社会開発協力部報告書

No. 5

AFRICAN DEVELOPMENT BANK

GOVERNMENT OF MAURITIUS

BEAU BASSIN - PORT LOUIS LINK ROAD

QUANTITY MEASUREMENT

OF

BRIDGES
(Superstructures)

SEPTEMBER 1980

Japan International Cooperation Agency

CONTENTS

1. Motorway Junction Bridge

CONTENTS

§1 MOTORWAY JUNCTION PC T-GIRDER MATERIAL TABLE

bridge name			remark	unit	A,B-Le,L=29.2	A,B-Le,L=33.2	B-Le,L=20.5	A,B-Le,L=26.8	E-Rp,L=33.2	E-Rp,L=20.2	E-Rp,L=29.2	TOTAL
number of span					2	2	1	3	1	1	1	
girder	concrete		GRADE 40	m^3	324.4	361.4	96.7	451.5	144.6	95.5	129.8	1 347.3
	formwork			m^2	1 675.8	1 899.8	477.5	2 274.0	759.9	464.4	670.3	8 221.7
	reinforce-ment	12	HIGH YIELD BAR	kg	24 422	22 060	6 808	34 407	8 610	7 122	9 582	113 011
		16		kg	—	13 960	3 555	—	5 584	—	—	23 099
		total		kg	24 422	36 020	10 363	34 407	14 194	7 122	9 582	136 110
	12~12.5	pc cable		kg	13 300	18 090	—	14 640	7 236	—	5 320	58 586
		duct	ϕ 65 mm	m	1 482.0	2 018.0	—	1 630.5	807.2	—	590.8	6 528.5
		grout		m	1 489.0	2 027.0	—	1 639.5	810.8	—	595.6	6 561.9
		anchorage		set	100	120	—	120	48	—	40	428
	12-7 mm	pc cable		kg	—	—	3 615	—	—	1 804	—	5 419
		duct	ϕ 45 mm	m	—	—	986.0	—	—	492.0	—	1 448.0
		grout		m	—	—	998.0	—	—	498.0	—	1 496.0
		anchorage		set	—	—	100	—	—	48	—	148
slab surface	concrete		GRADE 30	m^3	80.1	66.6	26.6	114.0	18.7	21.4	26.5	353.9
	formwork			m^2	408.2	441.2	138.5	581.4	148.2	111.0	136.8	1 965.3
	reinforcement		HIGH YIELD BAR	kg	3 508	3 814	1 216	4 995	1 311	953	1 202	16 999
	12-7 mm	pc cable		kg	—	—	—	—	—	—	1 366	1 366
		duct	ϕ 45 mm	m	—	—	—	—	—	—	363.9	363.9
		grout		m	—	—	—	—	—	—	376.9	376.9
		anchorage		set	—	—	—	—	—	—	108	108
	12-5 mm	pc cable		kg	3 042	3 400	1 144	4 239	1 162	745	—	13 732
		duct	ϕ 35 mm	m	1 611.4	1 801.4	606.2	2 246.1	610.9	391.7	—	7 267.7
		grout		m	1 645.8	1 839.8	619.2	2 294.1	628.9	403.3	—	7 431.1
		anchorage		set	344	384	130	480	180	116	—	1 634
	asphalt pave.			m^2	534.0	605.2	187.8	734.4	207.4	126.9	183.0	2 578.7
	foot path			m^2	—	—	—	—	—	—	—	—

§2 A.B-LINE, L=29.2

1. MATERIAL TABLE

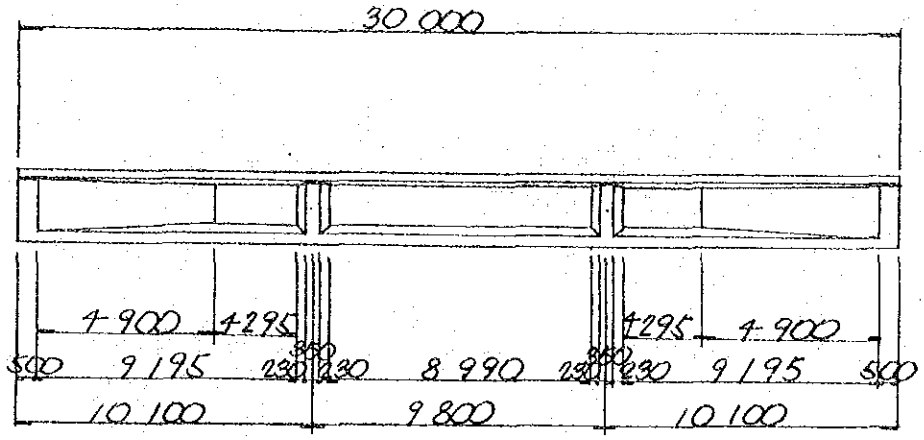
1. GIRDER

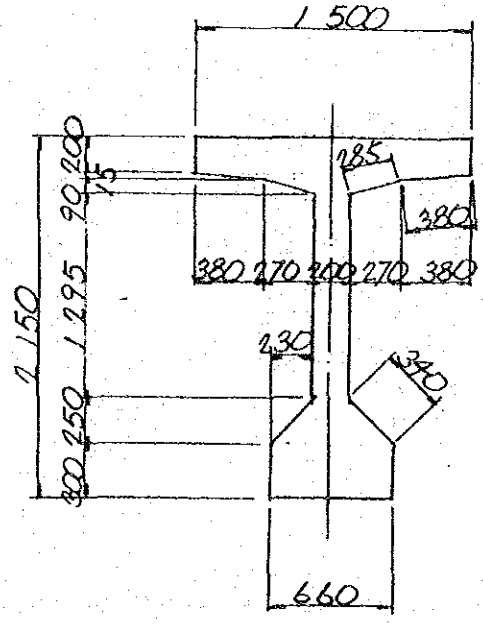
ITEM			UNIT	FOR ONE GIRDER	FOR ONE SPAN	REMARKS
NUMBER			NO	1	5	
CONCRETE			m^3	32.44	162.20	$\sigma_{ck}=40\ N/mm^2$
FORMWORK			m^2	167.58	837.90	
REINFORCEMENT BARS	φ12	INNER	kg	2 471	12 211	HIGH YIELD BAR
		EDGE (L)	〃	2 399		
		〃 (R)	〃	2 399		
	φ16	INNER	〃			
		EDGE (L)	〃			
		〃 (R)	〃			
	TOTAL	INNER	〃	2 471	12 211	
		EDGE (L)	〃	2 399		
		〃 (R)	〃	2 399		
PC CABLE			kg	1330	6650	12T12.5 mm
DUCT			m	148.2	741.0	φ65 mm
GROUT			〃	148.9	744.5	
ANCHORAGE			set	10	50	

2. CROSS BEAM , SLAB and SURFACING

ITEM		UNIT	FOR ONE SPAN		REMARKS
CONCRETE	cross beam , slab	m^3	28.75		$\sigma_{ck}=30\ N/mm^2$
	kerb	,	11.28		
	smoothed	,	—		
	total	,	40.03		
FORMWORK	cross beam , slab	m^2	145.75		
	kerb	,	58.35		
	total	,	204.10		
REINFORCEMENT	cross beam , slab	kg	1 275		HIGH YIELD BAR
	kerb	,	479		(ϕ12)
	total	,	1 754		
PC CABLE		kg	1 521		12-ϕ5 mm
DUKT		m	805.7		ϕ35 mm
GROUT		,	822.9		
ANCHORAGE		set	172		
ASPHALT PAVEMENT		m^2	267.0		t = 80 mm
FOOT PATH		,	—		

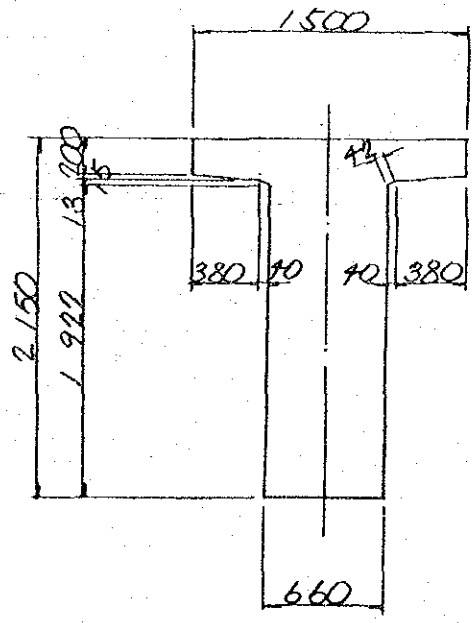
2. GIRDER





CENTER SECTION

$A = 0.9236\ m^2$



SUPPORT SECTION

$A = 1.5944\ m^2$

1. CONCRETE ($\acute{O}_{CK}$ = 40 N/mm²)

V_1 = 0.9236 × 30.000 = 27.708 m³

V_2 = (1.5944 − 0.6708 − 0.9236) × (0.500 + 0.350) × 2 = 1.140 "

V_3 = 1/2 × 0.6708 × (4.900 + 0.230 × 2) × 2 = 3.595 "

ΣV = 32.443 m³

2. FORMWORK

FORMWORK LENGTH OF CROSS SECTION

CENTER SECTION

U = 2 × (0.20 + 0.38 + 0.285 + 1.295 + 0.34 + 0.30)

= 5.600 m

SUPPORT SECTION

U = 2 × (0.20 + 0.38 + 0.042 + 1.922)

= 5.088 m

AREA OF FORMWORK

(BOTTOM FORMWORK ARE NOT INCLUDED)

A_1 = 5.600 × (4.295 × 2 + 8.990) = 98.45 m²

A_2 = 5.088 × (0.50 + 0.35) × 2 = 8.65 "

A_3 = 1/2 × (5.600 + 5.088) × (4.900 × 2 + 0.230 × 4) = 57.29 "

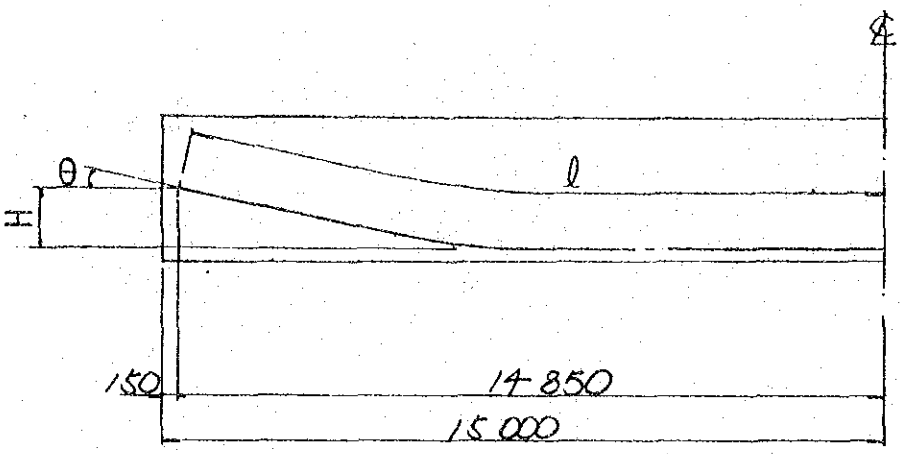
A_4 = 1.5944 × 2 = 3.19 "

ΣA = 167.58 m²

BOTTOM FORMWORK

A = 0.66 × 30.00 = 19.80 m²

3. P.C CABLE STRAND 12T12.5 mm



	H	θ	ℓ	2×ℓ×N
C_1	1450	7°	14937	29874
C_2	1150	6°	14909	29818
C_3	850	5°	14887	29774
C_4, C_5	450	4°	14865	59460
			TOTAL	148926

1) CABLE 12-7. WIRE - STRAND 12.5 mm

L = 148.926 × 12 = 1787.112 m

W = 1787.112 × 744 kg/km = 1329.6 kg

2) DUCT (φ65)

L = 148.926 − (0.075 × 10) = 148.2 m

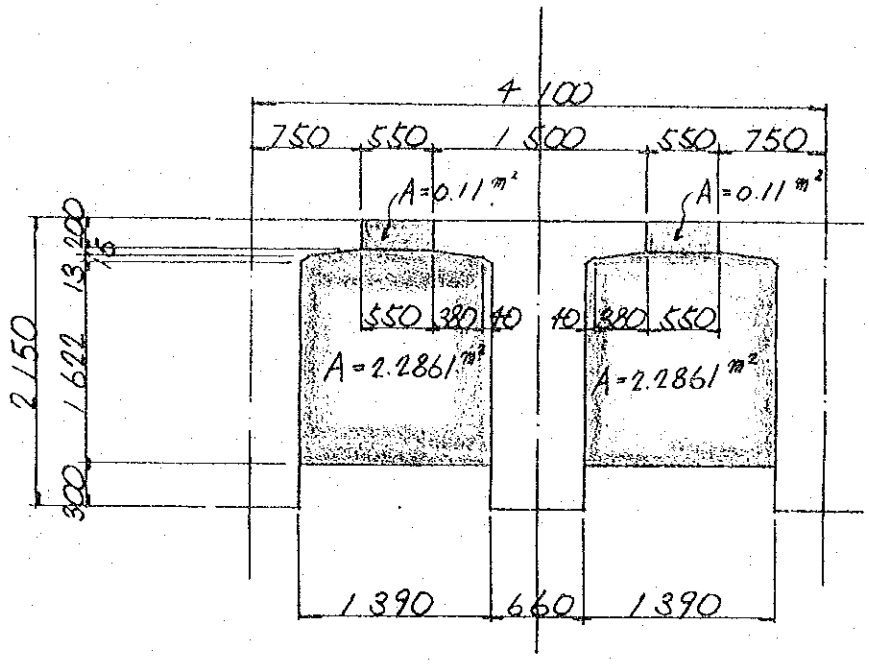
3) GROUT (φ65)

L = 148.9 m

4) ANCHORAGE

N = 10 sets

3. CROSS BEAM and SLAB



1. CONCRETE ($\acute{O}_{CK} = 30\ N/mm^2$)

$V_1 = 2.2861 \times (0.50+0.35) \times 4 \times 2 = 15.545\ m^3$

$V_2 = 0.11 \times 30.00 \times 4 = 13.200\ "$

$\Sigma V = 28.745\ m^3$

2. FORMWORK

$A_1 = 2.2861 \times 2 \times 4 \times 4 = 73.16\ m^2$

$A_2 = 1.390 \times (0.50 + 0.35) \times 4 \times 2 = 9.45\ "$

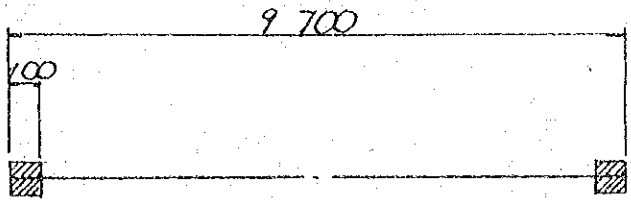
$A_3 = 0.550 \times (30.00 - 0.50 \times 2 - 0.35 \times 2) \times 4 = 62.26\ "$

$A_4 = 0.110 \times 4 \times 2 = 0.88\ "$

$\Sigma A = 145.75\ m^2$

3. P.C CABLE

1) SLAB (12-φ5 mm)



NO. OF CABLE 74

a) CABLE

L = 74 × 9.700 = 717.8 m

W = 717.8 × 1.848 kg/m = 1326.5 kg

b) DUCT (φ35)

L = 717.8 − (0.10 × 74 × 2) = 703.0 m

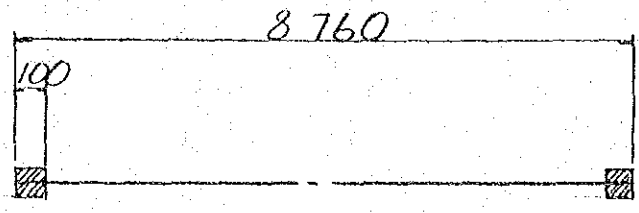
c) GROUT

L = 717.8 m

d) ANCHORAGE

N = 74 × 2 = 148 sets

2) CROSS BEAM (12 - φ5 mm)



NO. OF CABLE 12

a) CABLE

L = 12 × 8.76 = 105.1 m

W = 105.1 × 1.848 kg/m = 194.2 kg

b) DUCT (φ35)

