80 \times 0.40 \times 2 = 0.640\ m^2$

$A_b = 4.00 \times 0.40 \times 2 = 3.200\ "$

COLUMN TOTAL = $3.840\ m^2$

(3) FOOTING

REFER TO PIER 101 $A = 15.400\ m^2$

3) EXCAVATION

REFER TO PIER 119 $V = 34.992\ m^3$

4) BEARING BASE MORTAR

$$Va = \frac{1}{2} \times (0.83 \times 0.53 + 0.80 \times 0.50) \times 0.015 \times 2$$

$$+ \frac{1}{2} \times (0.872 \times 0.572 + 0.80 \times 0.50) \times 0.036 \times 2 = 0.045\ m^3$$

5) LEVELING CONCRETE

REFER TO PIER 101 $V = 1.764\ m^3$

6) AGGREGATE SUBBASE

REFER TO PIER 101 $V = 3.528\ m^3$

7) PILE

ϕ-500

TYPE-A 7m × 9

TYPE-B 8m × 9

8) REINFORCING BAR

(1) BEAM

REFER TO PIER 101

$$R = \frac{\text{REINFORCING BAR OF PIER 101}}{\text{CONCRETE VOLUME OF PIER 101}} \times \text{CONCRETE VOLUME OF PIER 120}$$

$$= \frac{519.7}{5.9} \times 7.8 = 687.1^{kg}$$

(2) COLUMN

REFER TO PIER 101

$$R = \frac{2584.7}{20.5} \times 1.3 = 163.9^{kg}$$

(3) FOOTING

REFER TO PIER 101 Total = 1376.5 kg

§ 24. ABUTMENT

CONTENTS

ABUTMENT

No. 0-3

REMARKS / UNIT / NO.	CONCRETE VOLUME WALL	CONCRETE VOLUME FOUNDATION	FORM AREA	REINFORCING BAR	LEVELING CONCRETE	AGGRE-GATE SUB BASE	STRUCTURE EXCAVATION VOLUME	STRUCTURE EXCAVATION TYPE	FOUNDATION MORTAR	P.C. PILES	
	CLASS D	CLASS D		SD 30	CLASS F	A.S.B -3			σ_{ck} = 400 kg/cm	CLASS B Ø 500 mm	CLASS A Ø 500 mm
	m^3	m^3	m^2	kg	m^3	m^3	m^3		m^3	m L x N	m L x N
Ab 1	102.7	84.6	260.6	9307.3	6.6	13.2	156.4	C	0.030	11.0 × 11	—
2	102.7	84.6	260.6	9307.3	6.6	13.2	156.4	C	0.030	11.0 × 11	—
3	23.3	32.7	81.8	2179.3	3.7	7.4	68.9	A	0.080	12.0 × 6	—
4	161.5	145.9	408.6	21 657.1	9.5	19.0	255.2	C	0.100	9.0 × 5	—
5	88.2	77.0	218.7	6 736.8	6.0	12.1	143.9	A	0.080	12.0 × 21	—
101	20.7	16.9	66.0	1542.6	2.0	3.9	36.7	A	0.040	14.0 × 6	—
										CLASS A Ø 350 mm	CLASS A Ø 350 mm
102		8.2	23.9	838.3	0.6	1.2	9.4	C	0.120	8.0 × 4	7.0 × 4
103		8.2	23.9	838.3	0.6	1.2	9.4	C	0.120	8.0 × 4	7.0 × 4
		—								CLASS B Ø 500 mm	CLASS A Ø 500 mm
U	203.7	256.5	640.9	32 594.0	26.1	52.2	544.5	A		12.0 × 79	—

JICA

ABUTMENT

No. 0-4

REMARKS / UNIT / NO.	CONCRETE VOLUME		FORM AREA	REINFORCING BAR	LEVELING CONCRETE	AGGRE-GATE SUB BASE	STRUCTURE EXCAVATION		FOUNDA-TION MORTAR	P.C. PILES	
							VORUME	TY-PE			
	CLASS D	CLASS D		SD 30	CLASS F	A.S.B. -3			σ_{ck} = 400 kg/cm	CLASS B ø 500 mm	CLASS A ø 500 mm
	m^3	m^3	m^2	kg	m^3	m^3	m^3		m^3	m L x N	m L x N
TOTAL											
Ab1~5	702.8	714.6	1885.0	85208.0	61.7	123.4	794.0	A	0.600	9 · 5	—
Ab101~103							586.8	C		11 × 22	—
U1										12 · 106	—
										14 · 6	—
									TOTAL	1643 m	—
											ø 350
										—	8 × 8
										—	7 × 8
									TOTAL	—	120 m

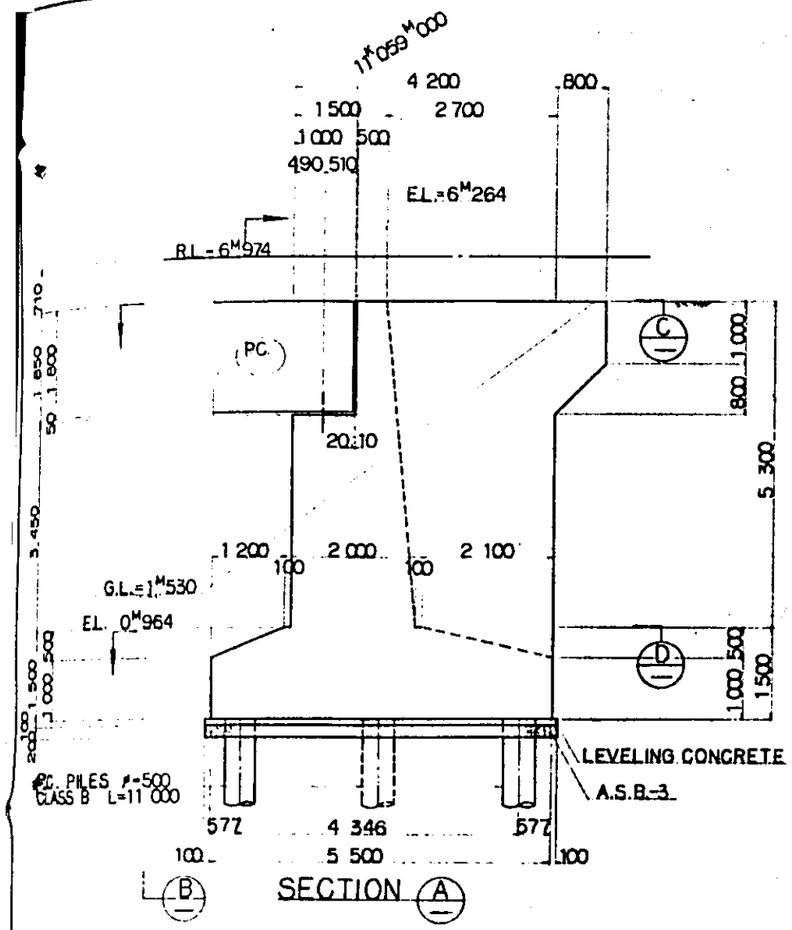
JICA

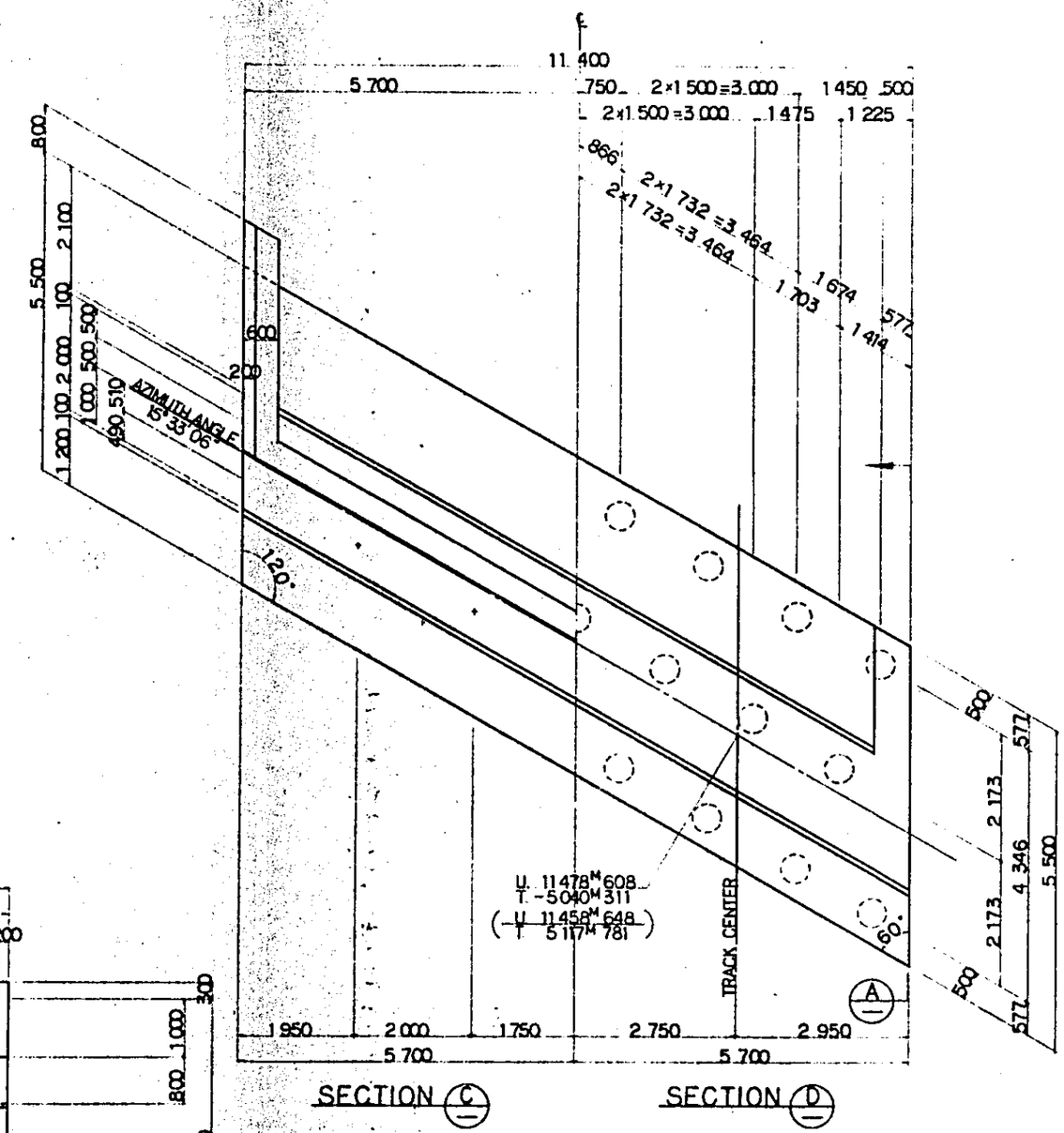
1. Ab 01
Ab 02

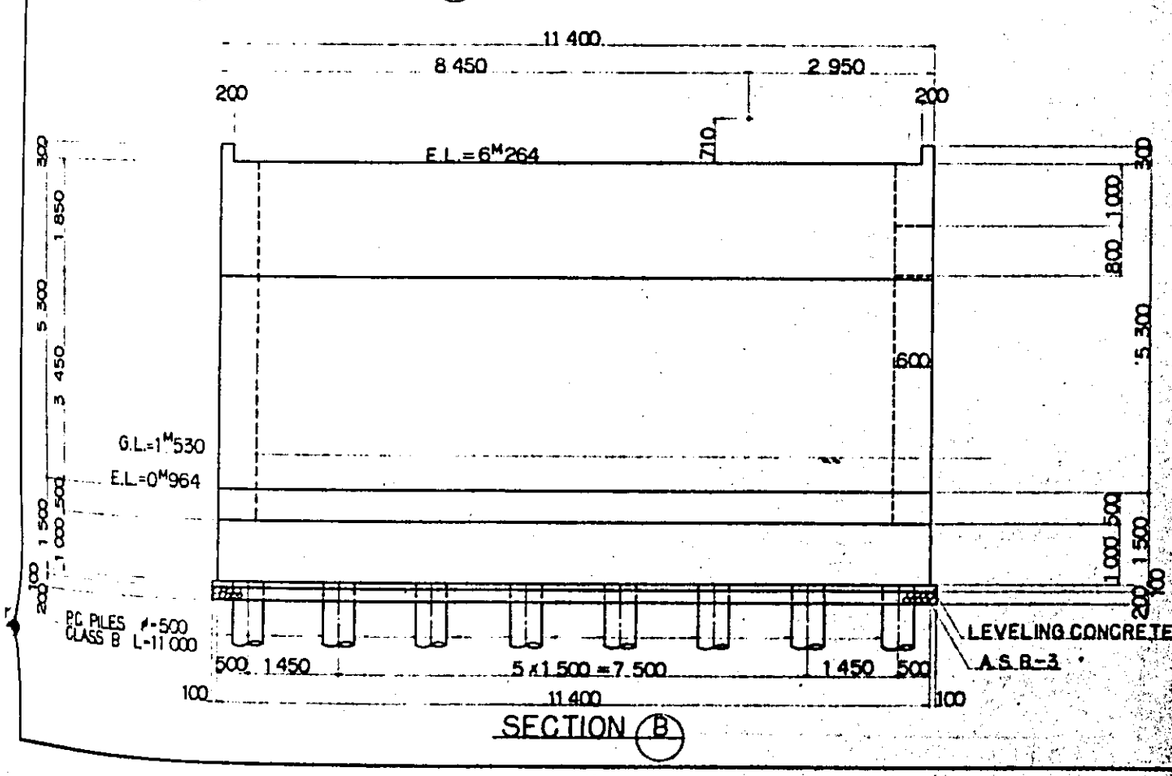
ABUTMENT Ab02 Ab01

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
WALL	102.7	219.4	5946.6	57.9
FOOTING	84.6	41.2	3360.7	39.7

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	6.6	CLASS F
AGGREGATE SUB BASE	〃	13.2	A.S.B-3
EXCAVATION	〃	156.4	
FOUNDATION MORTAR	〃	0.03	σ_{ck} = 400 kg/cm² 0.07 × 4 = 0.03
PILE	m × NUMBER	11.00 × 11 = 121.000	φ=500 CLASS B





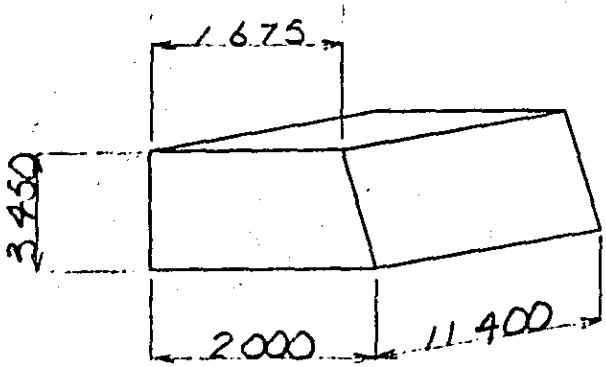


NOTES:

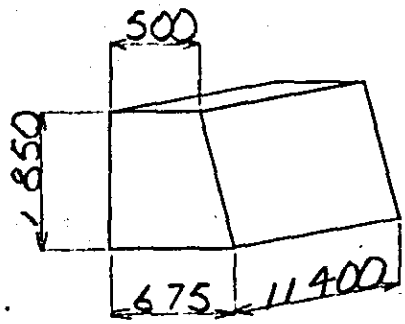
1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. REFERENCE DRAWING FOR BAR ARRANGEMENT : CS - 133
   CS - 134
   CS - 135

1) CONCRETE VOLUM

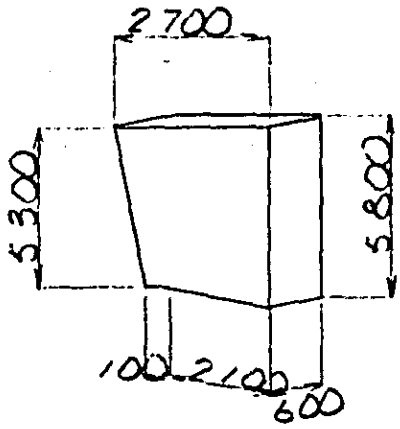
(1) WALL

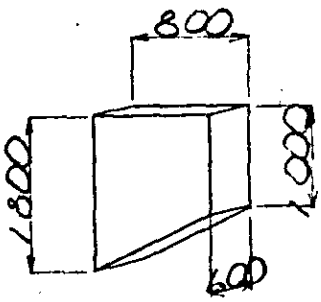


$V = 1/2 \times (1.675 + 2.000) \times 3.450 \times 11.400 = 72.269^{m3}$



$V = 1/2 \times (0.675 + 0.500) \times 1.850 \times 11.400 = 12.390^{m3}$



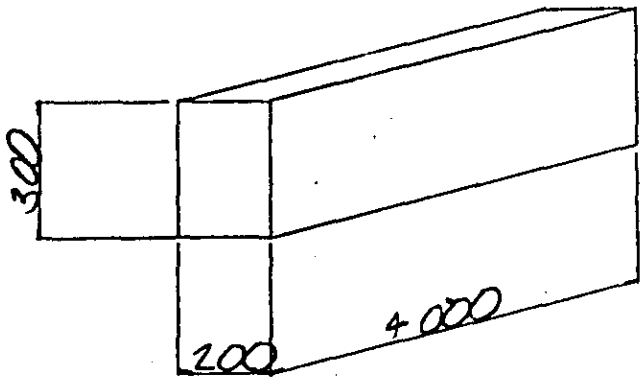


$V = 1/2 \times (1.000 \cdot 1.800) \cdot 0.800 \cdot 0.600) \cdot 2 : 1.344^{m3}$

$V = 1/2 \times (5.300 + 5.800) \times 2.100 \times 0.600 \times 2 = 13.986$

$V = 1/2 \cdot\cdot (0.100 + 0.600) \times 5.300 \cdot 0.600 \cdot 2 = 2.226$

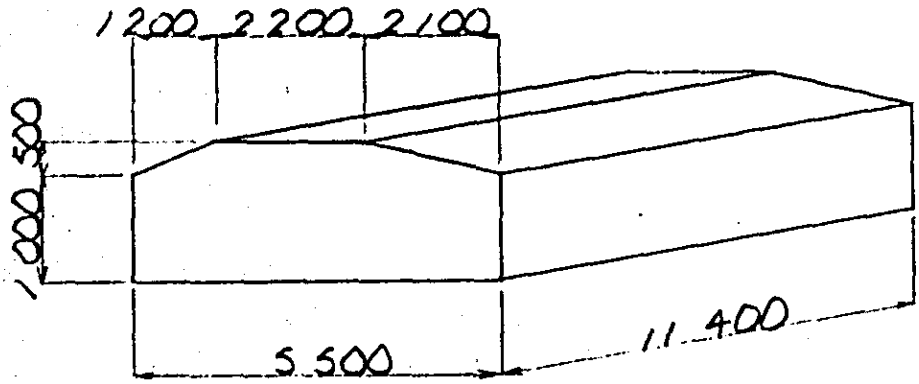
17.388^{m3}



$V = 0.300 \times 0.200 \times 4.000 \times 2 = 0.480^{m3}$

WALL TOTAL $= 102.695^{m3}$

(2) FOOTING

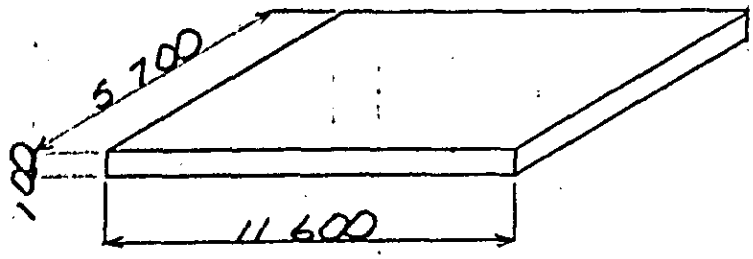


V = 1/2 × (5.500 + 2.200) × 0.500 × 11.400 = 21.945 m^3

V = 1.000 × 5.500 × 11.400 = 62.700 m^3

FOOTING TOTAL = 84.645 m^3

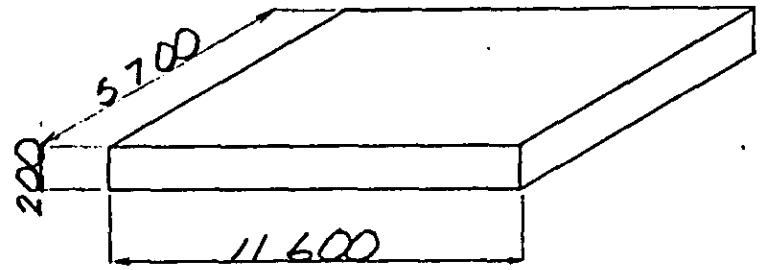
2) LEVELING CONCRETE



$V = 5.700 \times 11.600 \times 0.100 = 6.612\ m^3$

LEVELING CONCRETE TOTAL = $6.612\ m^3$

3) AGGREGATE SUB BASE



$V = 5.700 \times 11.600 \times 0.200 = 13.224\ m^3$

AGGREGATE SUB BASE TOTAL $= 13.224\ m^3$

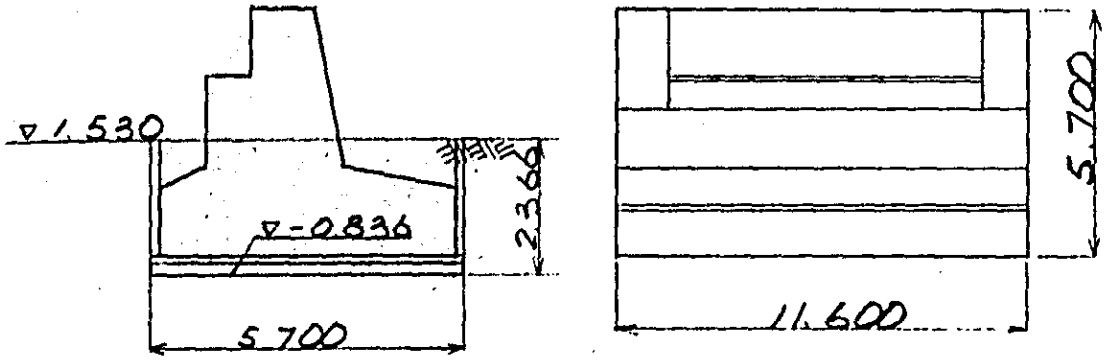
4) PILE

ϕ - 500 mm ℓ - 11.000 m n = 11 本

N = 11 本 x 1 = 11 本

PILE TOTAL 11 本

5) EXCAVATION

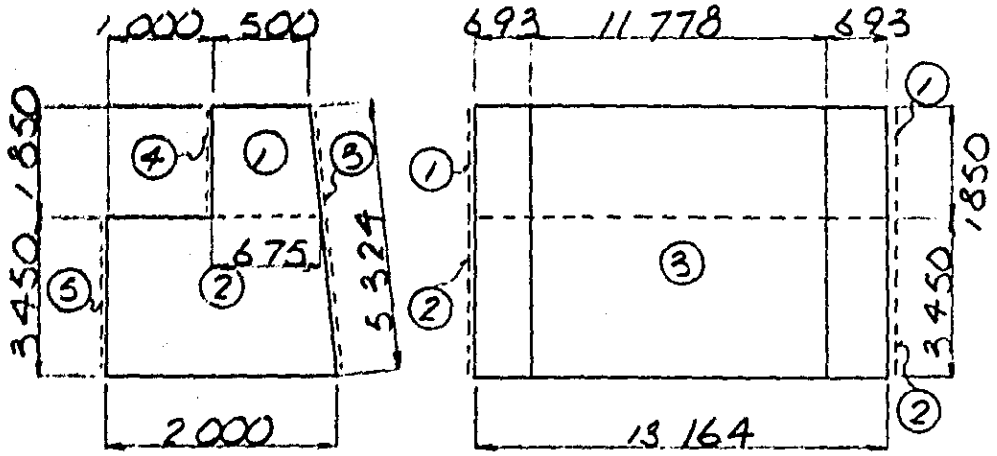


V = 11.600 × 5.700 × 2.366 = 156.440 m³

EXCAVATION TOTAL = 156.440 m³

6) FORM AREA

(1) WALL



A_1 = ½ × (0.500 + 0.675) × 1.850 × 2 = 2.174 m²

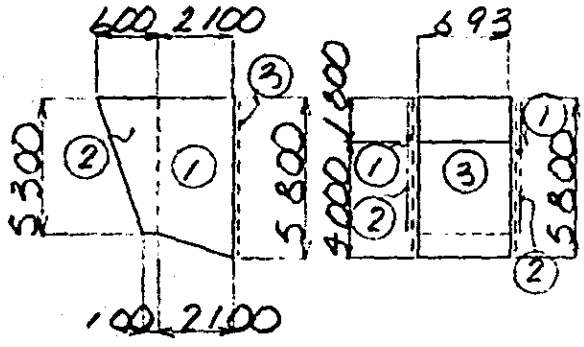
A_2 = ½ × (1.675 + 2.000) × 3.450 × 2 = 12.679 "

A_3 = 5.324 × 11.778 = 62.706 "

A_4 = 1.850 × 13.164 = 24.353 "

A_5 = 3.450 × 13.164 = 45.416 "

SUB TOTAL = 147.328 m²

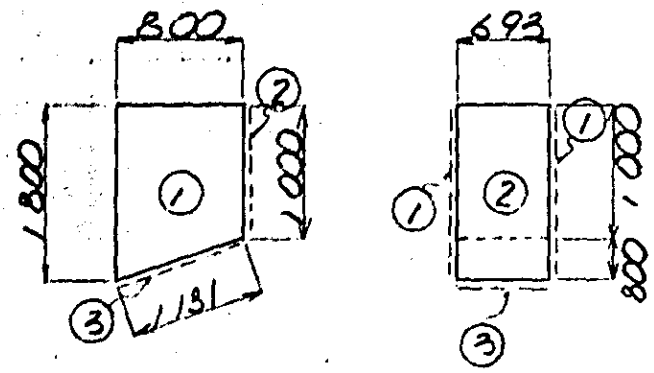


A_1 = ½ × (5.300 + 5.800) × 2.100 × 2 × 2 = 46.620 m²

A_2 = ½ × (0.100 + 0.600) × 5.300 × 2 × 2 = 7.420 "

A_3 = 0.693 × 4.000 × 2 = 5.544 "

SUB TOTAL = 59.584 m²

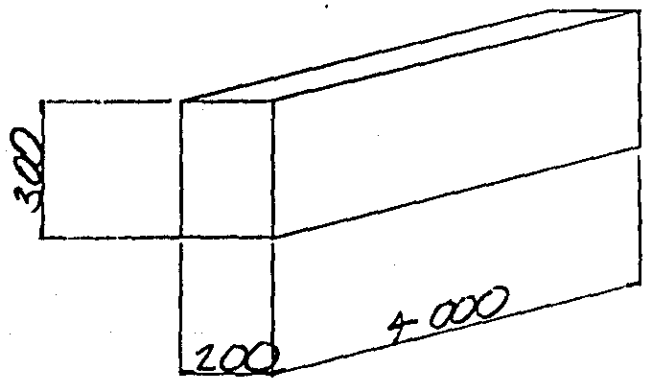


A_1 = $\frac{1}{2}$ × (1.000 + 1.800) × 0.800 × 2 × 2 = 4.480 m^2

A_2 = 0.693 × 1.000 × 2 = 1.386 "

A_3 = 0.693 × 1.131 × 2 = 1.568 "

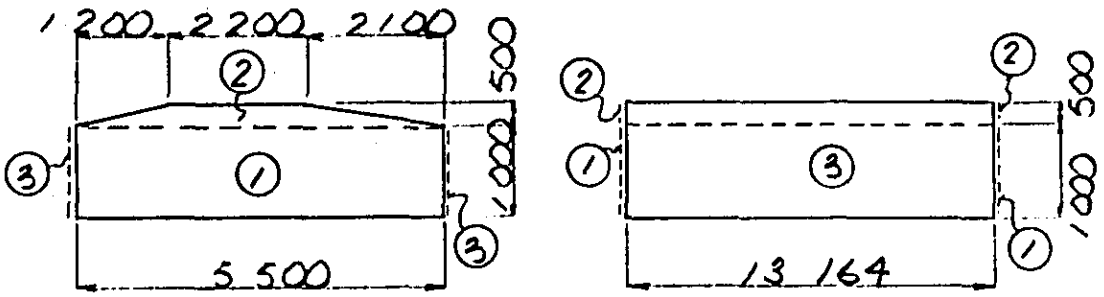
SUB TOTAL = 7.434 m^2



$A = 0.300 \times (0.200 + 4.000) \times 2 \times 2 = 5.040\ m^2$

WALL TOTAL $= 219.386\ m^2$

(2) FOOTING



$A_1 = 5.500 \times 1.000 \times 2 = 11.000\ m^2$

$A_2 = 1/2 \times (2.200 + 5.500) \times 0.500 \times 2 = 3.850$

$A_3 = 13.164 \times 1.000 \times 2 = 26.328$

FOOTING TOTAL = 41.178 m²

ABUTMENT (Ab02) (Ab01)

7) REINFORCING BAR

(SD30)

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
WALL	—	—	—	937.2	1160.0	3137.1	695.8	16.5	5946.6 kg
FOOTING	—	—	—	—	1528.5	1573.1	259.1	—	3360.7 kg

BEARING BASE MORTAR D16 - 31.2 kg x = 124.8 kg

JICA

No. 14

REINFORCING BAR

No. 15

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
G 1	D10	0.56	600	36	12 1	
2	〃	〃	3 890	2	4 4	
A 1	D19	2.25	4 910	105	1 160 0	
2	D16	1.56	16 340	17	433 3	(V)
3	〃	〃	4 850	53	401 0	
4	〃	〃	2 130	53	176 1	
5	〃	〃	13 600	6	127 3	〃
6	D13	0.995	13 630	17	230 6	
7	D16	1.56	2 740	105	448 8	
8	〃	〃	2 680	105	439 0	
9	D13	0.995	13 920	16	221 6	(V)
A° 1	D13	0.995	1 930	88	169 0	(V)
2	〃	〃	700	50	34 8	〃 (〃)
F 1	D19	2.25	6 470	105	1 528 5	
2	D16	1.56	13 600	23	488 0	〃
3	〃	〃	7 100	53	587 0	
4	〃	〃	15 080	16	376 4	(V)
5	〃	〃	13 570	4	84 7	〃
6	〃	〃	5 930	4	37 0	〃
F° 1	D13	0.995	2 950	50	146 8	(V)
2	〃	〃	2 970	38	112 3	〃 (〃)
W 1	D22	3.04	3 890	16	189 2	
2	〃	〃	3 510	12	128 0	〃 (V)
3	〃	〃	3 090	66	620 0	〃
4	D16	1.56	3 890	16	97 1	〃
5	〃	〃	3 510	12	65 7	〃 (V)
6	〃	〃	3 090	66	318 1	〃
7	〃	〃	6 760	44	464 0	
8	〃	〃	1 200	16	30 0	(V)
9	〃	〃	1 900	4	11 9	
W° 1	D13	0.995	770	52	39 8	

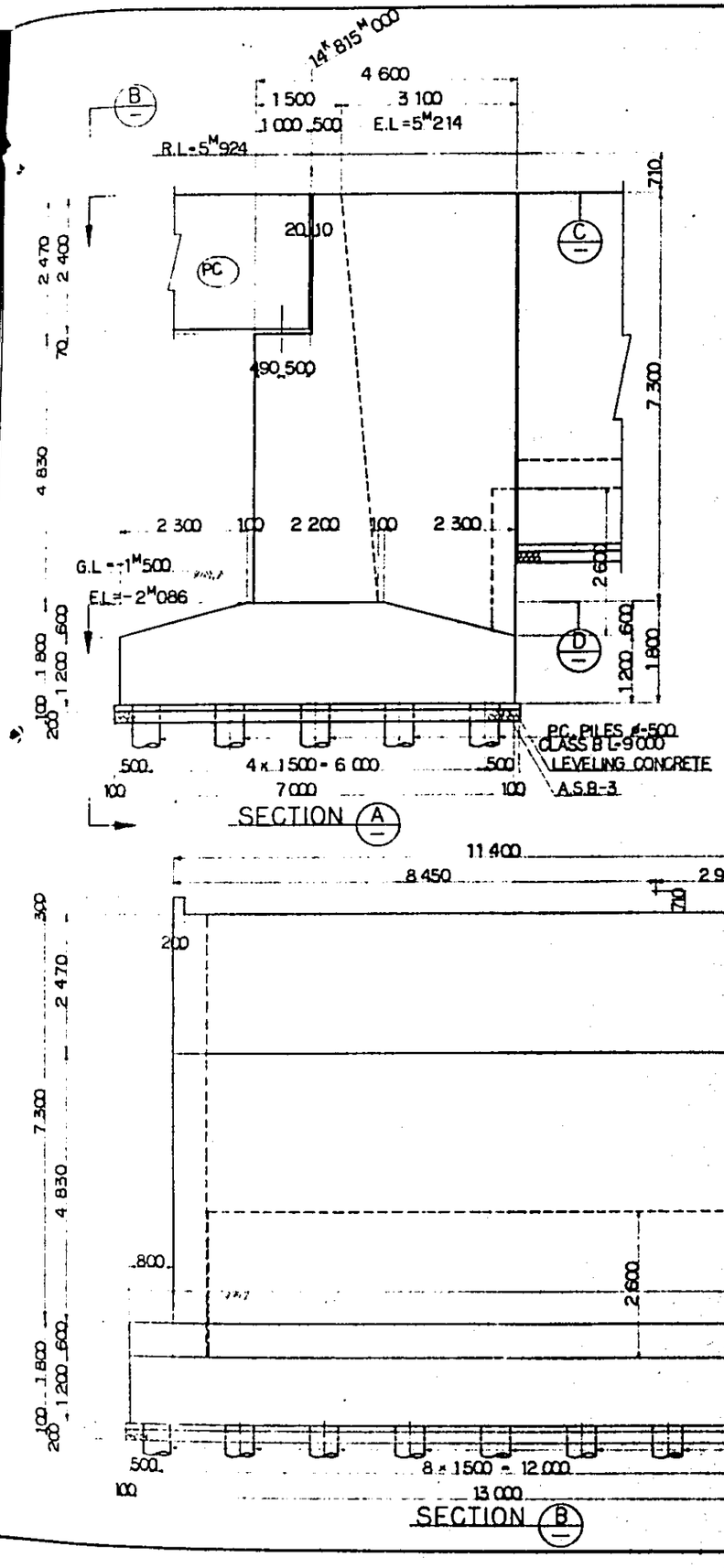
REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
			D22		937.2 kg	
			D19		1160.0 "	
			D16		3012.3 "	
			D13		695.8 "	
			D10		16.5 "	
			WALL TOTAL		5821.8 kg	G.A.W
			D19		1528.5 kg	
			D16		1573.1 "	
			D13		259.1 "	
			FOOTING TOTAL		3360.7 kg	F.

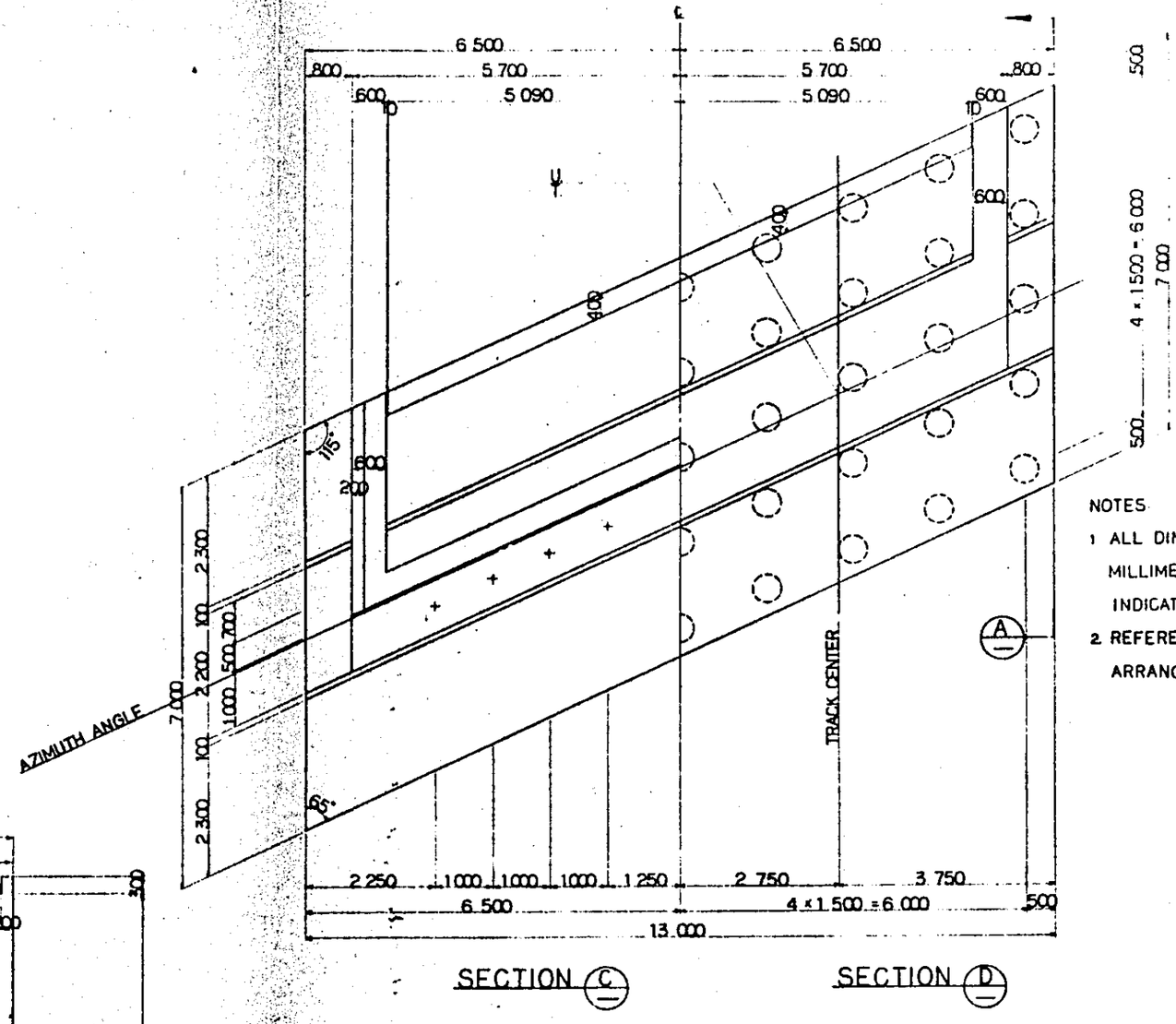
2. Ab 04

ABUTMENT (Ab 04)

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
WALL	161.5	351.7.	13662.7	84.6
FOOTING	145.9	56.9	7994.4	54.8

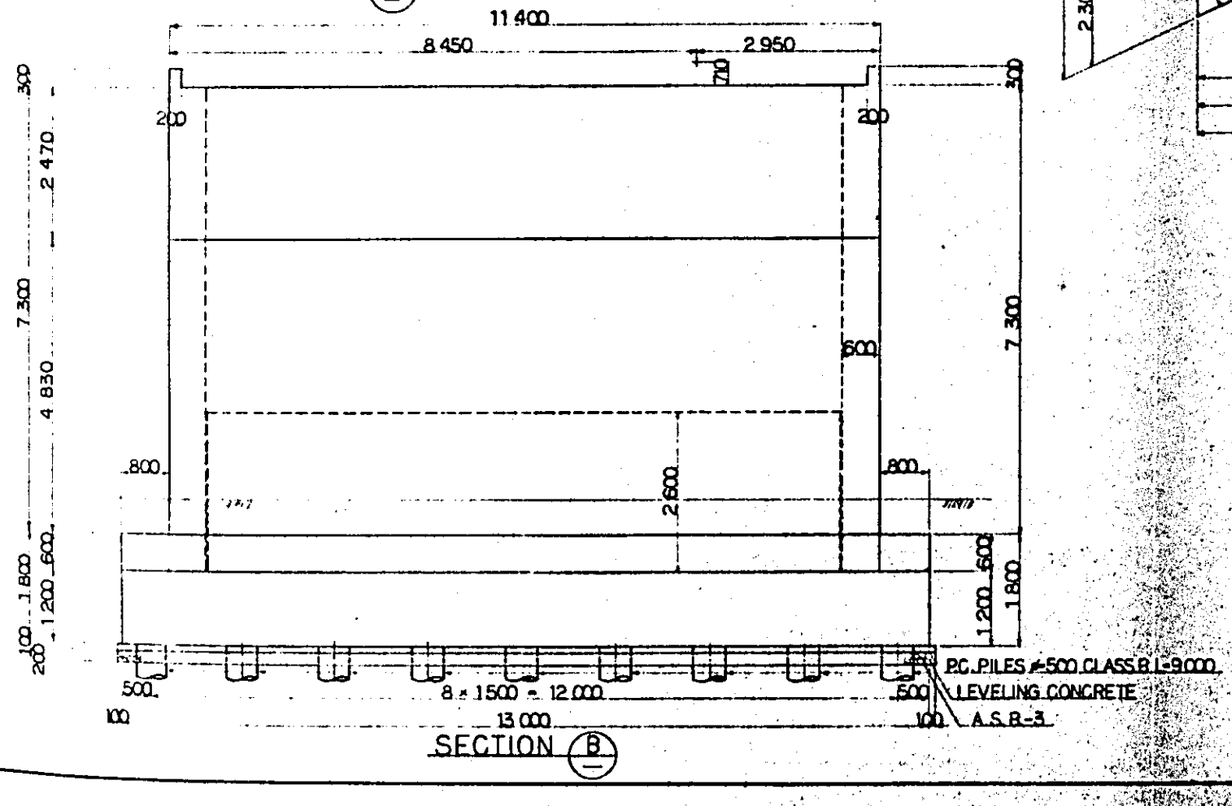
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	9.5	CLASS B
AGGREGATE SUB BASE	"	19.0	A.S.B.-3
EXCAVATION	"	255.2	
FOUNDATION MORTAR	"	0.10	σ_{ck} = 400 kg/cm² 0.012 × 8 = 0.10
PILE	m ×NUMBER	9.00×5 = 45.000	φ500 CLASS B





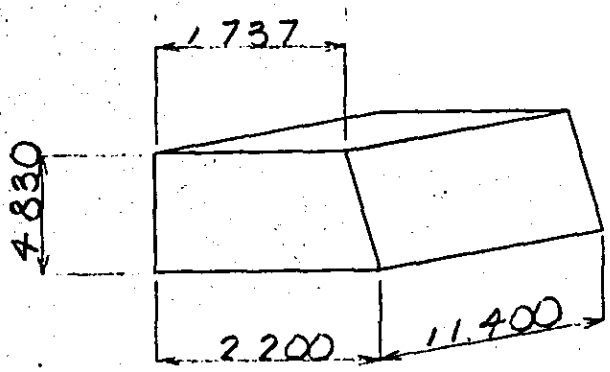
NOTES

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. REFERENCE DRAWING FOR BAR ARRANGEMENT : CS - 138
   CS - 139
   CS - 140

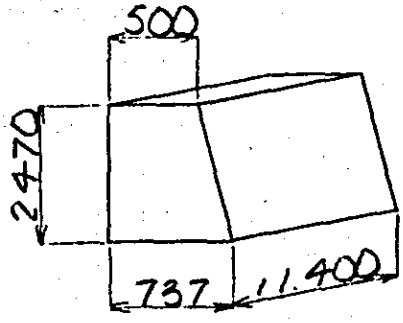


1) CONCRETE VOLUM

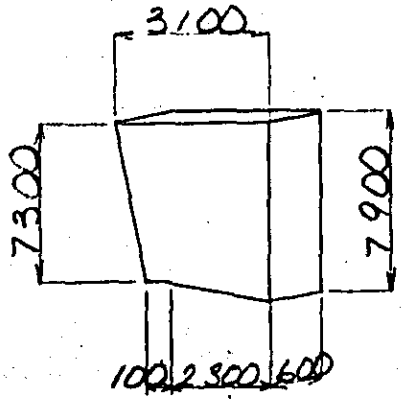
(1). WALL



$V = 1/2 \times (2.200 + 1.737) \times 4.830 \times 11.400 = 108.390^{m3}$



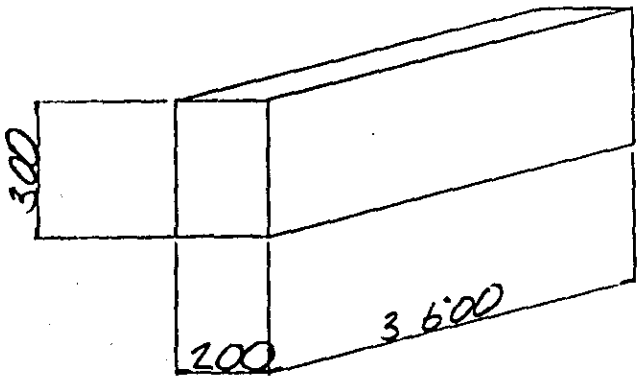
$V = 1/2 \times (0.500 + 0.737) \times 2.470 \times 11.400 = 17.416^{m3}$



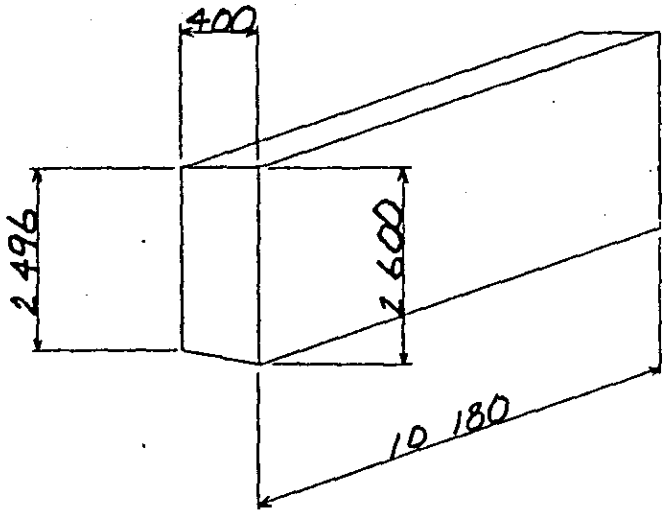
$V = 1/2 \times (7.300 + 7.900) \times 2.300 \times 0.600 \cdot 2 = 20.976^{m3}$

$V = 1/2 \cdot \times (0.100 + 0.800) \times 7.300 \cdot 0.600 \cdot 2 = 3.942$ "

SUB TOTAL = 24.918^{m3}



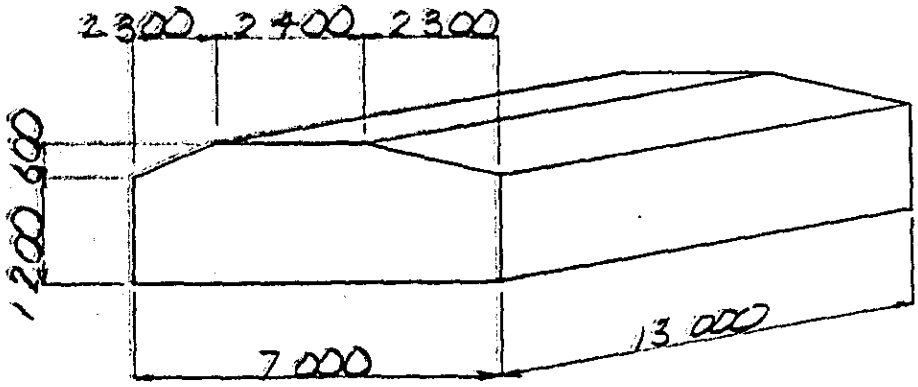
$V = 0.300 \times 0.200 \times 3.600 \times 2 = 0.432\ m^3$



$V = 1/2 \times (2.600 + 2.496) \times 0.400 \times 10.180 = 10.375\ m^3$

WALL TOTAL $= 161.531\ m^3$

(2) FOOTING

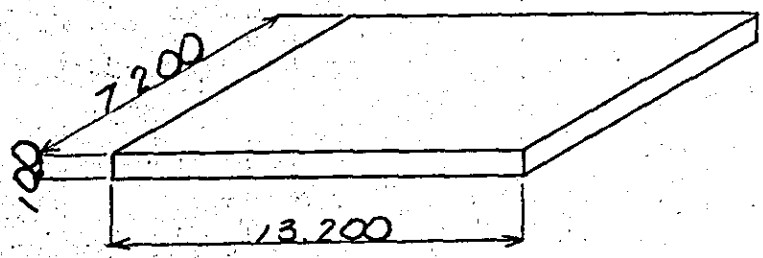


V = 1/2 × (2400 + 7.000) × 0.600 × 13.000 = 36.660 m³

V = 7.000 × 1.200 × 13.000 = 109.200 m³

FOOTING TOTAL = 145.860 m³

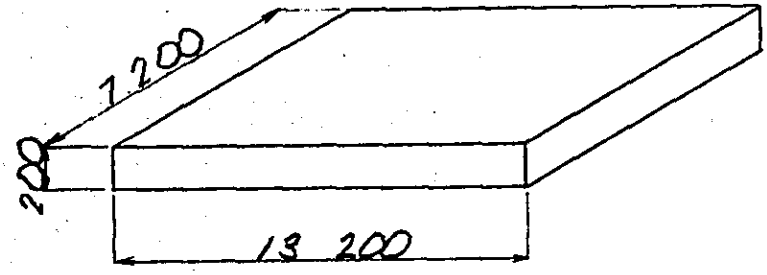
2) LEVELING CONCRETE



V = 7.200 × 13.200 × 0.100 = 9.504 m^3

LEVELING CONCRETE TOTAL = 9.504 m^3

3) AGGREGATE SUB BASE



V = 7.200 × 13.200 × 0.200 = 19.008 m^3

AGGREGATE SUB BASE TOTAL = 19.008 m^3

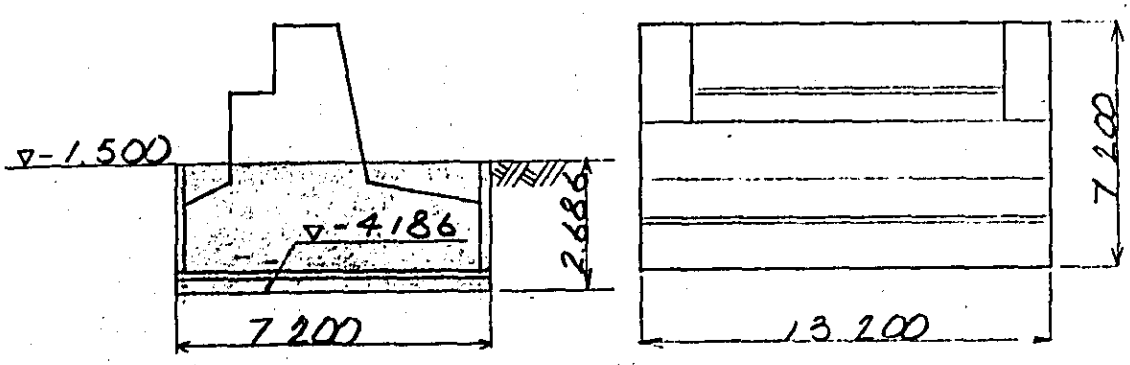
:4) PILE

$\phi = 500^{mm}$ $\ell = 9.000^{m}$ $n = 45^{本}$

$N = 45^{本} \times 1$ = 45 本

PILE TOTAL = 45 本

5) EXCAVATION

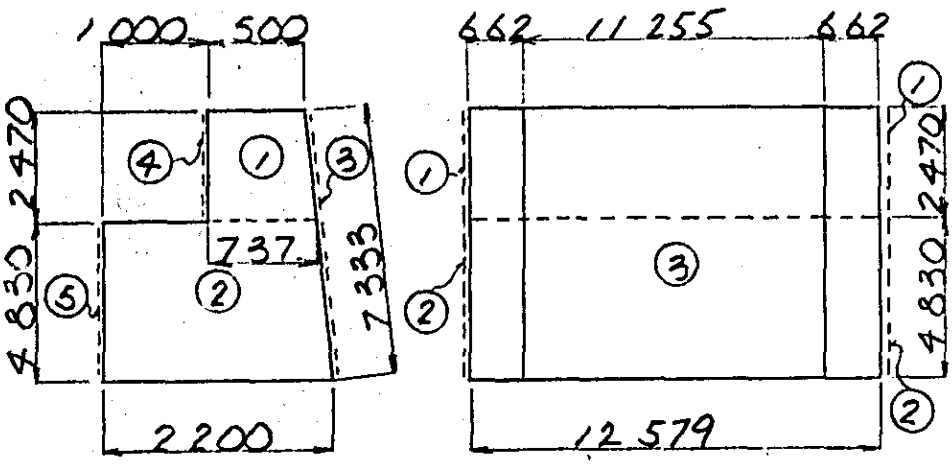


V = 7.200 × 13.200 × 2.686 = 255.277 m^3

EXCAVATION TOTAL = 255.277 m^3

6) FORM AREA

(1) WALL



A_1 = 1/2 × (0.500 + 0.737) × 2.470 × 2 = 3.055 m²

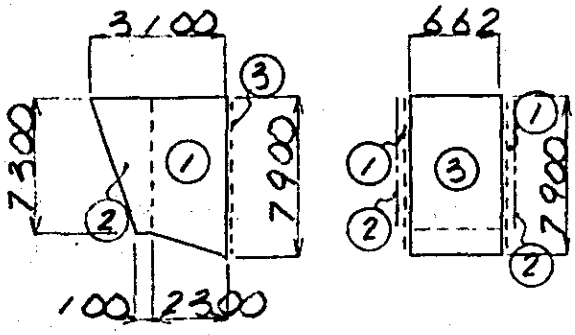
A_2 = 1/2 × (1.737 + 2.200) × 4.830 × 2 = 19.016 "

A_3 = 7.333 × 11.255 = 82.533 "

A_4 = 2.470 × 12.579 = 31.070 "

A_5 = 4.830 × 12.579 = 60.757 "

SUB TOTAL = 196.431 m²

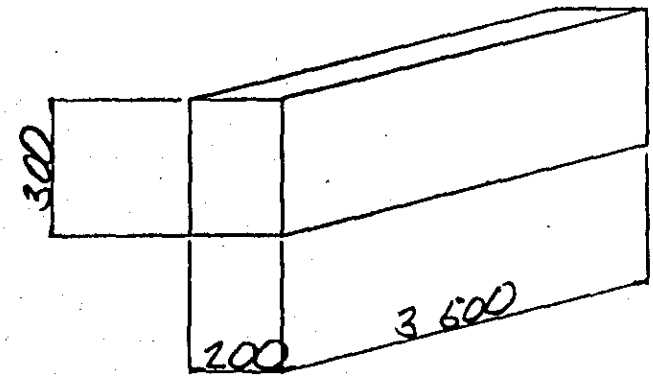


A_1 = 1/2 × (7.300 + 7.900) × 2.300 × 2 × 2 = 69.920 m²

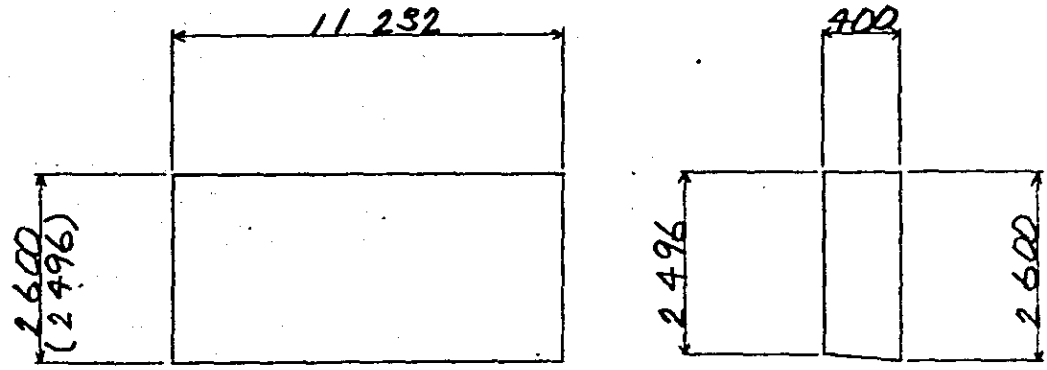
A_2 = 1/2 × (0.100 + 0.800) × 7.300 × 2 × 2 = 13.140 "

A_3 = 7.900 × 0.662 × 2 = 10.460 "

SUB TOTAL = 93.520 m²



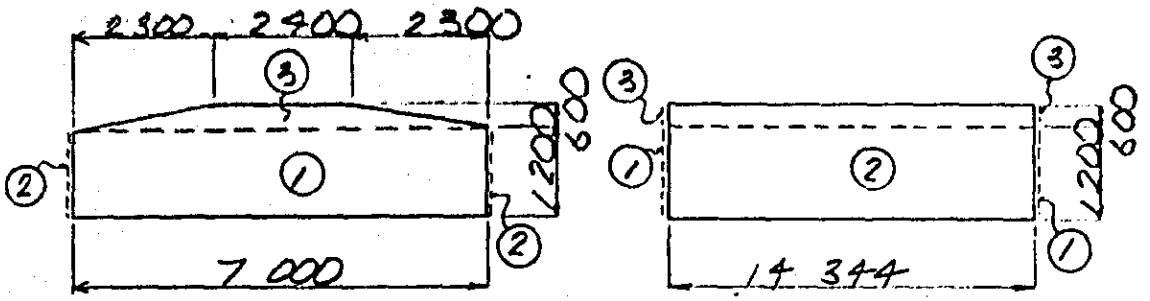
$A = 0.300 \times (3.600 + 0.200) \times 2 \times 2 \quad = 4.560\ m^2$



$A = 11.232 \times (2.496 + 2.600) \quad = 57.238\ m^2$

WALL TOTAL 351. 749 m^2

(2) FOOFING



A_1 = 7.000 × 1.200 × 2 = 16.800 m²

A_2 = 14.344 × 1.200 × 2 = 34.426 "

A_3 = ½ × (2.400 + 7.000) × 0.600 × 2 = 5.640 "

FOOTING TOTAL = 56.866 m²

ABUTMENT (Vb04)

7) REINFORCING BAR

(SD30)

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
WALL	4247.3	—	—	4138.7	—	4925.9	936.8	14.0	13662.7 kg
FOOTING	—	4834.7	—	—	2161.2	756.7	4741.6	—	7994.4 kg

BEARING BASE MORTAR D16 - 37.6 × 8 = 300.8 kg

JICA

No. 39

REINFORCING BAR

No. 30

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
G 1	D10	0.56	600	30	10 1	
2	〃	〃	3 460	2	3 9	
A 1	D32	6.23	6 750	101	4 247 3	
2	D22	3.04	16 000	22	1 070 1	(V)
3	〃	〃	6 590	51	1 021 7	
4	D16	1.56	13 090	22	447 5	
5	〃	〃	2 170	51	172 6	
6	〃	〃	13 000	6	121 7	〃
7	〃	〃	4 090	89	560 9	
8	〃	〃	4 090	89	560 9	
9	D13	0.995	11 550	22	252 8	
10	D16	1.56	3 760	101	592 4	
11	〃	〃	3 310	101	521 5	
12	D13	0.995	13 490	22	295 3	(V)
A° 1	D13	0.995	2 070	125	255 4	(V)
2	〃	〃	520	53	27 4	〃
3	〃	〃	750	63	47 0	〃 (V)
F 1	D29	5.04	7 860	117	4 634 9	
2	D19	2.25	14 810	29	966 4	〃
3	〃	〃	9 000	59	1 194 8	
4	D16	1.56	16 700	20	521 0	(V)
5	〃	〃	3 460	18	97 2	
6	〃	〃	14 770	4	92 2	
7	〃	〃	7 420	4	46 3	〃
F° 1	D13	0.995	3 720	103	381 2	(V)
2	〃	〃	3 370	10	33 5	〃 ( )
3	〃	〃	3 380	8	26 9	〃 ( )
W 1	D22	3.04	3 460	126	1 325 3	
2	〃	〃	9 130	26	721 6	
3	D16	1.56	3 460	126	680 1	
4	〃	〃	9 060	26	367 5	
W° 1	D13	0.995	740	80	58 9	(V)

JICA

No. 31

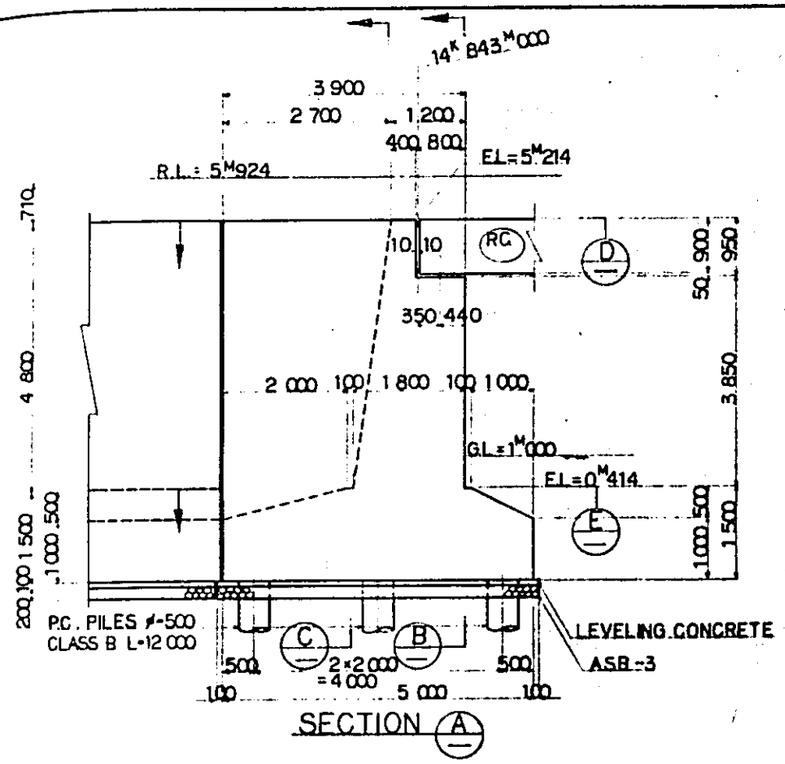
REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
			D32		4247.3 kg	
			D22		4138.7 "	
			D16		4025.1 "	
			D13		936.8 "	
			D10		14.0 "	
			WALL TOTAL		13361.9 kg	G.A.W
			D29		4634.9 kg	
			D19		2161.2 "	
			D16		756.7 "	
			D13		441.6 "	
			FOOTING TOTAL		7994.4 kg	F

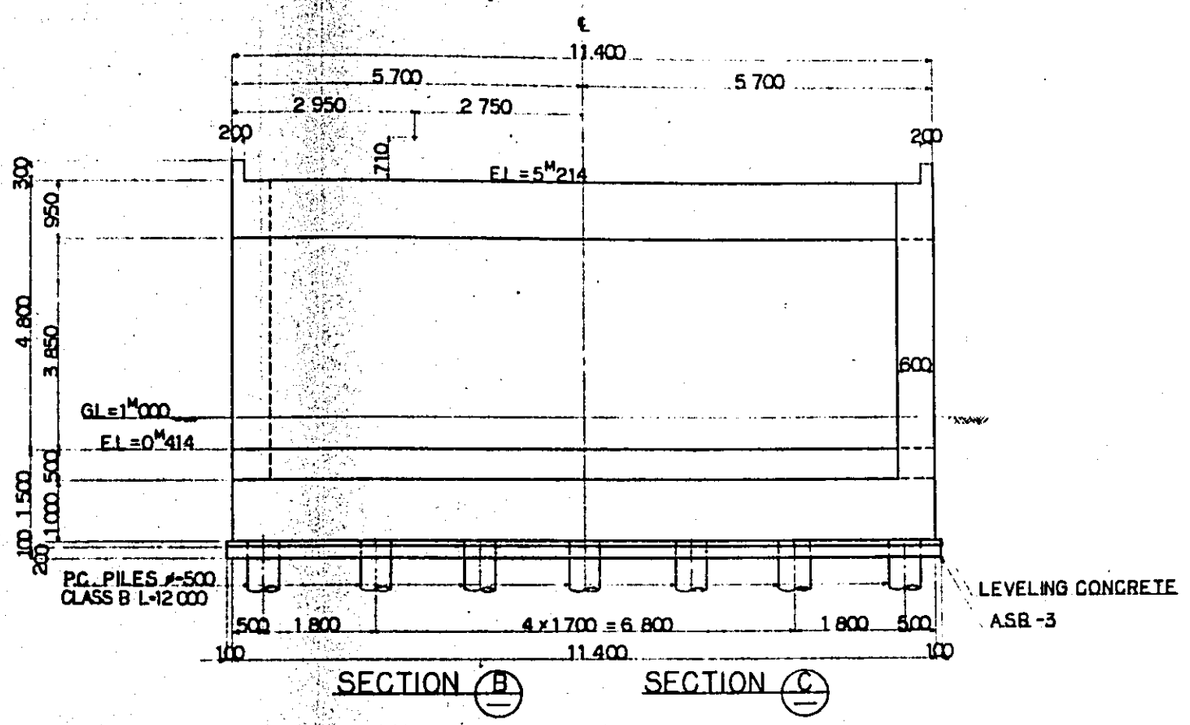
3. Ab 05

ABUTMENT (Ab 05)

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
WALL	88.2	182.4	4314.7	48.9
FOOTING	77.0	36.3	2 422.1	31.5

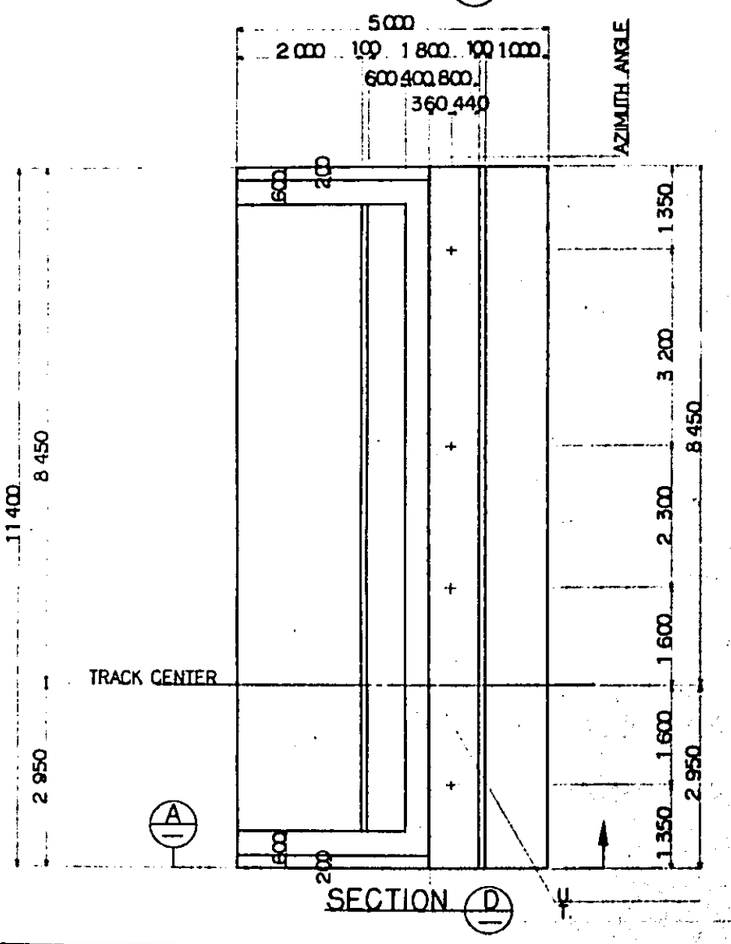
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	6.0	CLASS F
AGGREGATE SUB BASE	"	12.1	A.S.B - 3
EXCAVATION	"	143.9	
FOUNDATION MORTAR	"	0.08	5cm = 400 kg/m² 0.02 x 4 = 0.08
PILE	m x NUMBER	12.00 x 21 = 252.00	φ=500 CLASS B

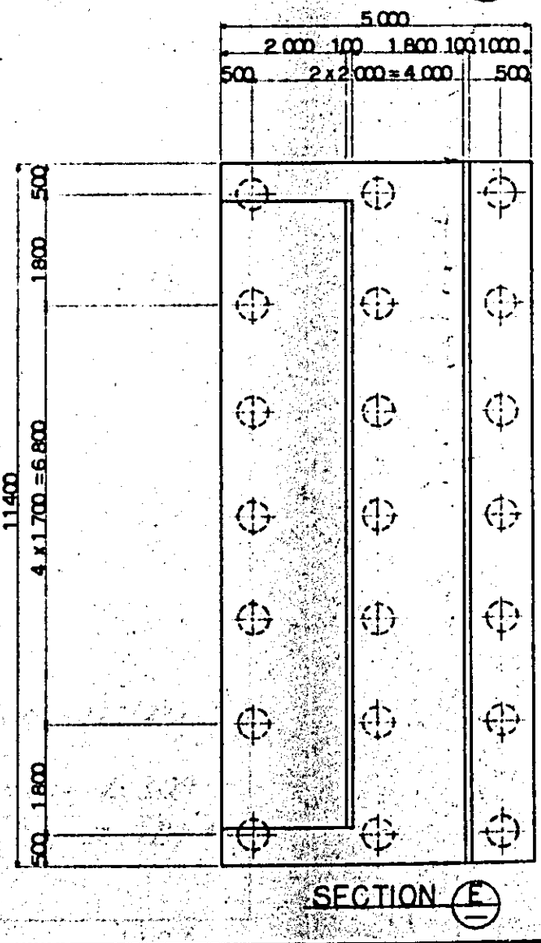




NOTES:

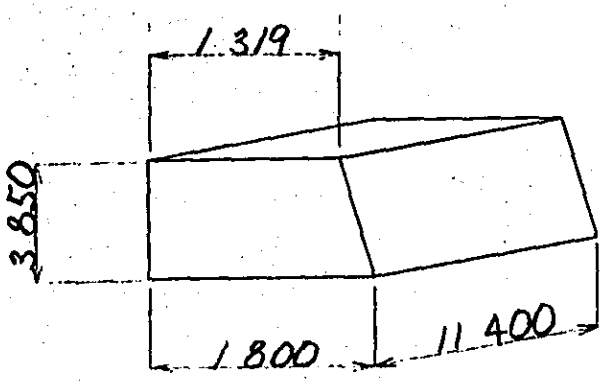
1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. REFERENCE DRAWING FOR BAR ARRANGEMENT : CS - 142
   CS - 143
   CS - 144



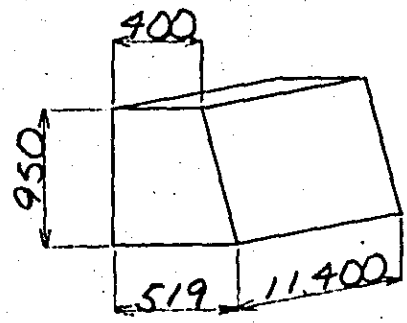


1) CONCRETE VOLUM

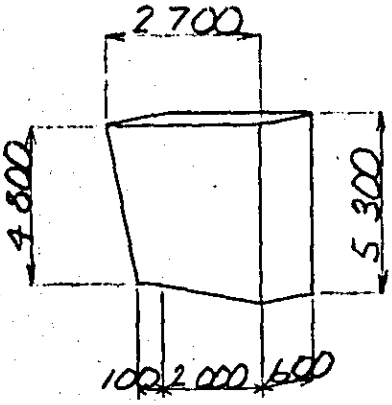
(1) WALL



$V = 1/2 \times (1.319 + 1.800) \times 3.850 \times 11.400 = 68.446\ m^3$



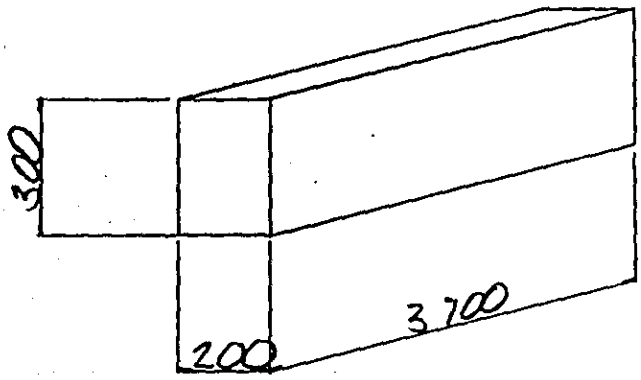
$V = 1/2 \times (0.400 + 0.519) \times 0.950 \times 11.400 = 4.976\ m^3$



$V = 1/2 \times (5.300 + 4.800) \times 2.000 \times 0.600 \times 2 = 12.120\ m^3$

$V = 1/2 \times (0.100 + 0.700) \times 4.800 \times 0.600 \times 2 = 2.304$

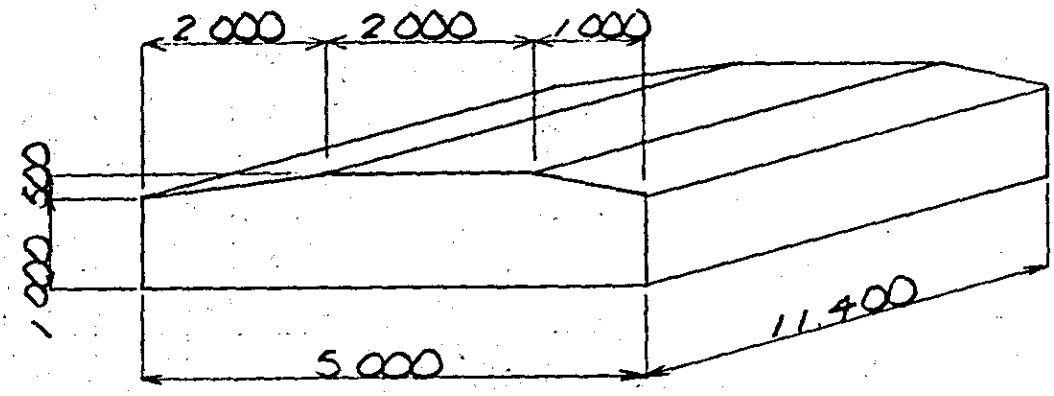
$14.424\ m^3$



$V = 0.300 \times 0.200 \times 3.100 \times 2 = 0.372\ m^3$

WALL TOTAL = 88.218 m^3

(2) FOOTING

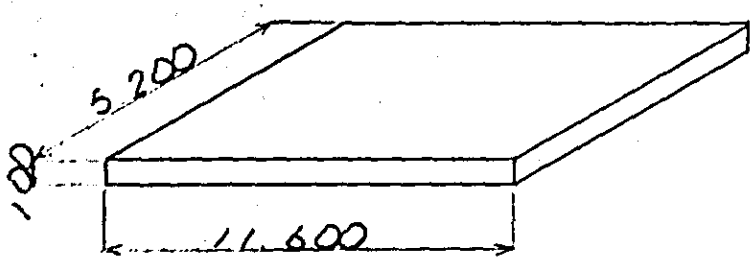


$V = 1/2 \times (2.000 + 5.000) \times 0.500 \times 11.400 = 19.950 m^3$

$V = 5.000 \times 1.000 \times 11.400 = 57.000$ "

FOOTING TOTAL $= 76.950 m^3$

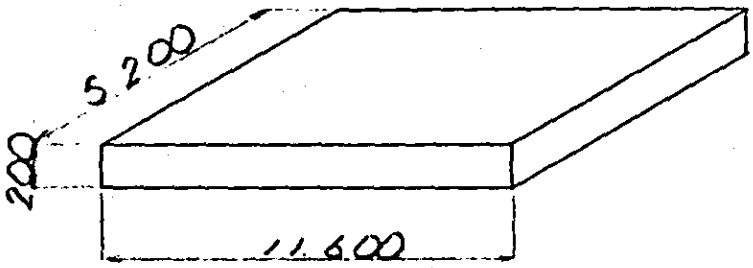
2) LEVELING CONCRETE



V= 5.200 × 11.600 × 0.100 = 6.032 m^3

LEVELING CONCRETE TOTAL = 6.032 m^3

3) AGGREGATE SUB BASE



V= 5.200 × 11.600 × 0.200 = 12.064 m^3

AGGREGATE SUB BASE TOTAL = 12.064 m^3

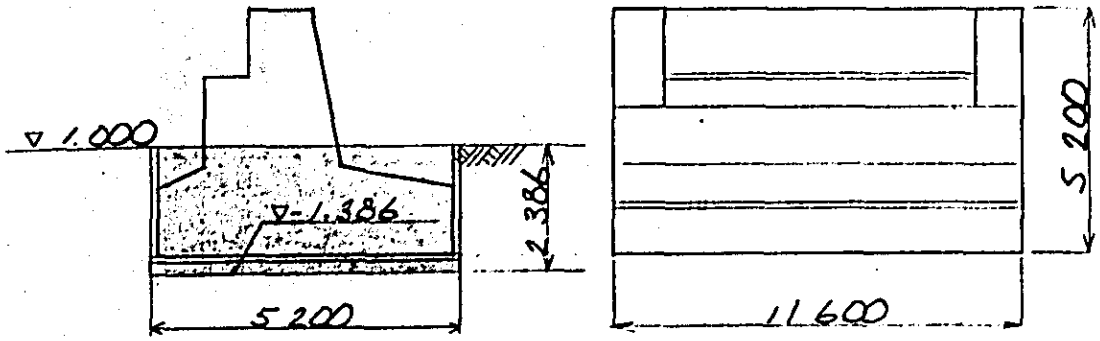
4) PILE

ϕ - 500 mm ℓ - 12.000 m n = 21 本

N = 21 本 x 1 = 21 本

PILE TOTAL 21 本

5) EXCAVATION.

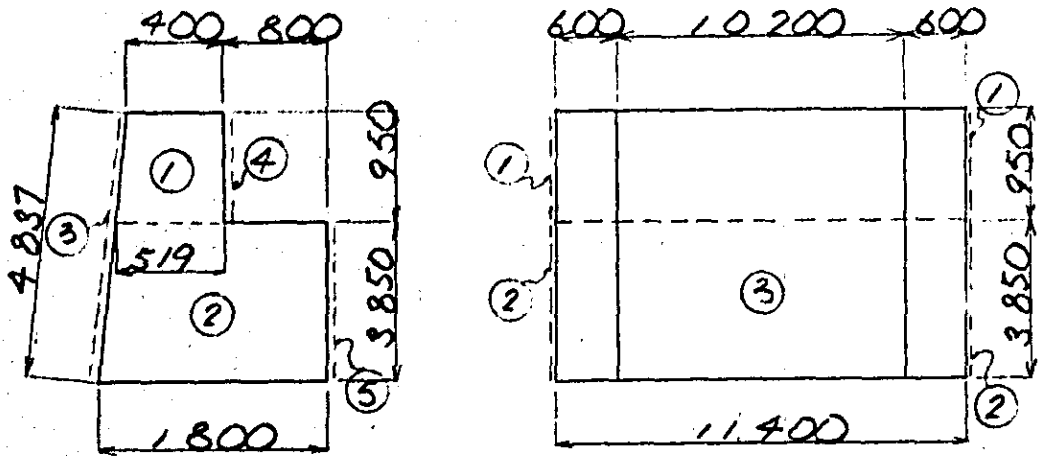


V = 11.600 × 5.200 × 2.386 = 143.924 m³

EXCAVATION TOTAL = 143.924 m³

6) FORM AREA

(1) WALL



$A_1 = 1/2 \times (0.400 + 0.519) \times 0.950 \times 2 = 0.873\ m^2$

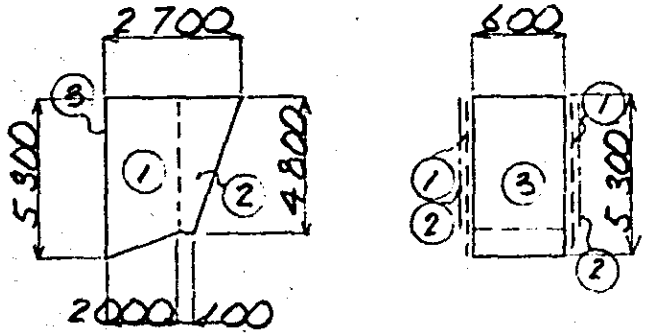
$A_2 = 1/2 \times (1.319 + 1.800) \times 3.850 \times 2 = 12.008\ "$

$A_3 = 4.837 \times 10.200 = 49.337\ "$

$A_4 = 0.950 \times 11.400 = 10.830\ "$

$A_5 = 3.850 \times 11.400 = 43.89\ "$

SUB TOTAL = 116.938 m^2

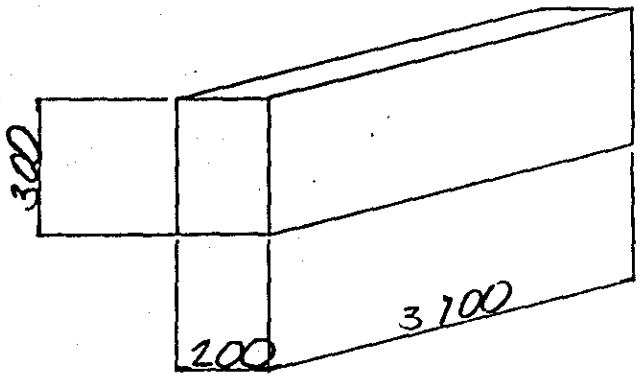


$A_1 = 1/2 \times (5.300 + 4.800) \times 2.000 \times 2 \times 2 = 40.400\ m^2$

$A_2 = 1/2 \times (0.100 + 0.700) \times 4.800 \times 2 \times 2 = 14.746\ "$

$A_3 = 0.600 \times 5.300 \times 2 = 6.360\ "$

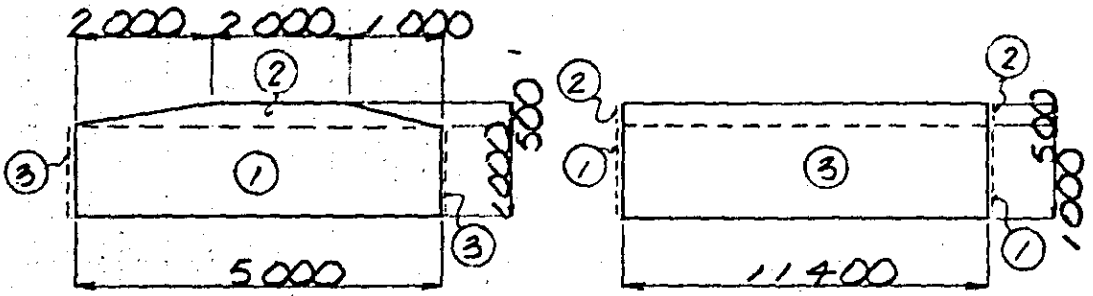
SUB TOTAL = 61.506 m^2



$A = 0.300 \times (0.200 + 3.100) \times 2 \times 2 = 3.960\ m^2$

WALL TOTAL $= 182.404\ m^2$

(2) FOOTING



A_1 = 5.000 × 1.000 × 2 = 10.000 m^2

A_2 = 1/2 × (2.000 + 5.000) × 0.500 × 2 = 3.500

A_3 = 11.400 × 1.000 × 2 = 22.800

FOOTING TOTAL = 36.300 m^2

ABUTMENT (Ab 05)

7) REINFORCING BAR

(SD30)

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
WALL	—	—	—	—	1669.9	1818.3	814.5	12.0	4314.7 kg
FOOTING	—	—	—	—	702.2	1565.0	154.9	—	2422.1 kg

BEARING BASE MORTER D16 - 18.7 × 4 = 74.8 kg

JICA

No. 44

REINFORCING BAR

No. 45

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
G 1	D 10	0.56	600	26	8.7	
2	"	"	2 990	2	3.3	
A 1	D 19	2.25	5 330	91	1091.3	
2	D 16	1.56	14 100	18	395.9	
3	"	"	5 250	47	384.9	
4	"	"	1 780	47	130.5	
5	D 13	0.995	11 850	5	59.0	
6	"	"	11 880	18	212.8	
7	"	"	1 690	91	153.0	
8	"	"	1 680	47	78.6	
9	"	"	11 980	10	119.2	(V)
A° 1	D 13	0.995	1 640	92	150.1	(V)
2	"	"	570	23	13.0	" (")
F 1	D 16	1.56	5 490	91	779.4	
2	D 19	2.25	6 643	47	702.2	
3	D 16	1.56	13 260	14	289.6	(V)
4	"	"	11 850	21	388.2	
5	"	"	11 820	4	73.8	"
6	"	"	5 450	4	34.0	"
F° 1	D 13	0.995	2 840	21	59.3	(V)
2	"	"	3 100	31	95.6	" (")
W 1	D 19	2.25	2 990	86	578.6	
2	D 16	1.56	2 990	86	401.1	"
3	"	"	6 280	44	431.1	
W° 1	D 13	0.995	690	42	28.8	

JICA

No. 46

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
			D19		1669.9 kg	
			D16		1743.5 "	
			D13		814.5 "	
			D10		12.0 "	
			WALL TOTAL		4239.9 kg	G.A.W
			D19		702.2 kg	
			D16		1565.0 "	
			D13		154.9 "	
			FOOTING TOTAL		2422.1 kg	F