L = 105.1 − (0.10 × 12 × 2) = 102.7 m

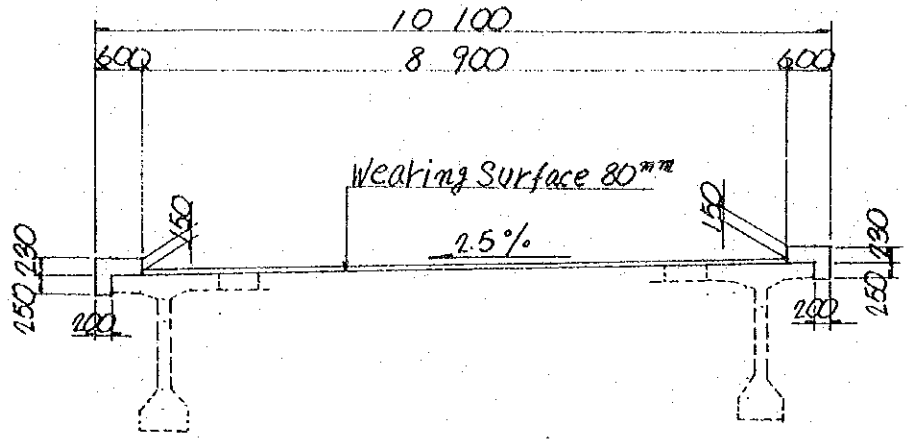
C) GROUT

L = 105.1 m

d) ANCHORAGE

N = 12 × 2 = 24 sets

4. SURFACING



1. KERB

1) CONCRETE

$A = (0.60 \times 0.23 + 0.20 \times 0.25) \times 2 = 0.376\ m^2$

$V = 0.376 \times 30.00 = 11.280\ m^3$

2) FORMWORK

$A_1 = 0.23 \times 4 \times 30.00 = 27.60\ m^2$

$A_2 = 2 \times (0.250 + 0.200 + 0.050) \times 30.00 = 30.00\ "$

$A_3 = 0.376 \times 2 = 0.75\ "$

$\Sigma A = 58.35\ m^2$

2. ASPHALT PAVEMENT (t = 80 mm)

$$A = 8.90 \times 30.00 = 267.00 \text{ m}^2$$

§ 3 A.B-LINE , L = 33.2

1. MATERIAL TABLE

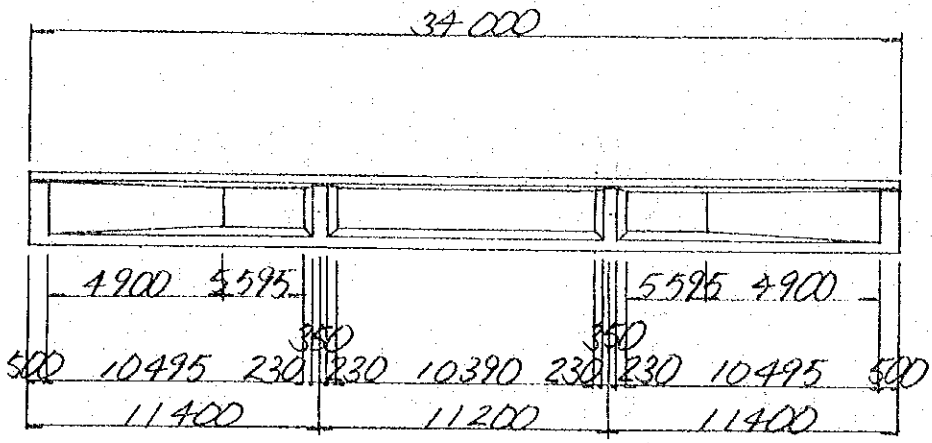
1. GIRDER

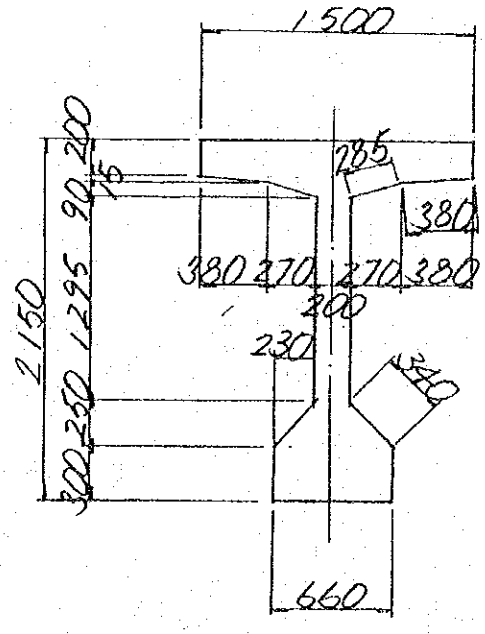
ITEM			UNIT	FOR ONE GIRDER	FOR ONE SPAN	REMARKS
NUMBER			NO	1	5	
CONCRETE			m^3	36.14	180.70	$\sigma_{ck}=40\ N/mm^2$
FORMWORK			m^2	189.98	949.90	
REINFORCEMENT BARS	φ12	INNER	kg	2 238	11 030	HIGH YIED BAR
		EDGE (L)	〃	2 158		
		〃 (R)	〃	2 158		
	φ16	INNER	〃	1 396	6980	
		EDGE (L)	〃	1 396		
		〃 (R)	〃	1 396		
	TOTAL	INNER	〃	3 634	18 010	
		EDGE (L)	〃	3 554		
		〃 (R)	〃	3 554		
PC CABLE			kg	1809	9045	12T12.5 mm
DUCT			m	201.8	1009.0	φ65 mm
GROUT			〃	202.7	1013.5	
ANCHORAGE			set	12	60	

2. CROSS BEAM , SLAB and SURFACING

ITEM		UNIT	FOR ONE SPAN		REMARKS
CONCRETE	cross beam , slab	m^3	30.51		$\sigma_{ck} = 30 N/mm^2$
	kerb	,	12.78		
	smoothed	,	—		
	total	,	33.29		
FORMWORK	cross beam , slab	m^2	154.55		
	kerb	,	66.03		
	total	,	220.58		
REINFORCEMENT	cross beam , slab	kg	1361		HIGH YIELD BAR
	kerb	,	546		(ϕ12)
	total	,	1907		
PC CABLE		kg	1700		12-ϕ5 mm
DUKT		m	900.7		ϕ35 mm
GROUT		,	919.9		
ANCHORAGE		set	192		
ASPHALT PAVEMENT		m^2	302.6		t = 80 mm
FOOT PATH		,	—		

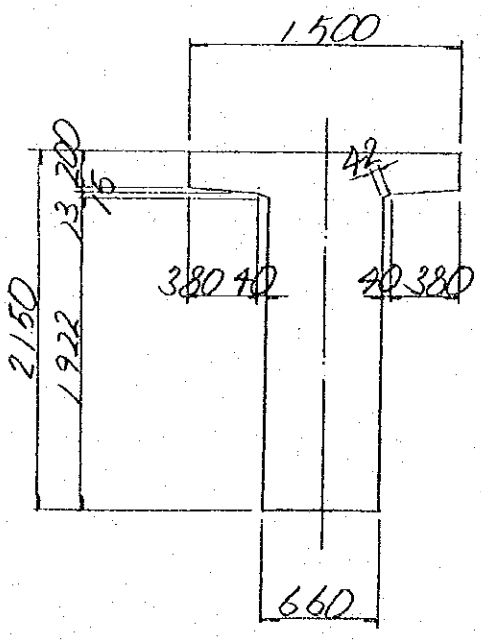
2. GIRDER





CENTER SECTION

$A = 0.9236\ m^2$



SUPPORT SECTION

$A = 1.5944\ m^2$

1. CONCRETE ($\sigma_{ck} = 40\ N/mm^2$)

$V_1 = 0.9236 \times 34.00 = 31.402\ m^3$

$V_2 = (1.5944 - 0.9236) \times (0.50 + 0.35) \times 2 = 1.140\ "$ (0.6708)

$V_3 = 1/2 \times 0.6708 \times (4.90 + 0.23 \times 2) \times 2 = 3.595\ "$

$\Sigma V = 36.137\ m^3$

2. FORMWORK

FORMWORK LENGTH OF CROSS SECTION

CENTER SECTION

$U = 2 \times (0.20 + 0.38 + 0.285 + 1.295 + 0.34 + 0.30)$

$= 5.600\ m$

SUPPORT SECTION

$U = 2 \times (0.20 + 0.38 + 0.042 + 1.922)$

$= 5.088\ m$

AREA OF FORMWORK

(BOTTOM FORMWORK ARE NOT INCLUDED)

$A_1 = 5.600 \times (5.595 \times 2 + 10.39) = 120.85\ m^2$

$A_2 = 5.088 \times (0.50 + 0.35) \times 2 = 8.65\ "$

$A_3 = 1/2 \times (5.600 + 5.088) \times (4.90 \times 2 + 0.23 \times 4) = 57.29\ "$

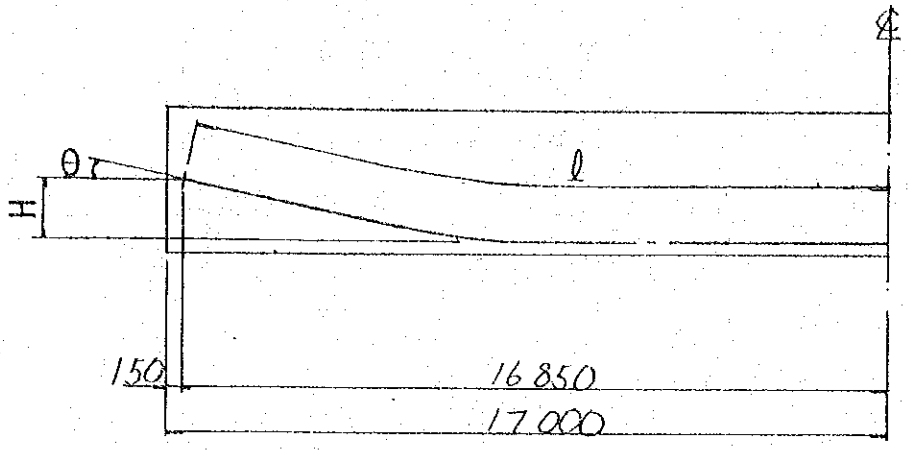
$A_4 = 1.5944 \times 2 = 3.19\ "$

$\Sigma A = 189.98\ m^2$

BOTTOM FORMWORK

$A = 0.66 \times 34.00 = 22.44\ m^2$

3. P.C CABLE STRAND 12 T 12.5 mm



	H	θ	ℓ	2 × ℓ × N
C_1	1540	7°	16 943	33 886
C_2	1330	6°	16 919	33 838
C_3	840	5°	16 886	33 772
C_4	490	4°	16 867	33 734
C_5, C_6	280	4°	16 859	67 436
			TOTAL	202 666

1) CABLE 12 - 7 WIRE - STRAND 12.5 mm

L = 202.666 × 12 = 2431.992 m

W = 2431.992 × 744 kg/km = 1809.4 kg

2) DUCT (φ 65)

L = 202.666 - (0.075 × 12) = 201.8 m

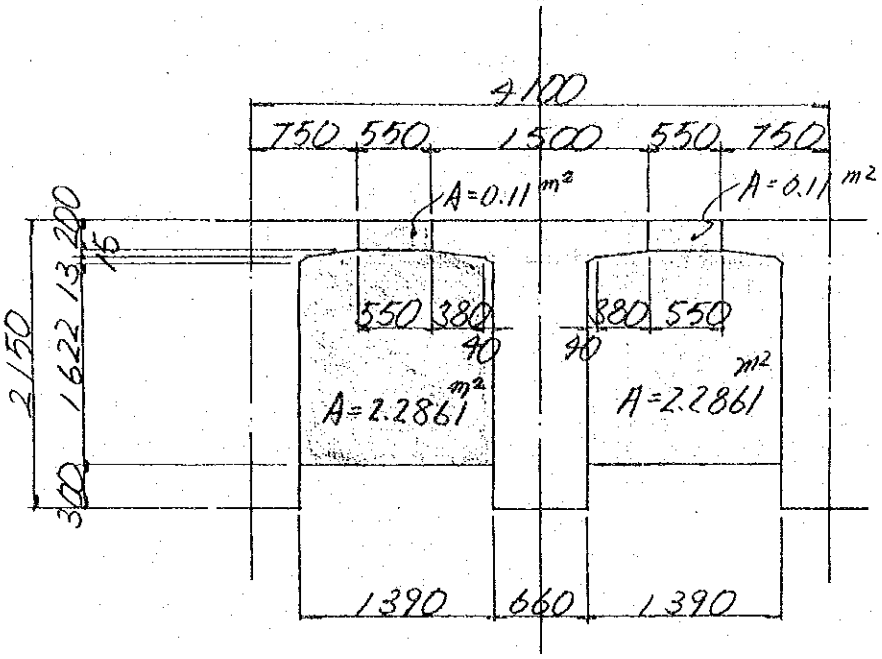
3) GROUT (φ 65)

L = 202.7 m

4) ANCHORAGE

N = 12 sets

3. CROSS BEAM and SLAB



1. CONCRETE ($\sigma_{ck} = 30\ N/mm^2$)

$V_1 = 2.2861 \times (0.50+0.35) \times 4 \times 2 = 15.545\ m^3$

$V_2 = 0.11 \times 34.00 \times 4 = 14.960\ "$

$\Sigma V = 30.505\ m^3$

2. FORMWORK

$A_1 = 2.2861 \times 2 \times 4 \times 4 = 73.16\ m^2$

$A_2 = 1.390 \times (0.50+0.35) \times 4 \times 2 = 9.45\ "$

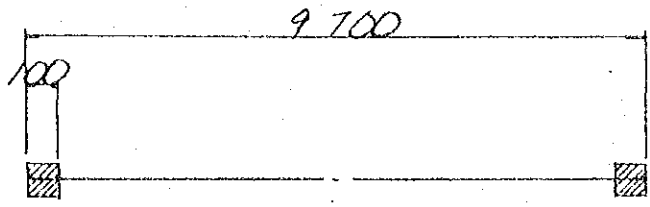
$A_3 = 0.55 \times (34.00-0.50\times2-0.35\times2) \times 4 = 71.06\ "$

$A_4 = 0.11 \times 4 \times 2 = 0.88\ "$

$\Sigma A = 154.55\ m^2$

3. P.C CABLE

1) SLAB (12-φ5 mm)



NO. OF CABLE 84

a) CABLE

L = 84 × 9.70 = 814.8 m

W = 814.8 × 1.848 kg/m = 1505.8 kg

b) DUCT (φ35)

L = 814.8 − (0.10 × 84 × 2) = 798.0 m

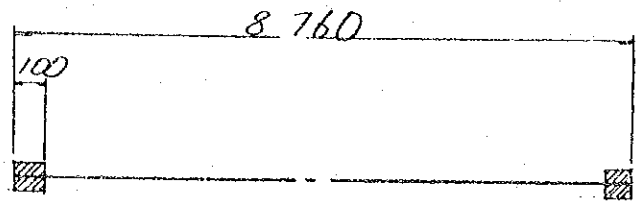
c) GROUT

L = 814.8 m

d) ANCHORAGE

N = 84 × 2 = 168 sets

2) CROSS BEAM (12 - φ5 mm)



NO. OF CABLE 12

a) CABLE

L = 12 × 8.760 = 105.1 m

W = 105.1 × 1.848 kg/m = 194.2 kg

b) DUCT (φ35)

L = 105.1 − (0.10 × 12 × 2) = 102.7 m

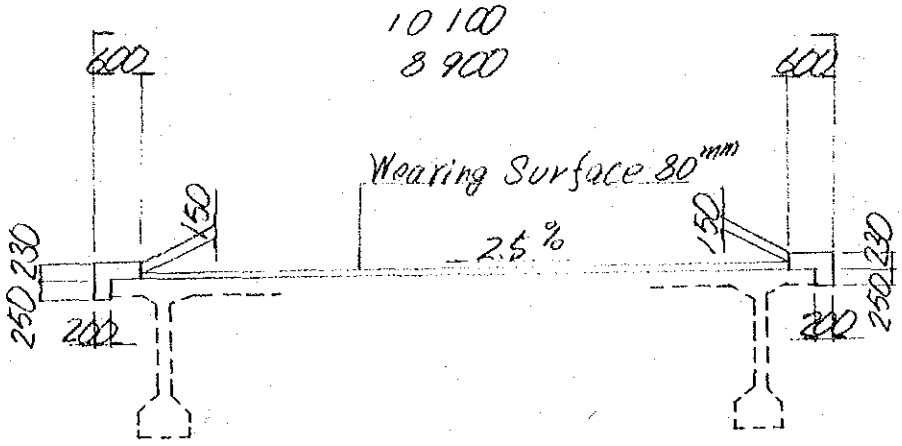
C) GROUT

L = 105.1 m

d) ANCHORAGE

N = 12 × 2 = 24 sets

4. SURFACING



1. KERB

1) CONCRETE

$A = (0.60 \times 0.23 + 0.20 \times 0.25) \times 2 = 0.376\ m^2$

$V = 0.376 \times 34.00 = 12.784\ m^3$

2) FORMWORK

$A_1 = 0.23 \times 4 \times 34.00 = 31.28\ m^2$

$A_2 = 2 \times (0.25 + 0.20 + 0.05) \times 34.00 = 34.00\ "$

$A_3 = 0.376 \times 2 = 0.75\ "$

$\Sigma A = 66.03\ m^2$

2. ASPHALT PAVEMENT (t = 80 mm)

$$A = 8.90 \times 34.00 = 302.60\ m^2$$

§4 B-LINE L=20.5

1. MATERIAL TABLE

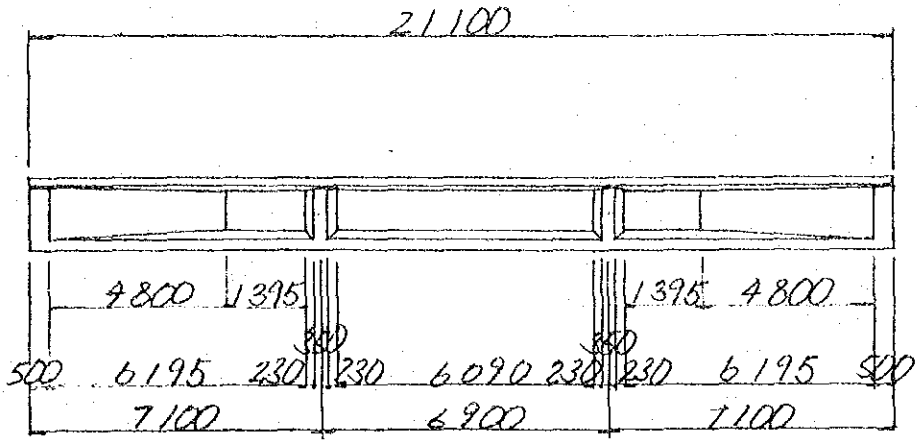
1. GIRDER

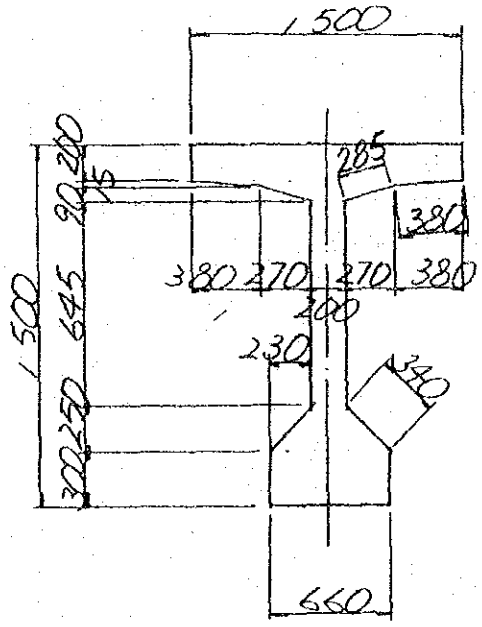
ITEM			UNIT	FOR ONE GIRDER	FOR ONE SPAN	REMARKS
NUMBER			NO	1	5	
CONCRETE			m^3	19.33	96.65	$\sigma_{ck}=40\ N/mm^2$
FORMWORK			m^2	89.49	477.45	
REINFORCEMENT BARS	φ12	INNER	kg	1382	6808	HIGH YIELD BAR
		EDGE (L)	〃	1331		
		〃 (R)	〃	1331		
	φ16	INNER	〃	711	3555	
		EDGE (L)	〃	711		
		〃 (R)	〃	711		
	TOTAL	INNER	〃	2093	10363	
		EDGE (L)	〃	2042		
		〃 (R)	〃	2042		
PC CABLE			kg	723	3615	12-φ7 mm
DUCT			m	197.2	986.0	φ45 mm
GROUT			〃	199.6	998.0	
ANCHORAGE			set	20	100	

2. CROSS BEAM , SLAB and SURFACING

ITEM		UNIT	FOR ONE SPAN		REMARKS
CONCRETE	cross beam , slab	m^3	18.69		$\sigma_{ck} = 30 N/mm^2$
	kerb	,	1.93		
	smoothed	,	—		
	total	,	26.62		
FORMWORK	cross beam , slab	m^2	97.25		
	kerb	,	41.26		
	total	,	138.51		
REINFORCEMENT	cross beam , slab	kg	875		HIGH YIELD BAR
	kerb	,	341		(ϕ12)
	total	,	1216		
PC CABLE		kg	1144		12 - ϕ5 mm
DUKT		m	606.2		ϕ35 mm
GROUT		,	619.2		
ANCHORAGE		set	130		
ASPHALT PAVEMENT		m^2	187.8		t = 80 mm
FOOT PATH		,	—		

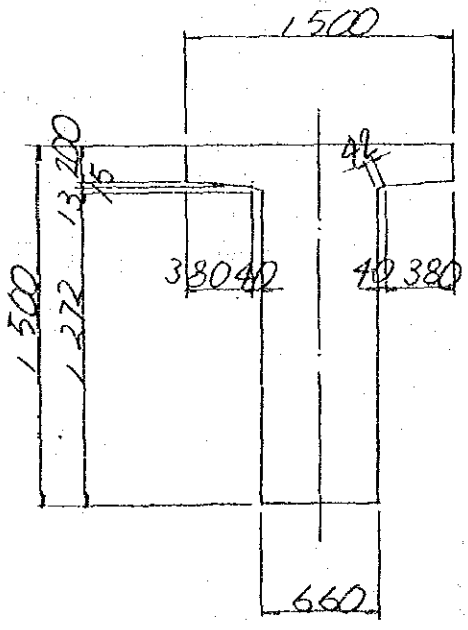
2. GIRDER





CENTER SECTION

$A = 0.7936\ m^2$



SUPPORT SECTION

$A = 1.1654\ m^2$

1. CONCRETE ($\acute{O}_{CK}$ = 40 N/mm²)

V_1 = 0.7936 × 21.10 = 16.745 m³

V_2 = (1.1654 − 0.7936) × (0.50 + 0.35) × 2 = 0.632 "

V_3 = ½ × 0.3718 × (4.80 + 0.23 × 2) × 2 = 1.956 "

ΣV = 19.333 m³

2. FORMWORK

FORMWORK LENGTH OF CROSS SECTION

CENTER SECTION

U = 2 × (0.20 + 0.38 + 0.285 + 0.645 + 0.34 + 0.30)

= 4.300 m

SUPPORT SECTION

U = 2 × (0.20 + 0.38 + 0.042 + 1.272)

= 3.788 m

AREA OF FORMWORK

(BOTTOM FORMWORK ARE NOT INCLUDED)

A_1 = 4.300 × (1.395 × 2 + 6.09) = 38.18 m²

A_2 = 3.788 × (0.50 + 0.35) × 2 = 6.44 "

A_3 = ½ × (4.30 + 3.788) × (4.80 × 2 + 0.23 × 4) = 42.54 "

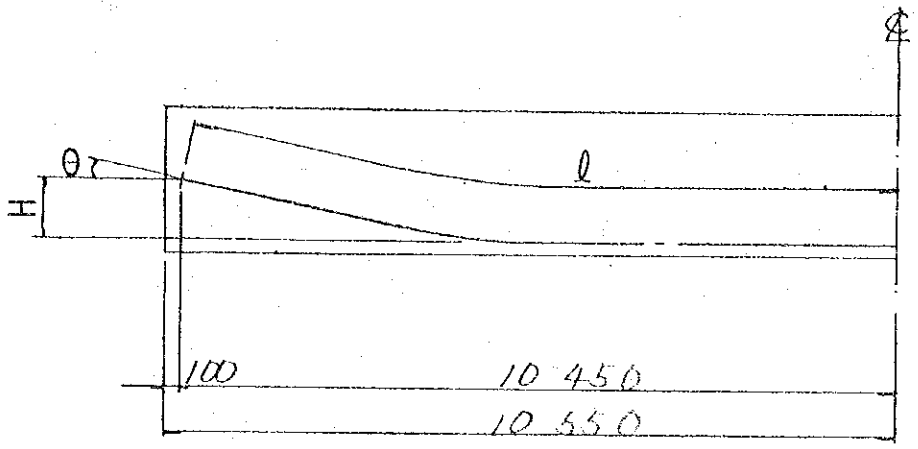
A_4 = 1.1654 × 2 = 2.33 "

ΣA = 89.99 m²

BOTTOM FORMWORK

A = 0.66 × 21.10 = 13.93 m²

3. P.C CABLE $12-\phi 7^{mm}$



	H	θ	ℓ	2 × ℓ × N
C_1	1200	20°	7126	14252
C_2	1320	20°	8641	17294
C_3, C_4	980	12°	10545	42180
C_5, C_6	850	10°	10520	42080
C_7, C_8	480	8°	10481	41924
C_9, C_{10}	350	6°	10461	41868
			TOTAL	199598

1) CABLE $12-\phi 7^{mm}$ WIRE

L = 199.598 × 12 = 2395.176 m

W = 2395.176 × 302 kg/km = 723.3 kg

2) DUCT (ϕ 45)

L = 199.598 − (0.12 × 20) = 197.2 m

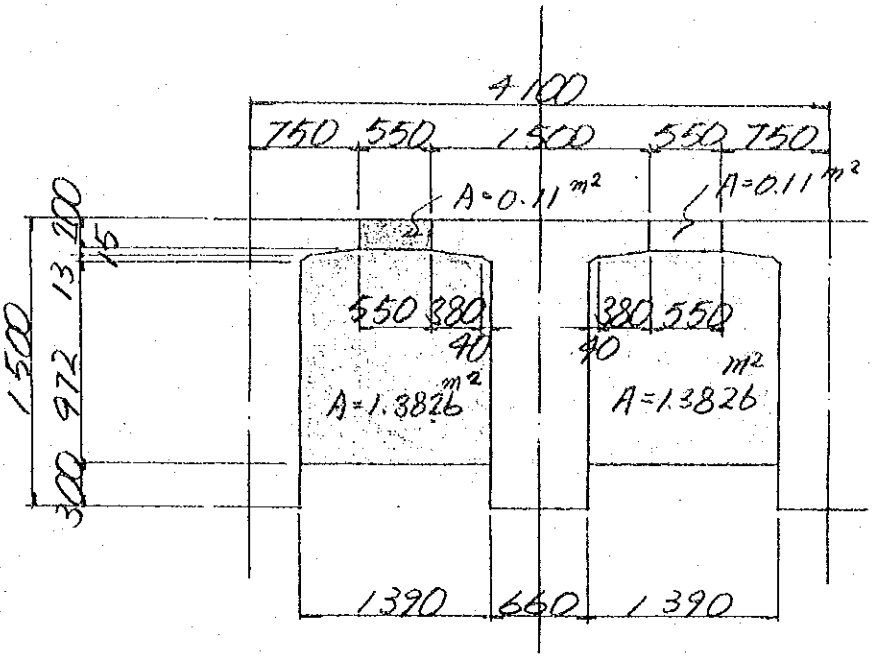
3) GROUT (ϕ 45)

L = 199.6 m

4) ANCHORAGE

N = 20 sets

3. CROSS BEAM and SLAB



1. CONCRETE ($\sigma_{ck} = 30\ N/mm^2$)

$V_1 = 1.3826 \times (0.50 + 0.35) \times 4 \times 2 = 9.402\ m^3$

$V_2 = 0.11 \times 21.10 \times 4 = 9.284\ "$

$\Sigma V = 18.686\ m^3$

2. FORMWORK

$A_1 = 1.3826 \times 2 \times 4 \times 4 = 44.24\ m^2$

$A_2 = 1.390 \times (0.50 + 0.35) \times 4 \times 2 = 9.45\ "$

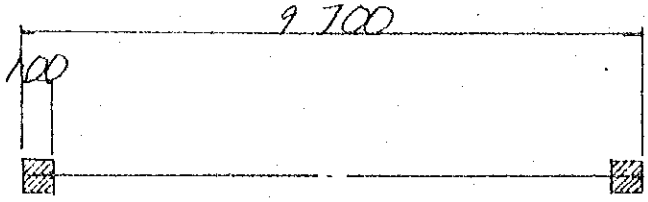
$A_3 = 0.55 \times (21.10 - 0.50 \times 2 - 0.35 \times 2) \times 4 = 42.68\ "$

$A_4 = 0.11 \times 4 \times 2 = 0.88\ "$

$\Sigma A = 97.25\ m^2$

3. P.C CABLE

1) SLAB (12-Φ5 mm)



NO. OF CABLE 53

a) CABLE

L = 53 × 9.700 = 514.1 m

W = 514.1 × 1.848 kg/m = 950.1 kg

b) DUCT (Φ35)

L = 514.1 - 10.10 × 53 × 2) = 503.5 m

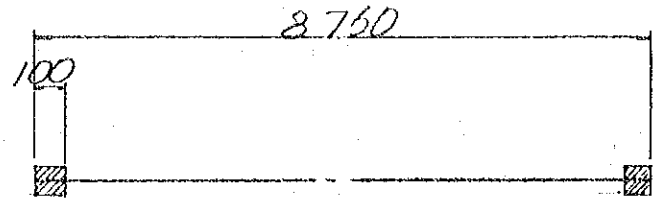
c) GROUT

L = 514.1 m

d) ANCHORAGE

N = 53 × 2 = 106 sets

2) CROSS BEAM (12 - φ5 mm)



NO. OF CABLE 12

a) CABLE

L = 12 × 8.760 = 105.1 m

W = 1.051 × 1.848 kg/m = 194.2 kg

b) DUCT (φ 35)

L = 105.1 − (0.10 × 12 × 2) = 102.7 m

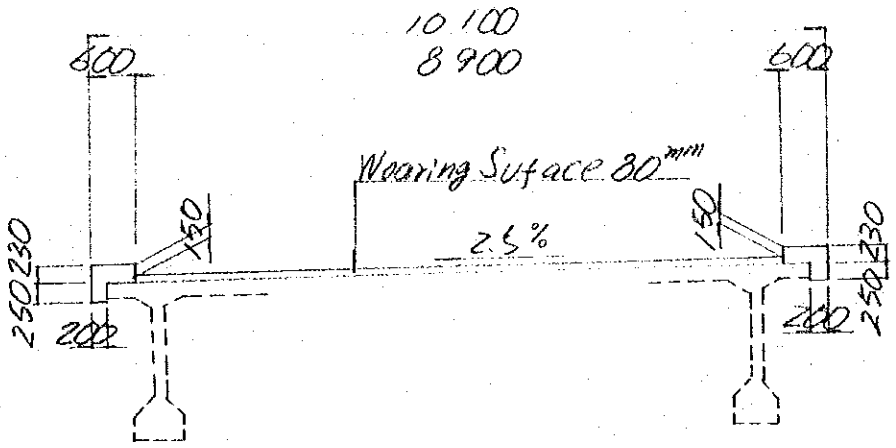
C) GROUT

L = 105.1 m

d) ANCHORAGE

N = 12 × 2 = 24 pcs

SURFACING



1. KERB

1) CONCRETE

$A = (0.60 \times 0.23 + 0.20 \times 0.25) \times 2 = 0.376\ m^2$

$V = 0.376 \times 21.10 = 7.934\ m^3$

2) FORMWORK

$A_1 = 0.23 \times 4 \times 21.10 = 19.41\ m^2$

$A_2 = 2 \times (0.25 + 0.20 + 0.05) \times 21.10 = 21.10\ "$

$A_3 = 0.376 \times 2 = 0.75\ "$

$\Sigma A = 41.26\ m^2$

2. ASPHALT PAVEMENT (t = 80 mm)

$$A = 8.90 \times 21.10 = 187.79 \ m^2$$

§5 A B-LINE L=26.8

1. MATERIAL TABLE

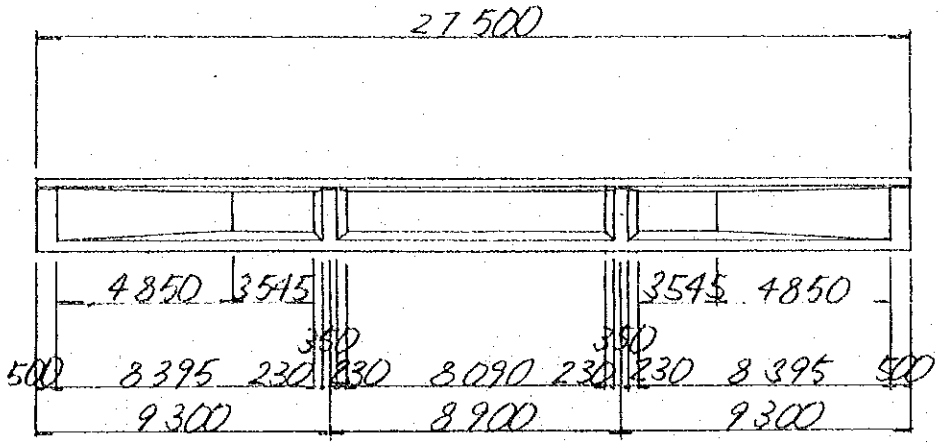
1. GIRDER

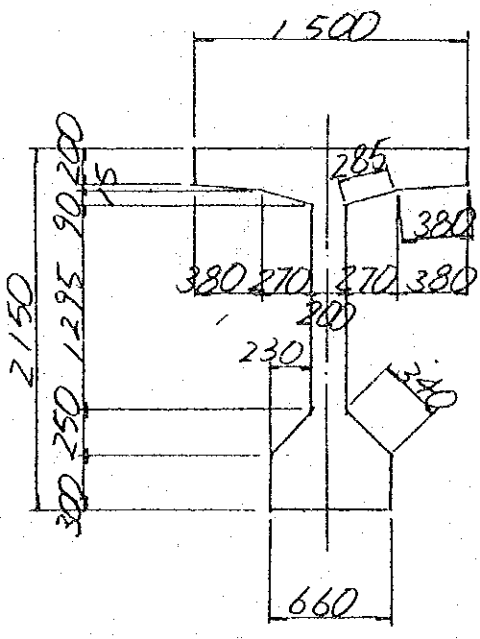
ITEM			UNIT	FOR ONE GIRDER	FOR ONE SPAN	REMARKS
NUMBER			NO	1	5	
CONCRETE			m^3	30.10	150.5	$\sigma_{ck}=40\ N/mm^2$
FORMWORK			m^2	153.60	768.0	
REINFORCEMENT BARS	φ12	INNER	kg	2321	11469	HIGH YIELD BAR
		EDGE (L)	〃	2253		
		〃 (R)	〃	2253		
	φ16	INNER	〃			
		EDGE (L)	〃			
		〃 (R)	〃			
	TOTAL	INNER	〃	2321	11469	
		EDGE (L)	〃	2253		
		〃 (R)	〃	2253		
PC CABLE			kg	976	4880	12T12.5 mm
DUCT			m	108.7	543.5	φ65 mm
GROUT			〃	109.3	546.5	
ANCHORAGE			set	8	40	

2. CROSS BEAM , SLAB and SURFACING

ITEM		UNIT	FOR ONE SPAN		REMARKS
CONCRETE	cross beam , slab	m^3	27.65		$\sigma_{ck} = 30 N/mm^2$
	kerb	,	10.34		
	smoothed	,	—		
	total	,	37.99		
FORMWORK	cross beam , slab	m^2	140.25		
	kerb	,	53.55		
	total	,	193.80		
REINFORCEMENT	cross beam , slab	kg	1222		HIGH YIELD BAR
	kerb	,	443		(ϕ12)
	total	,	1665		
PC CABLE		kg	1413		12-ϕ5 mm
DUKT		m	748.7		ϕ35 mm
GROUT		,	764.7		
ANCHORAGE		set	160		
ASPHALT PAVEMENT		m^2	244.8		t = 80 mm
FOOT PATH		,	—		

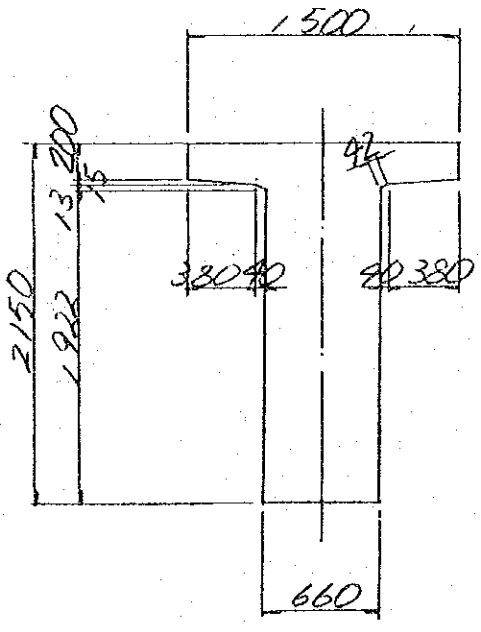
2. GIRDER





CENTER SECTION

$A = 0.9236\ m^2$



SUPPORT SECTION

$A = 1.5944\ m^2$

1. CONCRETE ($\acute{O}_{CK} = 40\ ^{N}/_{mm^2}$)

$\nabla_1 = 0.9236 \times 27.50 = 25.399\ ^{m^3}$

$\nabla_2 = (1.5944 - {}^{0.6708}0.9236) \times (0.50 + 0.35) \times 2 = 1.140\ ''$

$\nabla_3 = 1/2 \times 0.6708 \times (4.85 + 0.23 \times 2) \times 2 = 3.562\ ''$