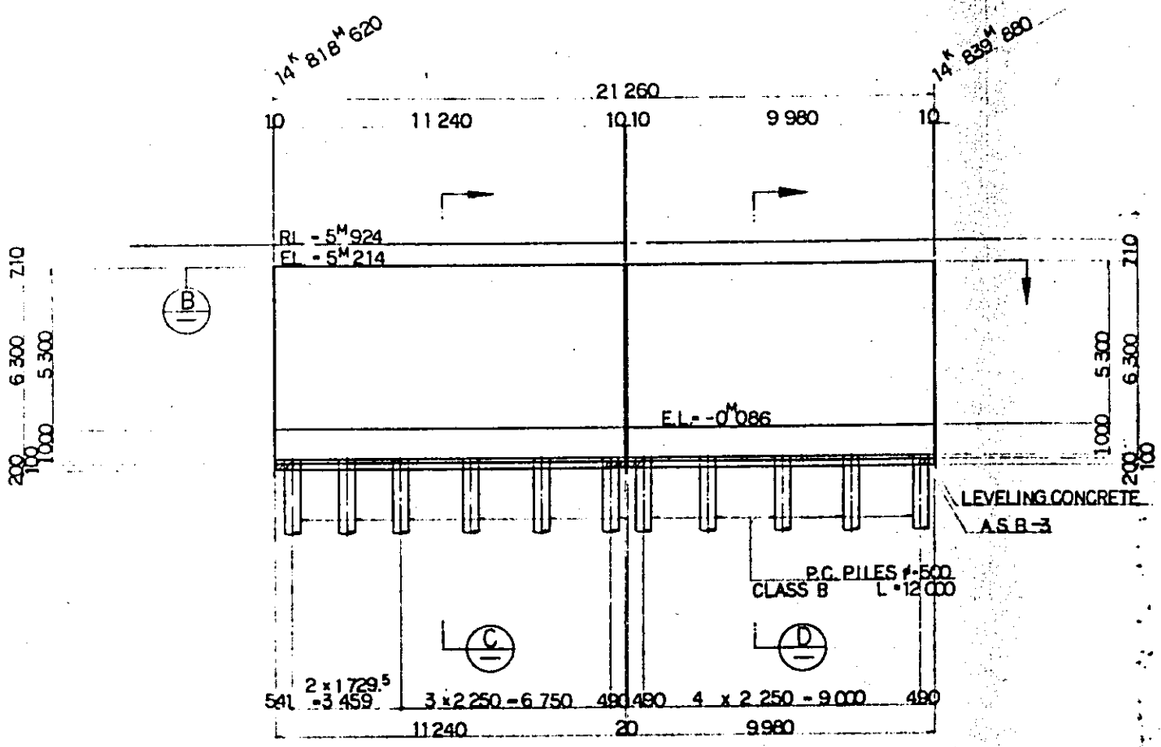
JICA

4. U1

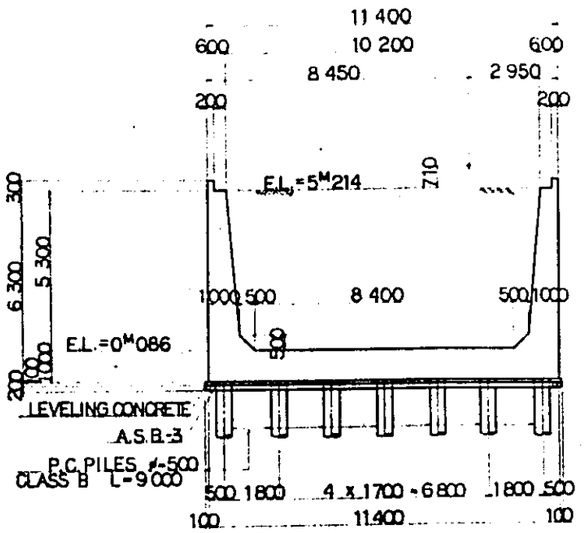
U-TYPE

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
WALL	460.2	640.9.	32 594.0	70.8

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	26.1	CLASS F.
AGGREGATE SUB BASE	〃	52.2	A.S.B.-3
EXCAVATION	〃	544.5	
FOUNDATION MORTAR	—	——	————
PILE	m × NUMBER	12.00×79=948.000	ϕ=500 CLASS B



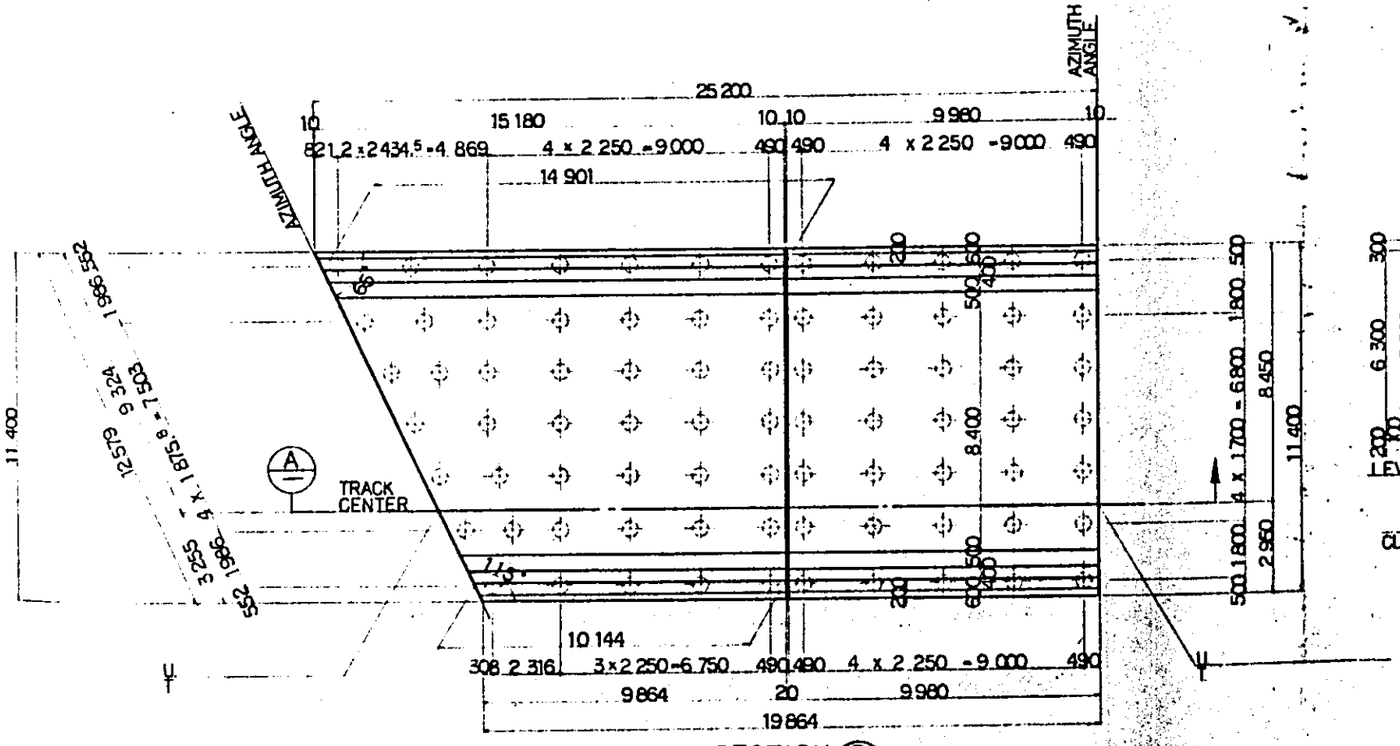
SECTION (A)



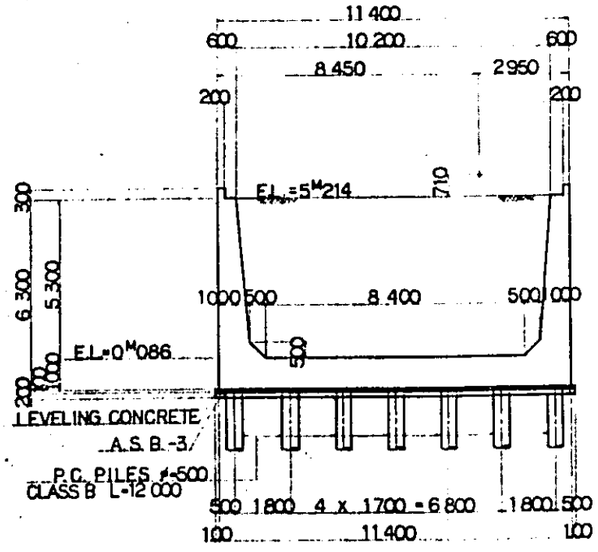
SECTION (C)

NOTES:

1. ALL DIMENSIONS ARE SHOW IN MILLMETERS UNLESS OTHERWISE INDICATED
2. DRAIN PIPE ϕ75 mm .P. .C EACH PER 2^{m2}
3. REFERENCE DRAWING FOR BAR ARRANGEMENT : CS - 146
   CS - 147
   CS - 148



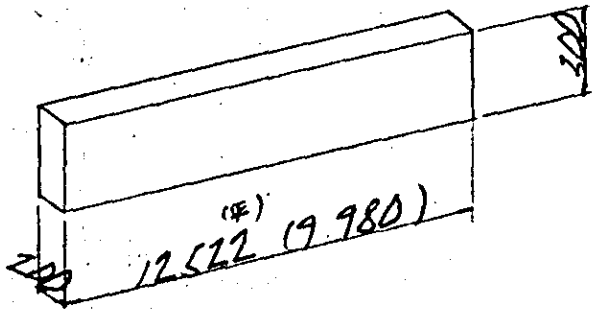
SECTION (B)



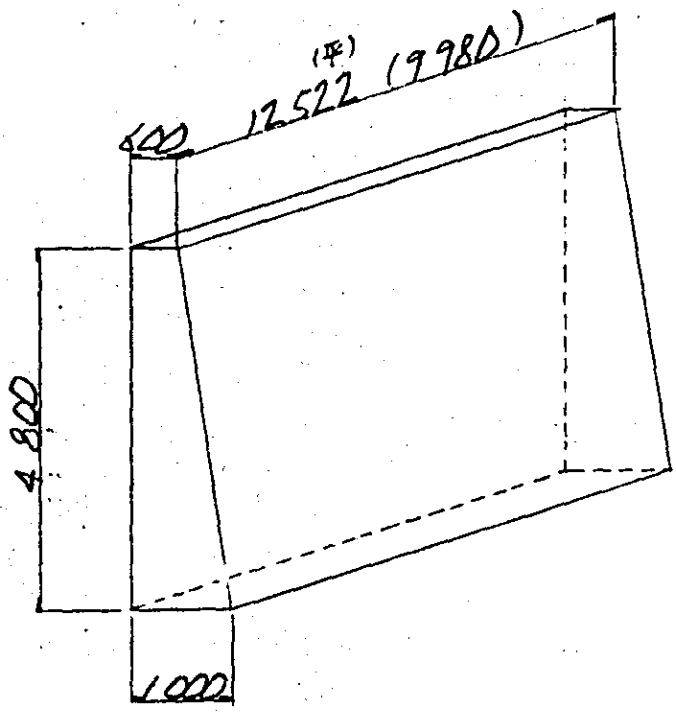
SECTION (D)

1). CONCRETE VOLUM

(1) WALL

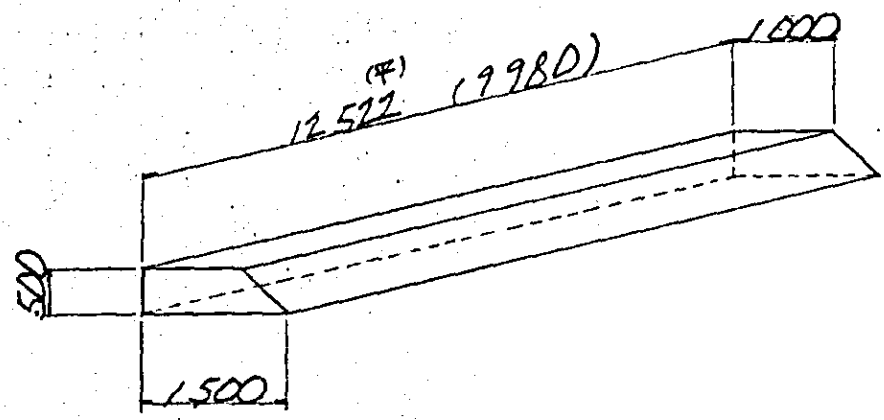


$V_1 = 0.200 \times 0.300 \times (12.522 + 9.980) \times 2 = 2.700\ m^3$



$V_{b1} = 1/2 \times (0.600 + 1.000) \times 4.800 \times 12.522 \times 2 = 96.169$ "

$V_{b2} = 1/2 \times (0.600 + 1.000) \times 4.800 \times 9.980 \times 2 = 76.646$ "

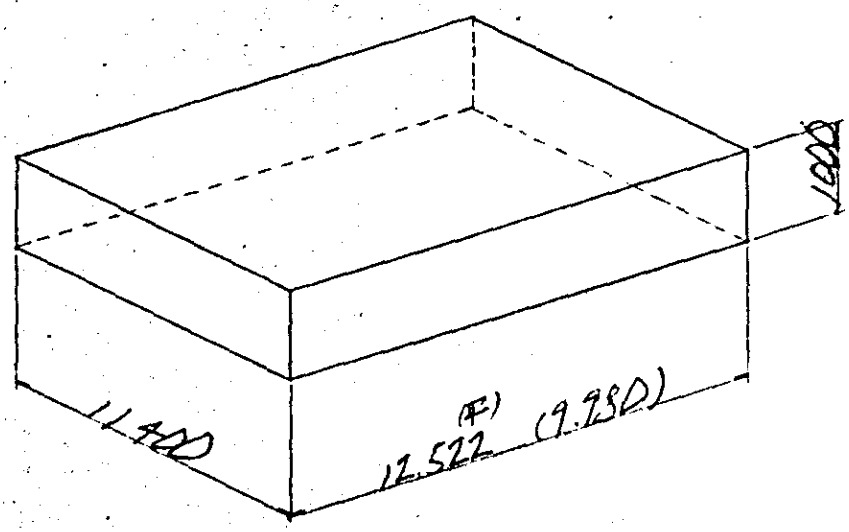


$V_{C1} = \frac{1}{2} \times (1.000 + 1.500) \times 0.500 \times 12.522 \times 2 = 15.653\ m^3$

$V_{C2} = \frac{1}{2} \times (1.000 + 1.500) \times 0.500 \times 9.980 \times 2 = 12.475\ "$

WALL TOTAL = 203.643 m^3

(2) FOOTING

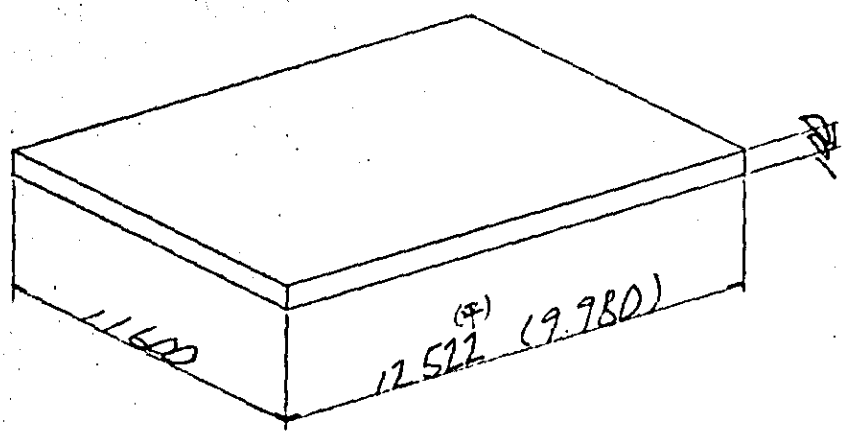


$V_{d1} = 1.000 \times 11.400 \times 12.522 = 142.751\ "$

$V_{d2} = 1.000 \times 11.400 \times 9.980 = 113.772\ "$

FOOTING TOTAL = 460.166 m^3

2) LEVELING CONCRETE

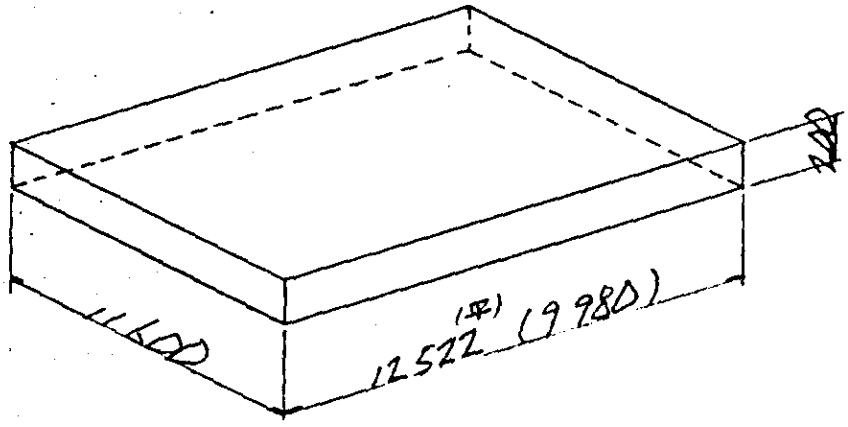


$V_1 = 11.600 \times 0.100 \times 12.522 = 14.526\ m^3$

$V_2 = 11.600 \times 0.100 \times 9.980 = 11.577\ "$

LEVELING CONCRETE TOTAL = $26.103\ m^3$

3) AGGREGATE SUB BASE



$V_1 = 11.600 \times 0.200 \times 12.522 = 29.051\ m^3$

$V_2 = 11.600 \times 0.200 \times 9.980 = 23.154\ "$

AGGREGATE SUB BASE TOTAL = $52.205\ m^3$

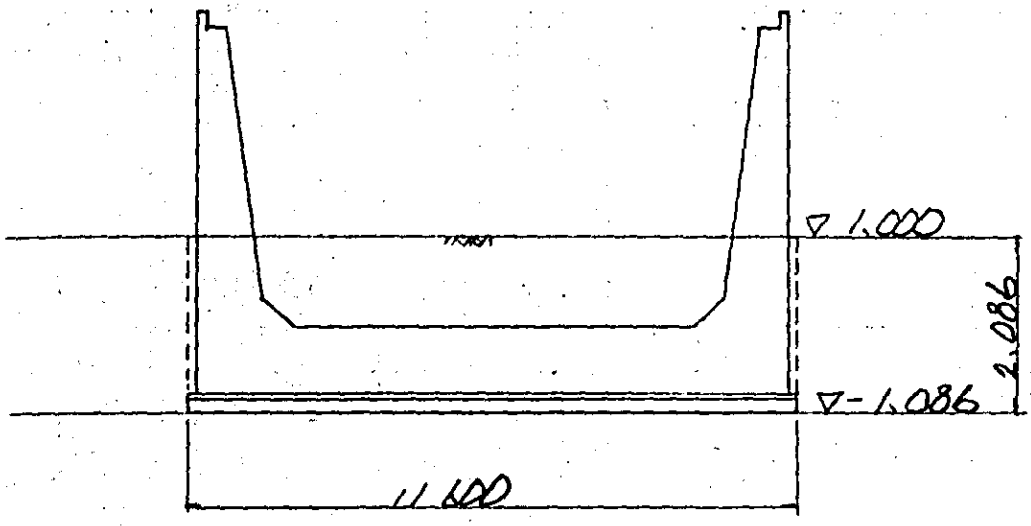
4) PILE

ϕ - 500 mm ℓ = 12.000 m n = 79 本

N = 79 本 x 1 = 79 本

PILE TOTAL 79 本

5) EXCAVATION



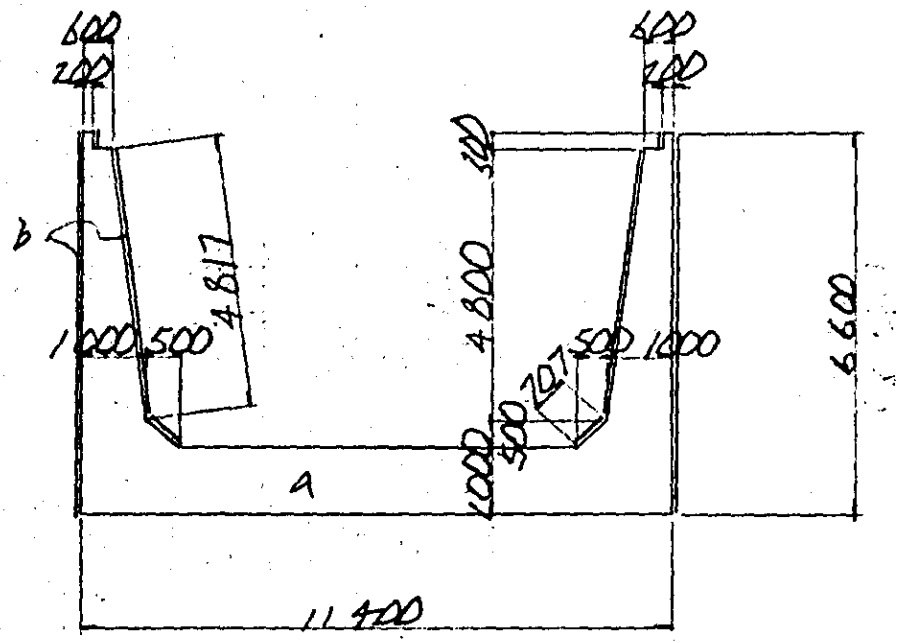
$L = 12.522^{(F)}\ m$ (9.980 m)

$V_1 = 11.600 \times 2.086 \times 12.522 = 303.002\ m^3$

$V_2 = 11.600 \times 2.086 \times 9.980 = 241.492\ "$

EXCAVATION TOTAL = 544.494 m^3

6) FORM AREA



$L = 12.522^{(中)}\,m \quad (9.980\,m)$

$A_{a1} = 0.200 \times 0.300 \times 2 \times 4 = 0.480\ m^2$

$A_{a2} = 1/2 \times (0.600 + 1.000) \times 4.800 \times 2 \times 2 = 15.360$ "

$A_{a3} = 1/2 \times (0.600 + 1.000) \times 4.800 \times 2 \times 2 = 15.360$ "

$A_{a4} = 1/2 \times (1.000 + 1.500) \times 0.500 \times 2 \times 4 = 5.000$ "

$A_{a5} = 11.400 \times 1.000 \times 4 = 45.600$ "

$A_{b1} = (6.600 + 0.300 + 4.817 + 0.707) \times 12.522 \times 2 = 311.147$ "

$A_{b2} = (6.600 + 0.300 + 4.817 + 0.707) \times 9.980 \times 2 = 247.983$ "

FORM AREA TOTAL = $640.930\ m^2$

U - TYPE

7) REINFORCING BAR

(SD30)

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
WALL	—	—	11 352.6	5 680.4	3 245.3	7528.8	4 700.6	86.3	32 594.0

REINFORCING BAR

No. 57

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
W 1	D25	3.98	11 770	78	3 653.9	⟷
2	〃	〃	12 920	9	462.8	〃
3	〃	〃	3 400	91	1 231.4	↗
4	〃	〃	3 680	10	146.5	〃
5	〃	〃	7 050	39	954.0	←
6	D22	3.04	6 320	101	1 940.5	↓
7	〃	〃	4 000	98	1 191.7	〃
8	D16	1.56	11 380	48	852.1	└
9	〃	〃	12 380	35	675.9	┘
10	〃	〃	11 920	5	93.0	└
11	〃	〃	13 020	5	101.6	┘
12	〃	〃	7 700	51	612.6	└
13	〃	〃	6 700	39	407.6	┘
14	〃	〃	8 340	4	52.0	└
15	〃	〃	7 240	4	45.2	┘
16	〃	〃	10 580	8	132.0	└
17	〃	〃	4 450	9	62.5	—
18	〃	〃	5 900	9	82.8	└
19	〃	〃	4 450	8	55.5	—
20	D19	2.25	12 370	65	1 809.1	〃
21	D16	1.56	14 780	28	645.6	〃
22	〃	〃	9 940	28	434.2	〃
23	D13	0.995	12 370	75	923.1	〃
24	〃	〃	15 020		313.8	〃
25	〃	〃	9 710		202.9	〃
26	〃	〃	1 060	101	106.5	⊓
27	D10	0.56	600	101	33.9		
28	〃	〃	15 020	1	8.4	—
29	〃	〃	9 710	1	5.4	〃
W° 1	D13	0.995	2 610	195	506.4	⊓
2	〃	〃	3 730	106	393.4	〃
3	〃	〃	930	230	212.8	⊓
				D25	6 448.6 kg	
				D22	3 132.2 〃	
				D19	1 809.1 〃	
				D16	4 252.6 〃	
				D13	2 658.9 〃	
				D10	47.7 〃	
				TOTAL	18 349.1 〃	

JICA

No. 58

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
W 1	D25	3.98	11 770	81	3 794.4	⟶
2	〃	〃	3 400	82	1 109.6	↗
3	D22	3.04	6 320	82	1 575.4	↓
4	〃	〃	4 000	80	972.8	〃
5	D16	1.56	11 380	41	727.9	⌊
6	〃	〃	12 380	41	791.8	⌊
7	〃	〃	7 700	40	480.5	⌊
8	〃	〃	6 700	40	418.1	⌊
9	D19	2.25	9 820	65	1 436.2	—
10	D16	1.56	9 820	56	857.9	〃
11	D13	0.995	9 820	117	1 143.2	〃
12	〃	〃	1 060	82	86.5	⊓
13	D10	0.56	600	82	27.6	↓
14	〃	〃	9 820	2	11.0	—
W° 1	D13	0.995	2 610	144	374.0	⊓
2	〃	〃	2 520	16	40.1	〃
3	〃	〃	3 730	54	200.4	〃
4	〃	〃	3 640	6	21.7	〃
5	〃	〃	930	190	175.8	⊓
				D25	4 904.0 kg	
				D22	2 548.2 〃	
				D19	1 436.2 〃	
				D16	3 276.2 〃	
				D13	2 041.3 〃	
				D10	38.6 〃	
				TOTAL	14 244.9 kg	

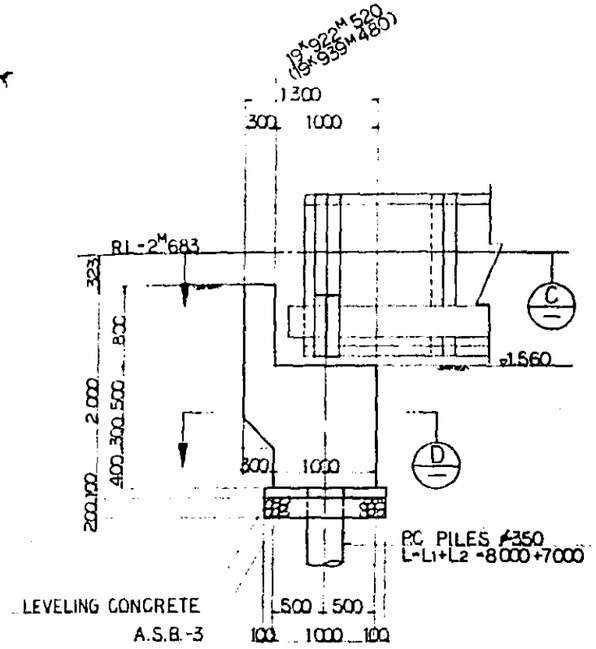
JICA

5. Ab 102
Ab 103

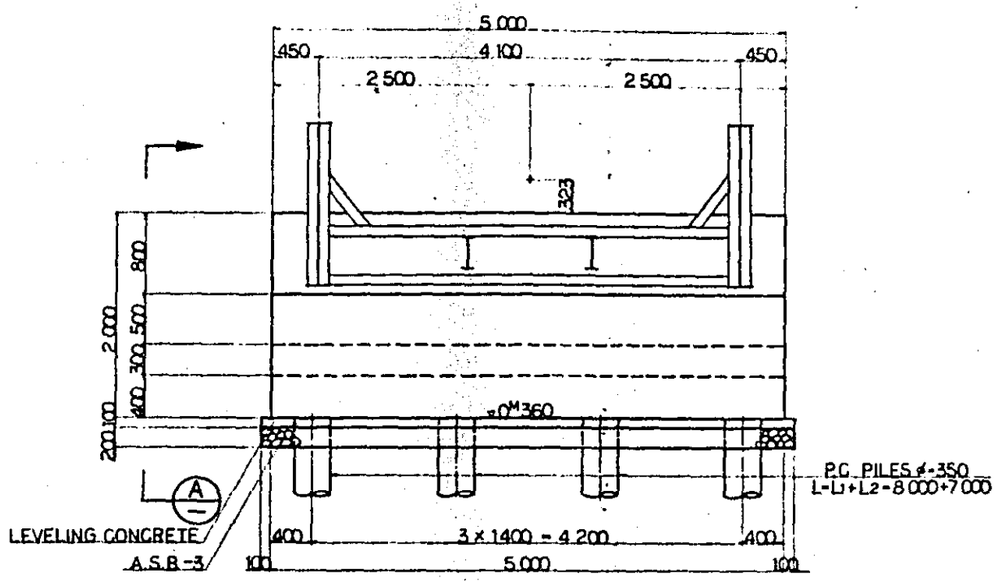
ABUTMENT (A102) (A103)

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
WALL	8.2	23.9	838.3	102.2
FOOTING	——	——	——	——

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	0.6	CLASS 5
AGGREGATE SUB BASE	〃	1.2	A.S.B.-3
EXCAVATION	〃	9.4	
FOUNDATION MORTAR	〃	0.12	f_{ck} = 400 kg/cm²
PILE	m × NUMBER	8.00 × 4 = 32.000	φ = 350 CLASS A
		7.00 × 4 = 28.000	φ = 350 CLASS A



SECTION (A)

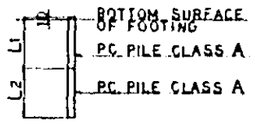


SECTION (B)

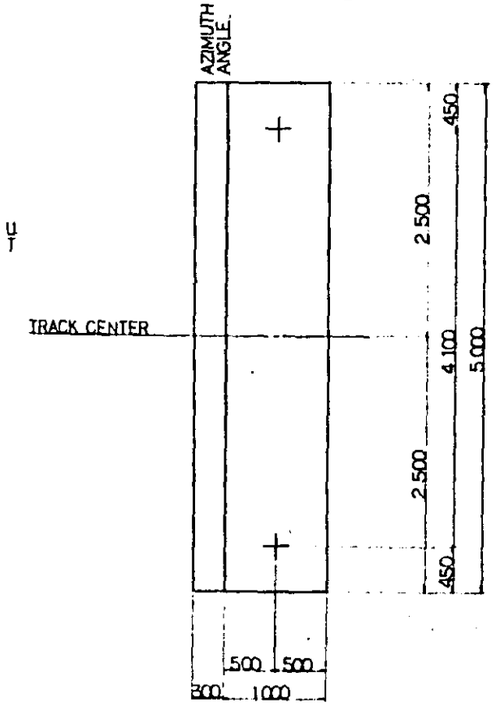
NOTES:

1 ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED

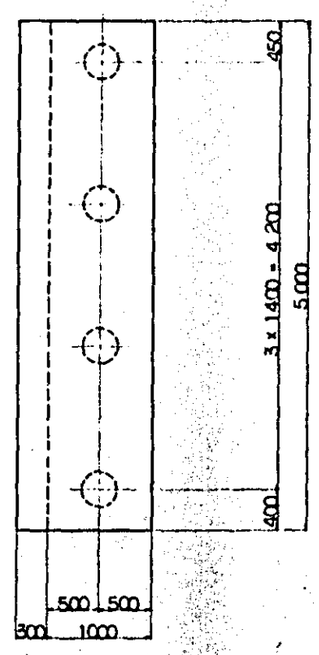
2 TYPES OF PC PILE



3 REFERENCE DRAWING FOR BAR ARRANGEMENT : CS - 287

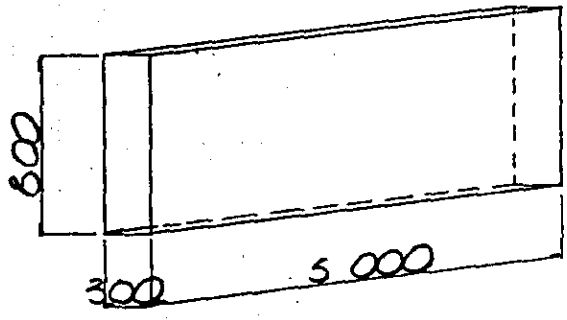


SECTION (C)

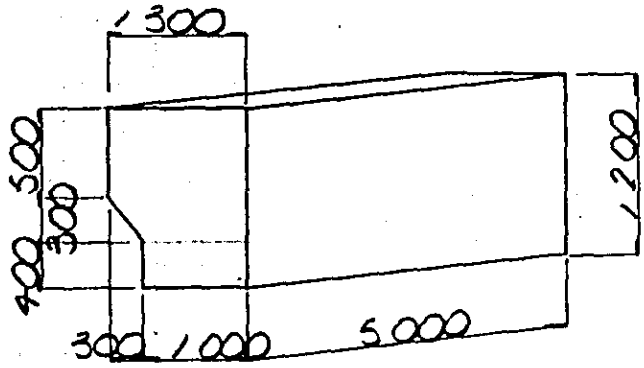


SECTION (D)

12 CONCRETE VOLUM



V = 0.800 × 0.300 × 5.000 = 1.200 m^3

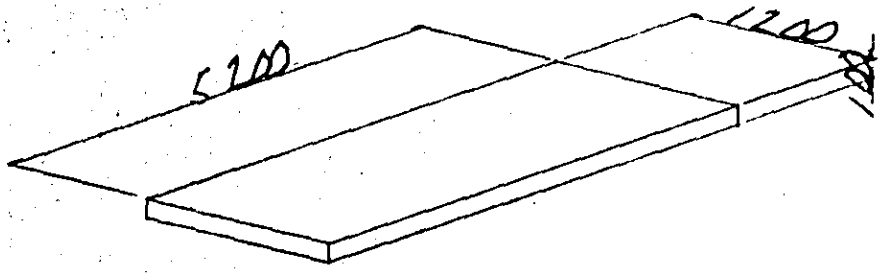


V = 1/2 × (0.500 + 0.800) × 0.300 × 5.000 = 0.975 m^3

V = 1.000 × 1.200 × 5.000 = 6.000 "

CONCRETE VOLUM TOTAL = 8.175 m^3

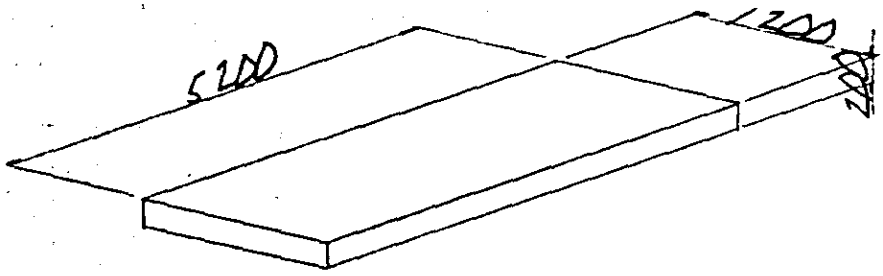
2) LEVELING CONCRETE



$V = 1.200 \times 5.200 \times 0.100 = 0.624\ m^3$

LEVELING CONCRETE TOTAL = $0.624\ m^3$

3) AGGREGATE SUB BASE



$V = 1.200 \times 5.200 \times 0.200 = 1.248\ m^3$

AGGREGATE SUB BASE TOTAL = $1.248\ m^3$

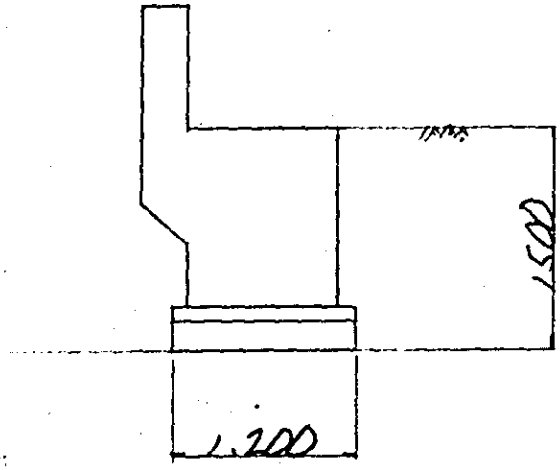
4) PILE

ϕ-350 mm ℓ- m n= 4 本

N= 4 本 x 1 = 4 本

PILE TOTAL 4 本

5) EXCAVATION

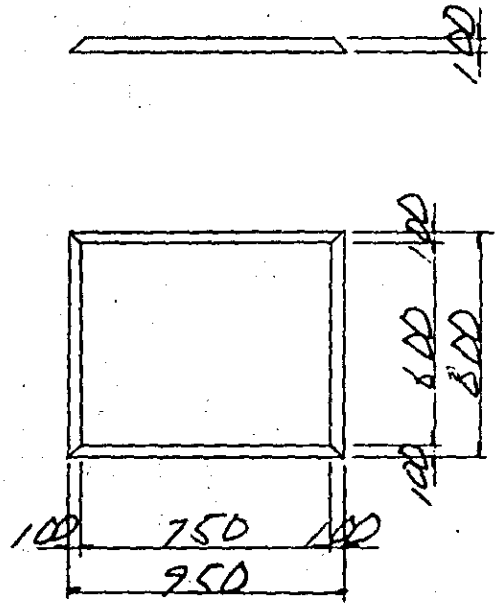


L = 5.200 m

$V = 1.200 \times 1.500 \times 5.200 = 9.360\ m^3$

EXCAVATION TOTAL = $9.360\ m^3$

6) FOUNDATION MORTAR

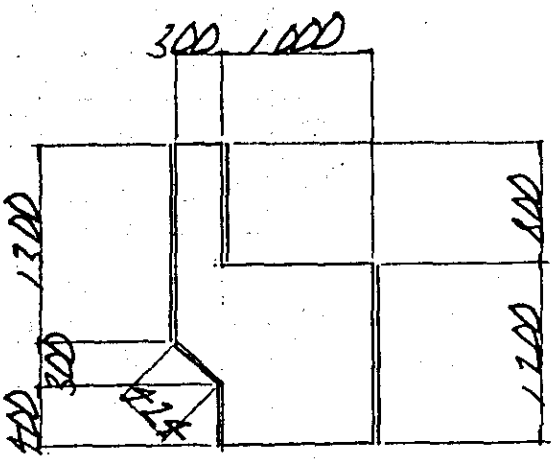


$$V = 1/6 \times (0.750 \times 0.600 + 0.950 \times 0.800 + 4 \times 0.850 \times 0.700) \times 0.100 \times 2 = 0.120 \ m^3$$

FOUNDATION MORTAR TOTAL = $0.120 \ m^3$

7) FORM AREA

WALL



L = 5.000 m

$A_1 = \frac{1}{2} \times (1.300 + 1.600) \times 0.300 \times 2 = 0.870\ m^2$

$A_2 = 1.000 \times 1.200 \times 2 = 2.400\ "$

$A_3 = (1.300 + 0.424 + 0.400 + 0.800 + 1.200) \times 5.000 = 20.620\ "$

FORM AREA TOTAL = 23.890 m^2

ABUTMENT

8) REINFORCING BAR

(SD30)

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
WALL	—	414.3	—	—	—	—	424.0	—	838.3
FOOTING	—	—	—	—	—	—	—	—	—

REINFORCING BAR

No. 69

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
A 1	D29	5.04	6 850	12	414 3	
2	D13	0.995	5 450	7	38 0	
3	"	"	4 880	10	48 6	
4	"	"	1 770	4	7 0	
5	"	"	1 450	2	2 9	"
6	"	"	3 260	34	110 3	
A' 1	D13	0.995	2 100	32	66 9	
2	"	"	3 280	32	104 4	
3	"	"	1 070	13	13 8	
S 1	D13	0.995	1 550	10	15 4	
2	"	"	1 400	12	16 7	"
			D29		414 3	kg
			D13		424 0	"
			TOTAL		838 3	kg

JICA

6. Ab 03

ABUTMENT Ab 03

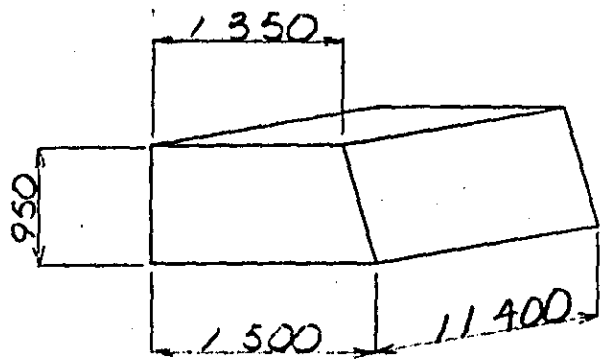
	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
WALL	23.3	57.9	※ 1139.4	※ 48.9
FOOTING	32.7	23.9	1039.9	31.8

※ REFER TO Ab 3

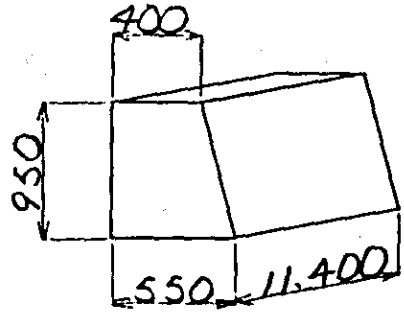
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	3.7	CLASS F
AGGREGATE SUB BASE	〃	7.4	A.S.B.-3
EXCAVATION	〃	68.9	
FOUNDATION MORTAR	〃	0.08	S_{ct} = 400 %/0.m. 0.02 × 4 = 0.08
PILE	m ※NUMBER	12.00×6=72.000	φ=500 CLASS B

1) CONCRETE VOLUM

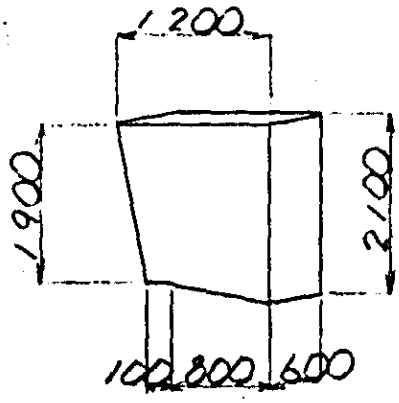
(1) WALL



$V = 1/2 \times (1.500 + 1.350) \times 0.950 \times 11.400 = 15.433\ m^3$



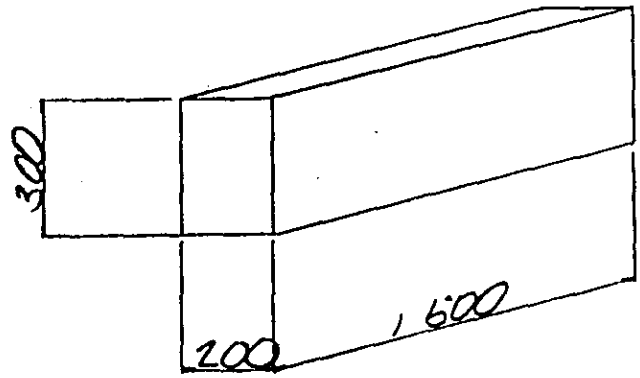
$V = 1/2 \times (0.550 + 0.400) \times 0.950 \times 11.400 = 5.144\ m^3$