$\Sigma \nabla = 30.101\ ^{m^3}$

2. FORMWORK

FORMWORK LENGTH OF CROSS SECTION

CENTER SECTION

$U = 2 \times (0.20 + 0.38 + 0.285 + 1.295 + 0.34 + 0.30)$

$= 5.600\ ^{m}$

SUPPORT SECTION

$U = 2 \times (0.20 + 0.38 + 0.042 + 1.922)$

$= 5.088\ ^{m}$

AREA OF FORMWORK

(BOTTOM FORMWORK ARE NOT INCLUDED)

$A_1 = 5.600 \times (13.545 \times 2 + 8.09) = 85.01\ ^{m^2}$

$A_2 = 5.088 \times (0.50 + 0.35) \times 2 = 8.65\ ''$

$A_3 = 1/2 \times (15.600 + 5.088) \times (4.85 \times 2 + 0.23 \times 4) = 56.75\ ''$

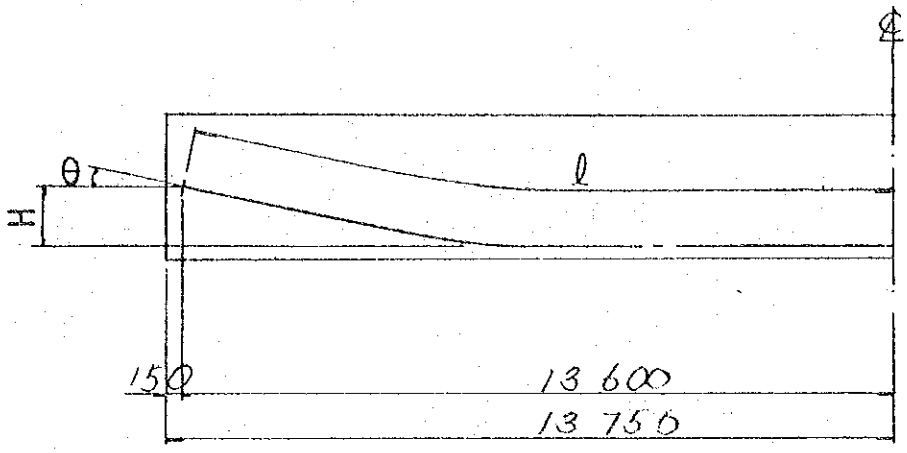
$A_4 = 1.5944 \times 2 = 3.19\ ''$

$\Sigma A = 153.60\ ^{m^2}$

BOTTOM FORMWORK

$A = 6.66 \times 27.50 = 18.15\ ^{m^2}$

3. P.C CABLE STRAND 12 T 12.5 mm



	H	θ	ℓ	2 × ℓ × N
C_1	1550	8°30′	13 712	27424
C_2	1250	7°30′	13 680	27360
C_3	850	6°30′	13 647	27294
C_4	450	5°30′	13 621	27242
			TOTAL	109 320

1) CABLE 12 − 7 WIRE STRAND 12.5 mm

L = 109.320 × 12 = 1311.840 m

W = 1311.840 × 744 kg/km = 976.0 kg

2) DUCT (φ65)

L = 109.320 − (0.075 × 8) = 108.7 m

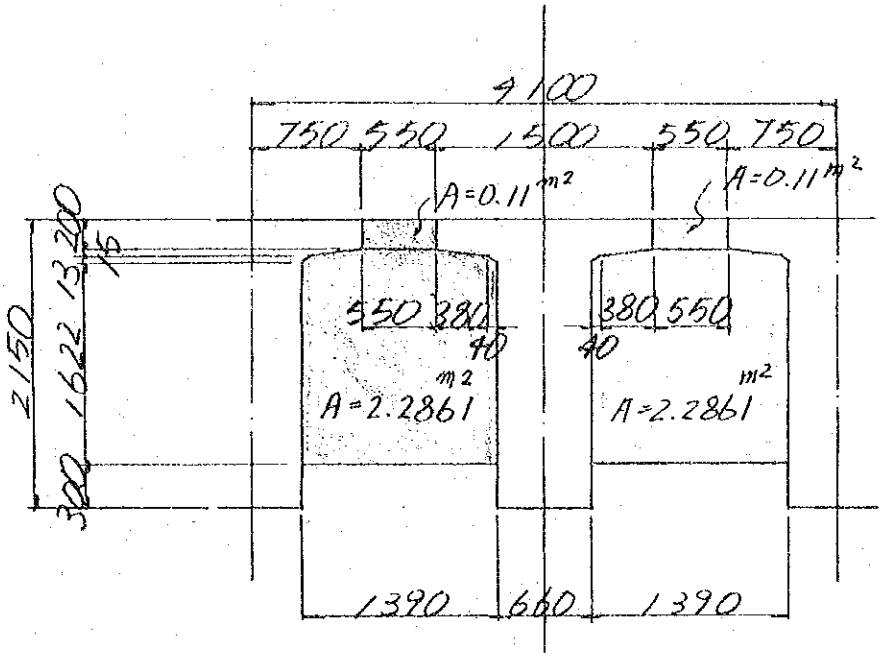
3) GROUT (φ65)

L = 109.3 m

4) ANCHORAGE

N = 8 sets

3. CROSS BEAM and SLAB



1. CONCRETE ($\sigma_{ck} = 30\ N/mm^2$)

$V_1 = 2.2861 \times (0.50+0.35) \times 4 \times 2 = 15.545\ m^3$

$V_2 = 0.11 \times 27.50 \times 4 = 12.100\ "$

$\Sigma V = 27.645\ m^3$

2. FORMWORK

$A_1 = 2.2861 \times 2 \times 4 \times 4 = 73.16\ m^2$

$A_2 = 1.390 \times (0.50+0.35) \times 4 \times 2 = 9.45\ "$

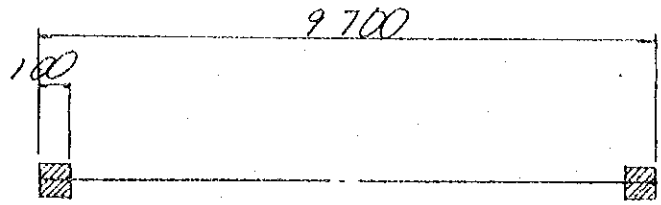
$A_3 = 0.55 \times (27.50 - 0.50 \times 2 - 0.35 \times 2) \times 4 = 56.76\ "$

$A_4 = 0.11 \times 4 \times 2 = 0.88\ "$

$\Sigma A = 140.25\ m^2$

3. P.C CABLE

1) SLAB (12-φ5 mm)



NO. OF CABLE 68

a) CABLE

L = 68 × 9.700 = 659.6 m

W = 659.6 × 1.848 kg/m = 1218.9 kg

b) DUCT (φ35)

L = 659.6 - (0.10 × 68 × 2) = 646.0 m

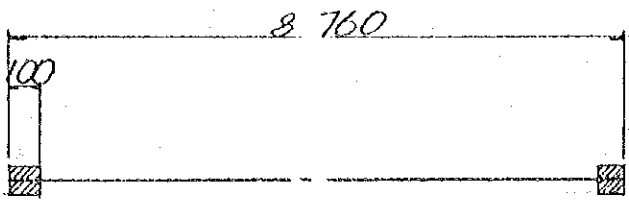
c) GROUT

L = 659.6 m

d) ANCHORAGE

N = 68 × 2 = 136 sets

2) CROSS BEAM (12 - φ5 mm)



NO. OF CABLE 12

a) CABLE

L = 12 × 8.760 = 105.1 m

W = 105.1 × 1.848 kg/m = 194.2 kg

b) DUCT (φ35)

L = 105.1 - (0.10 × 12 × 2) = 102.7 m

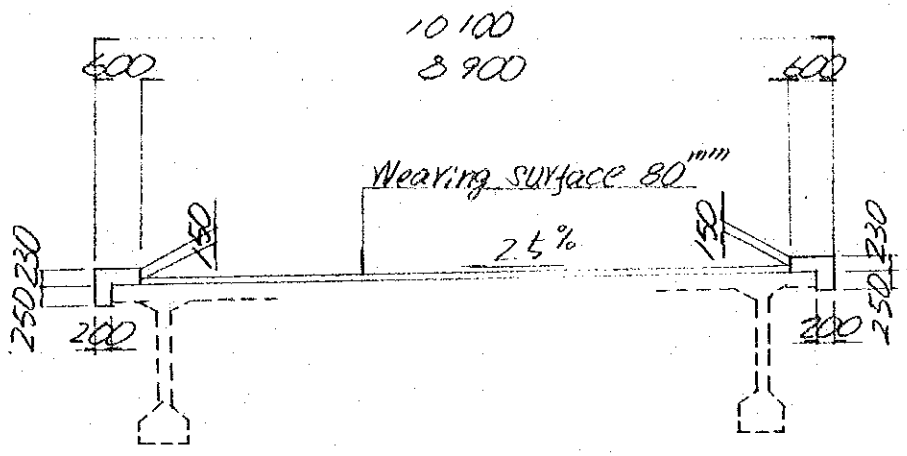
C) GROUT

L = 105.1 m

d) ANCHORAGE

N = 12 × 2 = 24 sets

4. SURFACING



1. KERB

1) CONCRETE

$A = (0.60 \times 0.23 + 0.20 \times 0.25) \times 2 = 0.376\ m^2$

$V = 0.376 \times 27.50 = 10.340\ m^3$

2) FORMWORK

$A_1 = 0.23 \times 4 \times 27.50 = 25.30\ m^2$

$A_2 = 2 \times (0.25 + 0.20 + 0.05) \times 27.50 = 27.50\ "$

$A_3 = 0.376 \times 2 = 0.75\ "$

$\Sigma A = 53.55\ m^2$

2. ASPHALT PAVEMENT (t = 80 mm)

$$A = 8.90 \times 27.50 = 244.75\ m^2$$

§6 E－Rp　L＝33.2

1. MATERIAL TABLE

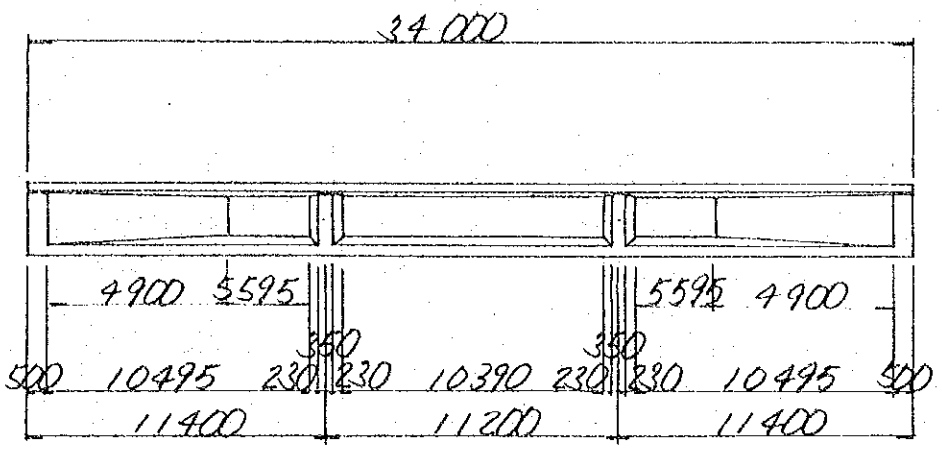
1. GIRDER

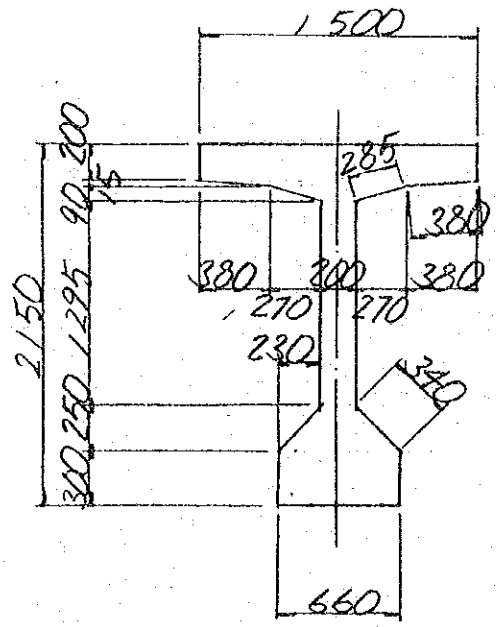
ITEM			UNIT	FOR ONE GIRDER	FOR ONE SPAN	REMARKS
NUMBER			NO	1	4	
CONCRETE			m^3	36.14	144.56	$\sigma_{ck}=40\ N/mm^2$
FORMWORK			m^2	189.98	759.92	
REINFORCEMENT BARS	φ12	INNER	kg	2 176	8 610	HIGH YIELD BAR
		EDGE (L)	〃	2 129		
		〃 (R)	〃	2 129		
	φ16	INNER	〃	1 396	5 584	
		EDGE (L)	〃	1 396		
		〃 (R)	〃	1 396		
	TOTAL	INNER	〃	3 572	14 194	
		EDGE (L)	〃	3 525		
		〃 (R)	〃	3 525		
PC CABLE			kg	1 809	7236	12 T12.5 mm
DUCT			m	201.8	807.2	φ65 mm
GROUT			〃	202.7	810.8	
ANCHORAGE			set	12	48	

2. CROSS BEAM , SLAB and SURFACING

ITEM		UNIT	FOR ONE SPAN		REMARKS
CONCRETE	cross beam , slab	m^3	17.12		$\sigma_{ck}=30 N/mm^2$
	kerb	,	11.53		
	smoothed	,	—		
	total	,	18.65		
FORMWORK	cross beam , slab	m^2	87.36		
	kerb	,	60.86		
	total	,	148.22		
REINFORCEMENT	cross beam , slab	kg	765		HIGH YIELD BAR (ϕ12)
	kerb	,	546		
	total	,	1311		
PC CABLE		kg	1,162		12-ϕ5 mm
DUKT		m	610.9		ϕ35 mm
GROUT		,	628.9		
ANCHORAGE		set	180		
ASPHALT PAVEMENT		m^2	207.4		t = 80 mm
FOOT PATH		,	—		

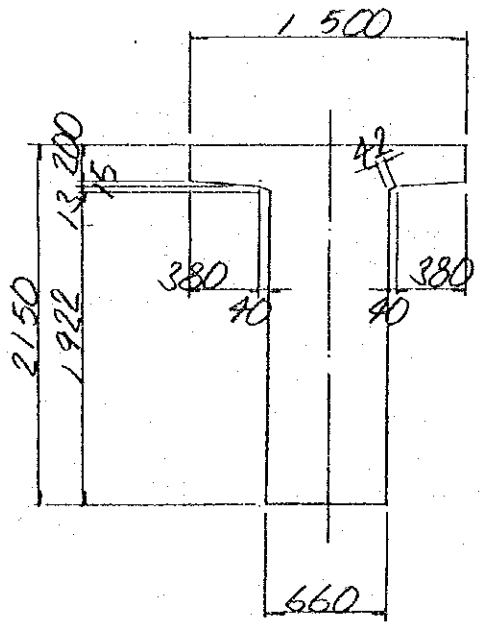
2. GIRDER





CENTER SECTION

A = 0.9236 m^2



SUPPORT SECTION

A = 1.5944 m^2

1. CONCRETE (σ_{ck} = 40 N/mm²)

V_1 = 0.9236 × 34.00 = 31.402 m³

V_2 = (1.5944 − 0.9236) × (0.50 + 0.35) × 2 = 1.140 "

V_3 = ½ × 0.6708 × (4.90 + 0.23 × 2) × 2 = 3.595 "

ΣV = 36.137 m³

2. FORMWORK

FORMWORK LENGTH OF CROSS SECTION

CENTER SECTION

U = 2 × (0.20 + 0.38 + 0.285 + 1.295 + 0.34 + 0.30)

= 5.600 m

SUPPORT SECTION

U = 2 × (0.20 + 0.38 + 0.042 + 1.922)

= 5.088 m

AREA OF FORMWORK

(BOTTOM FORMWORK ARE NOT INCLUDED)

A_1 = 5.600 × (5.595 × 2 + 0.39) = 120.85 m²

A_2 = 5.088 × (0.50 + 0.35) × 2 = 8.65 "

A_3 = ½ × (5.600 + 5.088) × (4.90 × 2 + 0.23 × 4) = 57.29 "

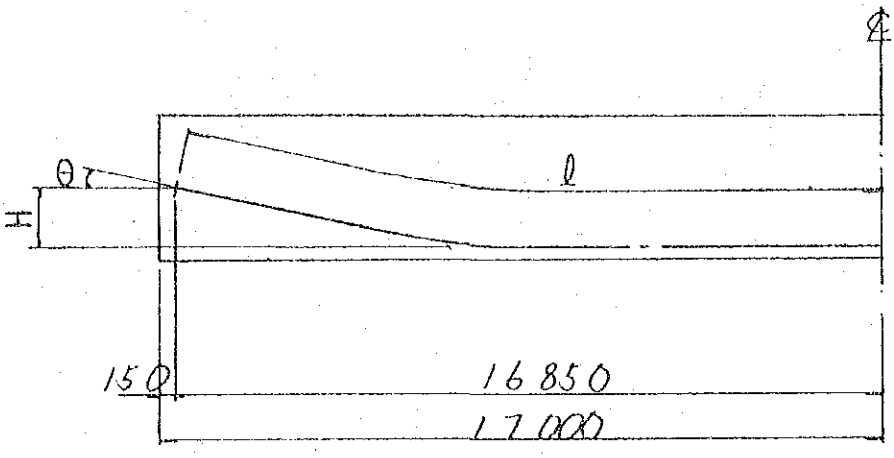
A_4 = 1.5944 × 2 = 3.19 "

ΣA = 189.98 m²

BOTTOM FORMWORK

A = 0.66 × 34.00 = 22.44 m²

3. P.C CABLE STRAND 12 T 12.5 mm



	H	θ	l	2 × l × N
C_1	1540	7°	16943	33886
C_2	1330	6°	16919	33838
C_3	840	5°	16886	33772
C_4	490	4°	16867	33734
C_5, C_6	280	4°	16859	67436
			TOTAL	202666

1) CABLE 12 - 7 WIRE - STRAND 12.5 mm

L = 202.666 × 12 = 2431.992 m

W = 2431.992 × 744 kg/km = 1809.4 kg

2) DUCT (φ65)