$V = 1/2 \times (2.100 + 1.900) \times 0.800 \times 0.600 \times 2 = 1.920\ m^3$

$V = 1/2 \times (0.400 + 0.100) \times 1.900 \times 0.600 \times 2 = 0.570\ m^3$

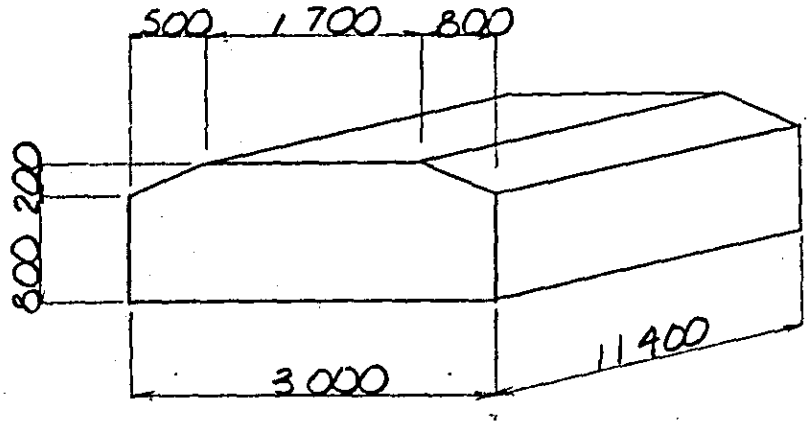
SUB TOTAL = $2.490\ m^3$



$V = 0.300 \times 0.200 \times 1.600 \times 2 = 0.192\ m^3$

WALL TOTAL $= 23.259\ m^3$

(2) FOOTING

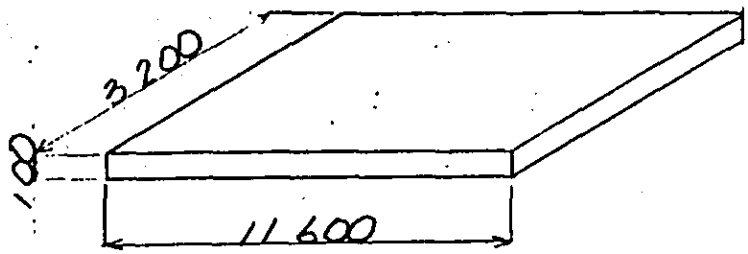


$V = 1/2 \times (3.000 + 1.700) \times 0.200 \times 11.400 = 5.358\ m^3$

$V = 3.000 \times 0.800 \times 11.400 = 27.360\ "$

FOOTING TOTAL = $32.718\ m^3$

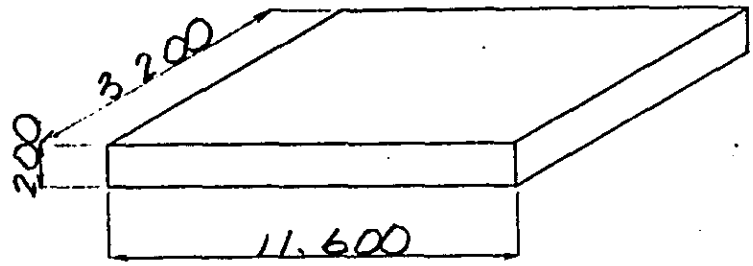
2) LEVELING CONCRETE



$V = 3.200 \times 11.600 \times 0.100 = 3.712\ m^3$

LEVELING CONCRETE TOTAL = 3.712 m^3

3) AGGREGATE SUB BASE



$V = 3.200 \times 11.600 \times 0.200 = 7.424\ m^3$

AGGREGATE SUB BASE TOTAL = 7.424 m^3

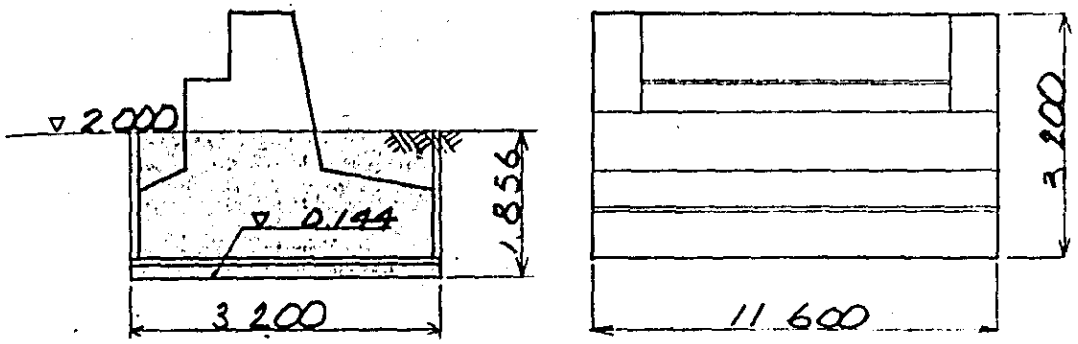
4) PILE

ϕ - 500 mm ℓ = 12.000 m n = 6 本

N = 6 本 × 1 = 6 本

PILE TOTAL 6 本

5) EXCAVATION

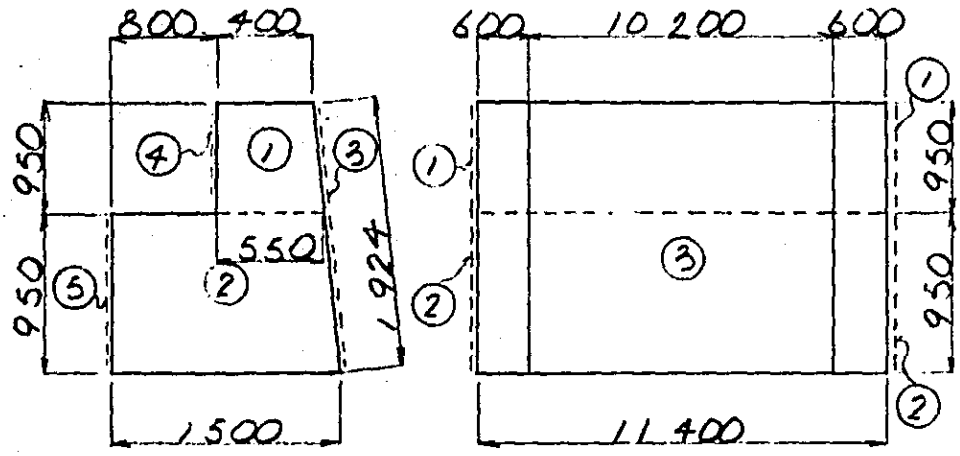


V = 11.600 × 3.200 × 1.856 = 68.895 m³

EXCAVATION TOTAL = 68.895 m³

6) FORM AREA

(1) WALL



A_1 = ½ × (0.400 + 0.550) × 0.950 × 2 = 0.903 m²

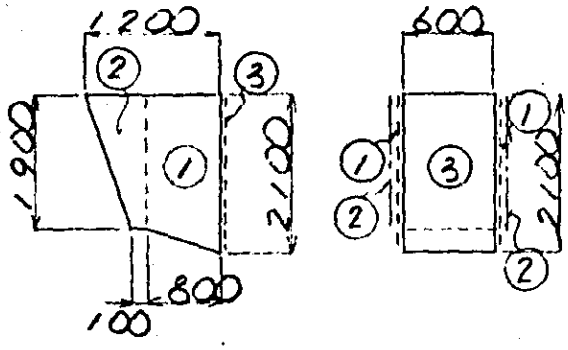
A_2 = ½ × (1.350 + 1.500) × 0.950 × 2 = 2.708 "

A_3 = 1.924 × 10.200 = 19.625 "

A_4 = 0.950 × 11.400 = 10.830 "

A_5 = 0.950 × 11.400 = 10.830 "

SUB TOTAL = 44.896 m²

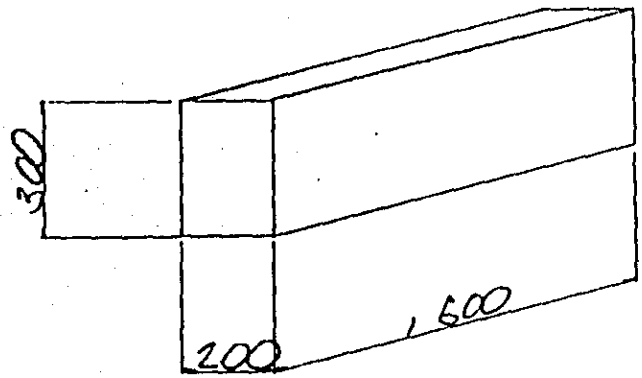


A_1 = ½ × (1.900 + 2.100) × 0.800 × 2 × 2 = 6.400 m²

A_2 = ½ × (0.100 + 0.400) × 1.900 × 2 × 2 = 1.900 "

A_3 = 0.600 × 2.100 × 2 = 2.520 "

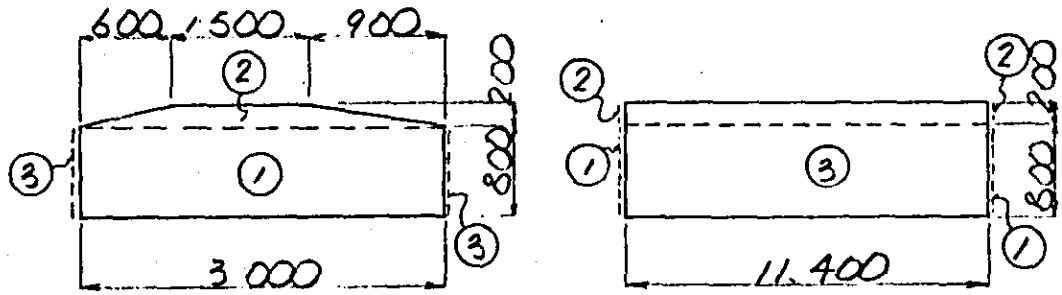
SUB TOTAL = 10.820 m²



$A = 0.300 \times (1.600 + 0.200) \times 2 \times 2 = 2.160\ m^2$

WALL TOTAL $= 57.876\ m^2$

(2) FOOTING



A_1 = 3.000 × 0.800 × 2 = 4.800 m²

A_2 = 1/2 × (1.500 − 3.000) × 0.200 × 2 = 0.900 "

A_3 = 0.800 × 11.400 × 2 = 18.240 "

FOOTING TOTAL = 23.940 m²

ABUTMENT (Ab 101)

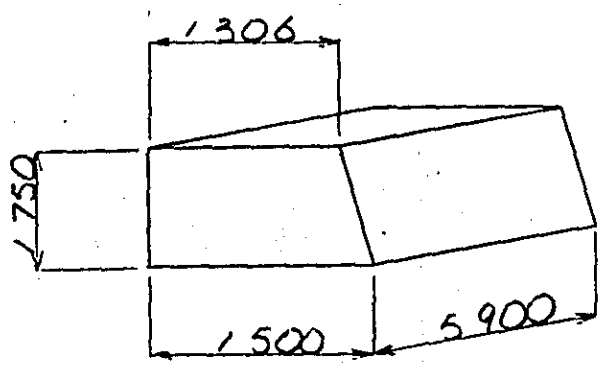
	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
WALL	20.7	50.8	※ 1012.2	※ 48.9
FOOTING	16.9	15.2	537.4	31.8

※ REFER TO Ab 5

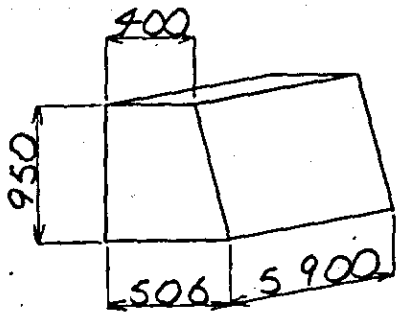
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	m^3	2.0	CLASS F
AGGREGATE SUB BASE	"	3.9	A.S.B.-3
EXCAVATION	"	36.7	
FOUNDATION MORTAR	"	0.04	0.02 × 2 = 0.04
PILE	m ×NUMBER	14.00×6 = 84.000	φ=500 CLASS B

1) CONCRETE VOLVM

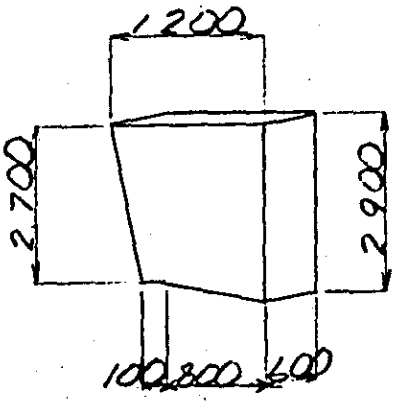
(1) WALL



$V = 1/2 \times (1.500 + 1.306) \times 1.750 \times 5.900 = 14.486^{m^3}$



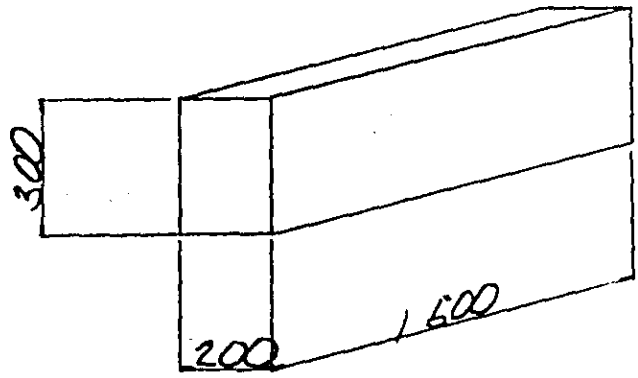
$V = 1/2 \times (0.506 + 0.400) \times 0.950 \times 5.900 = 2.539^{m^3}$



$V = 1/2 \times (2.900 + 2.700) \times 0.800 \times 0.600 \times 2 = 2.688^{m^3}$

$V = 1/2 \times (0.400 + 0.100) \times 2.700 \times 0.500 \times 2 = 0.810$ "

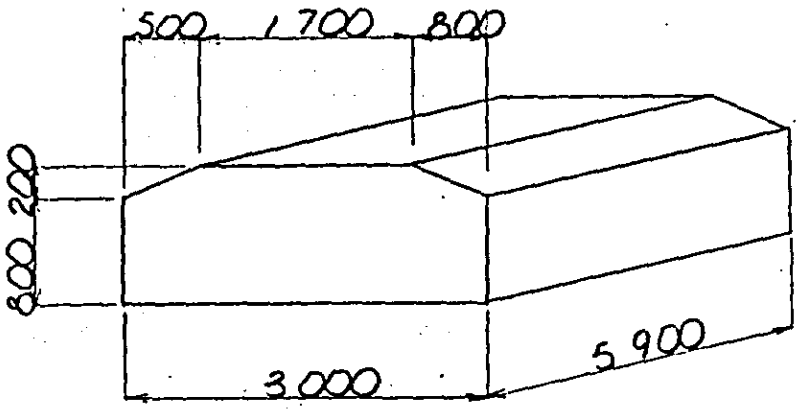
SUB TOTAL = 3.498^{m^3}



$V = 0.300 \times 0.200 \times 1.600 \times 2 = 0.192\ m^3$

WALL TOTAL $= 20.715\ m^3$

(2) FOOTING

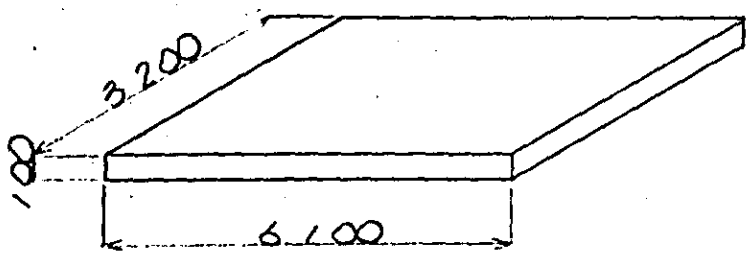


$V = 1/2 \times (3.000 + 1.700) \times 0.200 \times 5.900 = 2.773^{m3}$

$V = 3.000 \times 0.800 \times 5.900 = 14.160^{"}$

FOOTING TOTAL = 16.933^{m3}

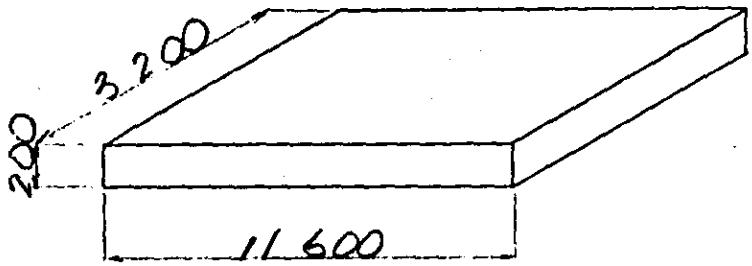
2) LEVELING CONCRETE



V = 3.200 × 6.100 × 0.100 = 1.952 m^3

LEVELING CONCRETE TOTAL = 1.952 m^3.

3) AGGREGATE SUB BASE



V = 3.200 × 6.100 × 0.200 = 3.904 m^3

AGGREGATE SUB BASE TOTAL = 3.904 m^3

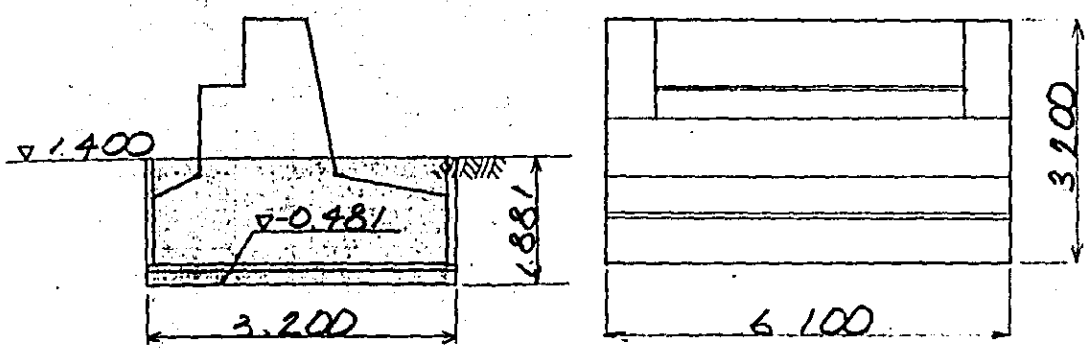
(4) PILE

$\phi = 500^{mm}$ $\ell = 14.000^{m}$ $n = 6$ 本

$N = 6$ 本 $\times$ 1 = 6 本

PILE TOTAL 6 本

5) EXCAVATION

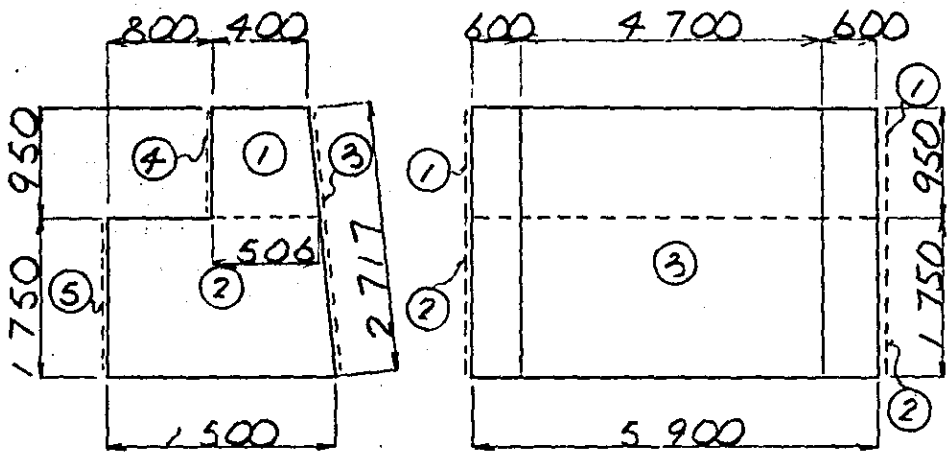


V= 3.200 × 6.100 × 1.881 = 36.717 m³

EXCAVATION TOTAL = 36.717 m³

6) FORM AREA

(1) WALL



A_1 = ½ × (0.400 + 0.506) × 0.950 × 2 = 0.861 m²

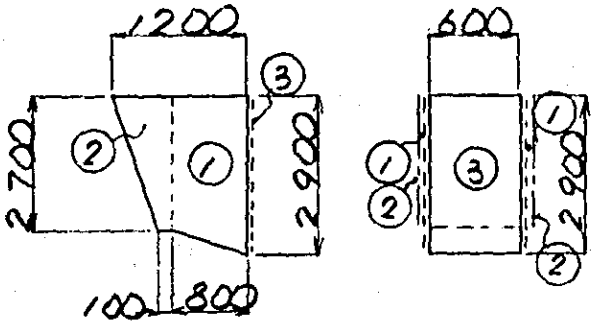
A_2 = ½ × (1.306 + 1.500) × 1.750 × 2 = 4.911 "

A_3 = 2.717 × 4.700 = 12.770 "

A_4 = 0.950 × 5.900 = 5.605 "

A_5 = 1.750 × 5.900 = 10.325 "

34.472 m²

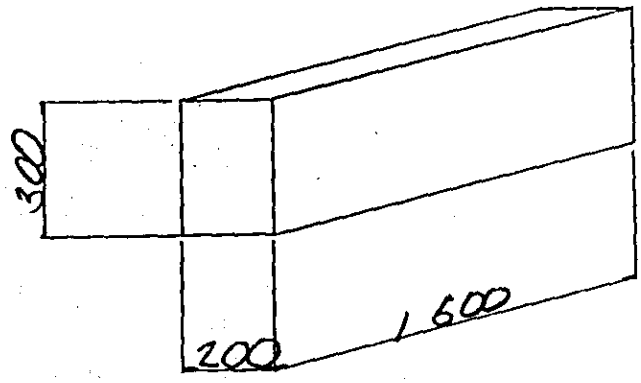


A_1 = ½ × (2.700 + 2.900) × 0.800 × 2 × 2 = 8.960 m²

A_2 = ½ × (0.100 + 0.400) × 2.700 × 2 × 2 = 2.700 "

A_3 = 0.600 × 2.900 × 2 = 3.480 "

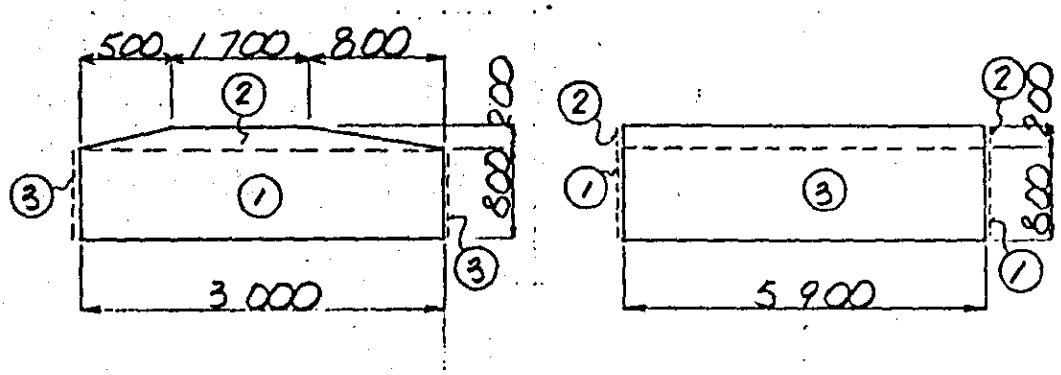
15.140 m²



$A = 0.300 \times (1.600 + 0.200) \times 2 \times 2 = 2.160\ m^2$

WALL TOTAL $= 51.772\ m^2$

(2) FOOTING



A_1 = 3.000 × 0.800 × 2 = 4.800 m²

A_2 = 1/2 × (1.700 + 3.000) × 0.200 × 2 = 0.940 "

A_3 = 0.800 × 5.900 × 2 = 9.440 "

FOOTING TOTAL = 15.180 m²

§ 25. VIADUCT (1 OF 3)

VIADUCT

No. 0-2

REMARKS / UNIT / NO.	CONCRETE VOLUME SLAB BEAM COLUMN	CONCRETE VOLUME FOUNDATION	FORM AREA	REINFORCING BAR	LEVELING CONCRETE	AGGRE-GATE SUB BASE	STRUCTURE EXCAVATION VORUME	STRUCTURE EXCAVATION TY-PE	FOUNDATION MORTAR	P.C. PILES	
	CLASS C	CLASS C		SD 30	CLASS F	A.S.B. -3			σ_{ck} = 400 kg/cm	CLASS B ø 350 mm	CLASS A ø 350 mm
	m^3	m^3	m^2	kg	m^3	m^3	m^3		m^3	m L x N	m L x N
V 001	95.1	67.7	447.8	24 961.4	8.7	17.4	156.4	A	0.044	10.0 · 48	—
002	102.3	58.9	475.7	24 685.4	8.1	16.1	144.9	A	—	10.0 · 48	—
003	101.9	58.9	493.7	25 389.4	8.1	16.1	144.9	A	—	10.0 · 48	—
004	133.6	74.5	632.1	32 032.5	10.2	20.5	184.1	A	—	10.0 · 60	—
005	137.4	74.5	657.3	32 964.2	10.2	20.5	184.1	A	—	10.0 · 60	—
006	138.6	74.5	665.1	33 216.0	10.2	20.5	184.1	A	—	11.0 · 60	—
007	132.9	81.4	645.3	33 724.1	11.0	22.1	231.7	A	0.044	11.0 · 60	—
008	75.3	47.4	366.2	19 857.5	6.3	12.7	114.2	A	0.044	11.0 · 36	—
009	140.8	74.5	679.7	33 687.1	10.2	20.5	184.1	A	—	11.0 · 60	—
010	78.6	47.4	387.1	20 662.1	6.3	12.7	114.2	A	0.044	11.0 · 36	—
011	104.4	64.4	506.9	26 835.3	8.7	17.4	156.4	A	—	11.0 · 48	—
012	140.8	74.5	679.7	33 687.1	10.2	20.5	184.1	A	—	11.0 · 60	—
013	104.3	64.4	506.8	26 828.9	8.7	17.4	156.4	A	0.044	11.0 · 48	—
014	105.5	64.4	514.9	27 205.4	8.7	17.4	156.4	A	0.044	11.0 · 48	—
015	140.6	74.5	679.1	33 547.6	10.2	20.5	184.1	A	—	11.0 · 60	—
016	142.1	74.5	688.8	33 977.6	10.2	20.5	184.1	A	—	11.0 · 60	—
017	77.4	47.4	379.6	20 418.4	6.3	12.7	114.2	A	0.044	11.0 · 36	—

JICA

VIADUCT

No. 0-3

REMARKS / UNIT / NO.	CONCRETE VOLUME: SLAB, BEAM COLUMN	CONCRETE VOLUME: FOUNDATION	FORM AREA	REINFORCING BAR	LEVELING CONCRETE	AGGRE-GATE SUB BASE	STRUCTURE EXCAVATION: VORUME	STRUCTURE EXCAVATION: TY-PE	FOUNDA-TION MORTAR	P.C. PILES	
	CLASS C	CLASS C		SD 30	CLASS F	A.S.B. -3			σ_{ck} = 400 kg/cm	CLASS B ø 350 mm	CLASS A ø 350 mm
	m^3	m^3	m^2	kg	m^3	m^3	m^3		m^3	m L x N	m L x N
V 018	134.8	81.4	657.9	34 265.7	11.0	22.1	199.2	A	0.044	12.0 × 60	—
019	141.2	74.5	682.5	33 776.7	10.2	20.5	184.1	A	—	12.0 × 60	—
020	140.4	74.5	677.8	33 503.1	10.2	20.5	184.1	A	—	12.0 × 60	—
021	139.9	74.5	673.6	33 489.4	10.2	20.5	184.1	A	—	12.0 × 60	—
022	137.8	74.5	658.9	33 409.1	10.2	20.5	184.1	A	—	12.0 × 60	—
023	134.6	74.5	639.3	32 262.6	10.2	20.5	184.1	A	—	12.0 × 60	—
024	106.3	58.9	503.1	25 690.6	8.1	16.1	144.9	A	—	12.0 × 48	—
025	106.2	58.9	501.6	25 524.2	8.1	16.1	144.9	A	—	12.0 × 48	—
026	104.1	58.9	488.4	25 216.0	8.1	16.1	144.9	A	—	12.0 × 48	—
027	96.5	61.4	457.3	25 096.5	8.7	17.4	156.9	A	0.044	12.0 × 48	—
028	124.4	81.4	588.8	32 001.4	11.0	22.1	199.2	A	0.044	12.0 × 60	—
029	131.3	74.5	616.6	31 535.0	10.2	20.5	184.7	A	—	12.0 × 60	—
030	132.4	74.5	623.6	31 879.7	10.2	20.5	184.7	A	—	13.0 × 60	—
031	132.4	74.5	623.6	31 879.7	10.2	20.5	184.7	A	—	13.0 × 60	—
032	131.3	74.5	616.7	31 535.0	10.2	20.5	184.7	A	—	13.0 × 60	—
033	132.4	74.5	623.6	31 879.7	10.2	20.5	184.7	A	—	13.0 × 60	
034	132.4	74.5	623.6	31 879.7	10.2	20.5	184.7	A	—	14.0 × 60	

JICA

VIADUCT

No. 0-4

REMARKS / UNIT / NO.	CONCRETE VOLUME SLAB, BEAM COLUMN	CONCRETE VOLUME FOUNDATION	FORM	REINFORCING	LEVELING	AGGRE-GATE	STRUCTURE EXCAVATION		FOUNDATION	P.C. PILES	
				BAR	CONCRETE	SUB BASE	VORUME	TYPE	MORTAR		
	CLASS C	CLASS C		SD 30	CLASS F	A.S.B. -3			σ_{ck} = 400 kg/cm	CLASS B Ø 350 mm	CLASS A Ø 350 mm
	m^3	m^3	m^2	kg	m^3	m^3	m^3		m^3	m L x N	m L x N
V 035	131.3	74.5	616.7	31 535.0	10.2	20.5	184.7	A	—	14.0 × 60	—
036	132.4	74.5	623.6	31 879.7	10.2	20.5	184.7	A	—	14.0 × 60	—
037	132.4	74.5	623.6	31 879.7	10.2	20.5	184.7	A	—	14.0 × 60	—
038	131.3	74.5	616.7	31 535.0	10.2	20.5	184.7	A	—	14.0 × 60	—
039	132.4	74.5	623.6	31 879.7	10.2	20.5	184.7	A	—	14.0 × 60	—
040	132.3	74.5	623.4	31 873.5	10.2	20.5	184.1	A	—	14.0 × 60	—
041	132.3	74.5	623.5	31 755.9	10.2	20.5	184.1	A	—	14.0 × 60	—
042	139.8	74.5	672.5	33 461.4	10.2	20.5	184.1	A	—	14.0 × 60	—
043	139.5	74.5	670.9	33 409.1	10.2	20.5	184.1	A	—	14.0 × 60	—
044	140.3	74.5	677.0	33 475.3	10.2	20.5	184.1	A	—	14.0 × 60	—
045	143.2	74.5	696.2	34 217.0	10.2	20.5	184.1	A	—	14.0 × 60	—
046	135.1	81.4	659.6	34 320.5	11.0	22.1	198.6	A	0.044	8.0 × 60	7.0 60
047	78.1	47.4	383.5	20 563.9	6.3	12.7	114.2	A	0.044	8.0 × 36	7.0 36
048	113.0	58.9	547.4	26 893.8	8.1	16.1	145.4	A	—	8.0 × 48	8.0 48
049	114.0	58.9	554.3	27 338.5	8.1	16.1	145.4	A	—	8.0 × 48	8.0 48
050	142.1	74.5	688.8	33 854.5	10.2	20.5	184.1	A	—	8.0 × 60	8.0 60
051	142.4	74.5	690.3	34 026.2	10.2	20.5	184.1	A	—	8.0 × 60	8.0 60

JICA

VIADUCT

No. 0-5

REMARKS / UNIT / NO.	CONCRETE VOLUME: SLAB, BEAM COLUMN	CONCRETE VOLUME: FOUNDATION	FORM AREA	REINFORCING BAR	LEVELING CONCRETE	AGGRE-GATE SUB BASE	STRUCTURE EXCAVATION: VOLUME	STRUCTURE EXCAVATION: TYPE	FOUNDATION MORTAR	P.C. PILES: CLASS B	P.C. PILES: CLASS A
	CLASS C	CLASS C		SD 30	CLASS F	A.S.B. -3			σ_{ck} = 400 kg/cm	∅ 350 mm	∅ 350 mm
NO.	m^3	m^3	m^2	kg	m^3	m^3	m^3		m^3	m × N	m × N
052	140.3	74.5	677.0	33 476.1	10.2	20.5	184.1	A	——	8.0 × 60	8.0 × 60
053	140.4	74.5	677.5	33 615.3	10.2	20.5	184.1	A	——	8.0 × 60	8.0 × 60
054	139.5	74.5	671.1	33 409.9	10.2	20.5	184.1	A	——	8.0 × 60	8.0 × 60
055	138.2	74.5	662.9	33 021.1	10.2	20.5	184.1	A	——	8.0 × 60	8.0 × 60
056	138.9	74.5	667.1	33 279.3	10.2	20.5	184.1	A	——	8.0 × 60	8.0 × 60
057	138.9	74.5	667.5	33 293.2	10.2	20.5	184.7	A	——	8.0 × 60	8.0 × 60
058	138.9	74.5	667.5	33 293.2	10.2	20.5	184.7	A	——	8.0 × 60	8.0 × 60
059	137.8	74.5	660.6	32 948.5	10.2	20.5	184.7	A	——	8.0 × 60	8.0 × 60
060	138.9	74.5	667.5	33 293.2	10.2	20.5	184.7	A	——	8.0 × 60	8.0 × 60
061	138.9	74.5	667.5	33 293.2	10.2	20.5	184.7	A	——	8.0 × 60	8.0 × 60
062	140.0	74.5	674.8	33 411.7	10.2	20.5	184.7	A	——	8.0 × 60	10.0 × 60
063	138.9	74.5	667.5	33 293.2	10.2	20.5	184.7	A	——	8.0 × 60	10.0 × 60
064	138.9	74.5	667.5	33 293.2	10.2	20.5	184.7	A	——	8.0 × 60	10.0 × 60
065	137.8	74.5	660.6	32 948.5	10.2	20.5	184.7	A	——	8.0 × 60	10.0 × 60
066	138.9	74.5	667.5	33 293.2	10.2	20.5	184.7	A	——	8.0 × 60	10.0 × 60
067	137.8	74.5	660.6	32 948.5	10.2	20.5	184.7	A	——	8.0 × 60	10.0 × 60
068	140.1	74.5	681.7	33 756.4	10.2	20.5	184.7	A	——	8.0 × 60	11.0 × 60

VIADUCT

No. 0-6

NO. (REMARKS / UNIT)	CONCRETE VOLUME: SLAB, BEAM COLUMN	CONCRETE VOLUME: FOUNDATION	FORM AREA	REINFORCING BAR	LEVELING CONCRETE	AGGRE-GATE SUB BASE	STRUCTURE EXCAVATION: VORUME	STRUCTURE EXCAVATION: TY-PE	FOUNDA-TION MORTAR	P.C. PILES	
	CLASS C	CLASS C		SD 30	CLASS F	A.S.B. -3			$\hat{O}_{CK}$ =400 kg/cm	CLASS B Ø 350 mm	CLASS A Ø 350 mm
	m^3	m^3	m^2	kg	m^3	m^3	m^3		m^3	m L × N	m L × N
069	138.9	74.5	667.5	33 293.2	10.2	20.5	184.7	A	——	8.0 × 60	11.0 × 60
070	137.1	74.5	655.8	32 794.0	10.2	20.5	184.7	A	——	8.0 × 60	11.0 × 60
071	138.2	74.5	662.7	33 138.7	10.2	20.5	184.7	A	——	8.0 × 60	11.0 × 60
072	138.2	74.5	662.7	33 138.7	10.2	20.5	184.7	A	——	8.0 × 60	12.0 × 60
073	131.7	81.4	637.5	32 602.6	11.0	22.1	199.2	A	——	8.0 × 60	12.0 × 60
074	130.6	81.4	630.6	32 258.5	11.0	22.1	199.2	A	——	8.0 × 60	12.0 × 60
075	138.2	74.5	662.7	33 138.7	10.2	20.5	184.7	A	——	8.0 × 60	12.0 × 60
076	138.2	74.5	662.7	33 138.7	10.2	20.5	184.7	A	——	8.0 × 60	12.0 × 60
077	136.4	74.5	651.0	32 639.6	10.2	20.5	184.7	A	——	8.0 × 60	13.0 × 60
078	138.1	74.5	661.6	33 107.8	10.2	20.5	184.1	A	——	8.0 × 60	13.0 × 60
079	139.1	74.5	668.3	33 317.9	10.2	20.5	184.1	A	——	8.0 × 60	13.0 × 60
080	110.1	58.9	527.6	26 354.9	8.1	16.1	144.9	A	——	8.0 × 48	13.0 × 48
081	113.0	58.9	576.7	27 091.2	8.1	16.1	144.9	A	——	8.0 × 48	13.0 × 48
082	111.1	58.9	537.5	26 577.4	8.1	16.1	144.9	A	——	8.0 × 48	13.0 × 48
083	112.6	58.9	544.8	27 033.3	8.1	16.1	144.9	A	——	8.0 × 48	14.0 × 48
084	112.1	58.9	541.4	26 799.8	8.1	16.1	144.9	A	——	8.0 × 48	14.0 × 48
085	77.7	47.4	381.1	20 769.7	6.3	12.7	114.2	A	0.044	8.0 × 36	14.0 × 36

JICA

VIADUCT

No. 0-7

NO. (REMARKS / UNIT)	CONCRETE VOLUME SLAB. BEAM COLUMN	CONCRETE VOLUME FOUNDATION	FORM AREA	REINFORCING BAR	LEVELING CONCRETE	AGGRE-GATE SUB BASE	STRUCTURE EXCAVATION VORUME	STRUCTURE EXCAVATION TY-PE	FOUNDA-TION MORTAR	P.C. PILES	
	CLASS C	CLASS C		SD 30	CLASS F	A.S.B. -3			σ_{ck} = 400 kg/cm	CLASS B ø 350 mm	CLASS A ø 350 mm
	m^3	m^3	m^2	kg	m^3	m^3	m^3		m^3	m L x N	m L x N
086	192.6	105.0	769.1	42 894.1	12.9	25.8	255.9	A	0.007	8.0×84	14.0×84
087	192.0	105.0	769.7	43 143.2	12.9	25.8	255.9	A	0.005	8.0×84	14.0×84
088	130.8	73.9	525.7	30 028.6	9.1	18.1	200.9	A	0.005	8.0×63	14.0×63
089	137.3	73.9	567.9	31 109.4	9.1	18.1	200.9	A	0.005	8.0×63	14.0×63
090	198.3	105.6	791.2	48 886.8	13.3	26.7	288.0	A	0.009	8.0×84	13.0×84
091	198.3	105.6	791.2	48 886.8	13.3	26.7	288.0	B	0.009	8.0×84	13.0×84
092	198.3	105.6	791.2	48 886.8	13.3	26.7	288.0	B	0.009	8.0×84	13.0×84
093	198.3	105.6	791.2	48 886.8	13.3	26.7	288.0	B	0.009	8.0×84	13.0×84
094	201.1	105.6	809.6	49 771.5	13.3	26.7	288.0	A	0.009	8.0×84	12.0×84
095	206.3	105.6	832.9	50 089.5	13.3	26.7	288.0	A	0.011	8.0×84	12.0×84
096	310.0	179.2	1188.6	78 870.2	22.1	44.2	483.8	A	0.014	8.0×132	12.0×132
097	310.5	179.2	1192.2	78 918.5	22.1	44.2	483.8	A	0.014	8.0×132	12.0×132
098	105.2	64.4	512.5	27 019.3	8.7	17.4	156.9	A	0.044	8.0×78	11.0×78
099	112.7	58.9	545.3	27 048.1	8.1	16.1	145.4	A	—	8.0×78	11.0×78
100	111.7	58.9	538.4	26 705.4	8.1	16.1	145.4	A	—	8.0×78	11.0×78
101	107.8	64.4	529.9	27 705.9	8.7	17.4	156.9	A	0.044	8.0×78	10.0×78
102	133.6	81.4	650.6	33 903.2	11.0	22.1	198.6	A	0.044	80×60	10.0×60

JICA

VIADUCT

NO. / REMARKS / UNIT	CONCRETE VOLUME SLAB. BEAM COLUMN	CONCRETE VOLUME FONDATION	FORM AREA	REINFORCING BAR	LEVELING CONCRETE	AGGRE-GATE SUB BASE	STRUCTURE EXCAVATION VORUME	STRUCTURE EXCAVATION TYPE	FOUNDATION MORTAR	P.C. PILE CLASS B	P.C. PILE CLASS A
	CLASS C	CLASS C		SD 30	CLASS F	A.S.B. -3			σ_{ck} = 400 kg/cm	∅ 350 mm	∅ 350 mm
	m^3	m^3	m^2	kg	m^3	m^3	m^3		m^3	m L x N	m L x N
103	111.3	58.9	536.0	26 750.3	8.1	16.1	144.9	A	——	8.0 x 48	10.0 x 48
104	110.0	58.9	527.7	26 482.1	8.1	16.1	144.9	A	——	8.0 x 48	10.0 x 48
105	108.7	58.9	518.1	26 204.1	8.1	16.1	144.9	A	——	8.0 x 48	9.0 x 48
106	107.4	58.9	510.4	25 926.0	8.1	16.1	144.9	A	——	8.0 x 48	9.0 x 48
107	105.1	58.9	494.5	25 290.9	8.1	16.1	144.9	A	——	8.0 x 48	9.0 x 48
108	104.8	58.9	493.0	25 385.6	8.1	16.1	144.9	A	——	8.0 x 48	9.0 x 48
109	104.2	58.9	488.7	25 225.3	8.1	16.1	145.4	A	——	8.0 x 48	9.0 x 48
110	104.3	58.9	489.5	25 251.3	8.1	16.1	144.9	A	——	8.0 x 48	9.0 x 48
111	98.2	64.4	466.1	25 595.4	8.7	17.4	156.4	A	0.044	8.0 x 48	8.0 x 48
112	97.9	64.4	463.8	25 419.5	8.7	17.4	156.4	A	0.044	8.0 x 48	8.0 x 48
113	105.8	58.9	499.8	25 583.1	8.1	16.1	144.9	A	——	8.0 x 48	8.0 x 48
114	106.3	58.9	502.7	25 675.8	8.1	16.1	144.9	A	——	8.0 x 48	8.0 x 48
115	107.7	58.9	512.5	25 989.0	8.1	16.1	144.9	A	——	8.0 x 48	8.0 x 48
116	106.1	58.9	501.5	25 516.7	8.1	16.1	144.9	A	——	8.0 x 48	8.0 x 48
117	107.6	58.9	511.3	25 853.8	8.1	16.1	144.9	A	——	8.0 x 48	8.0 x 48
118	107.1	58.9	508.1	25 729.0	8.1	16.1	144.9	A	——	8.0 x 48	8.0 x 48
119	109.0	58.9	521.0	26 264.6	8.1	16.1	144.9	A	——	8.0 x 48	8.0 x 48

VIADUCT

No. 0-9

NO. (REMARKS / UNIT)	CONCRETE VOLUME: SLAB, BEAM, COLUMN	CONCRETE VOLUME: FOUNDATION	FORM AREA	REINFORCING BAR	LEVELING CONCRETE	AGGRE-GATE SUB BASE	STRUCTURE EXCAVATION: VORUME	STRUCTURE EXCAVATION: TY-PE	FOUNDA-TION MORTAR	P.C. PILES	
	CLASS C	CLASS C		SD 30	CLASS F	A.S.B. -3			σ_{ck} = 400 kg/cm	CLASS B Ø 350 mm	CLASS A Ø 350 mm
	m^3	m^3	m^2	kg	m^3	m^3	m^3		m^3	$L^m \times N$	$L^m \times N$
120	109.2	58.9	522.1	26 177.6	8.1	16.1	144.9	A	—	8.0×48	8.0×48
121	111.5	58.9	537.6	26 800.3	8.1	16.1	144.9	A	—	8.0×48	7.0×48
122	111.8	58.9	539.3	26 733.7	8.1	16.1	144.9	A	—	8.0×48	7.0×48
123	143.8	74.5	700.1	34 342.9	10.2	20.5	184.1	A	—	8.0×60	7.0×60
124	144.7	74.5	706.7	34 644.6	10.2	20.5	184.1	A	—	8.0×60	7.0×60
125	147.2	74.5	722.6	35 065.1	10.2	20.5	184.1	A	—	8.0×60	7.0×60
126	150.3	74.5	744.4	35 764.7	10.2	20.5	184.7	A	—	8.0×60	7.0×60
127	306.7	188.6	1210.9	76 710.8	21.1	42.3	535.1	A	—	8.0×132	7.0×132
128	365.1	238.6	1343.3	85 455.0	25.6	51.1	674.5	A	—	8.0×168	7.0×168
129	330.7	225.4	1377.0	88 452.8	25.3	50.6	640.9	A	0.080	8.0×156	7.0×156