L = 202.666 - (0.075 × 12) = 201.8 m

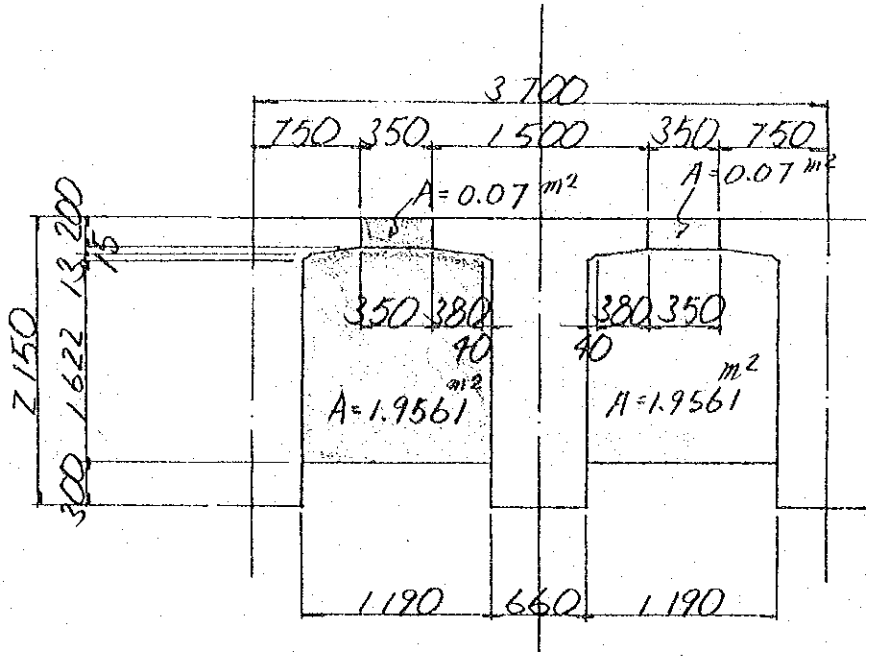
3) GROUT (φ65)

L = 202.7 m

4) ANCHORAGE

N = 12 sets

3. CROSS BEAM and SLAB



1. CONCRETE (σ_{ck} = 30 N/mm²)

$V_1 = 1.9561 \times (0.50+0.35) \times 3 \times 2$ = 9.976 m³

$V_2 = 0.07 \times 34.00 \times 3$ = 7.140 "

$\Sigma V = 17.116$ m³

2. FORMWORK

$A_1 = 1.9561 \times 2 \times 3 \times 4$ = 46.95 m²

$A_2 = 1.190 \times (0.50+0.35) \times 3 \times 2$ = 6.07 "

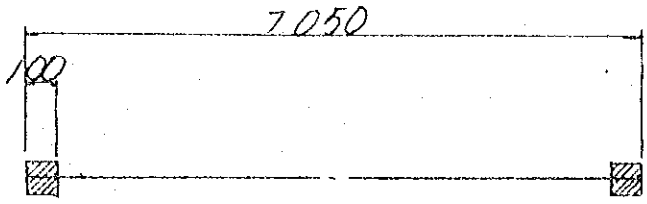
$A_3 = 0.35 \times (34.00 - 0.50 \times 2 - 0.35 \times 2) \times 3$ = 33.92 "

$A_4 = 0.07 \times 3 \times 2$ = 0.42 "

$\Sigma A = 87.36$ m²

3. P.C CABLE

1) SLAB (12-φ5 mm)



NO. OF CABLE 84

a) CABLE

L = 84 × 7.050 = 592.2 m

W = 592.2 × 1.848 kg/m = 1094.4 kg

b) DUCT (φ35)

L = 592.2 − (0.10 × 84 × 2) = 575.4 m

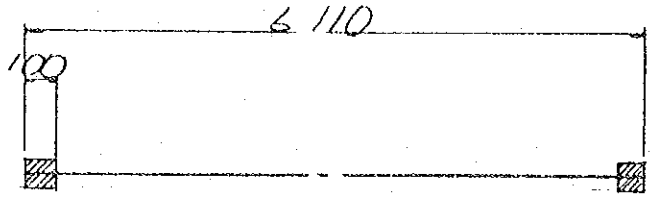
c) GROUT

L = 592.2 m

d) ANCHORAGE

N = 84 × 2 = 168 sets

2) CROSS BEAM (12 - φ5 mm)



NO. OF CABLE 6

a) CABLE

L = 6 × 6.110 = 36.7 m

W = 36.7 × 1.848 kg/m = 67.8 kg

b) DUCT (φ 35)

L = 36.7 - (0.10 × 6 × 2) = 35.5 m

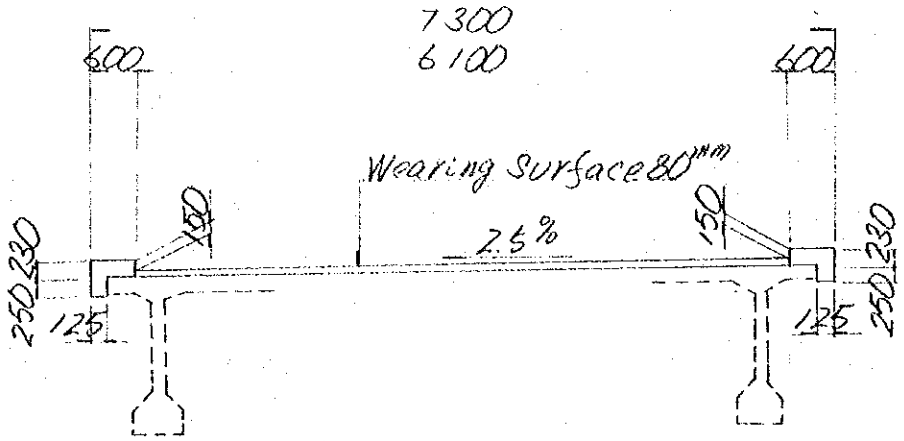
C) GROUT

L = 36.7 m

d) ANCHORAGE

N = 6 × 2 = 12 sets

4. SURFACING



1. KERB

1) CONCRETE

$A = (0.60 \times 0.23 + 0.125 \times 0.25) \times 2 = 0.339\ m^2$

$V = 0.339 \times 34.00 = 11.526\ m^3$

2) FORMWORK

$A_1 = 0.23 \times 4 \times 34.00 = 31.28\ m^2$

$A_2 = 2 \times (0.25 + 0.125 + 0.05) \times 34.00 = 28.90\ "$

$A_3 = 0.339 \times 2 = 0.68\ "$

$\Sigma A = 60.86\ m^2$

2. ASPHALT PAVEMENT (t = 80 mm)

$$A = 6.10 \times 34.00 = 207.40 \ m^2$$

§7 E - Rp L = 20.2

1. MATERIAL TABLE

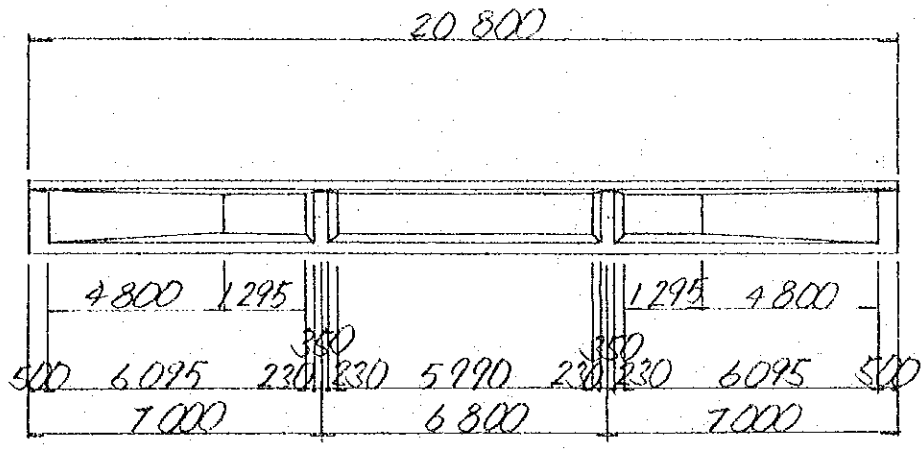
1. GIRDER

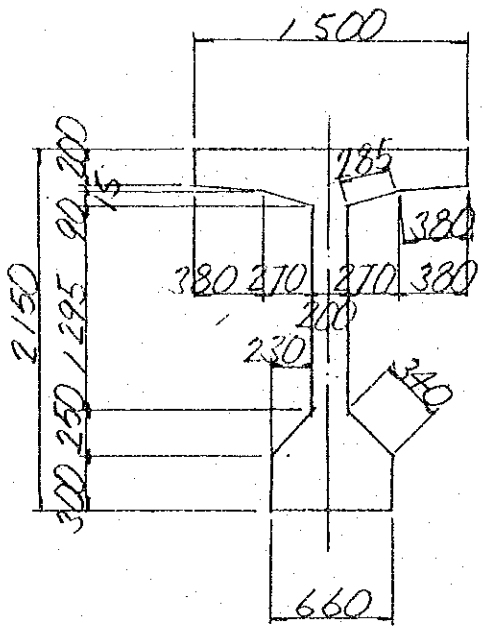
ITEM			UNIT	FOR ONE GIRDER	FOR ONE SPAN	REMARKS
NUMBER			NO	1	4	
CONCRETE			m^3	23.88	95.52	$\sigma_{ck}=40\ N/mm^2$
FORMWORK			m^2	116.11	464.44	
REINFORCEMENT BARS	φ12	INNER	kg	1799	7122	HIGH YIELD BAR
		EDGE (L)	〃	1762		
		〃 (R)	〃	1762		
	φ16	INNER	〃			
		EDGE (L)	〃			
		〃 (R)	〃			
	TOTAL	INNER	〃	1799	7122	
		EDGE (L)	〃	1762		
		〃 (R)	〃	1762		
PC CABLE			kg	451	1804	12-φ7 mm
DUCT			m	123.0	492.0	φ45 mm
GROUT			〃	124.5	498.0	
ANCHORAGE			set	12	48	

2. CROSS BEAM , SLAB and SURFACING

ITEM		UNIT	FOR ONE SPAN		REMARKS
CONCRETE	cross beam , slab	m^3	14.34		$\sigma_{ck}=30\ N/mm^2$
	kerb	,	7.05		
	smoothed	,	—		
	total	,	21.39		
FORMWORK	cross beam , slab	m^2	73.50		
	kerb	,	37.50		
	total	,	111.00		
REINFORCEMENT	cross beam , slab	kg	621		HIGH YIELD BAR
	kerb	,	332		(ϕ12)
	total	,	953		
PC CABLE		kg	745		12-ϕ5 mm
DUKT		m	391.7		ϕ35 mm
GROUT		,	403.3		
ANCHORAGE		set	116		
ASPHALT PAVEMENT		m^2	126.9		t = 80 mm
FOOT PATH		,	—		

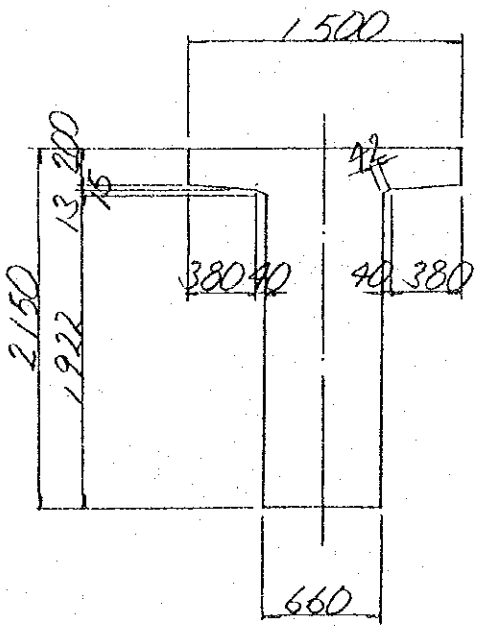
2. GIRDER





CENTER SECTION

$A = 0.9236\ m^2$



SUPPORT SECTION

$A = 1.5944\ m^2$

1. CONCRETE ($\acute{O}_{CK} = 40\ ^{N}/_{mm^2}$)

$V_1 = 0.9236 \times 20.80 = 19.211\ m^3$

$V_2 = (1.5944 - \overset{0.6708}{0.9236}) \times (0.50 + 0.35) \times 2 = 1.140\ "$

$V_3 = 1/2 \times 0.6708 \times (4.80 + 0.23 \times 2) \times 2 = 3.528\ "$

$\Sigma V = 23.879\ m^3$

2. FORMWORK

FORMWORK LENGTH OF CROSS SECTION

CENTER SECTION

$U = 2 \times (0.20 + 0.38 + 0.285 + 1.295 + 0.34 + 0.30)$

$= 5.600\ m$

SUPPORT SECTION

$U = 2 \times (0.20 + 0.38 + 0.042 + 1.922)$

$= 5.088\ m$

AREA OF FORMWORK

(BOTTOM FORMWORK ARE NOT INCLUDED)

$A_1 = 5.600 \times (1.295 \times 2 + 5.99) = 48.05\ m^2$

$A_2 = 5.088 \times (0.50 + 0.35) \times 2 = 8.65\ "$

$A_3 = 1/2 \times (5.600 + 5.088) \times (4.80 \times 2 + 0.23 \times 4) = 56.22\ "$

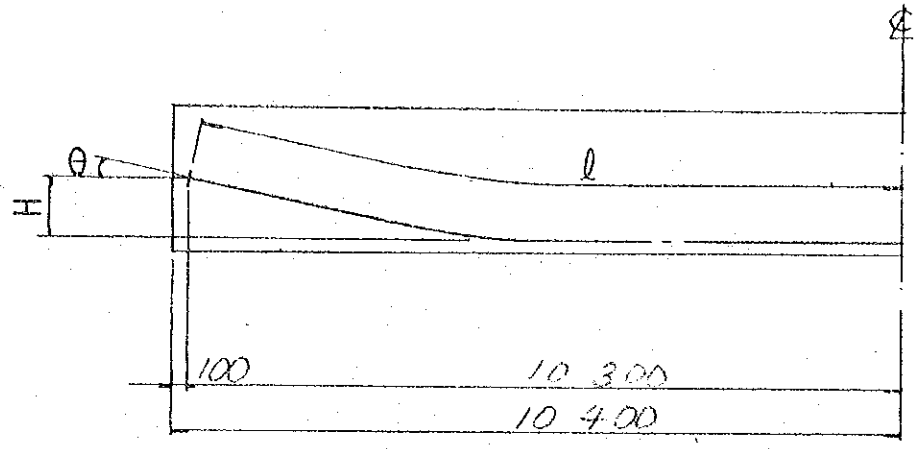
$A_4 = 1.5944 \times 2 = 3.19\ "$

$\Sigma A = 116.11\ m^2$

BOTTOM FORMWORK

$A = 0.66 \times 20.80 = 13.73\ m^2$

3. P.C CABLE　　12 − φ 7 mm



	H	θ	ℓ	2 × ℓ × N
C_1	1640	12°	10 465	20 930
C_2	1370	11°	10 426	20 852
C_3	940	9°30′	10 314	20 748
C_4	590	8°	10 339	20 678
C_5, C_6	320	7°	10 318	41 272
			TOTAL	124 480

1) CABLE　12 - φ 7 mm WIRE

L = 124.480 × 12 = 1 493.760 m

W = 1493.760 × 302 kg/km = 451.1 kg

2) DUCT (φ 45)

L = 124.480 - (0.12 × 12) = 123.0 m

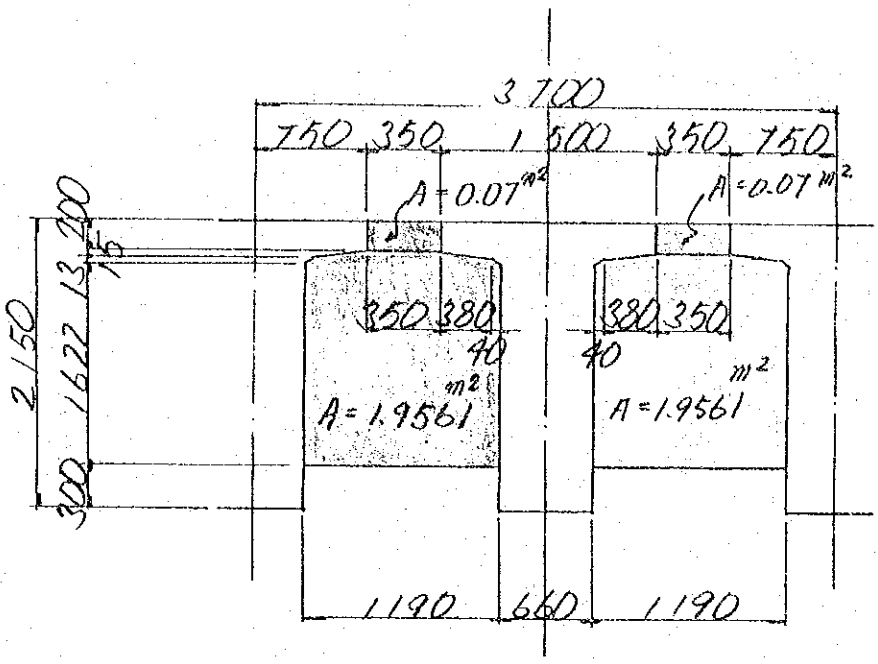
3) GROUT (φ 45)

L = 124.5 m

4) ANCHORAGE

N = 12 sets

3. CROSS BEAM and SLAB



1. CONCRETE ($\sigma_{ck} = 30\ N/mm^2$)

$V_1 = 1.9561 \times (0.50 + 0.35) \times 3 \times 2 = 9.976\ m^3$

$V_2 = 0.07 \times 20.80 \times 3 = 4.368\ "$

$\Sigma V = 14.344\ m^3$

2. FORMWORK

$A_1 = 1.9561 \times 2 \times 3 \times 4 = 46.95\ m^2$

$A_2 = 1.190 \times (0.50 + 0.35) \times 3 \times 2 = 6.07\ "$

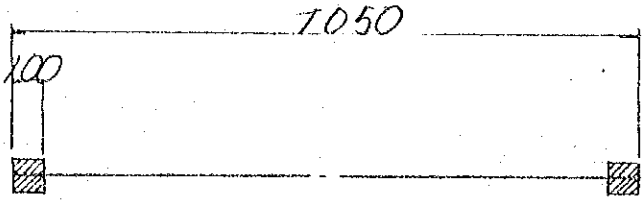
$A_3 = 0.35 \times (20.80 - 0.50 \times 2 - 0.35 \times 2) \times 3 = 20.06\ "$