JICA

VIADUCT

NO. / REMARKS / UNIT	CONCRETE VOLUME SLAB. BEAM COLUMN	CONCRETE VOLUME FOUNDATION	FORM AREA	REINFORCING BAR	LEVELING CONCRETE	AGGRE-GATE SUB BASE	STRUCTURE EXCAVATION VORUME	STRUCTURE EXCAVATION TY-PE	FOUNDA-TION MORTAR	P.C. PILES	
	CLASS C	CLASS C		SD 30	CLASS F	A.S.B. -3			σ_{ck} = 400 kg/cm	CLASS B ⌀ 350 mm	CLASS A ⌀ 350 mm
	m^3	m^3	m^2	kg	m^3	m^3	m^3		m^3	m L × N	m L × N
VP 1	66.6	38.6	436.1	20 132.9	6.2	12.4	85.9	B	0.001	8.0×40	14.0×40
2	118.7	38.6	659.2	28 388.3	6.2	12.4	85.9	B	0.001	8.0×40	14.0×40
3	66.6	38.6	436.1	20 132.9	6.2	12.4	85.9	B	0.001	8.0×40	14.0×40
										⌀ 500 mm	⌀ 500 mm
VP 4	301.8	131.9	1308.9	50 814.7	22.9	45.8	492.5	B	——	8.0×96	14.0×96
5	243.7	98.9	1123.4	40 363.5	17.2	34.4	354.5	B	——	8.0×72	14.0×72
6	298.3	131.9	1297.0	50 245.4	22.9	45.8	494.3	B	——	8.0×96	14.0×96
7	220.4	131.9	824.0	35 671.9	22.9	45.8	550.6	B	——	8.0×96	14.0×96
8	191.3	98.9	842.7	30 187.0	17.2	34.4	458.6	B	——	8.0×72	14.0×72
9	215.9	131.9	905.0	35 129.5	22.9	45.8	690.8	B	——	8.0×96	14.0×96

JICA

VIADUCT

REMARKS / UNIT / NO.	CONCRETE VOLUME SLAB. BEAM COLUMN	CONCRETE VOLUME FOUNDATION	FORM AREA	REINFORCING BAR	LEVELING CONCRETE	AGGRE-GATE SUB BASE	STRUCTURE EXCAVATION VORUME	STRUCTURE EXCAVATION TYPE	FOUNDATION MORTAR	P.C. PILES	
	CLASS C	CLASS C		SD 30	CLASS F	A.S.B. -3			σ_{ck} = 400 kg/cm	CLASS B ⌀ 350 mm	CLASS A ⌀ 350 mm
	m^3	m^3	m^2	kg	m^3	m^3	m^3		m^3	m L × N	m L × N
TOTAL											
V001~129	19320.9	10652.3	89257.3	4598443.0	1452.8	2910.1	23889.5	A	1.069	8 × 5358	7 × 888
VP1~9							4173.0	B		10 × 264	8 × 936
										11 × 612	9 × 648
										12 × 672	10 × 564
										13 × 240	11 × 384
										14 × 720	12 × 732
											13 × 660
											14 × 546
										54408 m	73500 m
										⌀500	⌀500
										8 × 528	14 × 528
										4224 m	7392 m

CONTENTS

No. 1

1. VIADUCT. V047

19M000

JICA

VIADUCT V04T L=19000 (POLE)

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	29.7	95.1	2326.0	78.3
BEAM	24.1	98.9	7204.3	298.9
COLUMN	14.4	94.6	3995.0	277.4
CURB	3.3	34.5	375.2	113.7
GRADING CONCRETE	6.6	———	———	———
TOTAL	78.1	323.1	13900.5	178.0
FOOTING	40.9	34.4	4752.3	116.2
BRACING BEAM	6.5	26.0	1911.1	294.0
TOTAL	47.4	60.4	6663.4	140.6

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	M^3	6.3	CLASS F
AGGREGATE SUB BASE	M^3	12.7	A.S.B.-3
EXCAVATION	M^3	114.6	
FOUNDATION MORTAR	M^3	0.044	σ_{CK} = 400 kg/cm²
PILE	M x NUMBER	A- 8 x 36 B- 7 x 36	Φ350 - A Φ350 - B

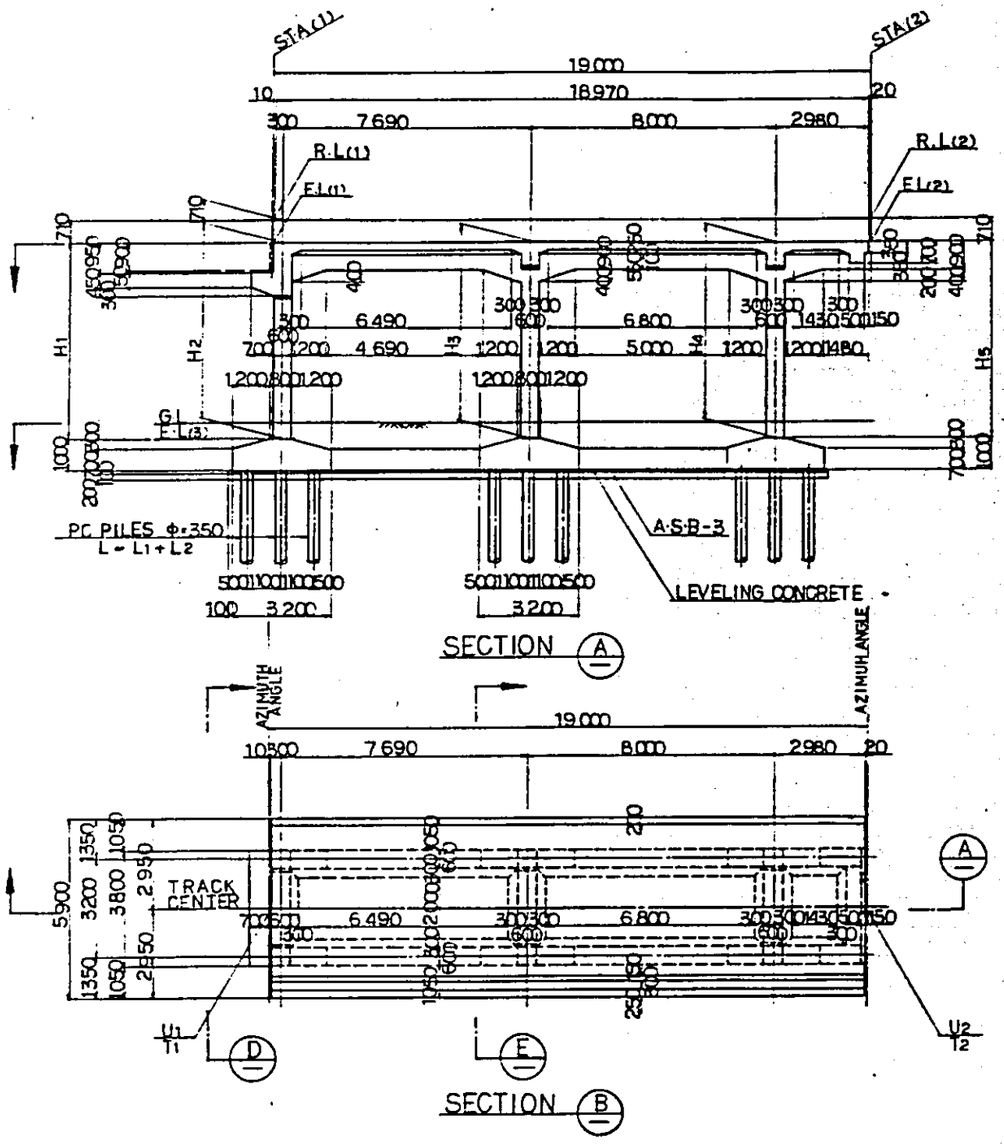
V047 L=19.000 (H=7.820)
(ELECTRIC, POLE) (AT. INTER)

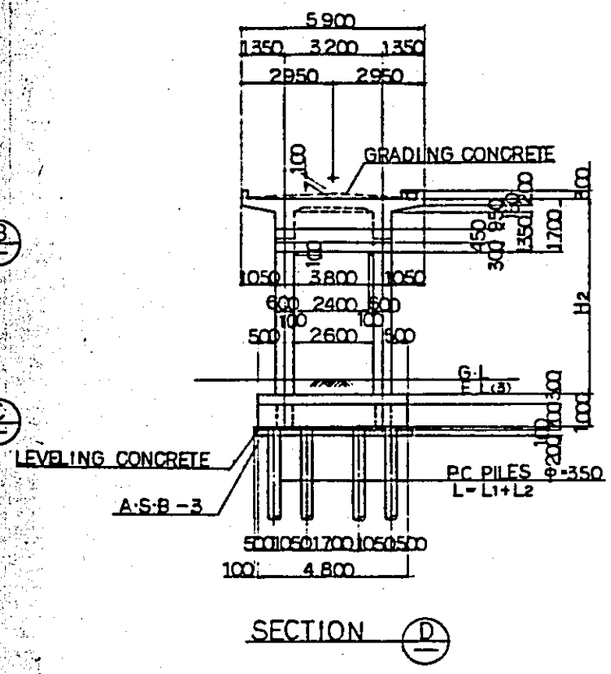
SD30 UNIT: Kg.

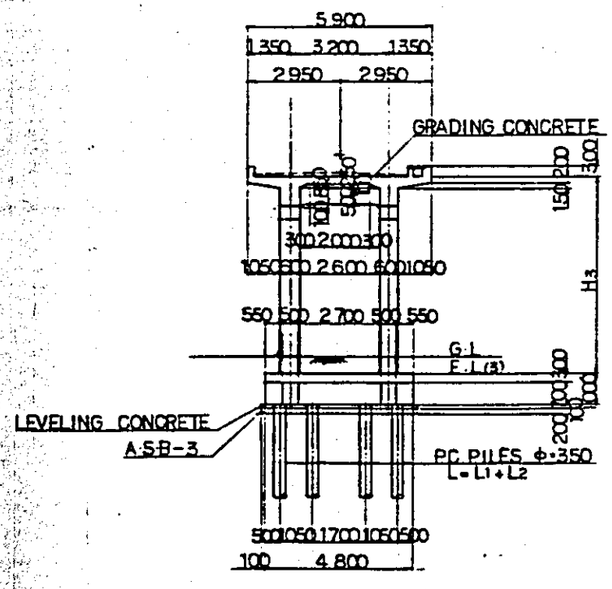
	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	.	.	.	.	.	.	2326.0	.	2326.0
BEAM	.	.	4276.1	357.9	442.5	189.3	1938.5	.	7204.3
COLUMN	.	.	3508.3	.	.	.	486.7	.	3995.0
CURB	.	.	.	.	.	.	.	375.2	375.2
TOTAL	.	.	7784.4	357.9	442.5	189.3	4751.2	375.2	13900.5
FOOTING	2195.1	.	509.7	.	1251.6	398.4	397.5	.	4752.3
BRACING BEAM	.	.	1255.1	.	.	238.7	417.3	.	1911.1
TOTAL	2195.1	.	1764.8	.	1251.6	637.1	814.8	.	6663.4

JICA

No. 2

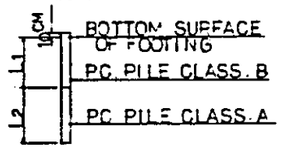






NOTES;

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. REFERENCE DRAWING FOR BAR ARRANGEMENT : CS-151~157
3. TYPES OF PC PILE



4. GRADING CONCRETE SHALL BE SIMULTANEOUSLY PLACED WITH SLAB CONCRETE

DIMENSION SCHEDULE

	V008	V010	V017	V047	V085
STA (1)	13ᴹ689ᴹ000	13ᴹ765ᴹ000	14ᴹ202ᴹ000	15ᴹ649ᴹ000	17ᴹ041ᴹ000
STA (2)	13ᴹ708ᴹ000	13ᴹ746ᴹ000	14ᴹ183ᴹ000	15ᴹ668ᴹ000	17ᴹ022ᴹ000
R.L (1)	8ᴹ470	8ᴹ470	8ᴹ960	8ᴹ724	8ᴹ754
R.L (2)	〃	〃	8ᴹ903	〃	8ᴹ706
AZIMUTH AT P1 = (θ1)	350° 39′ 55″58	350° 39′ 55″58	2° 29′ 30″68	1° 06′ 02″00	345° 30′ 45″40
DO (θ2)	〃	〃	〃	〃	〃
U 1	12ᴹ082ᴹ577	12ᴹ094ᴹ904	12ᴹ119ᴹ106	11ᴹ998ᴹ631	12ᴹ064ᴹ127
T 1	−2ᴹ482ᴹ419	−2ᴹ407ᴹ425	−1ᴹ972ᴹ658	−535ᴹ731	−848ᴹ914
U 2	12ᴹ085ᴹ659	12ᴹ091ᴹ823	12ᴹ119ᴹ933	11ᴹ998ᴹ266	12ᴹ059ᴹ374
T 2	−2ᴹ463ᴹ670	−2ᴹ426ᴹ173	−1ᴹ991ᴹ640	−514ᴹ734	−830ᴹ518
E L (1)	7ᴹ760	7ᴹ760	8ᴹ250	8ᴹ014	8ᴹ044
E L (2)	〃	〃	8ᴹ193	〃	7ᴹ996
E L (3)	0ᴹ700	0ᴹ700	0ᴹ700	0ᴹ194	0ᴹ400
G L	1ᴹ300	1ᴹ300	1ᴹ300	0ᴹ700	0ᴹ900
H 1	7060	7060	7550	7820	7644
H 2	〃	〃	7541	〃	7643
H 3	〃	〃	7517	〃	7624
H 4	〃	〃	7498	〃	7604
H 5	〃	〃	7492	〃	7596
PC PILES 1	11 000	11 000	11 000.	8 000	8 000
PC PILES 2	——	——	——	7 000	14 000

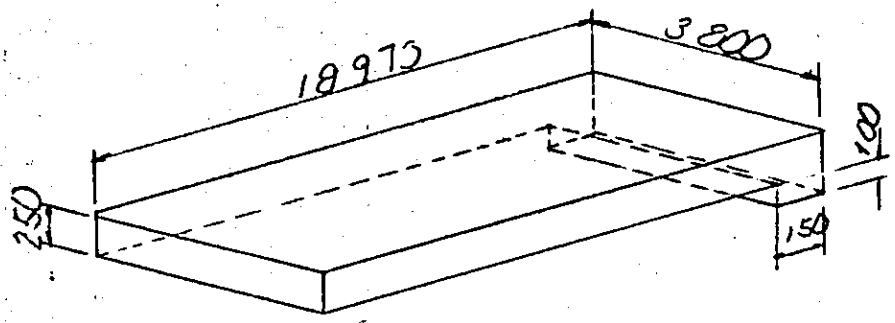
NOTES:

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. REFERENCE DRAWING FOR GENERAL VIEW: CS−149

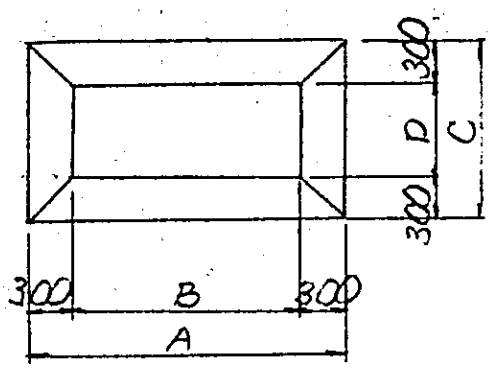
(V47) $8 \times 2 + 3 = 19.000^{m}$

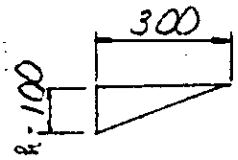
CONCRETE VOLUME

(1) SLAB



$Va = 3.800 \times (18.970 \times 0.250 + 0.150 \times 0.100) = 18.079^{m^3}$

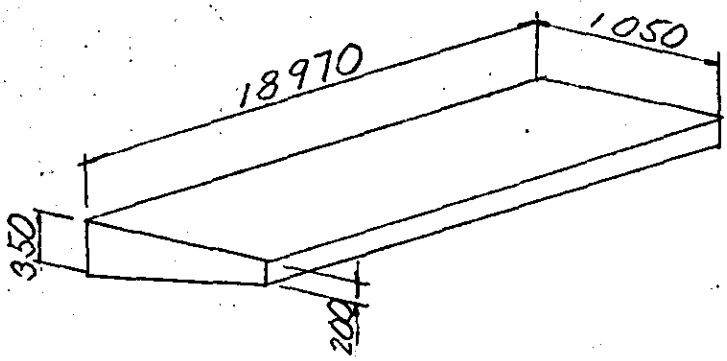




$$V = \left[A \times C - \left\{A \times C + (A+B)(C+D) + B \times D\right\} \times 1/6\right] \times h$$

	A	B	C	D	
Vb'	7090	6490	2600	2000	$= 0.279^{m^3}$
Vc'	7400	6800	〃	〃	$= 0.288^{〃}$
Vd'	2030	1430	〃	〃	$= 0.127^{〃}$

$Vb = 0.279 \times 1$	=	$0.279\ m^3$
$Vc = 0.288 \times 1$	=	$0.288\ "$
$Vd = 0.127 \times 1$	=	$0.127\ "$

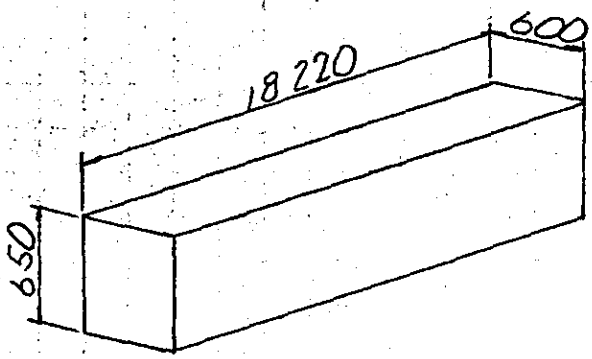


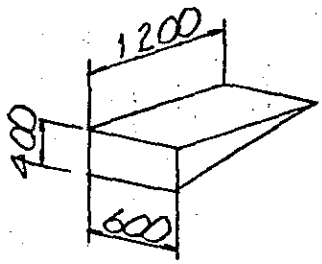
$Ve' = \frac{1}{2} \times (0.200 + 0.350) \times 1.050 \times 18.970 = 5.478\ m^3$

$Ve = 5.478 \times 2$	=	$10.956\ m^3$
SLAB. TOTAL	=	$29.729\ m^3$

(2) BEAM

1) LONGITUDINAL BEAM

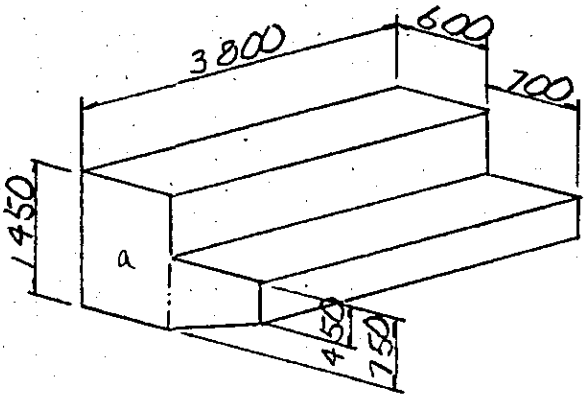


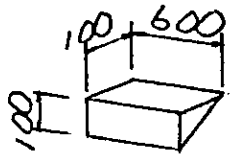


$Va' = 0.600 \times 0.650 \times 18.220$	$= 7.106\ m^3$	
$Va = 7.106 \times 2$		$= 14.212\ m^3$
$Vb' = 1.200 \times 0.400 \times 1/2 \times 0.600$	$= 0.144\ m^3$	
$Vb = 0.144 \times 10$		$= 1.440\ "$
SUB TOTAL		$= 15.652\ m^3$

2). AT END OF VIADUCT TRANSVERSE BEAM

- - END ①

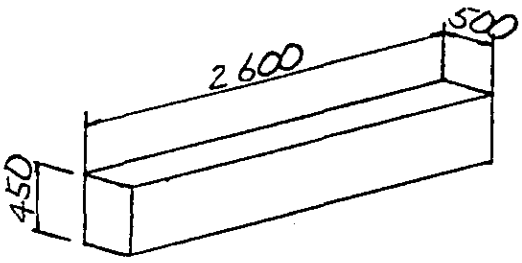




$Va' = 0.600 \times 1.450 \times 3.800$	$= 3.306^{m^3}$	
$Va = 3.306 \times 1$	$=$	3.306^{m^3}
$Vb' = (0.450 + 0.750) \times 1/2 \times 0.700 \times 3.800$	$= 1.596^{m^3}$	
$Vb = 1.596 \times 1$	$=$	$1.596^{"}$
$Vc' = 0.100 \times 0.100 \times 1/2 \times 0.600$	$= 0.003^{m^3}$	
$Vc = 0.003 \times 2$	$=$	$0.006^{"}$
SUB TOTAL	$=$	4.908^{m^3}

3) AT END OF VIADUCT TRANSVERSE BEAM

END ②

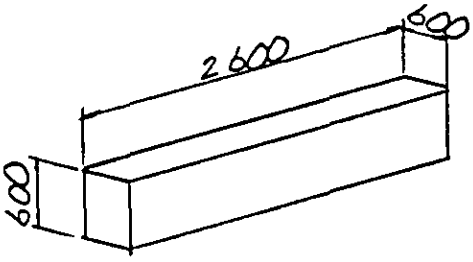


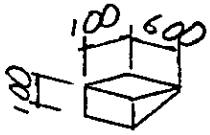
$Va' = 0.500 \times 0.450 \times 2.600 = 0.585\ m^3$

$Va = 0.585 \times 1 = 0.585\ m^3$

$0.585\ m^3$

4) AT INTERMEDIATE OF VIADUCT TRANSVERSE BEAM





$Va' = 0.600 \times 0.600 \times 2.600 = 0.936\ m^3$

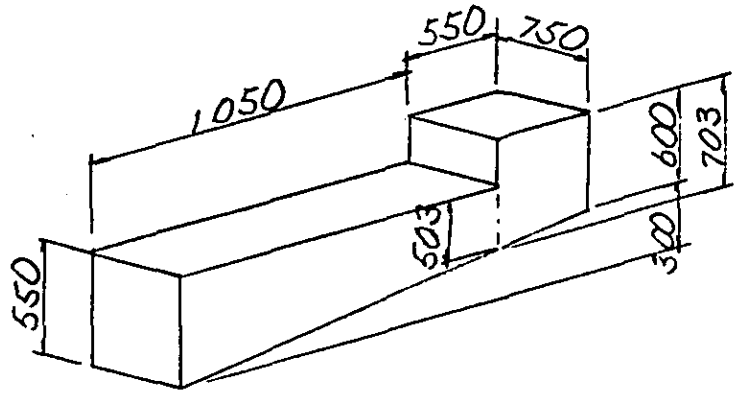
$Va = 0.936 \times 2 = 1.872\ m^3$

$Vb' = 0.100 \times 0.100 \times 1/2 \times 0.600 = 0.003\ m^3$

$Vb = 0.003 \times 2 \times 2 = 0.012\ m^3$

SUB TOTAL = $1.884\ m^3$

5). BASE OF ELECTRIC POLE



$Va' = (0.550 + 0.503) \times 1/2 \times 1.05 \times 0.750 = 0.415\ m^3$

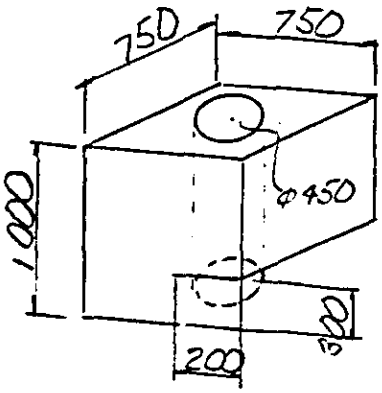
$Va = 0.415 \times 1 = 0.415\ m^3$

$Vb' = (0.600 + 0.703) \times 1/2 \times 0.550 \times 0.750 = 0.269\ "$

$Vb = 0.269 \times 1 = 0.269\ "$

SUB TOTAL = (0.684 m^3)

6) ELECTRIC POLE



$Va' = (0.750 \times 0.750 - 1/4 \times 3.142 \times 0.450^2) \times 1.000$

$- 0.300 \times 0.200 \times 0.750 = 0.358$

$Va = 0.358 \times 1$ = 0.358 m^3

(0.358 m^3)

ELECTRIC TOTAL (1.042 m^3)

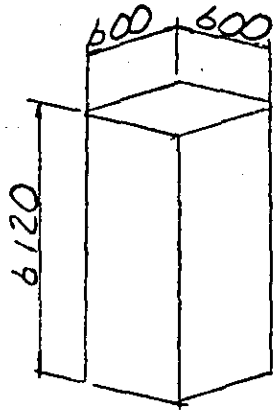
(BEAM TOTAL 24.071 m^3)

POLE BEAM TOTAL 23.029 "

JICA

(3) COLUMN

1) AT END OF VIADUCT. COLUMN

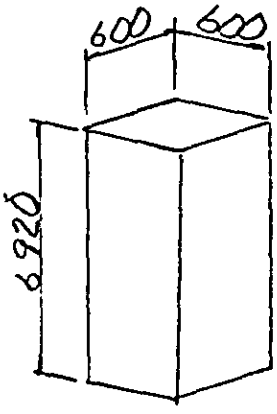


$Va' = 0.600 \cdot 0.600 \times 6.120 = 2.203\ m^3$

$Va = 2.203 \times 2 = 4.406\ m^3$

$4.406\ m^3$

2). AT INTERMEDIATE OF VIADUCT COLUMN



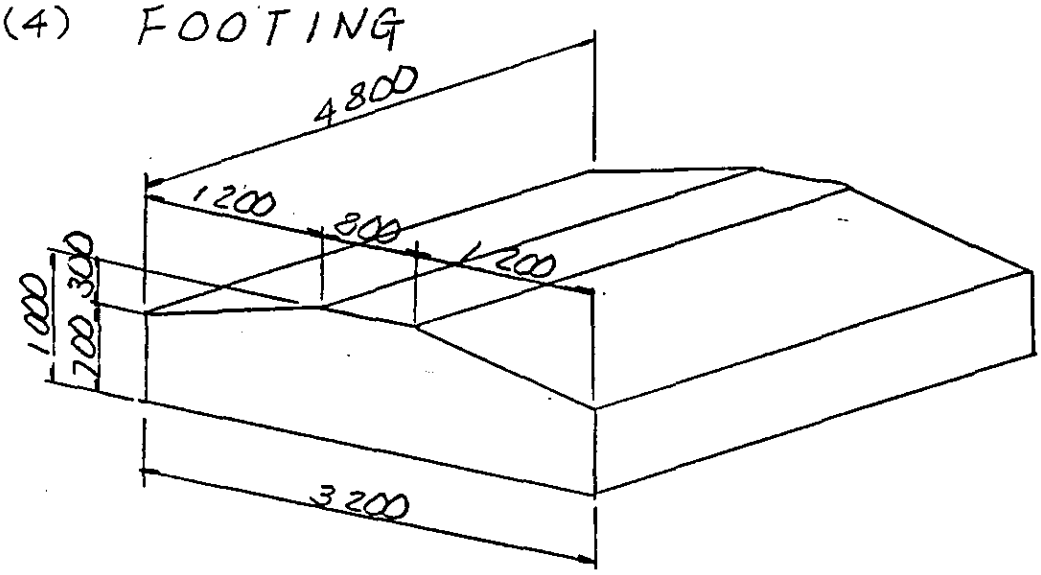
$Va' = 0.600 \times 0.600 \cdot 6.920 = 2.491\ m^3$

$Va = 2.491 \times 4 = 9.964\ m^3$

$9.964\ m^3$

COLUMN TOTAL $14.370\ m^3$

(4) FOOTING



$Va' = 3.200 \times 0.700 \times 4.800 = 10.752$

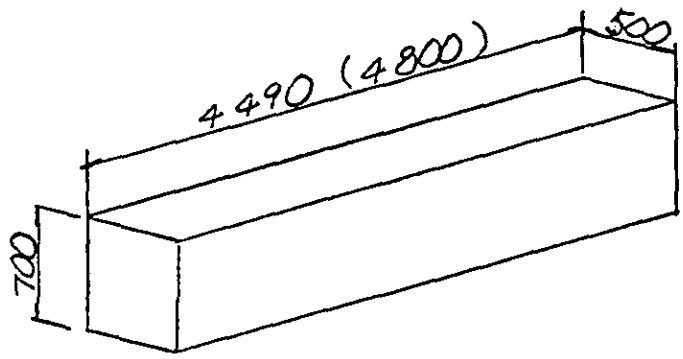
$Va = 10.752 \times 3 = 32.256\ m^3$

$Vb' = (3.200 + 0.800) \times 1/2 \times 0.300 \times 4.800 = 2.880$

$Vb = 2.880 \times 3 = 8.640\ "$

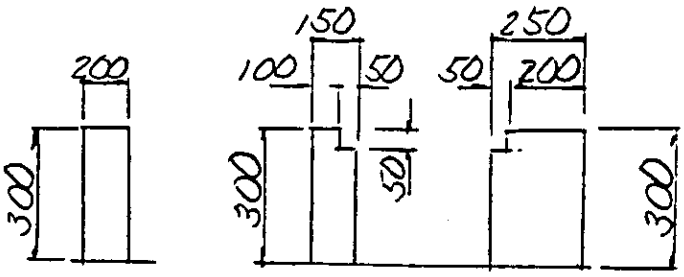
FOOTING TOTAL $40.896\ m^3$

(5) BRACING BEAM



$Va' = 0.500 \times 0.700 \times 4.490$	=	1.572	
$Va = 1.572 \times 2$		=	3.144 m^3
$Vb' = 0.500 \times 0.700 \times 4.800$	=	1.680	
$Vb = 1.680 \times 2$		=	3.360 "
BRACING BEAM TOTAL			6.504 m^3

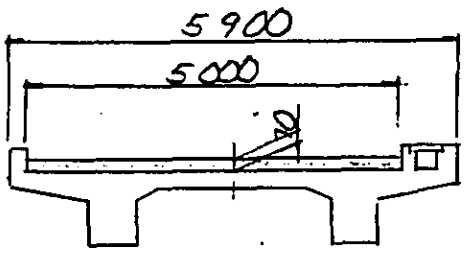
(6) CURB



ℓ = 18.970

$Va = 0.200 \times 0.300 \times 18.970$	=	1.138 m^3
$Vb = (0.150 \times 0.300 - 0.050 \times 0.050) \times 18.970$	=	0.806 "
$Vc = (0.250 \times 0.300 - 0.050 \times 0.050) \times 18.970$	=	1.375 "
CURB TOTAL		3.319 m^3

(7) GRADING CONCRETE

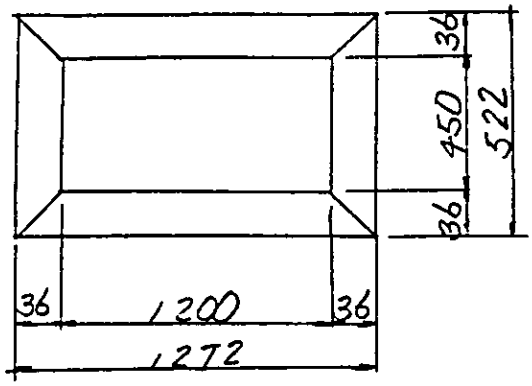


$\ell = 18.970$

$V = 0.070 \times 5.000 \times 18.970 = 6.640\ m^3$

$6.640\ m^3$

(8) FOUNDATION MORTAR



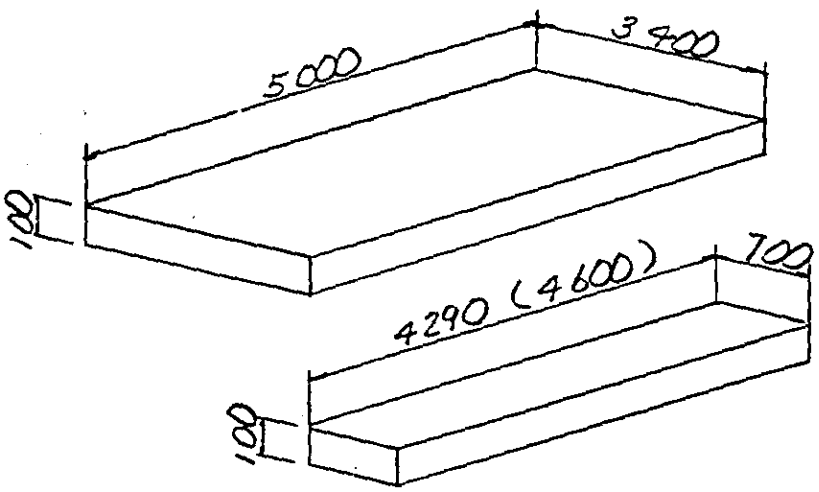
h- 36

$$Va' = \{1.272 \times 0.522 + (1.272 + 1.200)(0.522 + 0.450) + 1.200 \times 0.450\} \times 1/6 \times 0.036 = 0.022$$

$$Va = Va' \times 2 = 0.044 \ m^3$$

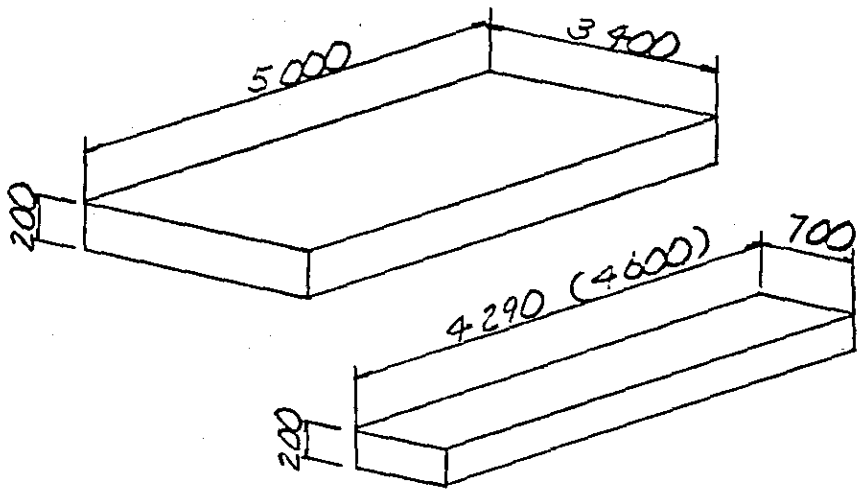
FOUNDATION MORTAR TOTAL 0.044 m^3

(9) LEVELING CONCRETE



$Aa' = 5.000 \times 3.400 \times 0.100$	$= 1.700\ m^3$	
$Aa = 1.700 \times 3$		$= 5.100\ m^3$
$Ab' = 0.700 \times 0.100 \times 4.290$	$= 0.300\ "$	
$Ab = 0.300 \times 2$		$= 0.600\ "$
$AC' = 0.700 \times 0.100 \times 4.600$	$= 0.322\ "$	
$AC = 0.322 \times 2$		$= 0.644\ "$
LEVELING CONCRETE TOTAL		$6.344\ m^3$

(10) AGGREGATE SUB BASE



$Va' = 3.400 \times 0.200 \times 5.000$	$= 3.400$	
$Va = 3.400 \times 3$		$= 10.200\ m^3$
$Vb' = 0.700 \times 0.200 \times 4.290$	$= 0.601$	
$Vb = 0.601 \times 2$		$= 1.202$ "
$Vc' = 0.700 \times 0.200 \times 4.600$	$= 0.644$	
$Vc = 0.644 \times 2$		$= 1.288$ "
TOTAL		$12.690\ m^3$

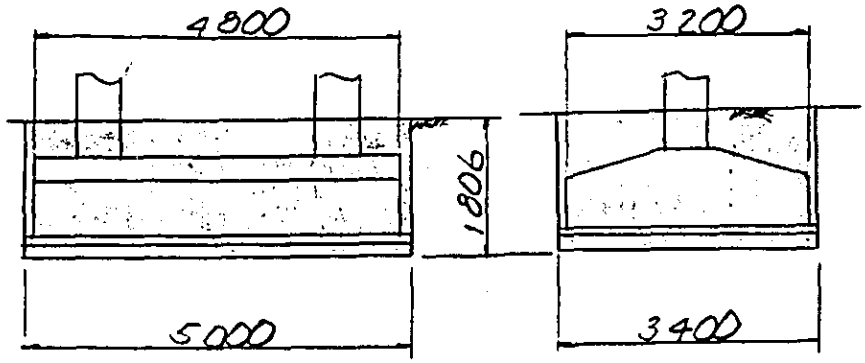
(11) PILE

$\phi = 350$ $\quad \ell = 15.00\ m$ $\quad n = 36$

$A = 8.000\ m \times 36$	A	= 36.
$B = 7.000\ m \times 36$	B	= 36

(12). EXCAVAION

1) FOOT ING

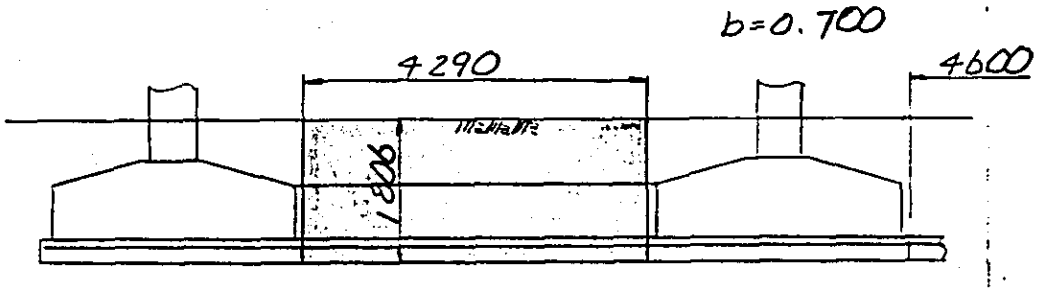


$Va' = 3.400 \times 1.806 \times 5.000 = 30.702\ m^3$

$Va = 30.702 \times 3 = 92.106\ m^3$

$92.106\ m^3$

2) BRACING. BEAM



$Va' = 4.290 \times 0.700 \times 1.806 = 5.423$

$Va = 5.423 \times 2 = 10.846\ m^3$

$Vb' = 4.600 \times 0.700 \times 1.806 = 5.815$

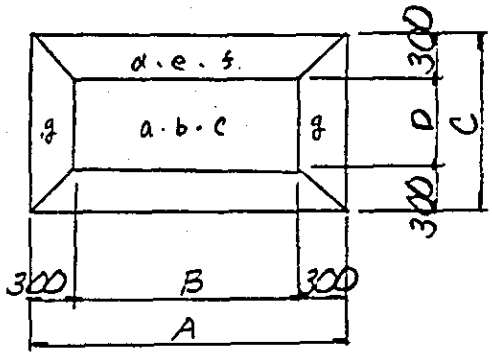
$Vb = 5.815 \times 2 = 11.630\ m^3$

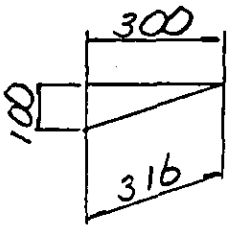
SUB TOTAL = $22.476\ m^3$

EXCAVTION TOTAL $114.582\ m^3$

FORM AREA

(1) SLAB





	A	B	C	D
a	7090	6490	2600	2000
b	7400	6800	"	"
c	2030	1430	"	"

Aa' = 6.490 × 2.000 = 12.998

Aa = 12.998 × 1 = 12.998 m²

Ab' = 7.400 × 2.000 = 14.800

Ab = 14.800 × 1 = 14.800 "

Ac' 1.430 × 2.000 = 2.860

Ac = 2.860 × 1 = 2.860 "

Ad' = (7.090 + 6.490) × 1/2 × 0.316 × 2 = 4.291

Ad = 4.291 × 1 = 4.291 "

$Ae' = (7.400 + 6.800) \times 1/2 \times 0.316 \times 2 = 4.487$

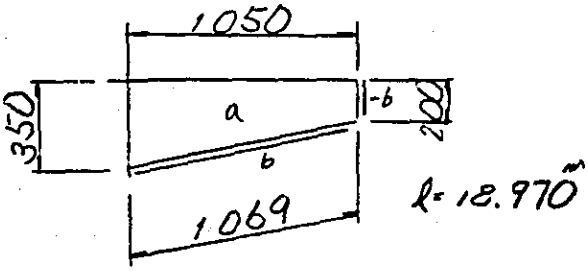
$Ae = 4.487 \times 1 = 4.487\ m^2$

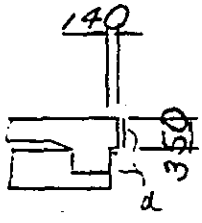
$Af = (2.030 + 1.430) \times 1/2 \times 0.316 \times 2 = 1.093$

$Af = 1.093 \times 1 = 1.093\ "$

$Ag' = (2.600 - 2.000) \times 1/2 \times 0.316 \times 2 = 1.454$

$Ag = 1.454 \times 3 = 4.362\ "$





$Aa' = (0.350 + 0.200) \times 1/2 \times 1.050 = 0.289$

$Aa = 0.289 \times 2 \times 2 = 1.156\ m^2$

$Ab' = (1.069 + 0.200) \times 18.970 = 24.073$

$Ab = 24.073 \times 2 = 48.146\ "$

$-Ac'_{POLE} = (1.069 + 0.200) \times 0.750 = \ominus 0.952$

$-Ac = 0.952 \times 1 = (= \ominus 0.952\ ")$

$Ad' = (0.140 + 0.350) \times 3.800 = 1.862$

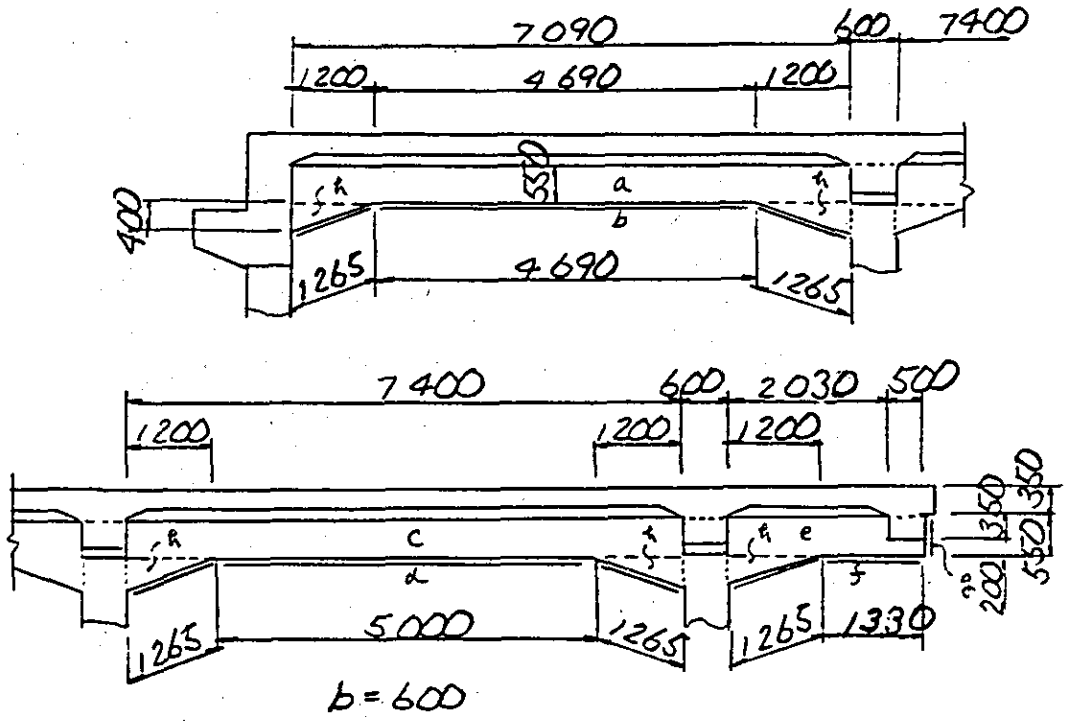
$Ad = 1.862 \times 1 = 1.862\ "$

(SLAB POLE TOTAL $95.103\ m^2$)