$A_4 = 0.07 \times 3 \times 2 = 0.42\ "$

$\Sigma A = 73.50\ m^2$

3. P.C CABLE

1) SLAB (12-φ5 mm)



NO. OF CABLE 52

a) CABLE

L = 52 × 7.050 = 366.6 m

W = 366.6 × 1.848 kg/m = 677.5 kg

b) DUCT (φ35)

L = 366.6 - (0.10 × 52 × 2) = 356.2 m

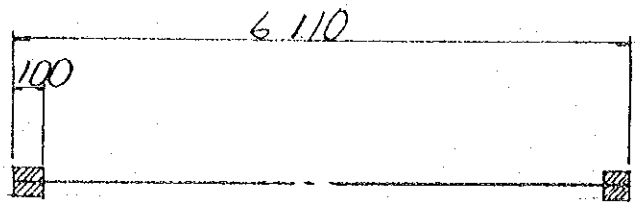
c) GROUT

L = 366.6 m

d) ANCHORAGE

N = 52 × 2 = 104 sets

2) CROSS BEAM (12 - ϕ5 mm)



NO. OF CABLE 6

a) CABLE

L = 6 × 6.110 = 36.7 m

W = 36.7 × 1.848 kg/m = 67.8 kg

b) DUCT (ϕ35)

L = 36.7 - (0.10 × 6 × 2) = 35.5 m

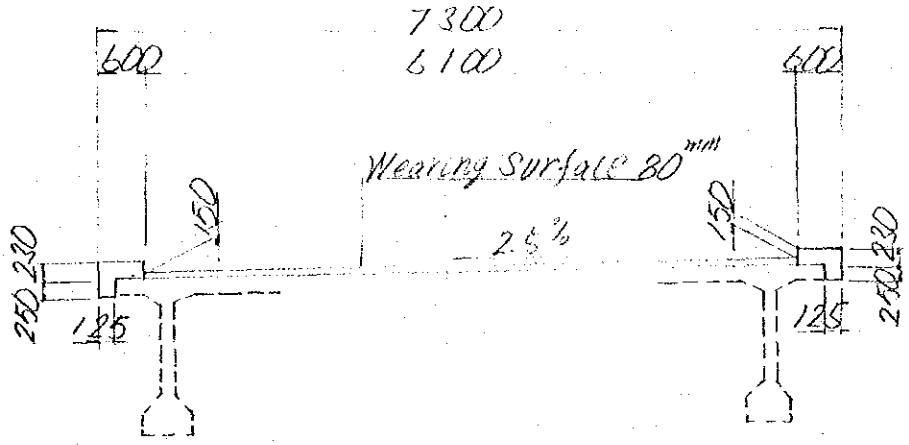
C) GROUT

L = 36.7 m

d) ANCHORAGE

N = 6 × 2 = 12 sets

4. SURFACING



1. KERB

1) CONCRETE

$A = (0.60 \times 0.23 + 0.125 \times 0.25) \times 2 = 0.339\ m^2$

$V = 0.339 \times 20.80 = 7.051\ m^3$

2) FORMWORK

$A_1 = 0.23 \times 4 \times 20.80 = 19.14\ m^2$

$A_2 = 2 \times (0.25 + 0.125 + 0.05) \times 20.80 = 17.68$ "

$A_3 = 0.339 \times 2 = 0.68$ "

$\Sigma A = 37.50\ m^2$

2. ASPHALT PAVEMENT (t = 80 mm)

$$A = 6.10 \times 20.80 = 126.88 \text{ m}^2$$

§8 E－Rp L＝29.2

1. MATERIAL TABLE

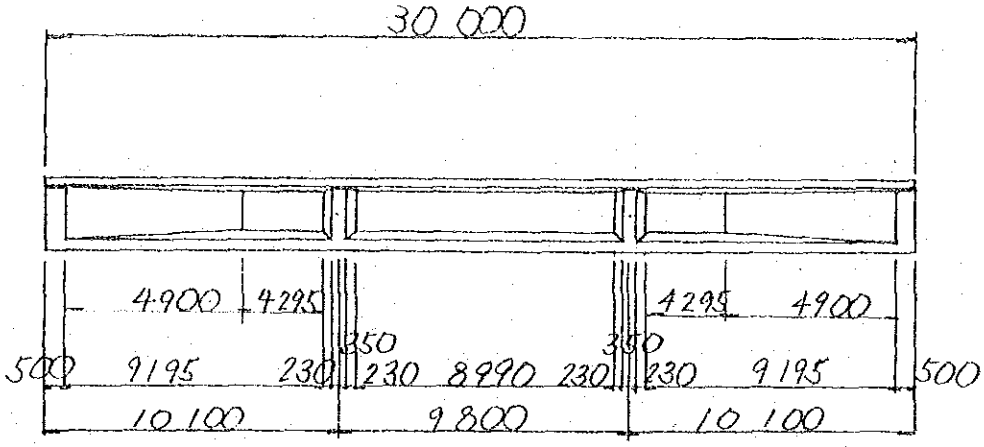
1. GIRDER

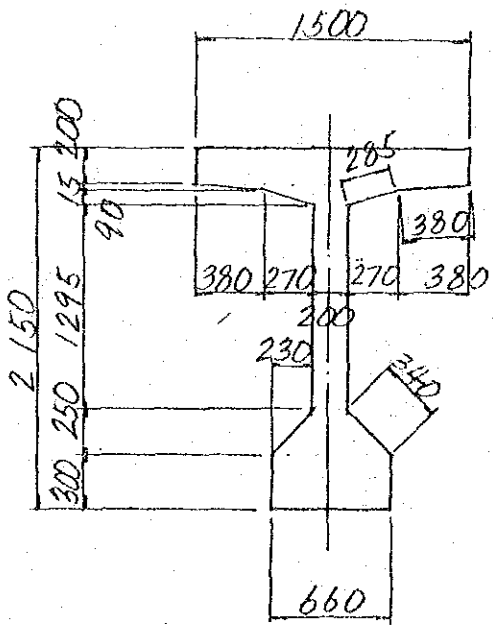
ITEM			UNIT	FOR ONE GIRDER	FOR ONE SPAN	REMARKS
NUMBER			NO	1	4	
CONCRETE			m^3	32.44	129.76	$\sigma_{ck}=40\ N/mm^2$
FORMWORK			m^2	167.58	670.32	
REINFORCEMENT BARS	φ12	INNER	kg	2 417	9 682	HIGH YIELD BAR
		EDGE (L)	〃	2 374		
		〃 (R)	〃	2 374		
	φ16	INNER	〃	—		
		EDGE (L)	〃	—		
		〃 (R)	〃	—		
	TOTAL	INNER	〃	2 417	9 682	
		EDGE (L)	〃	2 374		
		〃 (R)	〃	2 374		
PC CABLE			kg	1330	5320	12 T 12.5 mm
DUCT			m	147.7	590.8	φ65 mm
GROUT			〃	148.9	595.6	
ANCHORAGE			set	10	40	

2. CROSS BEAM , SLAB and SURFACING

ITEM		UNIT	FOR ONE SPAN		REMARKS
CONCRETE	cross beam , slab	m^3	16.28		$\sigma_{ck} = 30 N/mm^2$
	kerb	,	10.17		
	smoothed	,	—		
	total	,	26.45		
FORMWORK	cross beam , slab	m^2	83.16		
	kerb	,	53.78		
	total	,	136.84		
REINFORCEMENT	cross beam , slab	kg	723		HIGH YIELD BAR
	kerb	,	479		(ϕ12)
	total	,	1202		
PC CABLE		kg	1366		12 - ϕ7 mm
DUKT		m	363.9		ϕ45 mm
GROUT		,	376.9		
ANCHORAGE		set	108		
ASPHALT PAVEMENT		m^2	183.0		t = 80 mm
FOOT PATH		,	—		

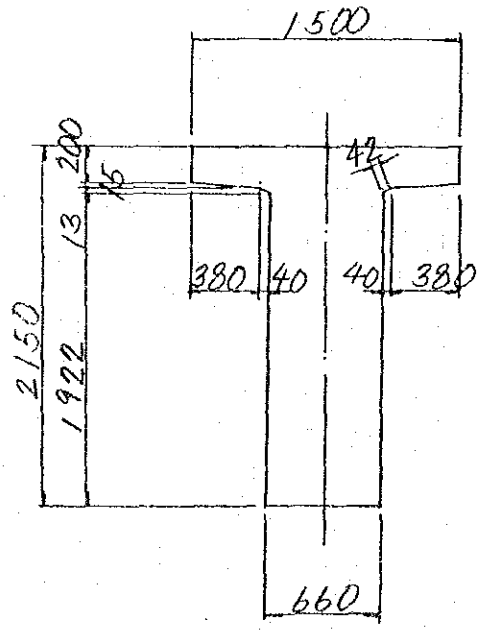
2. GIRDER





CENTER SECTION

$A = 0.9236\ m^2$



SUPPORT SECTION

$A = 1.5944\ m^2$

1. CONCRETE ($\acute{O}_{CK} = 40\ N/mm^2$)

$V_1 = 0.9236 \times 30.00 = 27.708\ m^3$

$V_2 = (1.5944 - 0.9236) \times (0.500 + 0.350) \times 2 = 1.140\ "$ (0.6708)

$V_3 = \frac{1}{2} \times 0.6708 \times (4.900 + 0.230 \times 2) \times 2 = 3.595\ "$

$\Sigma V = 32.443\ "$

2. FORMWORK

FORMWORK LENGTH OF CROSS SECTION

CENTER SECTION

$U = 2 \times (0.20 + 0.38 + 0.285 + 1.295 + 0.34 + 0.30)$

$= 5.600\ m$

SUPPORT SECTION

$U = 2 \times (0.20 + 0.38 + 0.042 + 1.922)$

$= 5.088\ m$

AREA OF FORMWORK

(BOTTOM FORMWORK ARE NOT INCLUDED)

$A_1 = 5.600 \times (4.295 \times 2 + 8.990) = 98.45\ m^2$

$A_2 = 5.088 \times (0.50 + 0.35) \times 2 = 8.65$

$A_3 = \frac{1}{2} \times (5.600 + 5.088) \times (4.900 \times 2 + 0.230 \times 4) = 57.29$

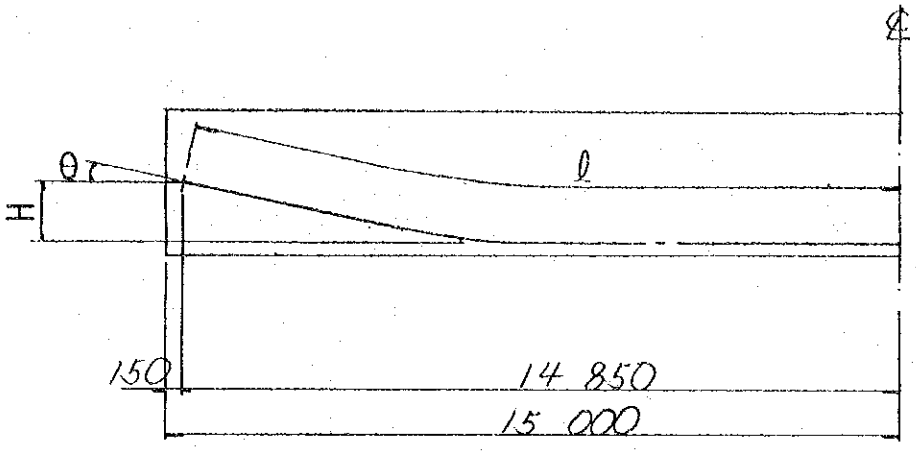
$A_4 = 1.5944 \times 2 = 3.19$

$\Sigma A = 167.58\ m^2$

BOTTOM FORMWORK

$A = 0.66 \times 30.00 = 19.80\ m^2$

3. P.C CABLE STRAND 12 T 12.5 mm



	H	θ	ℓ	2 × ℓ × N
C_1	1450	7°	14 937	29 874
C_2	1150	6°	14 909	29 818
C_3	850	5°	14 887	29 774
C_4 C_5	450	4°	14 865	59 460
			TOTAL	148 926

1) CABLE 12 - 7 WIRE - STRAND 12.5 mm

L = 148.926 × 12 = 1787.112 m

W = 1787.112 × 744 kg/km = 1329.6 kg

2) DUCT (φ 65)

L = 148.926 − (0.127 × 10) = 147.7 m

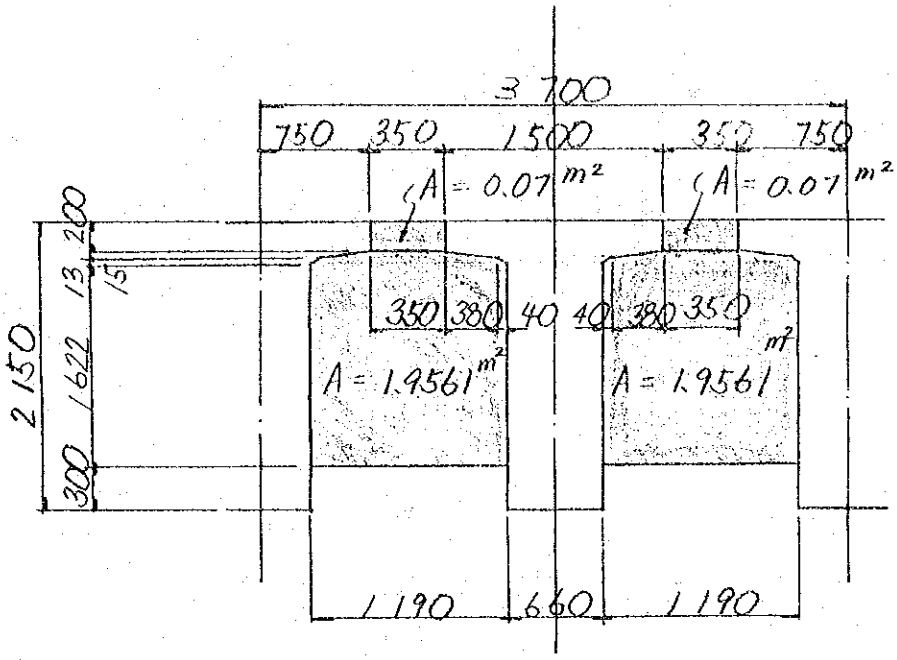
3) GROUT (φ 65)

L = 148.9 m

4) ANCHORAGE

N = 10 sets

3. CROSS BEAM and SLAB



1. CONCRETE ($\sigma_{ck} = 30\ N/mm^2$)

$V_1 = 1.9561 \times (0.50 + 0.35) \times 3 \times 2 = 9.976\ m^3$

$V_2 = 0.07 \times 30.00 \times 3 = 6.300\ "$

$\Sigma V = 16.276\ "$

2. FORMWORK

$A_1 = 1.9561 \times 2 \times 3 \times 4 = 46.95\ m^2$

$A_2 = 1.190 \times (0.50 + 0.35) \times 3 \times 2 = 6.07\ "$

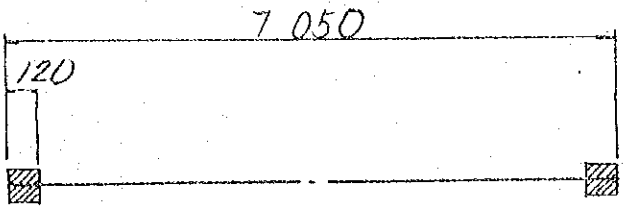
$A_3 = 0.35 \times (30.00 - 0.50 \times 2 - 0.35 \times 2) \times 3 = 29.72\ "$

$A_4 = 0.07 \times 3 \times 2 = 0.42\ "$

$\Sigma A = 83.16\ m^2$

3. P.C CABLE

1) SLAB (12-φ7 mm)



NO. OF CABLE 50

a) CABLE

L = 50 × 7.050 = 352.5 m

W = 352.5 × 3.624 kg/m = 1277.5 kg

b) DUCT (φ45)

L = 352.5 - (0.12 × 50 × 2) = 340.5 m

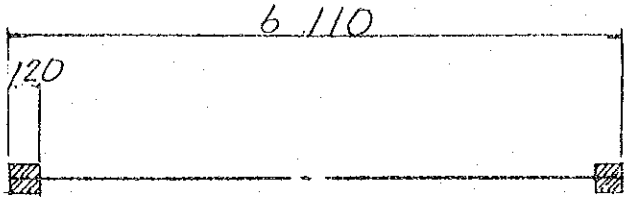
c) GROUT

L = 352.5 m

d) ANCHORAGE

N = 50 × 2 = 100 sets

2) CROSS BEAM (12 - ϕ 7 mm)



NO. OF CABLE 4

a) CABLE

L = 4 x 6.110 = 24.4 m

W = 24.4 x 3.624 kg/m = 88.4 kg

b) DUCT (ϕ 45)

L = 24.4 - (0.12 x 4 x 2) = 23.4 m

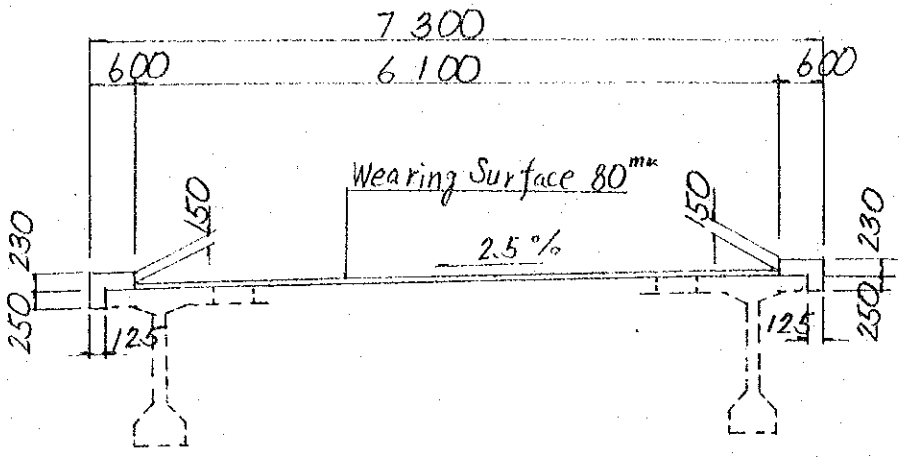
C) GROUT

L = 24.4 m

d) ANCHORAGE

N = 4 x 2 = 8 sets

4. SURFACING



1. KERB

1) CONCRETE

$$A = (0.60 \times 0.23 + 0.125 \times 0.25) \times 2 = 0.339 \ m^2$$

$$V = 0.339 \times 30.00 = 10.170 \ m^3$$

2) FORMWORK

$A_1 = 0.23 \times 4 \times 30.00 = 27.60$

$A_2 = 2 \times (0.25 + 0.125 + 0.050) \times 30.00 = 25.50$

$A_3 = 0.339 \times 2 = 0.68$

$\Sigma A = 53.78 \ m^2$

2. ASPHALT PAVEMENT (t = 80 mm)

$$A = 6.10 \times 30.00 = 183.00 \ m^2$$

§§ 2 MOTOR WAY JUNCTION R.C. VOIDED SLAB

§ 1 MATERIAL TABLE

I T E M		UNIT	A-LINE 3Br	B-LINE 3Br	TOTAL	REMARK
CONCRETE		m^3	218.5	133.5	352.0	GRADE 30
FORM WORK		m^2	373.8	245.7	619.5	
VOID		m	138.6	76.5	215.1	φ90c
REINFORCE-MENT	Φ12-Φ16	kg	11 779	6 867	18 646	H.Y.S.B
	Φ20~	"	12 887	7 597	20 484	"
	TOTAL	"	24 666	14 464	39 130	"
ASPHALT PAVEMENT		m^2	266.4	153.0	419.4	$t = 80^{m/m}$

§2 Mwy. Jn. A-LINE 3 Br.