SLAB TOTAL $96.055\ m^2$

(2) BEAM

1) LONGITUDINAL BEAM



b = 600

$Aa' = 7.090 \times 0.550 \times 2 = 7.799\ m^2$

$Ab' = (1.265 \times 2 + 4.690) \times 0.600 = 4.332$"

$Ac' = 7.400 \times 0.550 \times 2 = 8.140$"

$Ad' = (1.265 \times 2 + 5.000) \times 0.600 = 4.518$"

$Ae' = (2.530 \times 0.550 \times 2 - 0.500 \times 0.350) = 2.608$"

$Af' = (1.265 + 1.330) \times 0.600 = 1.557$"

$Ag' = 0.550 \times 0.600 = 0.330$"

$AR' = 1.200 \times 0.400 \times 1/2 \times 5 \times 2 = 2.400$"

$A' = 7.799 + 4.332 + 8.140 + 4.518 + 2.608$

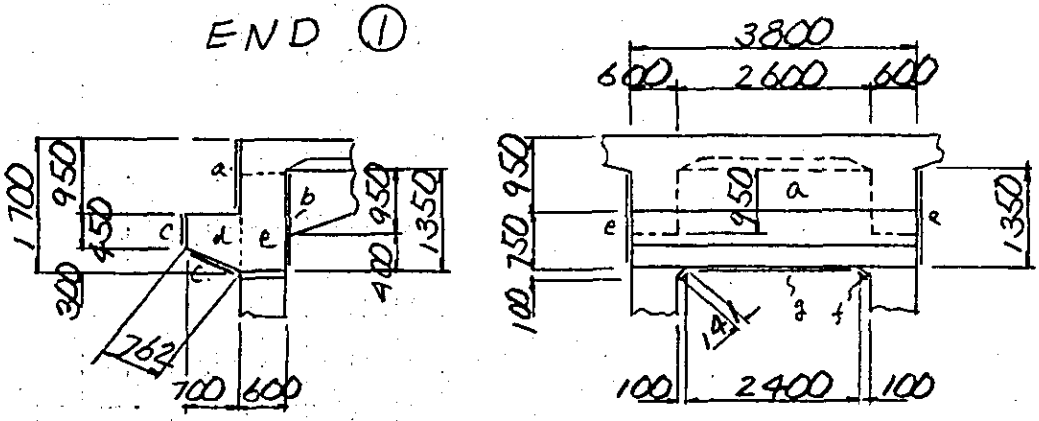
$+ 1.557 + 0.330 + 2.400 = 31.684\ m^2$

$A = 31.684 \times 2$ = 63.368 m²

SUB TOTAL = 63.368 m²

2). ATEND OF VIA DUCT TRANSVERSE BEAM

END ①



POLE TJL

$Aa = 3.800 \times 0.950$ = 3.610 m²

$Ab = 2.60 \times 0.95 + 3.800 \times 0.400$ = 3.990 "

$Ac = (0.450 + 0.762) \times 3.800$ = 4.606 "

$Ad = (0.450 + 0.750) \times \frac{1}{2} \times 0.700 \times 2$ = 0.840 "

$Ae = 0.600 \times 1.350 \times 2$ = 1.620 "

$Af = 0.100 \times 0.100 \times \frac{1}{2} \times 2 \times 2$ = 0.020 "

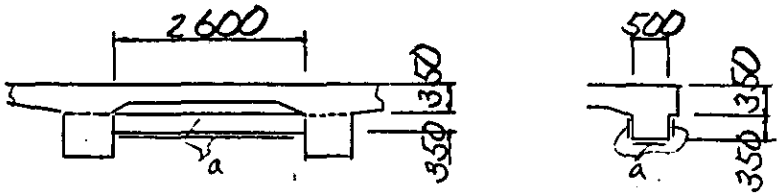
$Ag = (0.141 \times 2 + 2.400) \times 0.600$ = 1.609 "

SUB TOTAL = 16.295 m²

		m^2
$Aa = 3.610$	=	3.610
$Ab = 3.990$	=	3.990 "
$Ac = 4.606$	=	4.606 "
$Ad = 0.840$	=	0.840 "
$Ae = 0.600 \times (1.350 + 1.050)$	=	1.440 "
$Af = 0.020$	=	0.020 "
$Ag = 1.609$	=	1.609 "
SUB TOTAL =	(	16.115 m^2)

3) AT END OF VIADUCT TRANSVERSE BEAM

.END ②

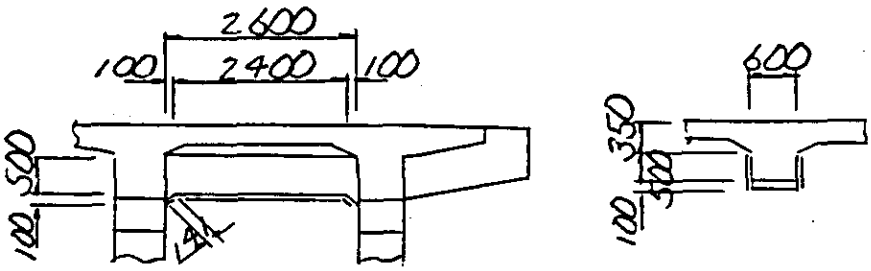


$Aa' = (0.350 \times 2 + 0.500) \times 2.600 = 3.120$

$Aa = 3.120 \times 1 = 3.120\ m^2$

$3.120\ m^2$

4) AT INTERMEDIATE OF VIADUCT. TRANSVERSE BEAM



$Aa' = 2.600 \times 0.500 \times 2 = 2.600$

$Aa = 2.600 \times 2 = 5.200\ m^2$

$Ab' = 0.100 \times 0.100 \times 1/2 \times 4 = 0.020$

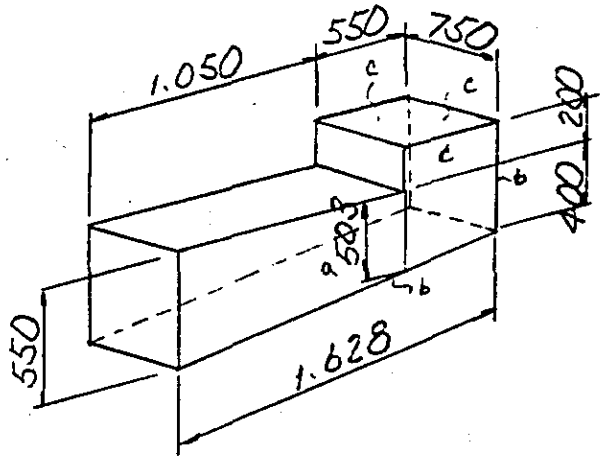
$Ab = 0.020 \times 2 = 0.040$ "

$AC' = (0.141 \times 2 + 2.400) \times 0.600 = 1.609$

$AC = 1.609 \times 2 = 3.218$ "

SUB TOTAL = $8.458\ m^2$

5) BASE OF ELECTRIC POLE



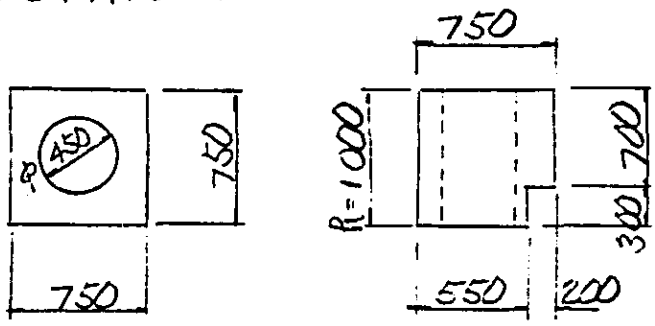
$$Aa = \left\{\frac{(0.550+0.503)}{2} \times 1.050 + \frac{(0.503+0.400)}{2} \times 0.550\right\} \times 2 = 1.602\ m^2$$

$$Ab = (1.628 + 0.600) \times 0.750 = 1.671\ "$$

$$Ac = (0.550 \times 2 + 0.750) \times 0.200 = 0.370\ "$$

SUB TOTAL = (3.643 m^2)

6) ELECTRIC POLE



$$Aa = 0.750 \times 3 \times 1.000 + 0.750 \times 0.700 = 2.775\ m^2$$

$$Ab = 0.450 \times 3.142 \times 1.000 = 1.414\ "$$

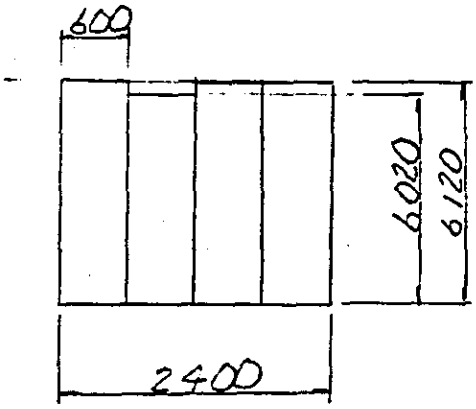
SUB TOTAL = (4.189 m^2)

5) + 6) = ELECTRIC TOTAL (7.832 m^2)

BEAM TOTAL	91.243 m²
(" POLE "	98.893 m²)

(3) COLUMN

1) AT END OF VIADUCT. COLUMN



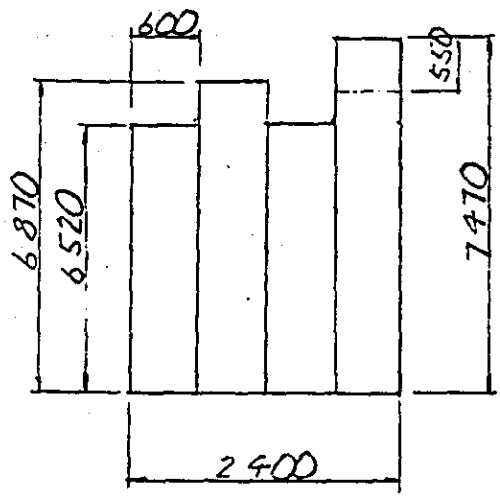
$Aa' = 0.600 \times (6.020 + 6.120 \times 3) = 14.628$

$Aa = 14.628 \times 2$

$= 29.256\ m^2$

$29.256\ m^2$

2) AT INTERMEDIATE OF. VIADUCT. COLUMN



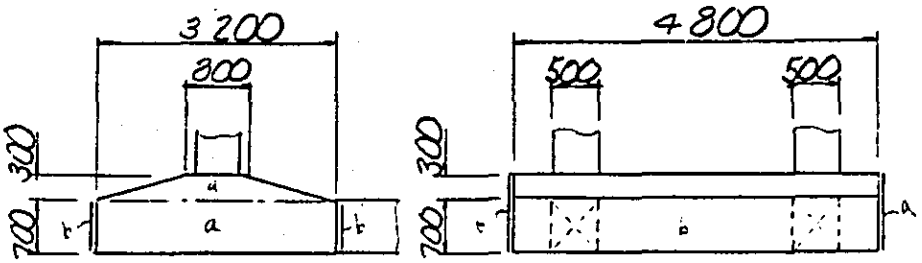
$Aa' = 0.600 \times (6.520 \times 2 + 6.870 + 7.470) = 16.428$

$Aa = 16.428 \times 4 - \overset{\text{POLE}}{0.600 \times 0.550} \quad (= 0.330\ m^2)$ = 65.382 m^2

65.382 m^2

COLUMN TOTAL 94.638 m^2

(4) FOOTING



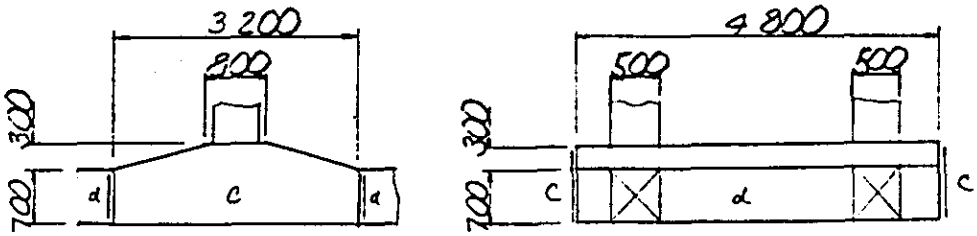
$Aa' = \{3.200 \times 0.700 + (0.800 + 3.200) \times 1/2 \times 0.30\}$

$\times 2 = 5.680$

$Aa = 5.680 \times 2 = 11.360\ m^2$

$Ab' = 0.700 \times (4.800 + 3.800) = 6.020$

$Ab = 6.020 \times 2 = 12.040$



$Ac' = \{3.200 \times 0.700 + (0.800 + 3.200) \times 1/2 \times 0.300\} \times 2 = 5.680$

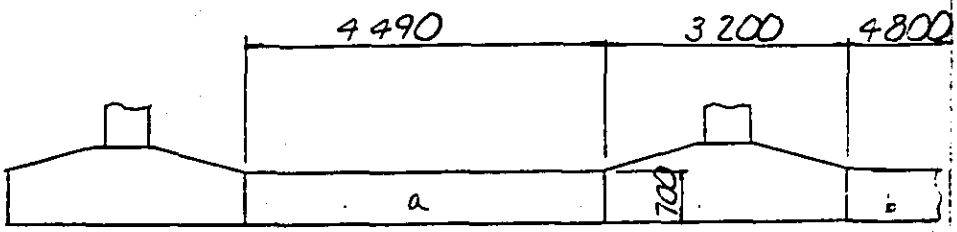
$Ac = 5.680 \times 1 = 5.680\ m^2$

$Ad' = 0.700 \times (4.800 - 1.000) \times 2 = 5.320$

$Ad = 5.320 \times 1 = 5.320$

FOOTING TOTAL 34.400 m^2

(5) BRACING BEAM



$Aa' = 4.490 \times 0.700 \times 2 = 6.286$

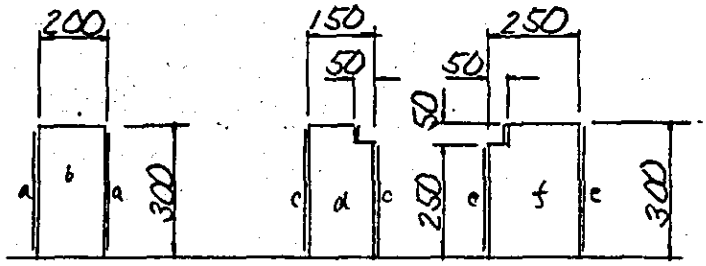
$Aa = 6.286 \times 2 = 12.572\ m^2$

$Ab' = 4.800 \times 0.700 \times 2 = 6.720$

$Ab = 6.720 \times 2 = 13.440\ m^2$

BRACING TOTAL $26.012\ m^2$

(6) CURB



$\ell = 18.970^{m}$

$Aa = 0.300 \times 2 \times 18.970$	=	11.382^{m^2}
$Ab = 0.200 \times 0.300 \times 2$	=	$0.120^{"}$
$Ac = (0.300 + 0.250 + 0.05) \times 18.970$	=	$11.382^{"}$
$Ad = (0.150 \times 0.300 - 0.050 \times 0.050) \times 2$	=	$0.085^{"}$
$Ae = (0.250 + 0.050 + 0.300) \times 18.970$	=	$11.382^{"}$
$Af = (0.250 \times 0.300 - 0.050 \times 0.050) \times 2$	=	$0.145^{"}$
CURB TOTAL		34.496^{m^2}

REINFORCING BAR

No. 33

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	L = 19.000					
	SLAB					
S 1	D 13	0.995	6 920	69	475 1	
2	"	"	5 480	6	32 7	
3	"	"	5 630	59	330 5	
4	"	"	3 600	69	247 2	
5	"	"	2 640	18	47 3	
6	"	"	1 920	24	45 8	
7	"	"	2 650	136	358 6	
8	"	"	1 400	18	25 1	
9	"	"	1 400	2	2 8	
S 21	D 13	0.995	19 240	9	172 3	
22	"	"	19 640	2	39 1	
23	"	"	19 640	2	39 1	"
24	"	"	18 740	7	130 5	
25	"	"	18 910	18	338 7	"
26	"	"	1 400	16	22 3	
27	"	"	1 460	13	18 9	
				D 13	2326 0 kg	
			SLAB	TOTAL	2326 0 kg	

JICA

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
(2)	BEAM					
	1) LONGITUDINAL BEAM					
B 1	D25	3.98	20 940	12	1000 1	
2	"	"	6 750	4	107 5	
3	"	"	21 690	4	345 3	
4	"	"	20 330	4	323 7	
5	"	"	19 710	12	941 4	
6	"	"	3 500	44	612 9	
7	D19	2.25	19 111	8	344 0	
B' 1	D13	0.995	2 450	114	277 9	
2	"	"	1 390	174	240 6	
3	"	"	2 280	114	258 7	
4	"	"	1 220	174	211 2	
5	"	"	2 900	60	173 2	(VARIES)
6	"	"	2 730	60	163 0	" (VARIES)
				D25	3330 9 kg	
				D19	344 0 "	
				D13	1324 6 "	
			SUB	TOTAL	4999 5 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
2) AT END OF VIADUCT. TRANSVERSE BEAM					END ①	
(a)						
B 21	D25	3.98	6 590	4	104 9	⊓
22	"	"	4 230	5	84 2	↔
23	D16	1.56	4 050	7	44 2	"
B° 21	D13	0.995	1 390	11	15 2	⊓
22	"	"	4 000	11	43 8	⊓
23	"	"	1 180	11	12 9	⊓
24	"	"	3 790	11	41 5	⊓
				D25	189 1 kg	
				D16	44 2 "	
				D13	113 4 "	
			SUB TOTAL		346 7 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
(B)						
(SUPPORT BEARING)						
G 1	D 16	1.56	2 040	8	25.5	
2	"	"	1 250	18	35.1	
				D16	60.6	kg
			SUB	TOTAL	60.6	kg
(C)						
(AT END BEAM)						
G 31	D 25	3.98	2 200	25	218.9	
32	D 22	3.04	3 590	8	87.3	
33	"	"	3 260	17	168.5	
34	D 13	0.995	3 080	18	55.2	
35	"	"	3 960	13	51.2	
G' 1	D 13	0.995	1 790	24	42.7	
				D25	218.9	kg
				D22	255.8	"
				D13	149.1	"
			SUB	TOTAL	623.8	kg

REINF. NO.	DIA. (mm.)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
3) AT END OF VIADUCT TRANSVERSE BEAM					END ②	
B41	D19	2.25	4 660	5	52 4	⌐¬
42	〃	〃	4 100	5	46 1	⟶
43	D16	1.56	4 040	2	12 6	〃
B°41	D13	0.995	1 350	14	18 8	⌐
42	〃	〃	1 960	14	27 3	⌊
				D19	98 5 kg	
				D16	12 6 〃	
				D13	46 1 〃	
			SUB	TOTAL	157 2 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
4) AT INTERMEDIATE OF VIADUCT TRANSVERSE BEAM						
B 31	D 25	3.98	4 890	8	155.6	
32	〃	〃	4 230	16	269.4	
33	D 16	1.56	4 050	8	50.6	
B°31	D 13	0.995	1 390	28	38.8	
32	〃	〃	2 300	28	64.0	
33	〃	〃	1 220	28	32.0	
34	〃	〃	2 130	28	59.4	
				D 25	425.0 kg	
				D 16	50.6 〃	
				D 13	196.2 〃	
			SUB	TOTAL	671.8 kg	
			BEAM TOTAL			
				D25	4 163.9 kg	
				D22	255.8 〃	
				D19	442.5 〃	
				D16	168.0 〃	
				D13	1 829.4 kg	
			BEAM.	TOTAL	6 859.6 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
(3)	COLUMN					
C 1	D25	3.98	9 020	24	861.6	↑
2	〃	〃	8 750	76	2646.7	↓
C° 1	D13	0.995	2 470	198	486.7	☐
				D25	3 508.3	
				D13	486.7	
			COLUMN	TOTAL	3 995.0	

No. 40

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
(4) CURB						
W 1	D10	0.560	890	127	63 2	
2	〃	〃	720	127	51 2	
3	〃	〃	610	127	43 4	
4	〃	〃	1 270	127	90 3	
5	〃	〃	18 910	12	127 1	
				D10	375 2 kg	
			CURB	TOTAL	375 2 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
(5)	FOOTING					
F21	D 32	6.23	4 000	87	2 195.2	
22	D 19	2.25	4 100	51	470.5	
23	D 16	1.56	4 020	12	75.3	
F°21	D 13	0.995	2 760	39	107.1	
22	〃	〃	1 860	39	72.2	
F 31	D 25	3.98	6 100	21	509.8	
32	D 19	2.25	5 510	63	781.1	
33	D 16	1.56	5 810	24	217.5	
34	〃	〃	5 640	12	105.6	
F°31	D 13	0.995	2 040	90	182.7	
32	〃	〃	1 980	18	35.5	〃
			D 32		2 195.1	Kg
			D 25		509.7	〃
			D 19		1 251.6	〃
			D 16		398.4	〃
			D 13		397.5	〃
		FOOTING	TOTAL		4 752.3	Kg

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
(6) BRACING BEAM						
F 1	D 25	3.98	19 710	76	1255 1	
2	D 16	1.56	19 130	8	238 7	
F° 1	D 13	0.995	1 730	138	237 5	
2	"	"	1 310	138	179 8	
				D 25	1255 1 kg	
				D 16	238 7 "	
				D 13	417 3 "	
		BRACING BEAM		TOTAL	1911 1 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	ELECTRIC		POLE	(AT END	OF VIADUCT	, END ①)
B 41	D 25	3.98	3 600	5	71.6	
42	"	"	2 550	4	40.6	
43	D 16	1.56	2 100	4	13.1	
44	"	"	2 620	2	8.2	
B° 41	D 13	0.995	2 300	7	16.0	(VARIES)
42	"	"	1 990	7	13.9	"
43	"	"	1 570	7	10.9	
44	"	"	1 270	7	8.8	
E 1	D22	3.04	2 100	16	102.1	
2	D13	0.995	1 580	8	12.6	
E° 1	D13	0.995	3 060	9	27.4	
2	"	"	2 110	9	18.9	
				D25	112.2 kg	
				D22	102.1 "	
				D16	21.3 "	
				D13	108.5 "	
			SUB	TOTAL	344.1 kg	

JICA

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	ELECTRIC		POLE (AT INTERMEDIATE)			
B 41	D 25	3.98	3 600	5	71.6	
42	"	"	2 550	4	40.6	
43	D 16	1.56	2 100	4	13.1	
44	"	"	2 620	2	8.2	
B° 41	D 13	0.995	2 330	7	16.2	(VARIES)
42	"	"	2 010	7	14.0	"
43	"	"	1 600	7	11.1	
44	"	"	1 280	7	8.9	
E 1	D22	3.04	2 100	16	102.1	
2	D13	0.995	1 580	8	12.6	
E° 1	D13	0.995	3 060	9	27.4	
2	"	"	2 110	9	18.9	
				D25	112.2 kg	
				D22	102.1 "	
				D16	21.3 "	
				D13	109.1 "	
			SUB	TOTAL	344.7 kg	

JICA

2. VIADUCT. V048

30M 000

VIADUCT V048 L=30.000
(H=7.820)

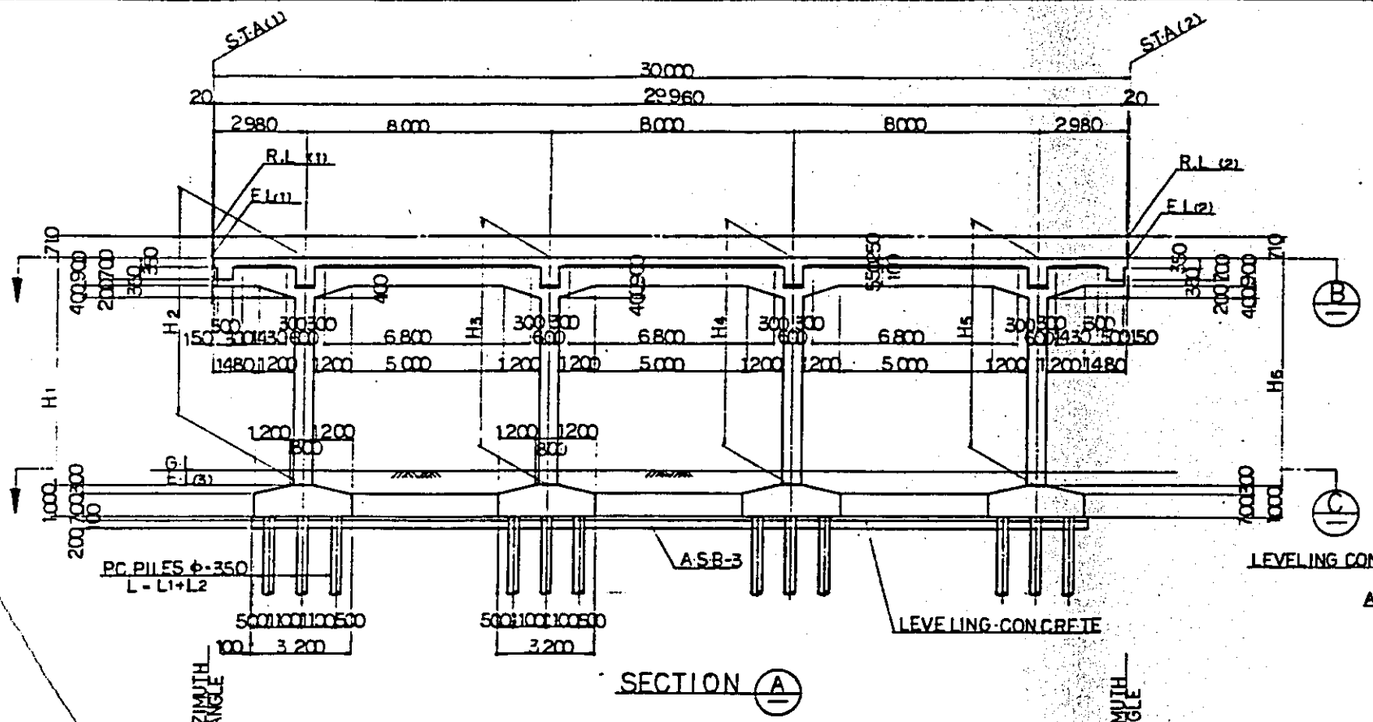
	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	47.0	154.0	3676.1	78.2
BEAM	30.4	124.8	9390.4	308.9
COLUMN	19.9	131.4	5140.9	258.3
CURB	5.2	54.3	591.7	113.8
GRADING CONCRETE	10.5	—	—	—
TOTAL	113.0	464.5	18799.1	166.4
FOOTING	48.8	42.6	5463.2	112.0
BRACING BEAM	10.1	40.3	2731.5	270.4
TOTAL	58.9	82.9	8194.7	139.1

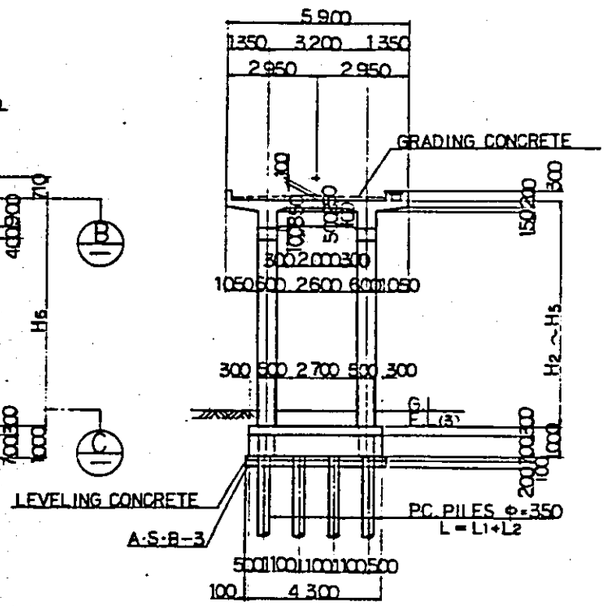
	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	M^3	8.1	CLASS F
AGGREGATE SUB BASE	M^3	16.1	A.S.B.-3
EXCAVATION	M^3	144.9	
FOUNDATION MORTAR	M^3	—	σ_{ck} = 400 kg/cm^2
PILE	M x NUMBER	A- 8 x 48 B- 8 x 48	Φ350 - A Φ350 - B

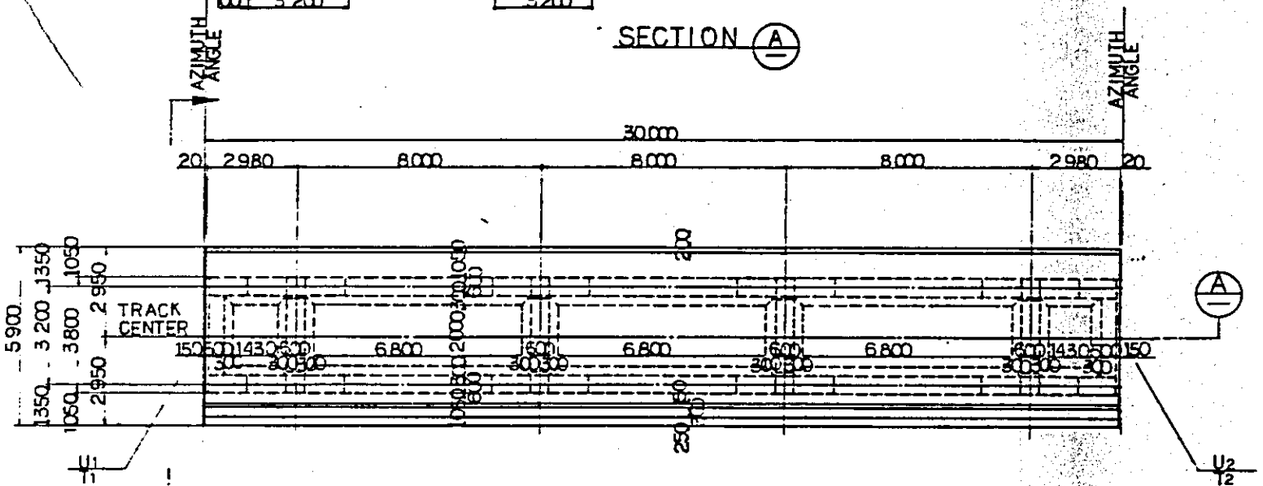
VIADUCT V048 L=30.000
(H=7.820)

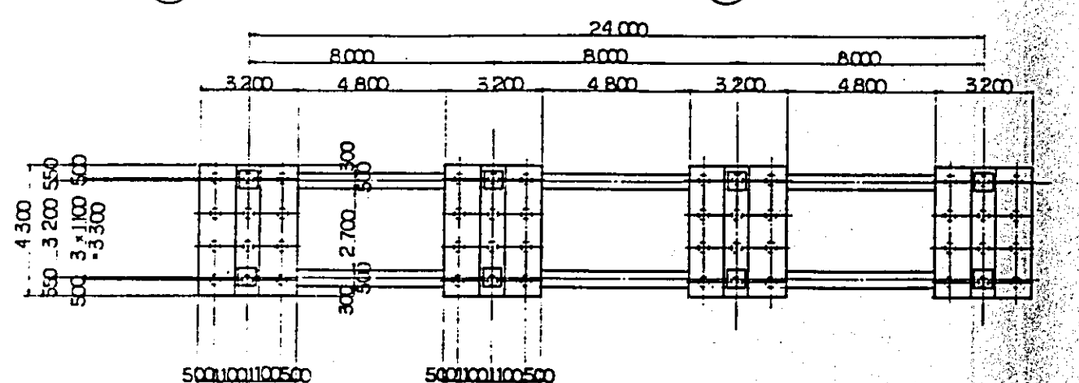
SD30 UNIT: Kg.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	——	——	——	——	——	——	3676.1	——	3676.1
BEAM	——	——	5910.9	——	735.7	126.4	2617.4	——	9390.4
COLUMN	——	——	4492.0	——	——	——	648.9	——	5140.9
CURB	——	——	——	——	——	——	——	591.7	591.7
TOTAL	——	——	10402.9	——	735.7	126.4	6942.4	591.7	18799.1
FOOTING	2523.2	790.2	——	——	553.6	1150.0	446.0	——	5463.2
BRACING BEAM	——	——	1784.3	——	——	342.4	604.8	——	2731.5
TOTAL	2523.2	790.2	1784.3	——	553.6	1492.4	1050.8	——	8194.7



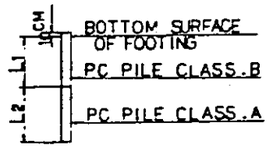






NOTES ;

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. REFERENCE DRAWING FOR BAR ARRANGEMENT : CS-160-164
3. TYPES OF PC PILE



4. GRADING CONCRETE SHALL BE SIMULTANEOUSLY PLACED WITH SLAB CONCRETE

_ DIMENSION SCHEDULE NO1

30 + 3x8.0 + 3.0 = 30.00

	V002	V003	V024	V025	V026	V048	V049	V080	V081	V082	V083	V084	V099	V100
STA (1)	13K436M000	13K466M000	14K649M000	14K679M000	14K709M000	15K668M000	15K698M000	16K872M000	16K902M000	16K932M000	16K962M000	16K992M000	17K662M000	17K692M000
STA (2)	13K466M000	13K496M000	14K679M000	14K709M000	14K739M000	15K698M000	15K728M000	16K902M000	16K932M000	16K962M000	16K992M000	17K022M000	17K692M000	17K722M000	
R.L (1)	4M794	5M394	6M986	6M539	6M113	8M724	8M724	7M805	7M986	8M166	8M346	8M526	8M754	8M754
R.L (2)	5M394	5M994	6M539	6M113	5M924	〃	〃	7M986	8M166	8M346	8M526	8M726	〃	〃
AZIMUTH ANGLE(θ1)	350°39'55"58	350°39'55"58	9°43'08"64	9°43'08"64	9°43'08"64	1°06'02"00	1°06'02"00	345°30'45"40	345°30'45"40	345°30'45"40	345°30'45"40	345°30'45"40	345°30'45"40	345°30'45"40
DD (θ2)	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃
U 1	12K041M541	12K046M407	12K082M840	12K077M775	12K072M711	11K998M266	11K997M690	12K021M849	12K029M354	12K036M859	12K044M364	12K051M869	12K219M481	12K226M986
T 1	-2K732M068	-2K702M466	-1K527M896	-1K498M127	-1K468M557	-514M734	-484M740	685M288	714M334	743M380	772M426	801M472	1K450M168	1K479M214
U 2	12K045M407	12K051M273	12K077M775	12K072M711	12K067M646	11K997M690	11K997M114	12K029M354	12K036M859	12K044M364	12K051M869	12K059M374	12K226M986	12K234M491
T 2	-2K702M466	-2K672M863	-1K498M127	-1K468M557	-1K438M988	-484M740	-454M745	714M334	743M380	772M426	801M472	830M518	1K479M214	1K508M260
E L (1)	4M084	4M684	6M276	5M829	5M355	8M014	8M014	7M096	7M276	7M456	7M636	7M816	8M044	8M044
E L (2)	4M684	5M284	5M829	5M355	5M214	〃	〃	7M276	7M456	7M636	7M816	7M996	〃	〃
E L (3)	0M300	0M300	0M900	0M900	0M900	0M194	0M194	0M400	0M400	0M400	0M400	0M400	0M694	0M694
G L	0M800	0M800	1M400	1M400	1M400	0M700	0M700	0M900	0M900	0M900	0M900	0M900	1M200	1M200
H 1	3784	4384	5376	4929	4455	7820	7820	6686	6876	7056	7236	7416	7350	7350
H 2	3844	4444	5331	4882	4441	〃	〃	6714	6894	7074	7254	7434	〃	〃
H 3	4004	4604	5212	4755	4403	〃	〃	6762	6942	7122	7302	7482	〃	〃
H 4	4164	4764	5093	4629	4366	〃	〃	6810	6990	7170	7350	7530	〃	〃
H 5	4324	4924	4974	4502	4328	〃	〃	6858	7038	7218	7398	7578	〃	〃
H 6	4384	4984	4929	4455	4314	〃	〃	6876	7056	7236	7416	7596	〃	〃
PC PILES L1	10000	10000	12000	12000	12000	8000	8000	8000	8000	8000	8000	8000	8000	8000
PC PILES L2	——	——	——	——	——	8000	8000	13000	13000	13000	14000	14000	11000	11000

DIMENSION SCHEDULE NO2

	V121	V122
STA (1)	18K412M000	18K442M000
STA (2)	18K442M000	18K472M000
R L (1)	8M334	8M784
R L (2)	8M784	9M234
AZIMUTH ANGLE(θ1)	30°25'59"73	30°25'59"73
DD (θ2)	〃	〃
U 1	12K154M003	12K138M800
T 1	2K162M443	2K188M305
U 2	12K138M800	12K123M586
T 2	2K188M305	2K214M167
E L (1)	7M624	8M074
E L (2)	8M074	8M524
E L (3)	0M900	0M900
G L	1M400	1M400
H 1	6724	7174
H 2	6769	7219
H 3	6889	7339
H 4	7009	7459
H 5	7129	7579
H 6	7174	7624
PC PILES L1	8000	8000
PC PILES L2	7000	7000

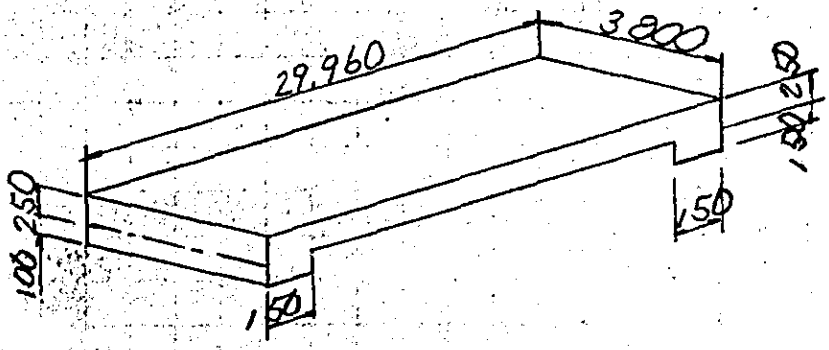
NOTES;

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. REFERENCE DRAWING FOR GENERAL VIEW: CS-158

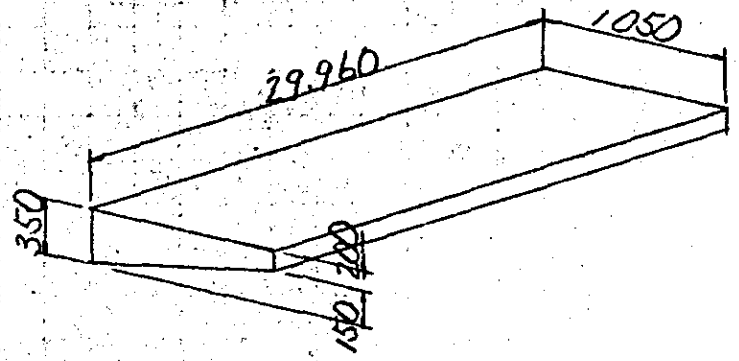
(V48) 3.0 + 3 × 8.0 + 3.0 = 30.000 m

CONCRETE VOLUM

(1) SLAB

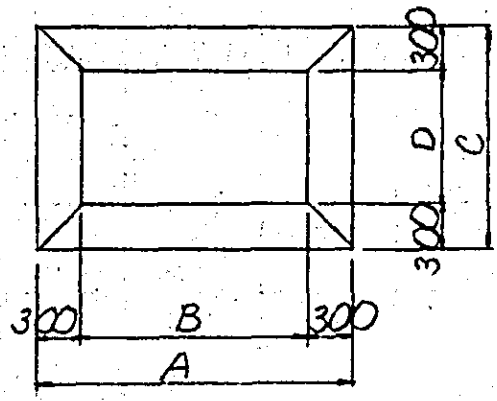


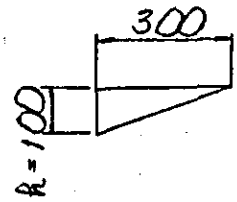
$V_a = 3.800 \times (0.250 \times 29.960 + 0.150 \times 0.100 \times 2) = 28.576\ m^3$



$V_b' = 1/2 \times (0.350 + 0.200) \times 1.050 \times 29.960 = 8.651$

$V_b = 8.651 \times 2 = 17.302\ m^3$





$$V=[A\times C-\{A\times C+(A+B)(C+D)+B\times D\}\times 1/6]\times h$$

	A	B	C	D	V'
Vc'	2030	1430	2600	2000	= 0.127 m^3
Vd'	7400	6800	〃	〃	= 0.288 m^3

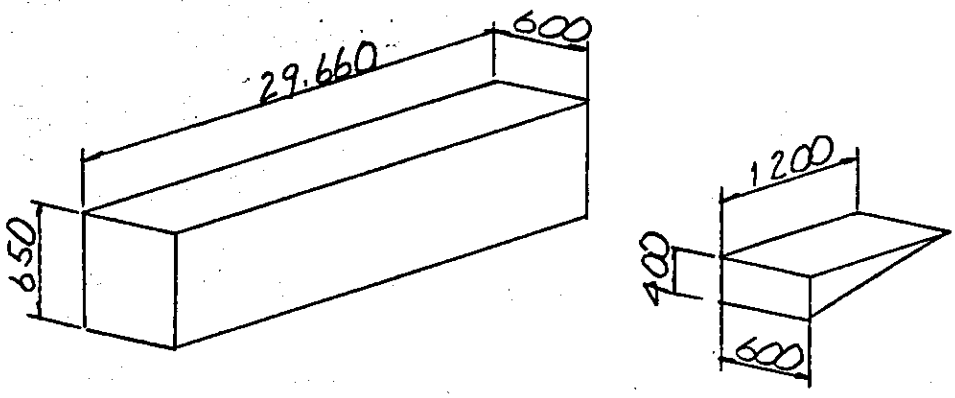
Vc = 0.127 × 2 = 0.254 m^3

Vd = 0.288 × 3 = 0.864

SLAB TOTAL 46.996 m^3

(2) BEAM

1) LONGITUDINAL BEAM



$Va' = 0.600 \times 0.650 \times 29.660 = 11.567\ m^3$

$Va = 11.567 \times 2 = 23.134\ m^3$

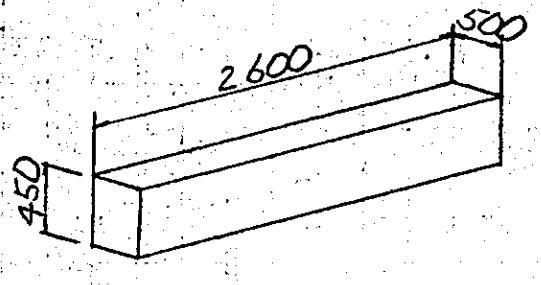
$Vb' = 1.200 \times 0.400 \times 1/2 \times 0.600 = 0.144\ m^3$

$Vb = 0.144 \times 8 \times 2 = 2.304\ "$

SUB TOTAL 25.438 m^3

2) AT END OF VIADUCT TRANSVERSE BEAM

END ②

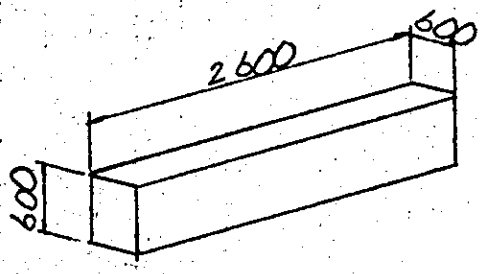


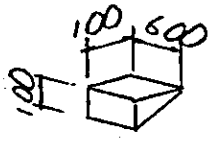
$Va' = 0.500 \times 0.450 \times 2.600 = 0.585\ m^3$