MATERIAL TABLE

ITEM		UNIT	QUANTITY	REMARK
CONCRETE		m^3	218.6	GRADE 30
FORM WORK		m^2	373.8	
VOID		m	138.6	φ 900
REINFOR--CEMENT	Φ12~Φ16	kg	11 779.	H.Y.S.B
	Φ20~	"	12 887	"
	TOTAL	"	24 666.	"
ASPHALT PAVEMENT		m^2	266.4	t=80 mm

1 CONCRETE

i) SECTION

$0.23 \times 0.60 \times 2 = 0.019\ m^2$

$\frac{0.20+0.40}{2} \times 1.25 = 0.375$ "

" $\times 1.223 = 0.367$ "

$14.40 \times 1.20 = 17.280$ "

$\Sigma = 18.041\ m^2$

ii) VOLUME

$V = 18.041 \times 17.00 - \frac{\pi}{4} \times 0.90^2 \times 4.20 \times 33 = 213.5\ m^3$

2. FORM

i) END AREA

$18.041 \times 2 = 36.802\ m^2$

ii) ELEVATION AND BOTTOM

$(0.23 + 0.43 + \sqrt{0.20^2 + 1.25^2} + 0.80 + 14.40 + 0.80 + \sqrt{0.20^2 + 1.223^2} + 0.43 + 0.23) \times 17.00 = 337.025\ m^2$

iii) TOTAL

$A = 36.802 + 337.025 = 373.8\ m^2$

3 VOID

$D = 0.900\ m \quad L = 4.20 \times 33 = 138.6\ m$

4. ASPHALT PAVEMENT

$A = 15.613 \times 17.00 = 266.9\ m^2$

§3 Mwy. Jn. B - LINE 3 Br.

MATERIAL TABLE

ITEM		UNIT	QUANTITY	REMARK
CONCRETE		m^3	133.5	GRADE 30
FORM WORK		m^2	295.7	
VOID		m	76.5	φ 900
REINFOR--CEMENT	Φ12~Φ16	kg	6 867	H.Y.S.B
	Φ20~	"	7 597	"
	TOTAL	"	14 464	"
ASPHALT PAVEMENT		m^2	153.0	t=80 mm

1 CONCRETE

i) SECTION

$0.23 \times 0.60 \times 2 = 0.276\ m^2$

$\frac{1}{2} \times (0.20 + 0.40) \times 1.00 \times 2 = 0.600$ "

$8.100 \times 1.200 = 9.720$ "

$\Sigma = 10.596$ "

ii) VOLUME

$V = 10.596 \times 17.192 - \frac{\pi}{4} \times 0.90^2 \times 4.25 \times 18 = 133.5\ m^3$

2 FORM

i) END AREA

$10.596 \times 2 = 21.192\ m^2$

ii) ELEVATION AND BOTTOM

$(0.23 \times 2 + 0.43 \times 2 + \sqrt{0.20^2 + 1.00^2} \times 2 + 0.80 \times 2 + 8.10) \times 17.192$

$= 224.521\ m^2$

iii) TOTAL

$A = 21.192 + 224.521 = 245.7\ m^2$

3 VOID

$D = 0.900\ m \quad L = 4.25 \times 18 = 76.5\ m$

4. ASPHALT PAVEMENT

$A = 8.900 \times 17.192 = 153.0\ m^2$

2. Rampway Bridge

CONTENS

§§1 RAMP - WAY BRIDGE TOTAL MATERIAL TABLE

ITEM		UNIT	Mwy. Jn. B-Rp	Mwy Jn G-Rp	Cor. In. E-Rp	Cor. In. F-Rp	TOTAL	REMARK
CONCRETE		m^3	415.8	310.2	290.0	305.5	1 321.5	GRADE 30
FORM WORK		m^2	757.2	555.0	656.7	679.9	2 695.8	
VOID	Φ900	m		138.1			138.1	
	Φ850	"	125.9				125.9	
	Φ700	"			212.8	211.2	424.0	
	TOTAL	"					688.0	
REINFORCE-MENT	Φ12~Φ16	kg	26 134	16 193	18 564	19 375	80 266	H.Y.S.B
	Φ20~	"	27 346	16 506	22 121	24 186	90 159	"
	TOTAL	"	53 480	32 699	40 685	43 561	170 925	"
ASPHALT PAVEMENT		m^2	485.8	331.0	432.3	446.2	1 695.3	t = 80 mm

§§2 RAMP - WAY BRIDGE R.C. VOIDED SLAB MATERIAL TABLE

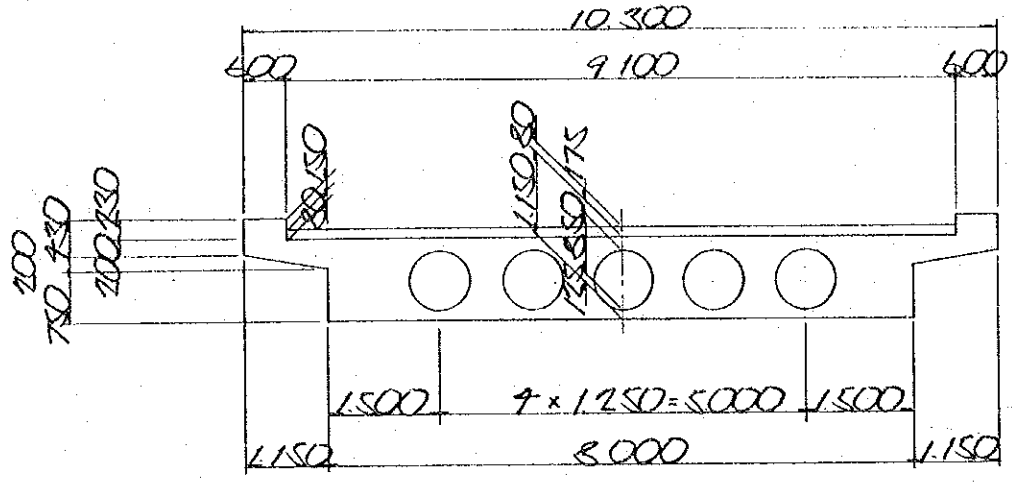
ITEM		UNIT	Mwy. Jn. B-Rp	Mwy Jn G-Rp	Cor. In. E-Rp	Cor. In. F-Rp	TOTAL	REMARK
CONCRETE		m^3	287.5	279.3	222.6	218.6	1 003.0	GRADE 30
FORM WORK		m^2	488.6	450.3	450.0	443.1	1 832.0	
VOID	Φ900	m		138.1			138.1	
	Φ850	"	125.9				125.9	
	Φ700	"			212.8	211.2	424.0	
	TOTAL	"					688.0	
REINFORCE-MENT	Φ12~Φ16	kg	17 822	13 621	19 319	19 092	59 799	H.Y.S.B
	Φ20~	"	20 742	16 490	18 809	19 974	76 010	"
	TOTAL	"	38 564	30 111	33 118	39 016	135 809	"
ASPHALT PAVEMENT		m^2	321.1	275.6	308.8	304	1 209.5	t = 80 m/m

§1 Mwy. Jn. B - Rp Br.

MATERIAL TABLE

ITEM		UNIT	QUANTITY	REMARK
CONCRETE		m^3	287.5	GRADE 30
FORM WORK		m^2	788.6	
VOID		m	125.9	φ850
REINFOR--CEMENT	Φ12~Φ16	kg	17 822	H.Y.S.B
	φ20~	"	20 792	"
	TOTAL	"	38 569	"
ASPHALT PAVEMENT		m^2	321.1	t=80mm

1. Concrete



area

$A_1 = 0.60 \times 0.23 \times 2 = 0.28\ m^2$

$A_2 = \frac{1}{2} \times (0.20 + 0.40) \times 1.15 \times 2 = 0.69\ "$

$A_3 = 1.15 \times 8.00 = 9.20\ "$

Total = 10.17 m^2

Length

$l_1 = \frac{1}{2} \times (34.295 + 36.291) = 35.29\ m$

$l_2 = \{6.30 + \frac{1}{2} \times (6.50 + 6.40) + \frac{1}{2} \times (6.80 + 6.60)\} \times 5$
$+ \frac{1}{2} \times (7.30 + 7.00) \times 4 = 125.85\ m$

Volume

$V_1 = 10.17 \times 35.29 = 358.90\ m^3$

$\ominus V_2 = 3.142 \times 0.85^2 \times \frac{1}{4} \times 125.85 = \ominus 71.42\ "$

Total = 287.48 m^3

2 Form

(Type I)

$A_1 = \{(0.75 + \sqrt{0.20^2 + 1.15^2} + 0.43 + 0.23) \times 2 + 8.00\} \times 35.29 = 464.22\ m^2$

$A_2 = 10.17 \times (1.015_{\text{skew}} + 1.386_{\text{skew}}) = 24.42\ ''$

Total $= 488.64\ m^2$

(Type II)

ϕ 850

concrete (length l_2) $= 125.85\ m$

3 Wearing Surface

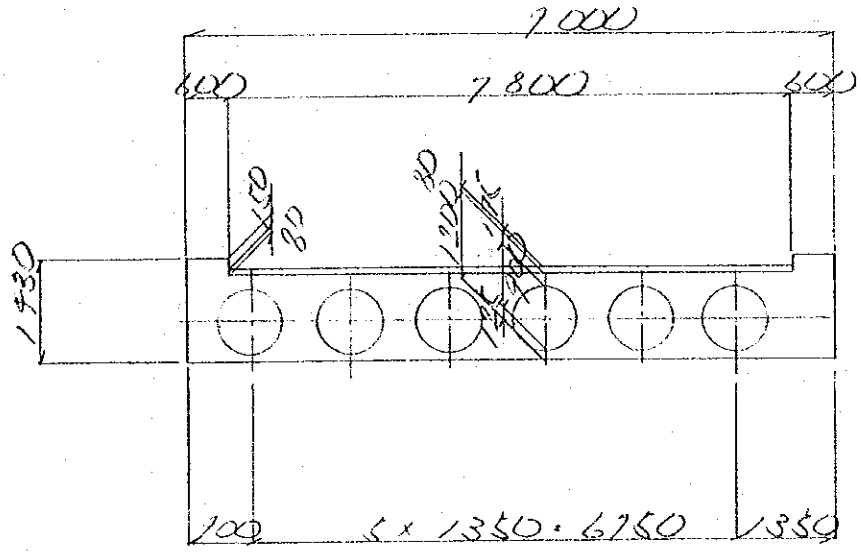
$A = 9.10 \times 35.29 = 321.14\ m^2$

§2 Mwy. Jn. G-Rp Br.

MATERIAL TABLE

ITEM		UNIT	QUANTITY	REMARK
CONCRETE		m^3	274.3	GRADE 30
FORM WORK		m^2	950.3	
VOID		m	138.1	φ 900
REINFOR-CEMENT	Φ12~Φ16	kg	13621	H.Y.S.B
	φ20~	"	16990	"
	TOTAL	"	30611	"
ASPHALT PAVEMENT		m^2	275.6	t=80mm

1 Concrete



Area

$A_1 = 0.60 \times 0.23 \times 2 = 0.28\ m^2$

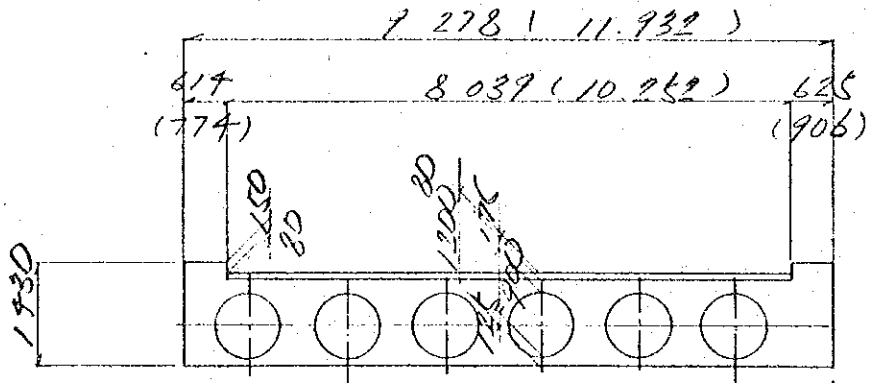
$A_2 = 1.20 \times 9.00 = 10.80\ "$

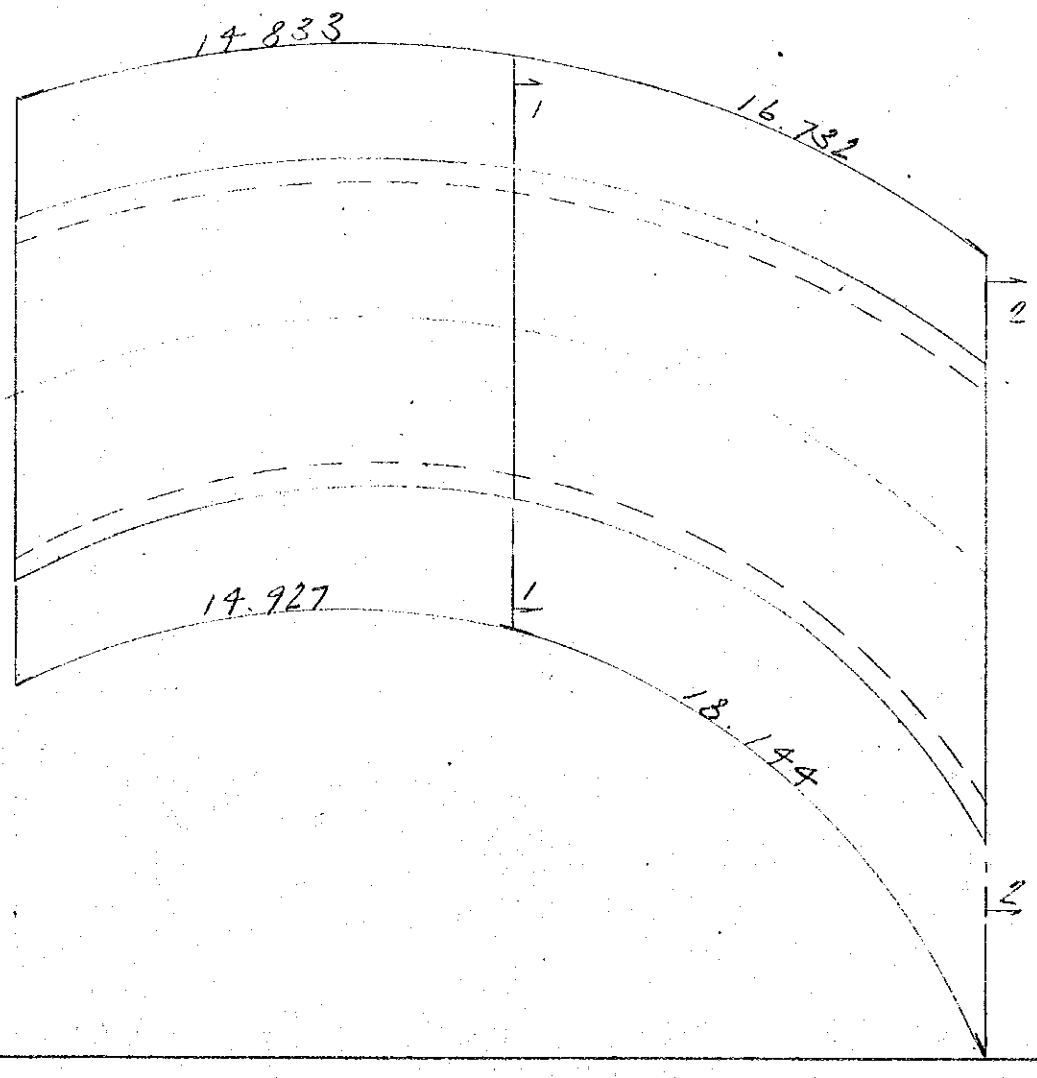
Total $= 11.08\ m^3$

length

$l = \frac{1}{2} \times (14.833 + 14.927) = 14.88\ m$

Section 1-1 (section 2-2)





Area

Section 1-1

$A_1 = (0.614 + 0.625) \times 0.23 = 0.28\ m^2$

$A_2 = 1.20 \times 8.039 = 9.65\ "$

Total : $9.93\ m^2$

Section 2-2

$A_1 = (0.774 + 0.906) \times 0.23 = 0.39\ m^2$

$A_2 = 1.20 \times 10.252 = 12.30\ "$

Total = $12.69\ m^2$

length

$l = 1/2 \times (16.732 + 18.144) = 17.44\ m$

Volume

$V_1 = 11.08 \times 14.88 = 164.87\ m^3$

$V_2 = 1/2 \times (9.93 + 12.69) \times 17.44 = 197.25\ "$

$- V_3 = 3.142 \times 0.90^2 \times 1/4 \times 138.10$ (5 Form (TYPE II)) $= \ominus 87.87\ "$

Total = $274.25\ m^3$

2. Form

(Type I)

$A_1 = (1.930 + 0.23) \times 2 \times (14.88 + 17.44) = 107.30\ m^2$

$A_2 = 9.00 \times 14.88 = 133.92$ "

$A_3 = \frac{1}{2} \times (9.278 + 11.932) \times 17.44 = 184.95$ "

$A_4 = 11.08 \times 1.032 \text{ (skew)} + 12.69 = 24.12$ "

Total = 450.29 m^2

(Type II)

ϕ 900

$0, = \{5.80 + 6.10 + \frac{1}{2} \times (6.60 + 6.70)\} \times 6$

$+ \frac{1}{2} \times (6.40 + 6.70) \times 4 = 138.10\ m$

3. Wearing surface

$A_1 = 7.80 \times 14.88 = 116.06\ m^2$

$A_2 = \frac{1}{2} \times (8.039 + 10.252) \times 17.44 = 159.50$ "

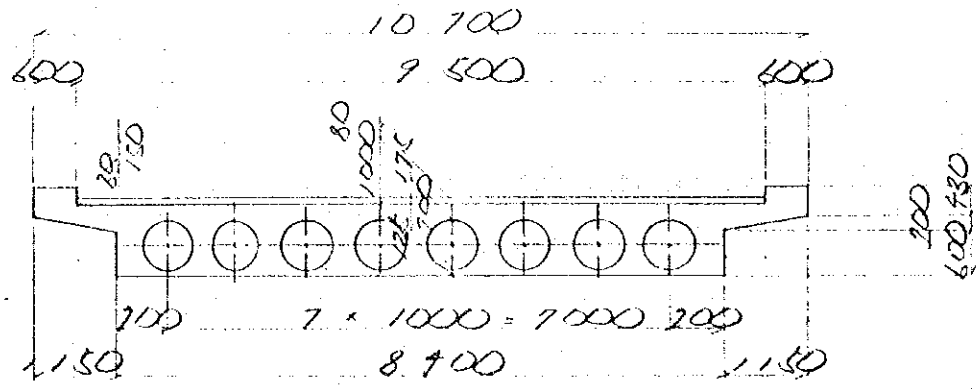
Total = 275.56 m^2

§3 Cor. Int. E-Rp Br.