$Va = 0.585 \times 2 = 1.170\ m^3$

$1.170\ m^3$

3) AT INTERMEDIATE OF VIADUCT TRANSVERSE BEAM





$Va' = 0.600 \times 0.600 \times 2.600 = 0.936\ m^3$

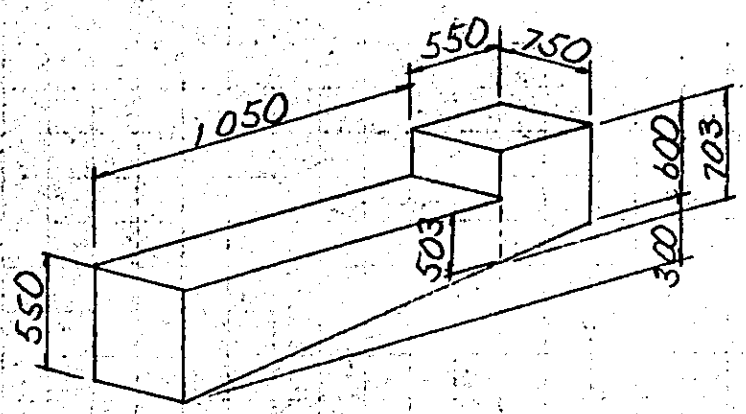
$Va = 0.936 \times 4 = 3.744\ m^3$

$Vb' = 0.100 \times 0.100 \times 1/2 \times 0.600 = 0.003\ m^3$

$Vb = 0.003 \times 2 \times 4 = 0.024\ m^3$

SUB TOTAL = $3.768\ m^3$

4) BASE OF ELECTRIC POLE



$Va' = (0.550 + 0.503) \times 1/2 \times 1.05 \times 0.750 = 0.417\ m^3$

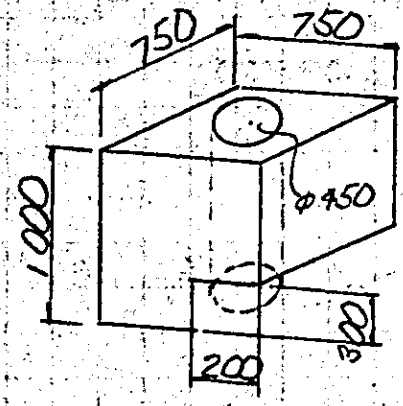
$Va = 0.413 \times 1$ = $0.415\ m^3$

$Vb' = (0.600 + 0.703) \times 1/2 \times 0.550 \times 0.750 = 0.269\ m^3$

$Vb = 0.269 \times 1$ = $0.269\ m^3$

SUB TOTAL = ($0.684\ m^3$)

5) ELECTRIC POLE



$Va' = (0.750 \times 0.750 - 1/4 \times 3.142 \times 0.450^2) \times 1.000$

$- 0.300 \times 0.200 \times 0.750 = 0.358$

$Va = 0.358 \times 1$ = 0.358 m^3

(0.358 m^3)

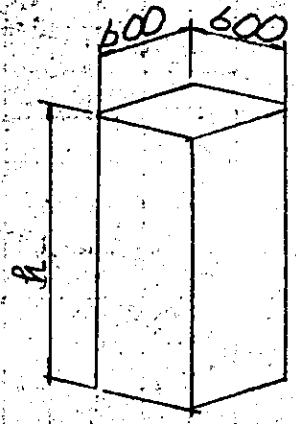
5) + 6) ELECTRIC TOTAL (31.042 m^3)

BEAM TOTAL 30.376 m^3

(BEAM TOTAL POLE 31.418 m^3)

(3) COLUMN

1) AT END of VIADUCT. COLUMN



h_2 = 6.920

h_6 = 6.920

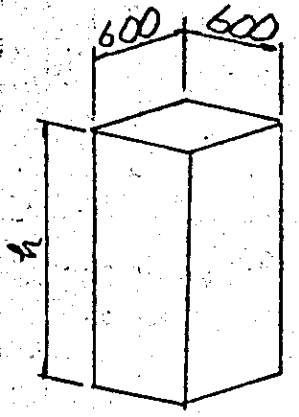
TOTAL = 13.840

$Va' = 0.600 \cdot 0.600 \times 13.840 = 4.982 \ m^3$

$Va = 4.982 \times 2$ = 9.964 m^3

9.964 m^3

2) AT INTERMEDIATE of VIADUCT COLUMN



h_3 = 6.920

h_4 = 〃

TOTAL = 13.840

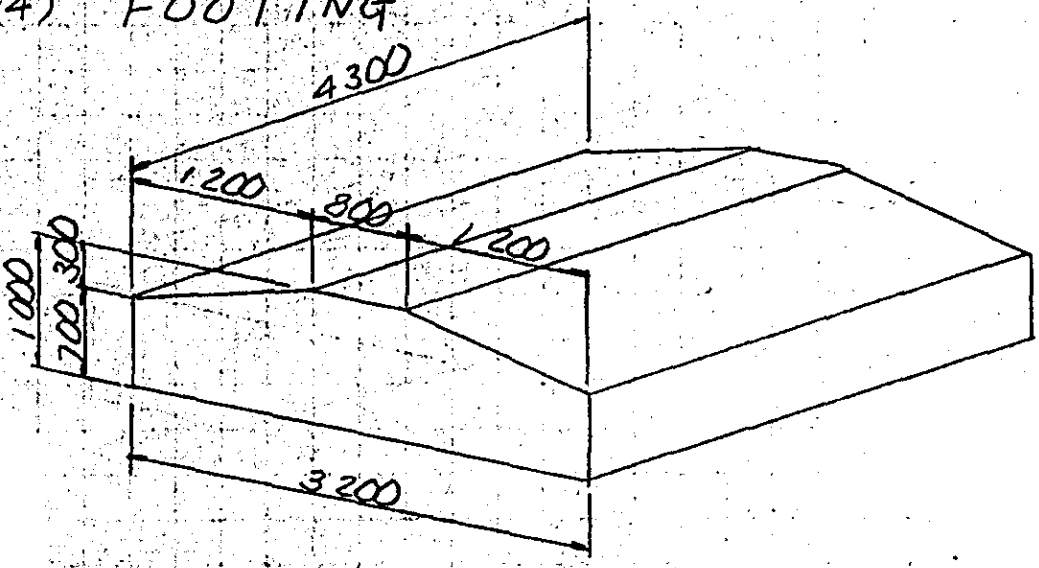
$Va' = 0.600 \cdot 0.600 \times 13.840 = 4.982 \ m^3$

$Va = 4.982 \times 2$ = 9.964 m^3

9.964 m^3

COLUMN TOTAL	19.928 m^3

(4) FOOTING



$Va' = 3.200 \times 0.700 \times 4.300 = 9.632$

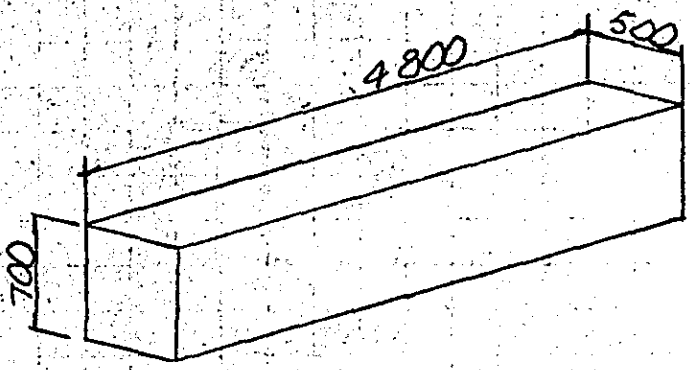
$Va = Va' \times 4 = 38.528\ m^3$

$Vb' = (3.200 + 0.800) \times 1/2 \times 0.300 \times 4.300 = 2.580$

$Vb = Vb' \times 4 = 10.320$ "

FOOTING TOTAL 48.848 m^3

(5) BRACING BEAM

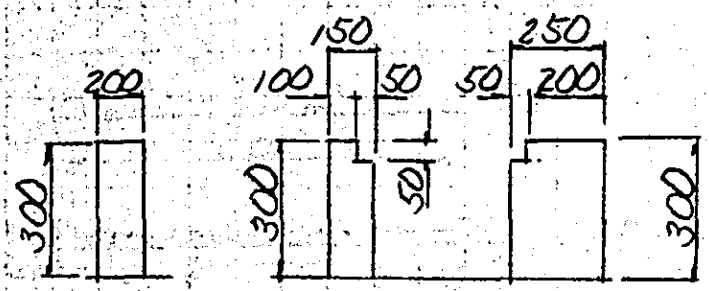


$Va = 0.500 \times 0.700 \times 4.800 \times 2 = 3.360$

$Va = 3.360 \times 3$ = 10.080 m^3

BRACING BEAM TOTAL 10.080 m^3

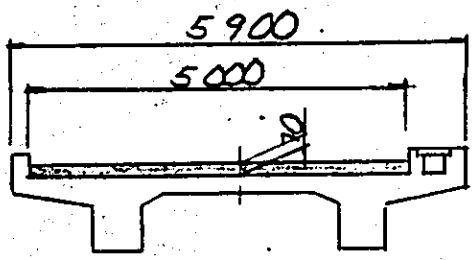
(6) CURB



$\ell = 29.960$

$Va = 0.200 \times 0.300 \times 29.960$	=	1.798 m^3
$Vb = (0.150 \times 0.300 - 0.050 \times 0.050) \times 29.960$	=	1.273 "
$Vc = (0.250 \times 0.300 - 0.050 \times 0.050) \times 29.960$	=	2.172 "
CURB TOTAL		5.243 m^3

(7) GRADIMG CONCRETE

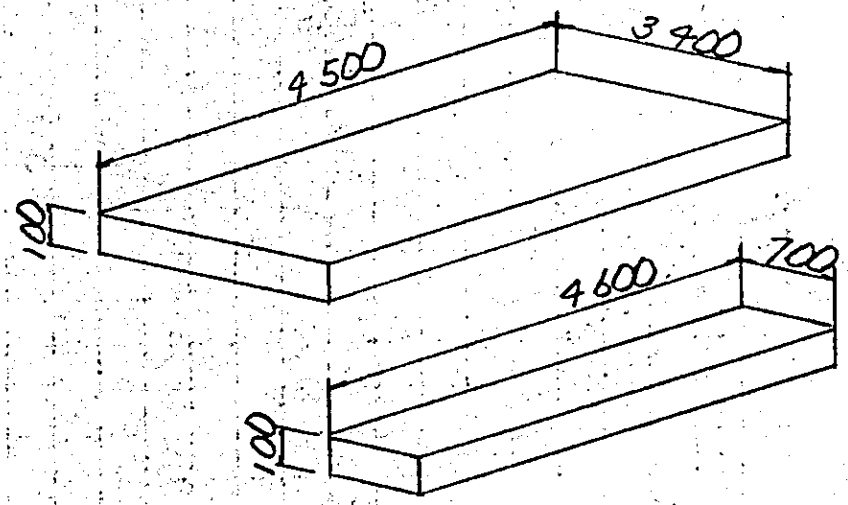


ℓ = 29.960

$V = 0.070 \times 5.000 \times 29.960 = 10.486\ m^3$

$10.486\ m^3$

(9) LEVELING CONCRETE



$Aa' = 4.500 \times 0.100 \times 3.400 = 1.530$

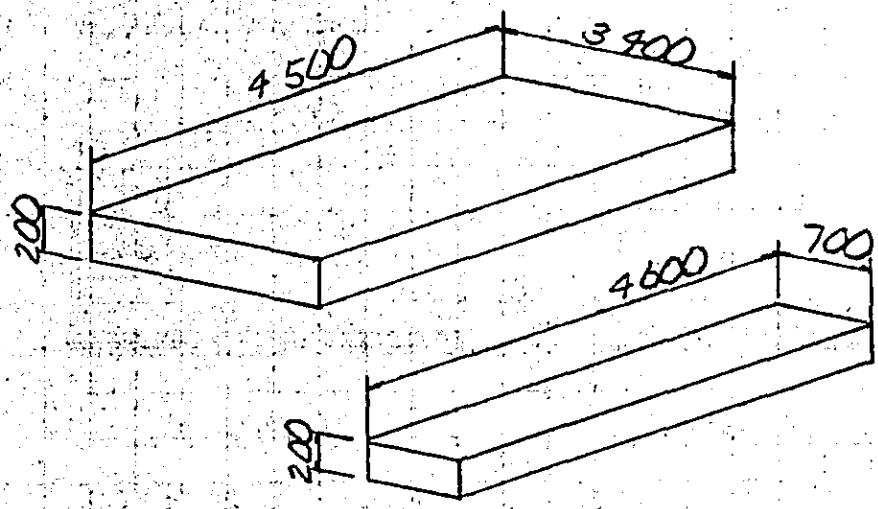
$Aa = Aa' \times 4 = 6.120\ m^3$

$Ab' = 0.700 \times 0.100 \times 4.600 \times 2 = 0.644$

$Ab = Ab' \times 3 = 1.932\ "$

LEVELING CONCRETE $8.052\ m^3$

(10) AGGREGATE SUB BASE



$Va' = 3.400 \times 0.200 \times 4.500 = 3.060$

$Va = Va' \times 4 = 12.240\ m^3$

$Vb' = 0.700 \times 0.200 \times 4.600 \times 2 = 1.288$

$Vb = Vb' \times 3 = 3.864$ "

AGGREGATE SUB BASE TOTAL $16.104\ m^3$

(11) PILE

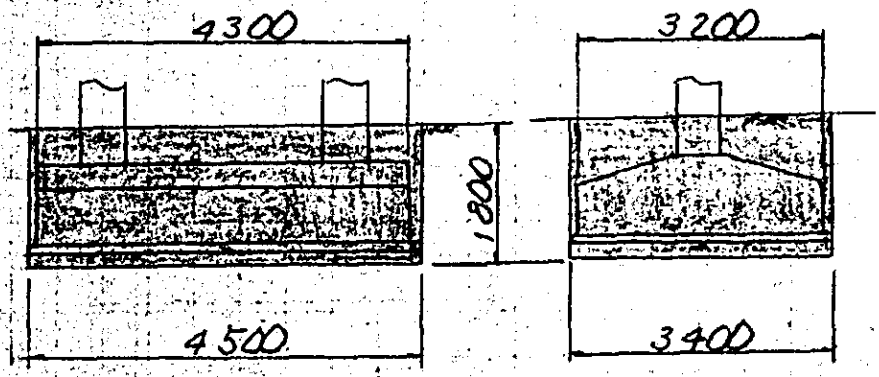
$\phi = 350$ $\ell = 16.00\ m$ $n = 48$

$A = 8.000 \times 48$ $A = 48$

$B = 8.000 \times 48$ $B = 48$

(2) EXCAVAION

1) FOOT ING

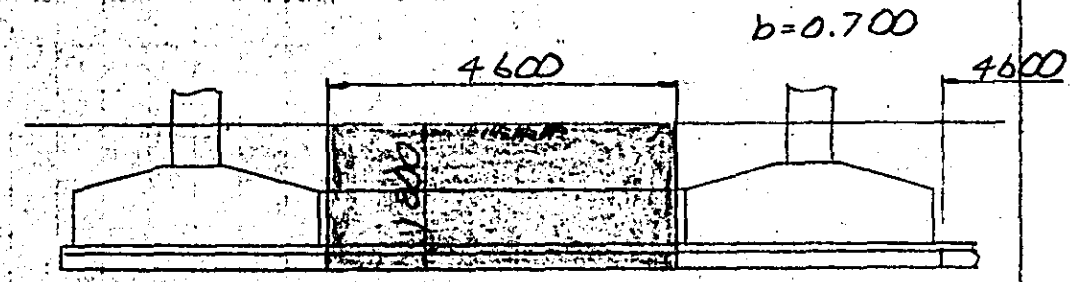


$Va' = 3.400 \times 1.800 \times 4.500 = 27.540\ m^3$

$Va = 27.540 \times 4 = 110.160\ m^3$

$110.160\ m^3$

2) BRACING BEAM



$Va' = 4.600 \times 0.700 \times 1.800 \times 2 = 11.592$

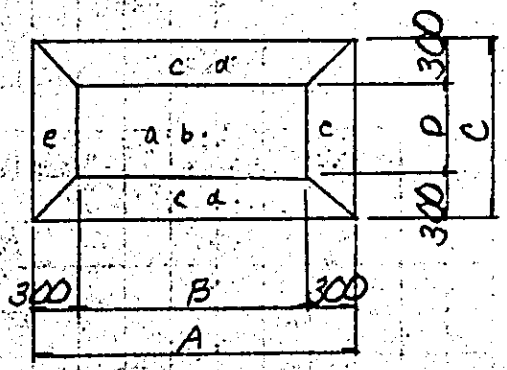
$Va = 11.592 \times 3 = 34.776\ m^3$

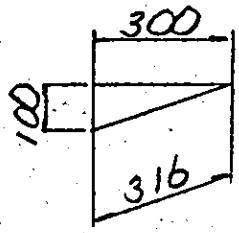
$34.776\ m^3$

EXCAVTION TOTAL $144.936\ m^3$

FORM AREA

(1) SLAB





	A	B	C	D
a	2,030	1,430	2600	2000
b	7400	6800	"	"

Aa' = 1.430 · 2.000 = 2.860

Aa = 2.860 × 2 = 5.720 m²

Ab' = 7.400 · 2.000 = 14.800

Ab = 14.800 × 3 = 44.400 "

$Ac' = (7.400 + 6.800) \times 1/2 \times 0.316 \times 2 = 4.487$

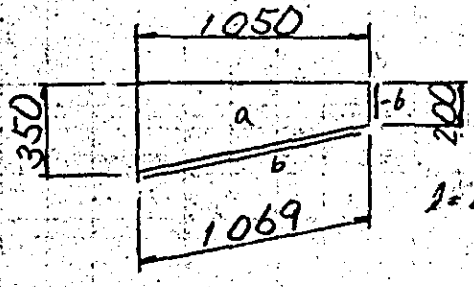
$Ac = 4.487 \times 3 = 13.461\ m^2$

$Ad' = (2.030 + 1.430) \times 1/2 \times 0.316 \times 2 = 1.093$

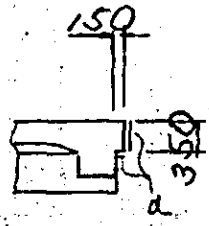
$Ad = 1.093 \times 2 = 2.186\ "$

$Ae' = (2.600 + 2.000) \times 1/2 \times 0.316 \times 2 = 1.454$

$Ae = 1.454 \times 5 = 7.270\ "$



$l = 29.960$



$l = 3.800$

$Aa' = (0.350 + 0.200) \times 1/2 \times 1.050 = 0.289$

$Aa = 0.289 \times 2 \times 2 = 1.156\ m^2$

$Ab' = (1.069 + 0.200) \times 29.960 = 38.019$

$Ab = 38.019 \times 2 = 76.038\ "$

$-Ac'_{POLE} = (1.069 + 0.200) \times 0.750 = \ominus 0.952$

$-Ac = 0.952 \times 1 = (= \ominus 0.952\ ")$

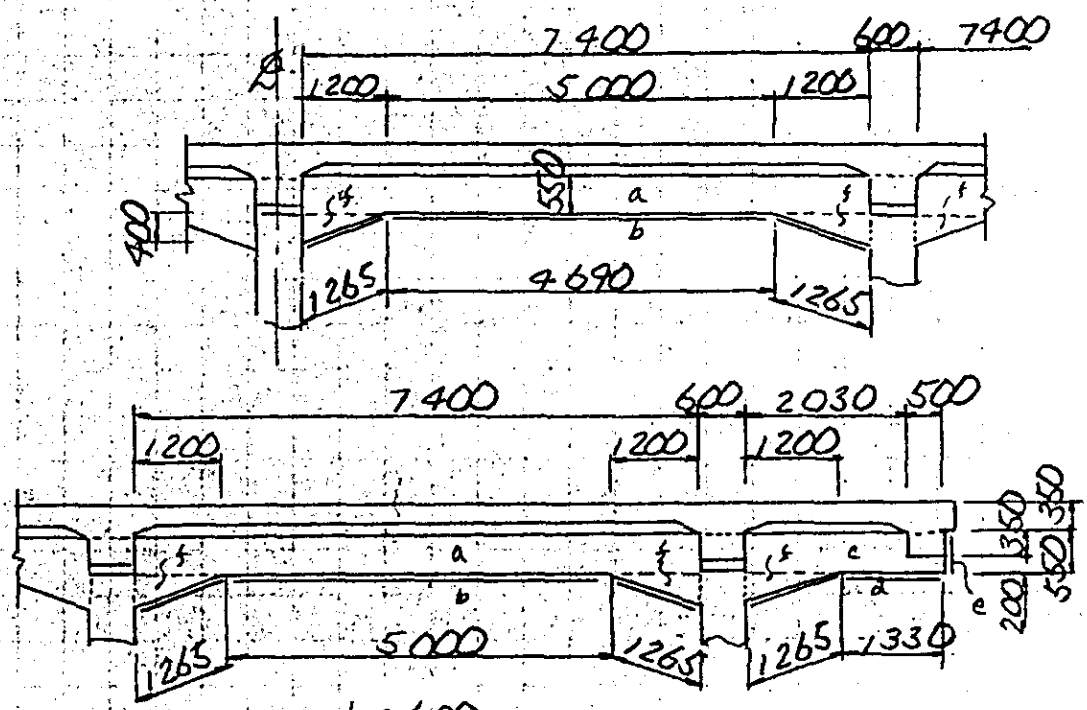
$Ad' = (0.150 + 0.350) \times 3.800 = 1.900$

$Ad = 1.900 \times 2 = 3.800\ "$

SLAB TOTAL	$154.031\ m^2$
(SLAB TOTAL POLE	$153.079\ "$)

(2) BEAM

1) LONGITUDINAL BEAM



b = 600

$Aa' = 7.400 \times 0.550 \times 2 \times 3 = 24.420\ m^2$

$Ab' = (1.265 \times 2 + 5.000) \times 0.600 \times 3 = 13.554$ "

$Ac' = (2.530 \times 0.550 \times 2 - 0.900 \times 0.350) \times 2 = 5.216$ "

$Ad' = (1.265 + 1.330) \times 0.600 \times 2 = 3.114$ "

$Ae' = 0.550 \times 0.600 \times 2 = 0.660$ "

$As' = 1.200 \times 0.400 \times 1/2 \times 8 \times 2 = 3.840$ "

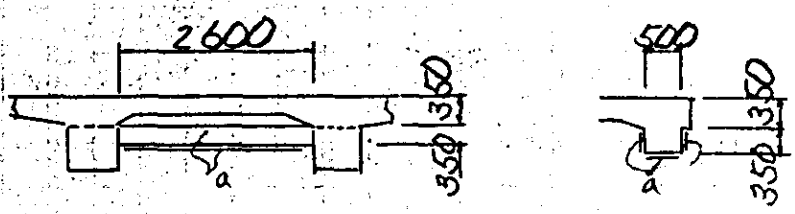
$A' = 24.420 + 13.554 + 5.216 + 3.114 + 0.660 + 3.840 = 50.804$

$A = 50.804 \times 2 = 101.608\ m^2$

SUB TOTAL = 101.608 m^2

3) AT END OF VIADUCT TRANSVERSE BEAM

END ②

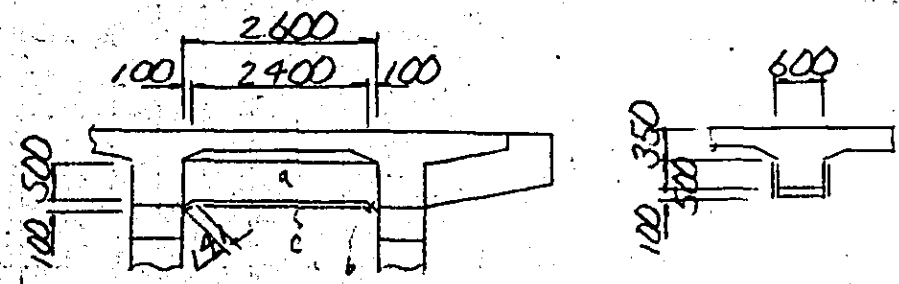


$Aa' = (0.350 \times 2 + 0.500) \times 2.600 = 3.120$

$Aa = 3.120 \times 2 = 6.240\ m^2$

$6.240\ m^2$

4) AT INTERMEDIATE OF VIADUCT. TRANSVERSE BEAM



$Aa' = 2.600 \times 0.500 \times 2 = 2.600$

$Aa = 2.600 \times 4 = 10.400\ m^2$

$Ab' = 0.100 \times 0.100 \times 1/2 \times 4 = 0.020$

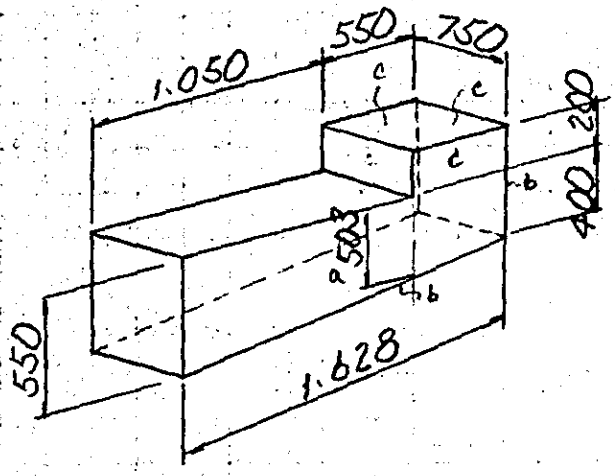
$Ab = 0.020 \times 4 = 0.080\ "$

$AC' = (0.141 \times 2 + 2.400) \times 0.600 = 1.609$

$AC = 1.609 \times 4 = 6.436\ "$

SUB TOTAL = $16.916\ m^2$

5) BASE OF ELECTRIC POLE



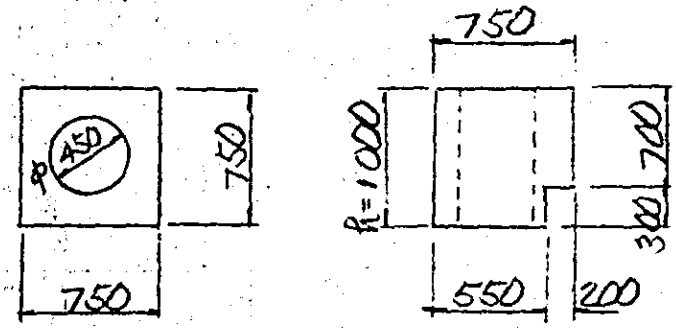
$$Aa = \left\{ \frac{0.550 + 0.503}{2} \times 1.050 + \frac{0.503 + 0.400}{2} \times 0.550 \right\} \times 2 = 1.602 \text{ m}^2$$

$$Ab = (1.628 + 0.600) \times 0.750 = 1.671 \text{ m}^2$$

$$Ac = (0.550 \times 2 + 0.750) \times 0.200 = 0.370 \text{ m}^2$$

SUB TOTAL = (3.643 m^2)

6) ELECTRIC POLE



$$Aa = 0.750 \times 3 \times 1.000 + 0.750 \times 0.700 = 2.775 \text{ m}^2$$

$$Ab = 0.450 \times 3.142 \times 1.000 = 1.414 \text{ m}^2$$

SUB TOTAL = (4.189 m^2)

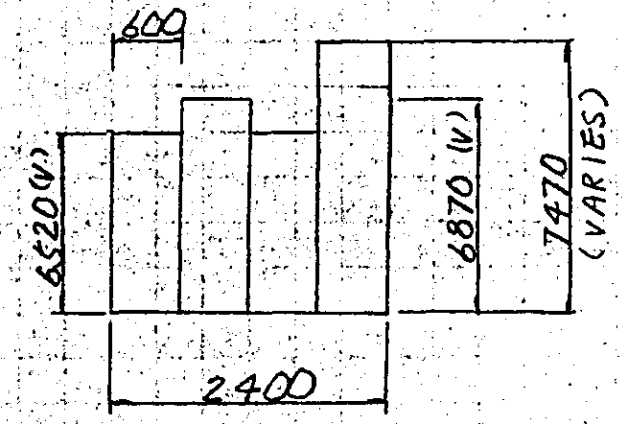
5) + 6) = ELECTRIC TOTAL (7.832 m^2)

BEAM TOTAL 124.764 m^2

(BEAM POLE TOTAL 132.596 m^2)

(3) COLUMN

1) AT END OF VIADUCT. COLUMN



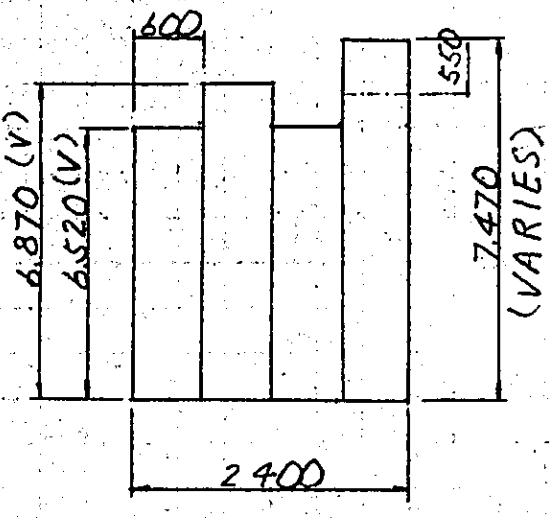
$Aa' = 0.600 \times (6.870 + 6.520 \times 2 + 7.470) = 16.428$

$Aa = 16.428 \times 4$

$= 65.712\ m^2$

$65.712\ m^2$

2) AT INTERMEDIATE OF VIADUCT COLUMN



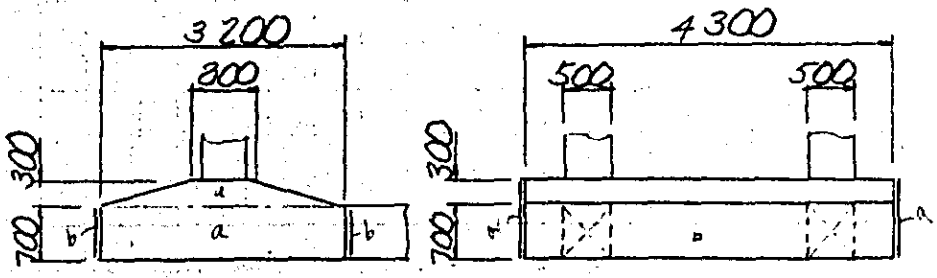
$Aa' = 0.600 \cdot (6.520 \times 2 + 6.870 + 7.470) = 16.428$

$Aa = 16.428 \times 4$ = 65.712 m^2

POLE ($-A = 0.600 \times 0.550 = 0.330^{m^2}$). 65.712 m^2

COLUMN TOTAL 131.424 m^2

(4) FOOTING



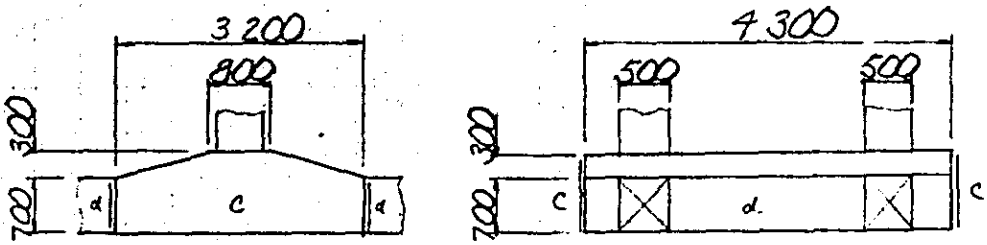
$Aa' = \{3.200 \times 0.700 + (0.800 + 3.200) \cdot 1/2 \cdot 0.30\}$

$\times 2 = 5.680$

$Aa = 5.680 \times 2 = 11.360\ m^2$

$Ab' = 0.700 \times (4.300 + 3.300) = 5.320$

$Ab = 5.320 \times 2 = 10.640$ "



$Ac' = \{3.200 \times 0.700 + (0.800 + 3.200) \cdot 1/2 \cdot 0.300\} \times 2 = 5.680$

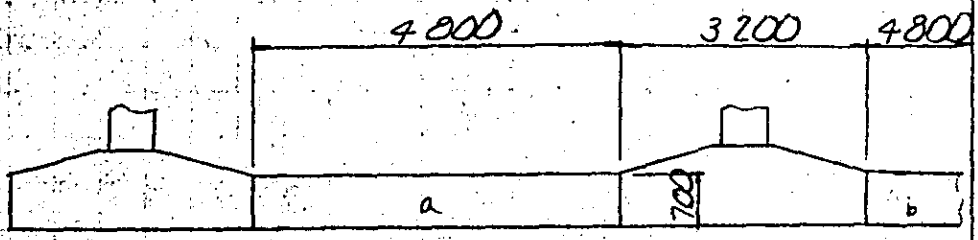
$Ac = 5.680 \times 2 = 11.360\ m^2$

$Ad' = 0.700 \times (4.300 - 1.000) \times 2 = 4.620$

$Ad = 4.620 \times 2 = 9.240$ "

FOOTING TOTAL $42.600\ m^2$

(5) BRACING BEAM



$Aa' = 4.800 \times 0.700 \times 2 = 6.720$

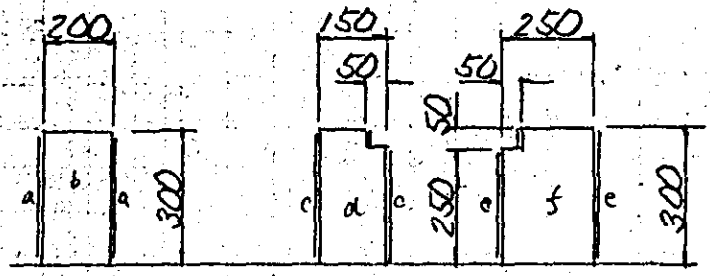
$Aa = 6.720 \times 4 = 26.880\ m^2$

$Ab' = 4.800 \times 0.700 \times 2 = 6.720$

$Ab = 6.720 \times 2 = 13.440\ "$

BRACING TOTAL $40.320\ m^2$

(6) CURB



$\ell = 29.960$

$Aa = 0.300 \times 2 \times 29.960$	=	17.976 m²
$Ab = 0.200 \times 0.300 \times 2$	=	0.120 "
$Ac = (0.300 + 0.250 + 0.05) \times 29.960$	=	17.976 "
$Ad = (0.150 \times 0.300 - 0.050 \times 0.050) \times 2$	=	0.085 "
$Ae = (0.250 + 0.050 + 0.300) \times 29.960$	=	17.976 "
$Af = (0.250 \times 0.300 - 0.050 \times 0.050) \times 2$	=	0.145 "
CURB TOTAL		54.278 m²

REINFORCING BAR

No. 74

REINF NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	S 1	SLAB				
S 1	D 13	0.995	6 920	110	757 4	
2	〃	〃	5 480	10	54 5	
3	〃	〃	5 630	97	543 4	
4	〃	〃	3 600	110	394 0	
5	〃	〃	2 640	24	63 0	
6	〃	〃	1 920	36	68 8	
7	〃	〃	2 650	216	569 6	
8	〃	〃	1 400	24	33 4	
9	〃	〃	1 400	4	5 6	
S 21	D 13	0.995	29 560	16	470 6	
22	〃	〃	30 220	2	60 1	
23	〃	〃	30 220	2	60 1	〃
24	〃	〃	29 900	18	535 5	
25	〃	〃	1 400	16	22 3	〃
26	〃	〃	1 460	26	37 8	
				D 13	3676 1 kg	
			SLAB	TOTAL	3676 1 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
		BEAM				
1)	LONGITUDINAL BEAM					
B 1	D 25	3.98	31 110	24	2971.6	
2	〃	〃	6 750	8	214.9	
3	〃	〃	32 230	4	513.1	
4	〃	〃	29 510	4	469.8	
5	〃	〃	3 500	64	891.5	
6	D 19	2.25	29 930	8	538.7	
B' 1	D 13	0.995	2 450	184	448.6	
2	〃	〃	1 390	280	387.2	
3	〃	〃	2 280	184	417.5	
4	〃	〃	1 220	280	339.9	
5	〃	〃	2 910	96	277.9	
6	〃	〃	2 740	96	261.7	
				D 25	5060.9 kg	
				D 19	538.7 〃	
				D 13	2132.8 〃	
			SUB	TOTAL	7732.4 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
2) AT END OF VIADUCT TRANSEVERSE BEAM						
B41	D19	2.25	4 660	10	104 8	⌐¬
42	"	"	4 100	10	92 2	⟷
43	D16	1.56	4 040	4	25 2	"
B°41	D13	0.995	1 350	28	37 6	⊓
42	"	"	1 960	28	54 6	⊔
				D19	197 0 kg	
				D16	25 2 "	
				D13	92 2 "	
			SUB	TOTAL	314 4 kg	

REINF. NO.	DIA. (mm.)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
3) AT INTERMEDIATE OF VIADUCT TRANSVERSE BEAM						
B31	D25	3.98	4 890	12	233.4	⌐¬
32	〃	〃	4 230	24	404.1	←
33	D16	1.56	4 050	12	75.9	〃
B°31	D13	0.995	1 390	42	58.2	⌐
32	〃	〃	2 300	42	96.0	⌴
33	〃	〃	1 220	42	51.0	⌐
34	〃	〃	2 130	42	89.1	⌴
				D25	637.5 kg	
				D16	75.9 〃	
				D13	294.3 〃	
			SUB	TOTAL	1007.7 kg	
			BEAM TOTAL			
				D25	5 698.4 kg	
				D19	735.7 〃	
				D16	101.1 〃	
				D13	2 519.3 〃	
			BEAM TOTAL		9 054.5 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	COLUMN					
C 1	D25	3.98	9 020	32	1 148.8	〃
2	〃	〃	8 750	96	3343.2	〃
C°1	D13	0.995	2 470	264	648.9	□
				D25	4 492.0 kg	
				D13	648.9 〃	
			COLUMN	TOTAL	5 140.9 kg	

No. 79

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
		CURB				
W 1	D10	0.560	890	200	99.6	⊏
2	〃	〃	720	200	80.6	〃
3	〃	〃	610	200	68.4	〃
4	〃	〃	1 270	200	142.2	〃
5	〃	〃	29 900	12	200.9	〃
				D10	591.7 kg	
			CURB	TOTAL	591.7 kg	

JICA

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
		FOOTING				
F 21	D32	6.23	4 050	100	2 523.2	
22	D19	2.25	4 100	60	553.6	
23	D16	1.56	4 020	16	100.4	
F° 21	D13	0.995	1 870	44	82.0	
22	〃	〃	2 760	44	120.8	
F 31	D29	5.04	5 600	28	790.4	
32	D16	1.56	5 010	84	656.4	
33	〃	〃	5 310	32	265.2	
34	〃	〃	5 130	16	128.0	
F° 31	D13	0.995	2 040	96	194.8	
32	〃	〃	2 030	24	48.4	
				D32	2 523.2 kg	
				D29	790.4 〃	
				D19	553.6 〃	
				D16	1 150.0 〃	
				D13	446.0 〃	
			FOOTING	TOTAL	5 463.2 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
		BRACING BEAM				
F 1	D 25	3.98	28 020	16	1 784.3	
2	D 16	1.56	27 440	8	342.4	
F° 1	D 13	0.995	1 730	200	344.2	
2	〃	〃	1 310	200	260.6	
				D 25	1 784.3 kg	
				D 16	342.4 〃	
				D 13	604.8 〃	
		BRACING BEAM		TOTAL	2 731.5 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	ELECTRIC	POLE	(AT INTERMEDIATE)			
B 41	D 25	3.98	3 600	5	71 6	
42	"	"	2 550	4	40 6	
43	D 16	1.56	2 100	4	13 1	
44	"	"	2 620	2	8 2	
B° 41	D 13	0.995	2 330	7	16 2	(VARIES)
42	"	"	2 010	7	14 0	"
43	"	"	1 600	7	11 1	
44	"	"	1 280	7	8 9	
E 1	D22	3.04	2 100	16	102 1	
2	D13	0.995	1 580	8	12 6	
E° 1	D13	0.995	3 060	9	27 4	
2	"	"	2 110	9	18 9	
				D25	112 2 kg	
				D22	102 1 "	
				D16	21 3 "	
				D13	109 1 "	
		ELECTRIC	POLE	TOTAL	344 7 kg	

JICA

3. VIADUCT. V008

19 M 000

V008 V010 V017 V085

VIADUCT L = 19 000 (POLE)

REFER TO V04T

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	29.7	95.1	2 326.0	78.3
BEAM	24.1	98.9	INTER 7 204.3 (480.2 kg/m)	298.9
COLUMN	※	※	※	※
CURB	3.3	34.5	375.2	113.7
GRADING CONCRETE	6.6	———	———	———
TOTAL	※ + 63.7	※ + 228.5	※ + 9905.2	※
FOOTING	40.9	34.4	4 752.3	116.2
BRACING BEAM	6.5	26.0	1 911.1	294.0
TOTAL	47.4	60.4	6 663.4	140.6

※ REFER TO NO.97

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	M^3	6.3	CLASS F
AGGREGATE SUB BASE	M^3	12.7	A.S.B – 3
EXCAVATION	M^3	※	
FOUNDATION MORTAR	M^3	0.044	f_{ck} = 400 kg/cm^2
PILE	M x NUMBER	A – ※ B – ※	Φ350 – A Φ350 – B

VIADUCT

ELECTRIC POLE (AT INTER)

SD30 UNIT : KG.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—	—	—	—	—	—	—	—	—
BEAM	—	—	112.2	102.1	—	21.3	109.1	—	344.7
COLUMN	—	—	—	—	—	—	—	—	—
CURB	—	—	—	—	—	—	—	—	—
TOTAL	—	—	112.2	102.1	—	21.3	109.1	—	344.7
FOOTING	—	—	—	—	—	—	—	—	—
BRACING BEAM	—	—	—	—	—	—	—	—	—
TOTAL	—	—	—	—	—	—	—	—	—

JICA

No. A5-57

V047 L=19.000
(ELECTRIC. POLE)(AT INTER)

SD30 UNIT : kg.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	.	.	.	.	.	.	2326.0	.	2326.0
BEAM	.	.	4276.1	357.8	442.5	189.3	1938.5	.	7204.3
COLUMN	.	.	(421.7 kg/m×H')	.	.	.	(58.5 kg/m×H')	.	(480.2 kg/m×H')
CURB	.	.	.	.	.	.	.	375.2	375.2
TOTAL	.	.	7784.4 +(421.7 kg/m×H')	357.9	442.5	189.3	4264.5 +(58.4 kg/m×H')	375.2	9905.5 +(480.2 kg/m×H')
FOOTING	2195.1	.	509.7	.	1251.6	398.4	397.5	.	4752.3
BRACING BEAM	.	.	1255.1	.	.	238.7	417.3	.	1911.1
TOTAL	2195.1	.	1764.8	.	1251.6	637.1	814.8	.	6663.4

NOTE ; $H' = H + 0.50$

JICA

No. 86

VIADUCT
ELECTRIC POLE AT END ①

SD30 UNIT : Kg.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—	—	—	—	—	—	—	—	—
BEAM	—	—	112.2	102.1	—	21.3	108.5	—	344.1
COLUMN	—	—	—	—	—	—	—	—	—
CURB	—	—	—	—	—	—	—	—	—
TOTAL	—	—	112.2	102.1	—	21.3	108.5	—	344.1
FOOTING	—	—	—	—	—	—	—	—	—
BRACING BEAM	—	—	—	—	—	—	—	—	—
TOTAL	—	—	—	—	—	—	—	—	—

JICA

No. 87

VIADUCT L = 19.000

REFER TO V04T

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	29.7	96.1	2326.0	78.3
BEAM	23.0	91.2	6859.6	298.2
COLUMN	14.4	94.6	3995.0	277.4
CURB	3.3	34.5	375.2	113.7
GRADING CONCRETE	6.6	———	———	———
TOTAL	77.0	316.4	13 555.8	176.0
FOOTING	40.9	34.4	4752.3	116.2
BRACING BEAM	6.5	26.0	1911.1	294.0
TOTAL	47.4	60.4	6663.4	140.6

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	M^3	6.3	CLASS F
AGGREGATE SUB BASE	M^3	12.7	A.S.B.-3
EXCAVATION	M^3	114.6	
FONDATION MORTAR	M^3	0.044	$\sigma_{ck} = 400$ kg/cm²
PILE	M x NUMBER	A- 7.0×36 B- 8.0×36	Φ350 - A Φ350 - B

V047 L=19.000 (H=7.820)

SD30 UNIT: KG.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	.	.	.	.	.	.	2326.0	.	2326.0
BEAM	.	.	4163.9	255.8	442.5	168.0	1829.4	.	6859.6
COLUMN	.	.	3508.3	.	.	.	486.7	.	3995.0
CURB	.	.	.	.	.	.	.	375.2	375.2
TOTAL	.	.	7672.2	255.8	442.5	168.0	4642.1	375.2	13555.8
FOOTING	2195.1	.	509.7	.	1251.6	398.4	397.5	.	4752.3
BRACING BEAM	.	.	1255.1	.	.	238.7	417.3	.	1911.1
TOTAL	2195.1	.	1764.8	.	1251.6	637.1	814.8	.	6663.4

JICA

No. 89

VIADUCT V008 L=19.000

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	29.7	96.1	2326.0	78.3
BEAM	23.0	91.2	6859.6	298.2
COLUMN	※	※	※ (480.2 kg/m)	※
CURB	3.3	34.5	375.2	113.7
GRADING CONCRETE	6.6	———	———	———
TOTAL	※ + 62.6	※ + 221.8	※ + 9560.8	※
FOOTING	40.9	34.4	4752.3	116.2
BRACING BEAM	6.5	26.0	1911.1	294.0
TOTAL	47.4	60.4	6663.4	140.6

※ REFER TO NO. 94

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	M^3	6.3	CLASS F
AGGREGATE SUB BASE	M^3	12.7	A.S.B. – 3
EXCAVATION	M^3	※	
FONDATION MORTAR	M^3	0.044	$\sigma_{ck} = 100\ kg/cm^2$
PILE	M x NUMBER	A – ※ B – ※	Φ350 – A Φ350 – B

V047 L=19.000

SD30 UNIT: Kg.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	.	.	.	.	.	.	2326.0	.	2326.0
BEAM	.	.	4163.9	255.8	442.5	168.0	1829.4	.	6859.6
COLUMN	.	.	(421.7 Kg/m × H')	.	.	.	(58.5 Kg/m × H')	.	(480.2 Kg/m × H')
CURB	.	.	.	.	.	.	.	375.2	375.2
TOTAL	.	.	4163.9 + (421.7 Kg/m × H')	255.8	442.5	168.0	4155.4 + (58.5 Kg/m × H')	375.2	9560.8 + (480.2 Kg/m × H')
FOOTING	2195.1	.	509.7	.	1251.6	398.4	397.5	.	4752.3
BRACING BEAM	.	.	1255.1	.	.	238.7	417.3	.	1911.1
TOTAL	2195.1	.	1764.8	.	1251.6	637.1	814.8	.	6663.4

NOTE ; H' = H + 0.50

JICA

No. 21

SIGNAL SPACE

L= 7000

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (KG)	RATIO (KG/m^3)
SLAB	1.7	8.9	339.5	199.7
CURB	0.5	5.3	123.7	247.4
TOTAL	2.2	14.2	463.2	210.5

VOID L=19m 13K761m000

VIADUCT. SIGNL L = 7.000

SD30 UNIT : kg.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	.	.	.	.	.	.	339.5	.	339.5
BEAM	.	.	.	.	.	.	.	.	.
COLUMN	.	.	.	.	.	.	.	.	.
CURB	.	.	.	.	.	.	123.7	.	123.7
TOTAL	.	.	.	.	.	.	463.2	.	463.2
FOOTING	.	.	.	.	.	.	.	.	.
BRACING BEAM	.	.	.	.	.	.	.	.	.
TOTAL	.	.	.	.	.	.	.	.	.

JICA

No.

NOTES: $L = 19.000$

(1) COLUMN.

1) CONCRETE VOLUME. $V = 0.360\ m^2 \times \{(H - 0.900) \times 4\ (\text{VARIES}) + (H_2 - 1.700) \times 2\}$

2) FORM. AREA $A = 0.600 \times \{(H \times 4 - 3.90) \times 4\ (\text{VARIES}) + (H_2 \times 4 - 6.90) \times 2\}$

3). REINFORCING BAR $W = 480.2\ kg/m \times (H + 0.50)\ (\text{VARIES})$

(2) EXCAVAION $V = 63.446\ m^2 \times H$

(3) PC PILES $\phi = 350$ $A = M. \times 36$ $B = M \times 36$

DIMENSION SCHEDULE NO. 1 ○ POLE ♀ END

		COLUMN				EXCAVAION		PC. PILE
		H	CONCRETE	FORM	REINFORCING BAR	H	VOLUME	$\phi = 350$
	V008	7.06	12.730	84.024	3630.3	1.80	114.2	A = B = 11.0 × 36
♀	V010	〃	〃	〃	〃	〃	〃	B = 〃
♀	V017	7.541 M 7.517	13.734	90.720	3849.8.	〃	〃	B = 〃
※ ○	V047	7.82	14.370	94.638	3995.0	〃	〃	A = 7.0 × 36 B = 8.0 × 36
♀	V085	7.643 M 7.624	13.962	92.237	3901.1	〃	〃	A = 14.0 × 36 B = 8.0 × 36

$L = 19^{m}$

CONCRETE VOLUM (V047)

(1) SLAB

$\Sigma V = 29.729^{m^3}$

(2) BEAM

$\Sigma V = 23.029^{m^3}$

($\Sigma V = 24.071^{"}$) POLE

(3) COLUMN

$\Sigma V = ※$

(4) FOOTING

$\Sigma V = 40.896^{m^3}$

(5) BRACING BEAM

$\Sigma V = 6.504^{m^3}$

(6) CURB

$\Sigma V = 3.319\ m^3$

(7) GRADING CONCRETE

$\Sigma V = 6.640\ m^3$

(8) BEARING BASE MORTAR

$\Sigma V = 0.044\ m^3$

(9) LVEVLING CONCRETE

$\Sigma V = 6.344\ m^3$

(10) AGGREGATE SUB BASE

$\Sigma V = 12.690\ m^3$

(11) PILE

$A = \times$

$B = \times$

(2) EXCAVAION

ΣV = ※

FORM AREA

(1) SLAB

ΣA = 96.055 m^2

(ΣA = 95.103 m^2) POLE

(2) BEAM

ΣA = 91.243 m^2

(ΣA = 98.893 ") POLE

(3) COLUMN

ΣA = ※

(4) FOOTING

$$\Sigma A = 34.400\ m^2$$

(5) BRACING BEAM

$$\Sigma A = 26.012\ m^2$$

(6) CURB

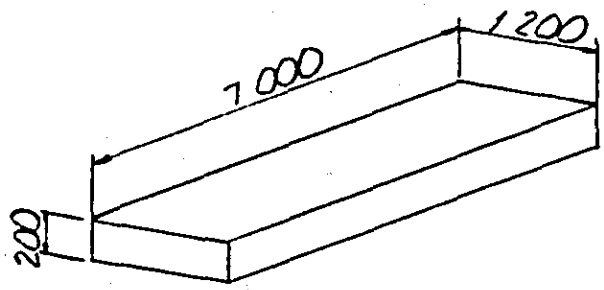
$$\Sigma A = 34.496\ m^2$$

3. SIGNAL SPACE

L = 7000

CONCRETE VOLUME

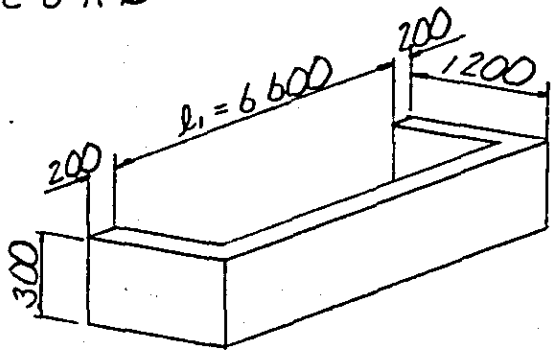
(1) SLAB



$V = 1.200 \times 0.200 \times 7.000$ = 1.680 m^3

SLAB TOTAL 1.680 m^3

(2) CURB

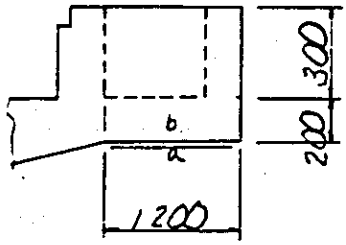


$V = 0.200 \times 0.300 \times (1.200 \times 2 + 6.600)$ (ℓ_1) = 0.540 m^3

CURB TOTAL 0.540 m^3

FORM AREA

(1) SLAB



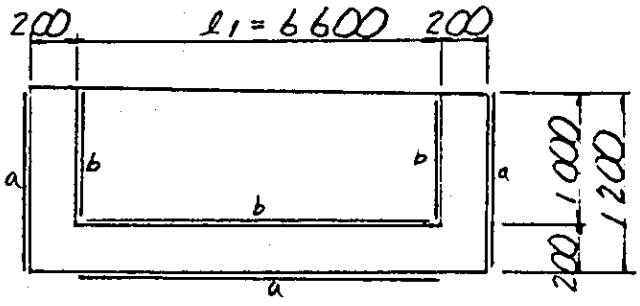
$\ell = 7.000$

$A_a = 1.200 \times 7.000$ = 8.400 m^2

$A_b = 0.200 \times 1.200 \times 2$ = 0.480 "

SLAB TOTAL 8.880 m^2

(2) CURB



$h = 300$

$A_a = 0.300 \times (1.200 \times 2 + 6.600)$ = 2.700 m^2

$A_b = 0.300 \times (1.000 \times 2 + 6.600)$ = 2.580 "

CURB TOTAL 5.280 m^2

REINFORCING BAR

No. 102

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	SIGNAL					
	L = 7000					
	SLAB					
S 31	D13	0.995	3840	57	217.8	
32	"	"	1590	29	45.9	
33	"	"	6930	11	75.8	
				D13	339.5 kg	
			SLAB	TOTAL	339.5 kg	
	CURB					
W 31	D13	0.995	6930	4	27.6	
32	"	"	1370	62	84.5	
33	"	"	1460	8	11.6	
				D13	123.7 kg	
			CURB	TOTAL	123.7 kg	

JICA

4. VIADUCT. V001

27 M 000

V001 V011 V013 V014

V027 V098 V101 V111

V112

VIADUCT V001 L=27 000 (POLE)

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	42.3	136.1	3 290.9	77.8
BEAM	31.8	130.5	9 520.6	299.4
COLUMN	6.9	44.3	2 579.0	373.8
CURB	4.7	49.0	532.5	113.3
GRADING CONCRETE	9.4	———	———	———
TOTAL	95.1	359.9	15 923.0	167.4
FOOTING	54.5	45.4	6 336.4	116.3
BRACING BEAM	9.9	39.5	2 702.0	272.9
TOTAL	64.4	84.9	9 038.4	140.3

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	M^3	8.7	CLASS F
AGGREGATE SUB BASE	M^3	17.4	A.S.B.-3
EXCAVATION	M^3	156.4	
FOUNDATION MORTAR	M^3	0.044	σ_{ck} = 400 kg/cm²
PILE	M x NUMBER	A- B- 10.0x48	Φ350 - A Φ350 - B

VIADUCT V011 L=2T000
(ELECTRIC POLE)(AT INTER)

SD30 UNIT : Kg

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—.	—.	—.	—.	—,	—.	3290.9	—.	3290.9
BEAM	—.	—.	5748.4	357.9	586.5	214.6	2613.2	—.	9520.6
COLUMN	—.	—.	2262.0	—.	—.	—.	317.0	—.	2579.0
CURB	—.	—.	—.	—.	—.	—.	—.	532.5	532.5
TOTAL	—.	—.	8010.4	357.9	586.5	214.6	6221.1	532.5	15923.0
FOOTING	2926.8	—.	679.6	—.	1668.8	531.2	530.0	—.	6336.4
BRACING BEAM	—.	—.	1764.6	—.	—.	338.6	598.8	—.	2702.0
TOTAL	2926.8	—.	2444.2	—.	1668.8	869.8	1128.8	—.	9038.4

NOTE ; COLUMN $634.6^{kg/m} \times (H+0.50)$ = TOTAL WEIGHT

JICA

No. 185

VIADUCT

ELECTRIC POLE (AT INTER)

SD30 UNIT : kg.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—	—	—	—	—	—	—	—	—
BEAM	—	—	112.2	102.1	—	21.3	109.1	—	344.7
COLUMN	—	—	—	—	—	—	—	—	—
CURB	—	—	—	—	—	—	—	—	—
TOTAL	—	—	112.2	102.1	—	21.3	109.1	—	344.7
FOOTING	—	—	—	—	—	—	—	—	—
BRACING BEAM	—	—	—	—	—	—	—	—	—
TOTAL	—	—	—	—	—	—	—	—	—

JICA

No. 102

VIADUCT L = 27 000 (POLE)

REFER TO V001

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	42.3	136.1	3 290.9	77.8
BEAM	31.8	130.5	9 520.6 END 9 520.0 (634.6 kg/m)	299.4
COLUMN	※	※	※	※
CURB	4.7	49.0	532.5	113.3
GRADING CONCRETE	9.4	———	———	———
TOTAL	※ + 88.2	※ + 315.6	※ + 13344.0	※
FOOTING	54.5	45.4	6 336.4	116.3
BRACING BEAM	9.9	39.5	2 702.0	272.9
TOTAL	64.4	84.9	9 038.4	140.3

※ REFER TO NO.114

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	M^3	8.7	CLASS F
AGGREGATE SUB BASE	M^3	17.4	A.S.B.-3
EXCAVATION	M^3	※	
FOUNDATION MORTAR	M^3	0.044	σ_{CK} = 400 kg/cm²
PILE	M x NUMBER	A- ※ B- ※	Φ350 - A Φ350 - B

VIADUCT V011 L=2T000

(ELECTRIC POLE) (AT INTER)

SD30 UNIT : KG.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—.	—.	—.	—.	—.	—.	3290.9	—.	3290.9
BEAM	—.	—.	5748.4	357.9	586.5	214.6	2613.2	—.	9520.6
COLUMN	—.	—.	(556.6 KG/M × H')	—.	—.	—.	(78.0 KG/M × H')	—.	(634.6 KG/M × H')
CURB	—.	—.	—.	—.	—.	—.	—.	532.5	532.5
TOTAL	—.	—.	5748.4 (556.6 KG/M × H')	357.9	586.5	214.6	5904.1 (78.0 KG/M × H')	532.5	13344.0 + (634.6 KG/M × H')
FOOTING	2926.8	—.	679.6	—.	1668.8	531.2	530.0	—.	6336.4
BRACING BEAM	—.	—.	1764.6	—.	—.	338.6	598.8	—.	2702.0
TOTAL	2926.8	—.	2444.2	—.	1668.8	869.8	1128.8	—.	9038.4

NOTE ; 1) COLUMN 634.6 KG/M × (H + 0.50) = TOTAL WEIGHT

2) H' = H + 0.50

JICA

No. 1028

VIADUCT
ELECTRIC POLE AT END ①

SD 30 UNIT : kg.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—	—	—	—	—	—	—	—	—
BEAM	—	—	112.2	102.1	—	21.3	108.5	—	344.1
COLUMN	—	—	—	—	—	—	—	—	—
CURB	—	—	—	—	—	—	—	—	—
TOTAL	—	—	112.2	102.1	—	21.3	108.5	—	344.1
FOOTING	—	—	—	—	—	—	—	—	—
BRACING BEAM	—	—	—	—	—	—	—	—	—
TOTAL	—	—	—	—	—	—	—	—	—

JICA

No. 112.8

VIADUCT V011 L = 27.000

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	42.3	137.1	3290.9	77.8
BEAM	30.8	122.	9175.9	297.9
COLUMN	※	※	※ (634.6 kg/m)	※
CURB	4.7	49.0	532.5	113.3
GRADING CONCRETE	9.4	———	———	———
TOTAL	※+87.2	※+308.8	※+12999.3	※
FOOTING	54.5	45.4	6336.4	116.3
BRACING BEAM	9.9	39.5	2702.0	272.9
TOTAL	64.4	84.9	9038.4	140.3

※ REFER TO NO.114

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	M^3	8.7	CLASS F
AGGREGATE SUB BASE	M^3	17.4	A.S.B.-3
EXCAVATION	M^3	※	
FOUNDATION MORTAR	M^3	0.044	σ_{CK} = 400 kg/cm^2
PILE	M x NUMBER	A- ※ B- ※	Φ350 - A Φ350 - B

VIADUCT V011 L=2T000

SD30 UNIT: KG.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—.	—.	—.	—.	—.	—.	3290.9	—.	3290.9
BEAM	—.	—.	5636.2	255.8	586.5	193.3	2504.1	—.	9175.9
COLUMN	—.	—.	(556.4 KG/M)	—.	—.	—.	(78.0 KG/M)	—.	(634.6 KG/M)
CURB	—.	—.	—.	—.	—.	—.	—.	532.5	532.5
TOTAL	—.	—.	(556.6 KG/M×H)	255.8	586.5	193.3	(78.0 KG/M×H)	532.5	12999.3 (634.6 KG/M×H)
FOOTING	2926.8	—.	679.6	—.	1668.8	531.2	530.0	—.	6336.4
BRACING BEAM	—.	—.	1764.6	—.	—.	338.6	598.8	—.	2702.0
TOTAL	2926.8	—.	2444.2	—.	1668.8	869.8	1128.8	—.	9038.4

NOTE; 1) COLUMN 634.6 KG/M × (H+0.50) = TOTAL WEIGHT

2) $H' = H - 0.500$

JICA

No. 1111

SIGNL SPACE

L = 5000

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (Kg)	RATIO (Kg/m^3)
SLAB	1.2	6.5	243.9	203.3
CURB	0.4	4.1	98.0	245.0
TOTAL	1.6	10.6	341.9	213.7

V 101 L= 27m 17K 729m 000

VIADUCT. SIGNL L = 5000

SD30 UNIT : kg.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—	—	—	—	—	—	243.9	—	243.9
BEAM	—	—	—	—	—	—	—	—	—
COLUMN	—	—	—	—	—	—	—	—	—
CURB	—	—	—	—	—	—	98.0	—	98.0
TOTAL	—	—	—	—	—	—	341.9	—	341.9
FOOTING	—	—	—	—	—	—	—	—	—
BRACING BEAM	—	—	—	—	—	—	—	—	—
TOTAL	—	—	—	—	—	—	—	—	—

JICA

No. 11/V

NOTES: $L = 27.000$

(1) COLUMN.

1) CONCRETE VOLUME. $V = 0.360\ m^2 \times \{(H - 0.900) \times \overset{\text{VARIES}}{6}\ m + (H_2 - 1.700) \times 2\}$

2) FORM. AREA $A = 0.600 \times \{(H \times 4 - 3.90) \times \overset{\text{VARIES}}{6}\ m + (H_2 \times 4 - 6.90) \times 2\}$

3). REINFORCING BAR $W = 634.6\ kg/m \times (\overset{\text{VARIES}}{H} + 0.50)$

(2) EXCAVAION $V = 86.886\ m^2 \times H$

(3) PC PILES $\phi = 350$ $A = M. \times 48$ $B = M \times 48$

DIMENSION SCHEDULE NO. 1 ○ ポール

		COLUMN				EXCAVAION		PC-PILE
		H	CONCRETE	FORM	REINFORCING BAR	H	VOLUME	$\phi = 350$
○	V001	3.250(H2) 3.564	6.870	44.272	2579.0	1.80	156.4	A = B = 10.0 × 48
	V011	7.06(H2) 7.06	17.165	113.232	4797.6	〃	〃	A = B = 11.0 × 48
	V013	7.06(H2) 7.05	17.143	113.088	4791.2	〃	〃	A = B = 11.0 × 48
○	V014	7.182(H2) 7.10	17.339	114.394	4823.0	〃	〃	A = B = 11.0 × 48
	V027	4.320 4.320	9.274	60.624	3058.8	1.806	156.9	A = B = 12.0 × 48
	V098	7.350 7.350	18.000	118.800	4981.6	〃	〃	A = 11.0 × 48 B = 8.0 × 48
○	V101	7.350 7.350	〃	〃	〃	〃	〃	A = 10.0 × 48 B = 8.0 × 48
○	V111	4.622 4.564	10.019	65.587	3213.6	1.80	156.4	A = 8.0 × 48 B = 8.0 × 43
	V112	4.771 4.829	10.698	70.118	3381.8	〃	〃	A = 8.0 × 48 B = 8.0 × 48

V001

3 × 8.0 + 3.0 = 27.000

CONCRETE VOLUME

(1) SLAB

$Va = 18.079^{m^3} \times 1/18.970 \times 26.970$	=	25.703^{m^3}
$Vb = 0.279^{m^3} \times 1$	=	$0.279^{"}$
$Vc = 0.288 \cdot 2$	=	$0.576^{"}$
$Vd = 0.127 \cdot 1$	=	$0.127^{"}$
$Ve = 10.956 \times 1/18.970 \times 26.970$	=	$15.576^{"}$
SLAB TOTAL		42.261^{m^3}

(2) BEAM

1) LONGITUDINAL BEAM

$Va = 14.212^{m^3} \times 1/18.220 \times 26.220$	=	20.452^{m^3}
$Vb = 0.144 \cdot 7 \times 2$	=	$2.016^{"}$
		22.468^{m^3}

2) AT END OF VIADUCT. TRANSVERSE BEAM

END (1)

$V = 4.908 \times 1$

$4.908\ m^3$

3) AT END OF VIADUCT TRANSVERSE BEAM

END (2)

$V = 0.585\ m^3 \times 1$

$0.585\ m^3$

4) AT INTERMEDIATE OF VIADUCT TRANSVERSE

$Va = 0.936\ m^3 \times 3 = 2.808\ m^3$

$Vb = 0.006\ m^3 \times 3 = 0.018\ "$

SUB TOTAL = $2.826\ m^3$

5) BASE OF ELECTRIC POLE

$V = 0.684\ m^3 \times 1$

$(0.684\ m^3)$

6) ELECTRIC POLE

$V = 0.583^{m^3} \times 1$

	(0.358^{m^3})
5) + 6) (ELECTRIC TOTAL -	(1.042^{m^3})
(1) BEAM TOTAL	30.787^{m^3}
((2) BEAM TOTAL POLE	31.829^{m^3})

(3) COLUMN

1). AT END OF VIADUCT COLUMN

$Va = 0.360^{m^2} \times (H2 - 1.700) \times 2$

$H2 = 3.250$

	1.116
	1.116^{m^3}

2) AT INTERMEDIATE OF VIADUCT COLUMN

$Va = 0.360^{m^2} \times (H4 - 0.900) \times 6$

$H4 = 3.564$

	5.754
	5.754^{m^3}
COLUMN TOTAL	6.870^{m^3}

12/3

(4) FOOTING

Va = 10.752 m³ × 4	=	43.008 m³
Vb = 2.880 m³ × 4	=	11.520 m³
FOOTING TOTAL		54.528 m³

(5) BRACING BEAM

Va = 1.572 m³ × 2	=	3.144 m³
Vb = 1.680 m³ × 2 × 2	=	6.720 m³
BRACING BEAM TOTAL		9.864 m³
(4) + (5) TOTAL		64.392 m³

(6) CURB

V = 3.319 m² × 1/18.970 × 26.970

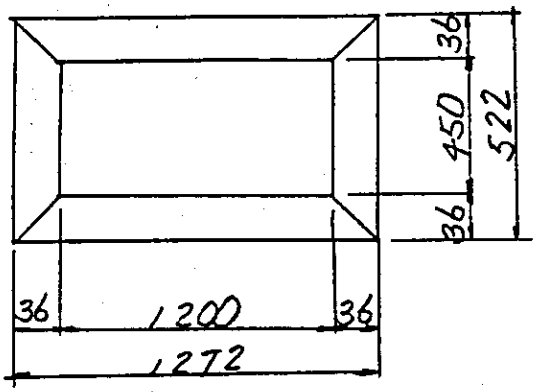
CURB TOTAL	4.719 m³

(7) GRADING CONCRETE

V = 6.640 m² × 1/18.970 × 26.970

GRADING CONCRETE TOTAL	9.440 m³

(8) FOUNDATION MORTAR



h- 36

$$Va' = \{1.272 \times 0.522 + (1.272 + 1.200)(0.522 + 0.450) + 1.200 \times 0.450\} \times 1/6 \times 0.036 = 0.022$$

$$Va = Va' \times 2 = 0.044\ m^3$$

FOUNDATION MORTAR TOTAL - 0.044 m^3

(9). LEVELING CONCRETE

Va = 1.700 m³ × 4	=	6.800 m³
Vb = 0.300 " × 2	=	0.600 "
Vc = 0.322 " × 2 × 2	=	1.288 "
LEVELING CONCRETE TOTAL		8.688 m³

(10) AGGREGATE SUB BASE

Va = 3.400 m³ × 4	=	13.600 m³
Vb = 0.601 " × 2	=	1.202 "
Vc = 0.644 " × 2 × 2	=	2.576 "
AGGREGATE SUB BASE TOTAL	=	17.378 m³

(11) PILES

φ = 350 ℓ = 10 000 n = 12 × 4 = 48

		NUMBER
A = ————	A	———
B = 10.0 × 48	B	48.

(12) EXCAVAION

1) FOOTING

V = 17.000 m² × 1.800 H × 4

		122.400 m³

2) BRACING BEAM

Va = 3.003 m² × 1.800 H × 2	=	10.811 m³
Vb = 3.220 " × 1.800 H × 4	=	23.184 "
SUB TOTAL =		33.995 m³
EXCAVAION TOTAL		156.395 m³

FORM. AREA

(1) SLAB

Aa = 12.998 m² × 1	=	12.998 m²
Ab = 14.800 " × 2	=	29.600 "
Ac = 2.860 " × 1	=	2.860 "
Ad = 4.291 " × 1	=	4.291 "
Ae = 4.487 " × 2	=	8.974 "
Af = 1.093 " × 1	=	1.093 "
Ag = 1.454 " × 4	=	5.816 "
Aa = 0.289 m² × 4	=	1.156 m²
Ab = 1.269 " × 26.970 × 2	=	68.450 "
(-Ac = 0.952 × 1	=	(⊖ 0.952 ")
(POLE)		
Ad = 1.862 × 1	=	1.862 "
(1) SLAB TOTAL		137.100 m²
((2) SLAB TOTAL		136.148 m²)
POLE		

(2) BEAM

1) LONGITUDINAL BEAM

Aa' =	7.799 m²	=	7.799 m²
Ab' =	4.332 "	=	4.332 "
Ac' =	8.140 " × 2	=	16.280 "
Ad' =	4.518 " × 2	=	9.036 "
Ae' =	2.608 "	=	2.608 "
Af' =	1.557 "	=	1.557 "
Ag' =	0.330 "	=	0.330 "
Ah' =	0.240 m² × 2 × 7	=	3.360 "
A' =			45.302 "

A = A' × 2	=	90.604 m²
		90.604 m²

2) AT END OF VIADUCT. TRANSVERSE BEAM

END (1)

A =	16.295 m² × 1	=	16.295 m²
A_{POLE} =	16.115 " × 1	(=	16.115 m²)

3) AT END OF VIADUCT TRANSVERS BEAM

END (2)

Aa = 3.120 × 1	=	3.120 m^2
		3.120 m^2

4) ATINTERMDIATE OF VIADUCT

TRANSVESE BEAM

Aa = 2.600 × 3	=	7.800 m^2
Ab = 0.020 × 3	=	0.060 "
Ac = 1.609 × 3	=	4.827 "
SUB TOTAL	=	12.687 m^2

5) BASE OF ELECTRIC POLE

A = 3.643 m^2 × 1

(3.643 m^2)

6) ELECTRIC POLE

A = 4.189 m^2 × 1

(4.189 m^2)

5)+6)	(ELECTRIC TOTAL	7.832 m^2)
	(1) BEAM TOTAL	122.706 m^2
POLE	(2) (BEAM TOTAL	130.538 m^2)

(3) COLUMN

1) ATEND OF VIADUCT COLUMN

$Aa = 0.600 \times (H2 \times 4 - 6.900) \times 2$ (H2 = 3.250) = 7.320 m²

7.320 m²

2) AT INTER MEDIATE OF VIADUCT COLUMN

$Aa = 0.600 \times (H4 \times 4 - 3.900) \times 6$ (H4 = 3.560) = 37.282 m²

$-Ab_{POLE} = 0.600 \times 0.550 = -0.330$ m² (⊖ 0.330)

37.282 m²

(36.952 m²)

COLUMN TOTAL 43.942 m²

(COLUMN TOTAL (POLE) 44.272 m²)

(4) FOOTING

Aa = 5.680 m² × 2	=	11.360 m²
Ab = 6.020 " × 2	=	12.040 "
Ac = 5.680 " × 2	=	11.360 "
Ad = 5.320 " × 2	=	10.640 "
FOOTING TOTAL		45.400 m²

(5) BRACING BEAM

Aa = 6.286 m² × 2	=	12.572 m²
Ab = 6.720 " × 4	=	26.880 "
BRACING TOTAL		39.452 m²

(6) CURB

A = 34.496 m² × 1/18.970 × 26.970

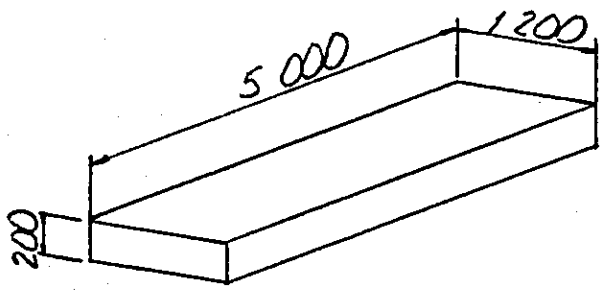
CURB TOTAL	49.044 m²

SIGNAL SPACE

$L = 5000$

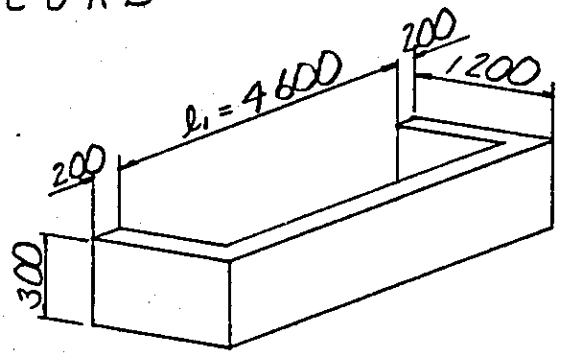
CONCRETE VOLUME

(1) SLAB



$V = 1.200 \times 0.200 \times 5.000$	=	$1.200\ m^3$
SLAB TOTAL		$1.200\ m^3$

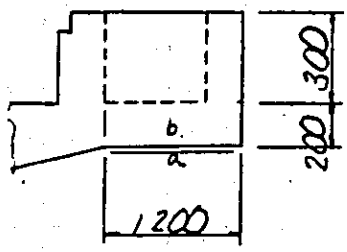
(2) CURB



$V = 0.200 \times 0.300 \times (1.200 \times 2 + 4.600)$ (ℓ_1)	=	$0.420\ m^3$
CURB TOTAL		$0.420\ m^3$

FORM AREA

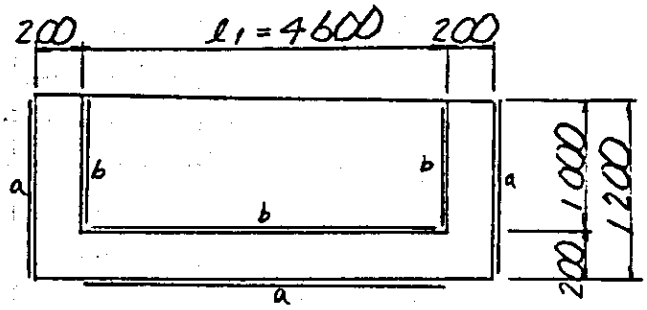
(1) SLAB



$\ell = 5000$

$A_a = 1.200 \times 5.000$	=	6.000 m^2
$A_b = 0.200 \times 1.200 \times 2$	=	0.480 "
SLAB TOTAL		6.480 m^2

(2) CURB



$h = 300$

$A_a = 0.300 \times (1.200 \times 2 + 4.600)$	=	2.100 m^2
$A_b = 0.300 \times (1.000 \times 2 + 4.600)$	=	1.980 "
CURB TOTAL		4.080 m^2

REINFORCING BAR

No. 130

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	SIGNAL					
	L=5000					
	SLAB					
S 31	D 13	0.995	3840	41	156.7	
32	"	"	1590	21	33.2	
33	"	"	4930	11	54.0	
				D13	243.9 kg	
			SLAB	TOTAL	243.9 kg	
	CURB					
W 31	D13	0.995	4930	4	19.6	
32	"	"	1370	49	66.8	
33	"	"	1460	8	11.6	
				D13	98.0 kg	
			CURB	TOTAL.	98.0 kg	

JICA

5. VIADUCT. V007

35 M 000

V007 V018 V028 V046

V073 V074 V102

VIADUCT V007 L=35000

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	54.8	178.1	4255.8	77.7
BEAM	38.5	154.2	11492.5	298.5
COLUMN	21.2	139.6	5870.9	276.9
CURB	6.1	63.6	691.8	113.4
GRADING CONCRETE	12.2	———	———	———
TOTAL	132.9	536.0	22311.0	168.0
FOOTING	68.2	56.4	7920.5	116.1
BRACING BEAM	13.2	52.9	3492.6	264.6
TOTAL	81.4	109.3	11413.1	140.2

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	M^3	11.0	CLASS F
AGGREGATE SUB BASE	M^3	22.1	A.S.B.-3
EXCAVATION	M^3	231.7	
FOUNDATION MORTAR	M^3	0.044	σ_{ck} = 400 kg/cm²
PILE	M x NUMBER	A- ——— B- 11.0×60	Φ350-A Φ350-B

VIADUCT V007 L=35 000 (H=6.940)

SD30 UNIT: Kg.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—.	—.	—.	—.	—.	—.	4255.8	—.	4255.8
BEAM	—.	—.	7108.8	255.8	730.5	218.6	3178.8	—.	11492.5
COLUMN	—.	—.	5145.5	—.	—.	—.	725.4	—.	5870.9
CURB	—.	—.	—.	—.	—.	—.	—.	691.8	691.8
TOTAL	—.	—.	12254.3	255.8	730.5	218.6	8160.0	691.8	22311.0
FOOTING	3658.5	—.	849.5	—.	2086.0	664.0	662.5	—.	7920.5
BRACING BEAM	—.	—.	2274.0	—.	—.	438.4	780.2	—.	3492.6
TOTAL	3658.5	—.	3123.5	—.	2086.0	1102.4	1442.7	—.	11413.1

NOTE; 1) COLUMN $789.1\ kg/m \times (H+0.50) =$ TOTAL WEIGHT

2) $H' = H+0.50$

JICA

No. 133

VIADUCT L=35000 POLE

REFER TO VOOT

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	54.8	177.2	4255.8	77.7
BEAM	39.6	162.0	11837.2	298.9
COLUMN	※	※	※ (784.1 kg/m)	※
CURB	6.1	63.6	691.8	113.4
GRADING CONCRETE	12.2	———	———	———
TOTAL	※ + 112.7	※ + 402.8	※ + 16784.8	※
FOOTING	68.2	56.4	7920.5	116.1
BRACING BEAM	13.2	52.9	3492.6	264.6
TOTAL	81.4	109.3	11413.1	140.2

※ REFER TO NO. 142

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	M^3	11.0	CLASS F
AGGREGATE SUB BASE	M^3	22.1	A.S.B.-3
EXCAVATION	M^3	※	
FOUNDATION MORTAR	M^3	0.044	σ_{ck} = 400 kg/cm²
PILE	M x NUMBER	A- ※ B- ※	Φ350 - A Φ350 - B

VIADUCT V007 L=35.000
(ELECTRIC POLE)(AT INTER)

SD30 UNIT: Kg.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—.	—.	—.	—.	—.	—.	4255.8	—.	4255.8
BEAM	—.	—.	7221.0	357.1	730.5	239.9	3287.9	—.	11837.2
COLUMN	—.	—.	(691.6 Kg/m·H')	—.	—.	—.	(97.5 Kg/m·H')	—.	(789.1 Kg/m·H')
CURB	—.	—.	—.	—.	—.	—.	—.	691.8	691.8
TOTAL	—.	—.	7221.0 (691.6 Kg/m×H')	357.9	730.5	239.9	7543.7 +(97.5 Kg/m×H')	691.8	16784.8 +(789.1 Kg/m·H')
FOOTING	3658.5	.	849.5	—.	2086.0	664.0	662.5	—.	7920.5
BRACING BEAM	—.	—.	2274.0	—.	—.	438.4	780.2	—.	3492.6
TOTAL	3658.5	—.	3123.5	—.	2086.0	1102.4	1442.7	—.	11413.1

NOTE; 1) COLUMN 789.1 Kg/m × (H+0.50) = TOTAL WEIGHT

2) H' = H+0.50m

JICA

No. 1/35

VIADUCT.

ELECTRIC POLE (AT INTER)

SD30 UNIT: Kg.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—	—	—	—	—	—	—	—	—
BEAM	—	—	112.2	102.1	—	21.3	109.1	—	344.7
COLUMN	—	—	—	—	—	—	—	—	—
CURB	—	—	—	—	—	—	—	—	—
TOTAL	—	—	112.2	102.1	—	21.3	109.1	—	344.7
FOOTING	—	—	—	—	—	—	—	—	—
BRACING BEAM	—	—	—	—	—	—	—	—	—
TOTAL	—	—	—	—	—	—	—	—	—

JICA

No. 45

VIADUCT
ELECTRIC POLE AT END ①

SD 30 UNIT : kg.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—	—	—	—	—	—	—	—	—
BEAM	—	—	112.2	102.1	—	21.3	108.5	—	344.1
COLUMN	—	—	—	—	—	—	—	—	—
CURB	—	—	—	—	—	—	—	—	—
TOTAL	—	—	112.2	102.1	—	21.3	108.5	—	344.1
FOOTING	—	—	—	—	—	—	—	—	—
BRACING BEAM	—	—	—	—	—	—	—	—	—
TOTAL	—	—	—	—	—	—	—	—	—

JICA

No. 1/37

VIADUCT

L = 35 000

REFER TO VOOT

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	54.8	178.1	4 255.8	77.7
BEAM	38.5	154.2	11 492.5	298.5
COLUMN	*	*	* (789.1 kg/m)	*
CURB	6.1	63.6	691.8	113.4
GRADING CONCRETE	12.2	———	———	———
TOTAL	* + 111.6	* + 395.9	* + 16440.1	*
FOOTING	68.2	56.4	7 920.5	116.1
BRACING BEAM	13.2	52.9	3 492.6	264.6
TOTAL	81.4	109.3	11 413.1	140.2

* REFER TO NO. 142

	UNIT	QUANTITY	REMARKS
LEVELING CONCRETE	M^3	11.0	CLASS F
AGGREGATE SUB BASE	M^3	22.1	A.S.B.—3
EXCAVATION	M^3	*	
FOUNDATION MORTAR	M^3	0.044	f'_{ck} = 400 kg/cm²
PILE	M x NUMBER	A - * B - *	Φ350 - A Φ350 - B

VIADUCT V007 L=35.000

SD30 UNIT : KG.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—.	—.	—.	—.	—.	—.	4255.8	—.	4255.8
BEAM	—.	—.	7108.8	255.8	730.5	218.6	3178.8	—.	11492.5
COLUMN	—.	—.	(691.6 KG/M)	—.	—.	—.	(97.5 KG/M)	—.	(789.1 KG/M)
CURB	—.	—.	—.	—.	—.	—.	—.	691.8	691.8
TOTAL	—.	—.	7108.8 (691.6 KG/M × H)	255.8	730.5	218.6	7434.6 (97.5 KG/M × H)	691.8	16440.1 (789.1 KG/M × H)
FOOTING	3658.5	.	849.5	—.	2086.0	664.0	662.5	—.	7920.5
BRACING BEAM	—.	—.	2274.0	—.	—.	438.4	780.2	—.	3492.6
TOTAL	3658.5	—.	3123.5	—.	2086.0	1102.4	1442.7	—.	11413.1

NOTE ; 1) COLUMN 789.1 KG/M × (H+0.50) = TOTAL WEIGHT

2) $H' = H + 0.500$ M

JICA

No. 4/5

SIGNAL SPACE

L = 3000

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (Kg)	RATIO (Kg/m^3)
SLAB	0.7	4.1	148.2	211.7
CURB	0.3	2.9	72.4	241.3
TOTAL	1.0	7.0	220.6	220.6

V018 L = 35m 14K428M000

VIADUCT. SIGNL L = 3.000

SD30 UNIT : kg.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—	—	—	—	—	—	148.2	—	148.2
BEAM	—	—	—	—	—	—	—	—	—
COLUMN	—	—	—	—	—	—	—	—	—
CURB	—	—	—	—	—	—	72.4	—	72.4
TOTAL	—	—	—	—	—	—	220.6	—	220.6
FOOTING	—	—	—	—	—	—	—	—	—
BRACING BEAM	—	—	—	—	—	—	—	—	—
TOTAL	—	—	—	—	—	—	—	—	—

NOTES: $L = 35.000$

(1.) COLUMN.

1) CONCRETE VOLUME. $V = 0.360^{m^2} \times \{(H - 0.900) \times 8^{m(\text{VARIES})} + (H_2 - 1.700) \times 2\}$

2) FORM. AREA $A = 0.600 \times \{(H \times 4 - 3.90) \times 8^{m(\text{VARIES})} + (H_2 \times 4 - 6.90) \times 2\}$

3). REINFORCING BAR $W = 789.1^{kg/m} \times (H + 0.50)^{m(\text{VARIES})}$

(2) EXCAVAION. $V = 110.326^{m^2} \times H$

(3) PC PILES $\phi = 350$ $A = M. \times 60$ $B = M \times 60$

DIMENSION SCHEDULE NO. 1 ○ POLE ♀ END

		COLUMN				EXCAVAION		PC·PILE
		H	CONCRETE	FORM	REINFORCING BAR	H	VOLUME	$\phi = 350$
	※ V007	7.058 H₂ 6.940	21.253	140.126	5870.9	2.10	231.7	A = B = 11.0 × 60
○	018	6.910 6.910	21.060	138.840	5847.2	1.806	199.2	A = B = 12.0 × 60
○	028	4.320 H₂ 4.320	11.736	76.680	3803.5	〃	〃	A = B = 12.0 × 60
○	046	7.313 H₂ 7.259	22.355	147.475	6122.6	1.80	198.6	A = 7.0 × 60 B = 8.0 × 60
♀	073	6.350 H₂ 6.350	19.044	125.400	5405.3	1.806	199.2	A = 12.0 × 60 B = 8.0 × 60
	074	6.350 H₂ 6.350	〃	〃	〃	〃	〃	A = 〃 B = 〃
	102	7.243 H₂ 7.167	22.040	145.373	6050.0	1.80	198.6	A = 10.0 × 60 B = 8.0 × 60