MATERIAL TABLE

ITEM		UNIT	QUANTITY	REMARK
CONCRETE		m^3	222.6	GRADE 30
FORM WORK		m^2	950.0	
VOID		m	212.8	φ700
REINFOR--CEMENT	Φ12~Φ16	kg	17 319	H.Y.S.B
	φ20~	"	18 809	"
	TOTAL	"	33 118	"
ASPHALT PAVEMENT		m^2	308.8	t=80 mm

1. Concrete



Area

$A_1 = 0.60 \times 0.13 \times 2 = 0.28\ m^2$

$A_2 = \frac{1}{2} \times (0.20 + 0.40) \times 1.15 \times 2 = 0.69\ m^2$

$A_3 = 1.00 \times 8.40 = 8.40\ m^2$

$\text{Total} = 9.37\ m^2$

Length

$l = \frac{1}{2} \times (32.437 + 32.567) = 32.50\ m$

Volume

$V_1 = 9.37 \times 32.50 = 304.53\ m^3$

$-V_2 = 3.142 \times 0.70^2 \times \frac{1}{4} \times 212.80$ (Form (Type II)) $= (-)\ 81.91\ m^3$

$\text{Total} = 222.62\ m^3$

2. Form

(Type I)

$A_1 = \{(0.60 + \sqrt{0.20^2 + 1.15^2} \times 0.43 + 0.23) \times 2 + 8.40\} \times 32.50 = 430.77\ m^2$

$A_2 = 9.37 \times (1.056_{\text{Skew}} + 1.000_{\text{Skew}}) = 19.26\ "$

Total $= 450.03\ m^2$

(Type II)

$\phi 700$

$\ell = 6.65 \times 8 \times 4 = 212.80\ m$

3. Wearing Surface

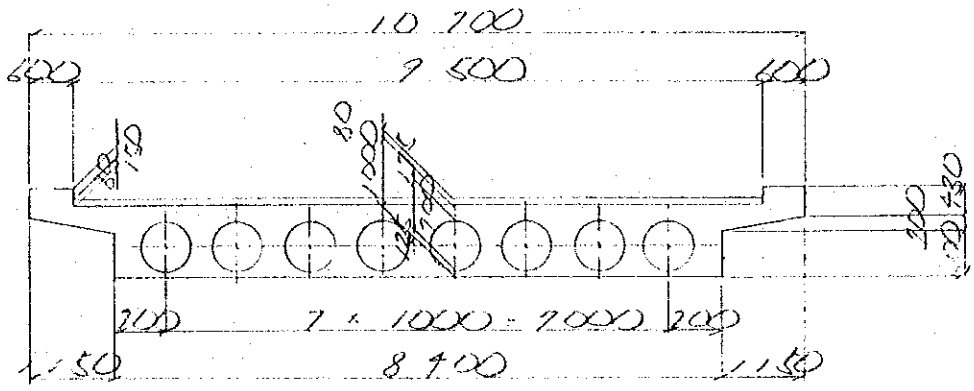
$A = 9.50 \times 32.50 = 308.75\ m^2$

§4 Cor. Int. F-Rp Br.

MATERIAL TABLE

ITEM		UNIT	QUANTITY	REMARK
CONCRETE		m^3	218.6	GRADE 30
FORM WORK		m^2	993.1	
VOID		m	211.2	φ 700
REINFOR-CEMENT	Φ12~Φ16	kg	19092	H.Y.S.B
	φ20~	"	19979	"
	TOTAL	"	39016	"
ASPHALT PAVEMENT		m^2	309.0	t=80 mm

1. Concrete



Area

A_1 = 0.60 × 0.23 × 2 = 0.28 m^2

A_2 = ½ × (0.20 + 0.40) × 1.15 × 2 = 0.69 "

A_3 = 1.00 × 8.40 = 8.40 "

Total = 9.37 m^2

Length

ℓ = ½ × (32.016 + 31.986) = 32.00 m

Volume

V_1 = 9.37 × 32.00 = 299.84 m^3

V_2 = 3.142 × 0.70² × ¼ × 11.20 (Holm Type II) = ⊖ 81.29 "

Total = 218.55 m^3

2. Form

(Type I)

$A_1 = \{(0.60 + \sqrt{0.20^2 + 1.15^2} + 0.43 + 0.23) \times 2 + 8.90\}$ (§ Skew) $\times$ 32.00 (§ Skew) $= 124.14\ m^2$

$A_2 = 9.37 \times (1.013 + 1.014) = 18.99\ "$

Total $= 143.13\ m^2$

(Type II)

Ø 700

$\ell = 6.60 \times 8 \times 4 = 211.20\ m$

3. Wearing Surface

$A = 9.50 \times 32.00 = 304.00\ m^2$

§§3 RAMP-WAY BRIDGE R.C. SOLID SLAB MATERIAL TABLE

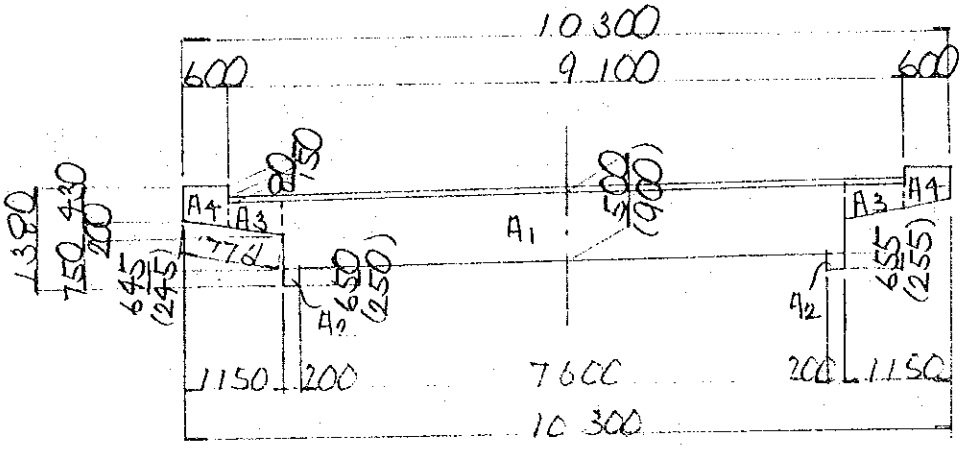
ITEM		UNIT	Mwy Jn B-Rp	Mwy Jn G-Rp	Cor In E-Rp	Cor In F-Rp	TOTAL	REMARK
concrete		m^3	128.3	35.9	67.7	86.9	318.5	GRADE 30
FORM WORK		m^2	265.6	109.7	206.7	236.8	813.8	
REINFORCE-MENT	Φ12~Φ16	kg	8 312	2 015	4 250	5 333	19 910	H.Y.S.B
	Φ20~	"	6 604	1 566	3 317	4 212	15 699	"
	TOTAL	"	14 916	3 581	7 567	9 545	35 609	"
ASPHALT PAVEMENT		m^2	169.7	55.4	123.5	142.5	486.1	t=80mm

§1 Mwy. Jn. B-Rp. Br

MATERIAL TABLE

ITEM		UNIT	①	②	TOTAL	REMARK
CONCRETE		m^3	36.6	91.7	128.3	GRADE 30
FORM WORK		m^2	106.2	159.4	265.6	
REIN FORCE-MENT	Φ12~Φ16	kg	2 261	6 051	8 312	H.Y.S.B
	Φ20~	"	1 769	4 835	6 604	"
	TOTAL	"	4 030	10 886	14 916	"
ASPHALT PAVEMENT		m^2	63.7	101.0	164.7	$t = 80^{mm}$

Mwy. Jn. B – Rp. Br.



Concrete ①

$A_1 = 0.50 \times 8.000 = 4.000\ m^2$

$A_2 = \frac{1}{2} \times (0.645 + 0.65 + 0.65 + 0.655) \times 0.20 = 0.260\ "$

$A_3 = \frac{1}{2} \times (0.900 + 0.307) \times 0.550 \times 2 = 0.387$

$A_4 = \frac{1}{2} \times (0.534 + 0.43) \times 0.60 \times 2 = 0.578$

$\sum_1^4 A = 5.225\ m^2$

$V = 5.225 \times 7.00 = 36.575\ m^3$

Form

$l = (0.43 \times 2 + 0.776 \times 2 + 0.750 \times 2 + 0.650 \times 2 + 0.230 \times 2) + 8.000 = 13.672\ m$

$A = 13.672 \times 7.00 + \sum A \times 2 = 95.704 + 10.450 = 106.154\ m^2$

Pavement ($t=80^{mm}$)

$A = 9.10 \times 7.00 = 63.7^{m^2}$

Concrete ②

$A_1 = 0.90 \times 8.000 = 7.200''$

$A_2 = \frac{1}{2} \times (0.245+0.25+0.25+0.255) \times 0.20 = 0.100'$

$A_3 = \frac{1}{2} \times (0.900 + 0.309) \times 0.550 \times 2 = 0.387''$

$A_4 = \frac{1}{2} \times (0.539+0.43) \times 0.60 \times 2 = 0.578''$

$\Sigma A = 8.265^{m^2}$

$V = 8.265 \times 11.10 = 91.742^{m^3}$

Form

$\ell = (0.43 \times 2 + 0.776 \times 2 + 0.750 \times 2 + 0.250 \times 2 + 0.230 \times 2) + 8.000 = 12.872^{m}$

$A = 12.872 \times 11.10 + \Sigma A \times 2 = 142.879 + 16.530 = 159.409.$

Pavement ($t=80^{mm}$)

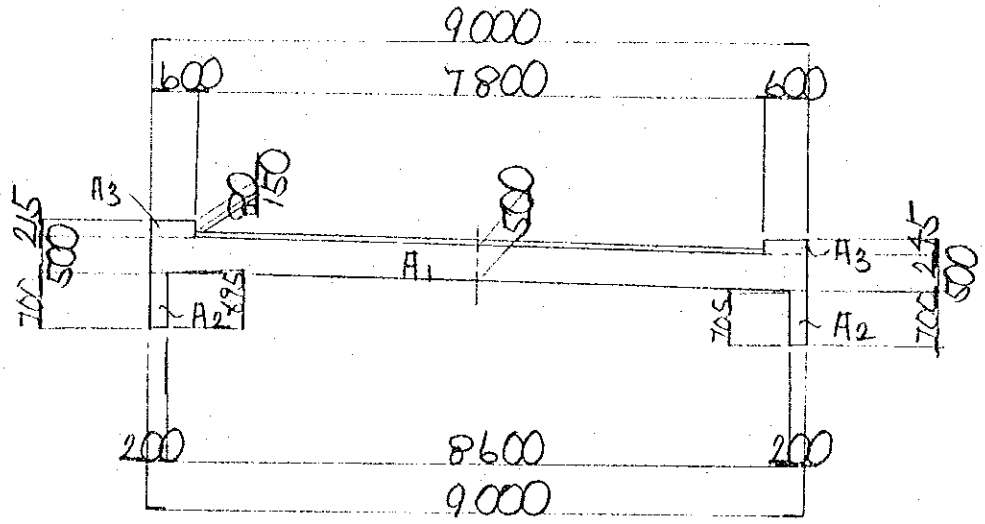
$A = 9.10 \times 11.10 = 101.01^{m^2}$

§2 Mwy. Jn. G – Rp. Br

MATERIAL TABLE

ITEM		UNIT	①	②	TOTAL	REMARK
CONCRETE		m^3			35.9	GRADE 30
FORM WORK		m^2			107	
REIN FORCE-MENT	Φ12 Φ16	kg			2015	H.Y.S.B
	Φ20	"			1566	"
	TOTAL	"			3581	"
ASPHALT PAVEMENT		m^2			55.9	t = 80 mm

Mwy. Jn. G – Rp. Br



concrete

$A_1 = 0.50 \times 9.00 = 4.500^{m^2}$

$A_2 = 1/2 \times (0.700 \times 2 + 0.695 + 0.705) \times 0.200 = 0.280$ "

$A_3 = 1/2 \times (0.215 + 0.230) \times 0.60 + 1/2 \times (0.23 + 0.245) \times 0.60 = 0.276$ "

$\sum^3_1 A = 5.056^{m^2}$

$V = 5.056 \times 7.10^{m} = 35.898^{m^3}$

Form

$\ell = (0.23 \times 2 + 1.43 \times 2 + 0.71 + 0.69) + 8.600 = 13.320$

$A = 13.320 \times 7.10 + \Sigma A \times 2 = 94.572 + 10.112 = 104.684^{m^2}$

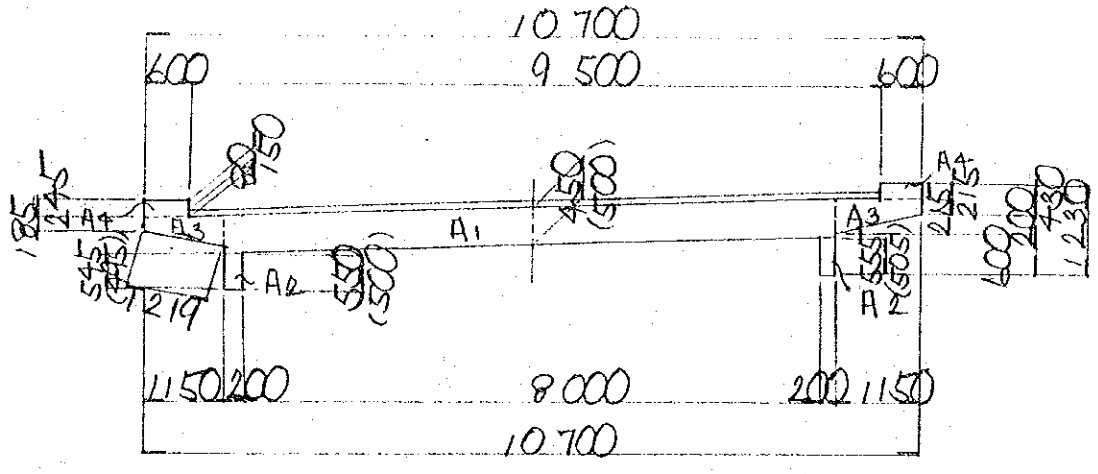
Pavement ($t = 80^{mm}$)

$A = 7.80 \times 7.10 = 55.380^{m^2}$

§3 Cor. Int. E-Rp. Br.

MATERIAL TABLE

ITEM		UNIT	①	②	TOTAL	REMARK
CONCRETE		m^3	29.8	37.6	67.4	GRADE 30
FORM WORK		m^2	95.5	111.2	206.7	
REIN FORCE-MENT	Φ12~Φ16	kg	1977	2273	4250.	H.Y.S.B
	Φ20~	"	1529	1788	3317.	"
	TOTAL	"	3506	4061	7567	"
ASPHALT PAVEMENT		m^2	57.0	66.5	123.5	t = 80 mm



Concrete ①

$A_1 = 0.45 \times 8.40 = 3.780\ m^2$

$A_2 = \frac{1}{2} \times (0.545 + 0.550 + 0.555 + 0.550) \times 0.20 = 0.220\ "$

$A_3 = \frac{1}{2} \times (0.419 + 0.185 + 0.381 + 0.215) \times 1.15 = 0.690\ "$

$A_4 = \frac{1}{2} \times (0.23 + 0.245 + 0.23 + 0.215) \times 0.60 = 0.276\ "$

$\Sigma A = 4.966\ m^2$

$V = 4.966 \times 6.00 = 29.796\ m^3$

Form

$\ell = (0.43 \times 2 + 1.219 \times 2 + 0.60 \times 2 + 0.55 \times 2 + 0.23 \times 2) + 8.400 = 14.958\ m$

$A = 14.958 \times 6.00 + \Sigma A \times 2 = 86.748 + 8.792 = 95.540\ m^2$

Pavement ($t = 80^{mm}$)

$A = 9.50 \times 6.00 = 57.0^{m^2}$

Concrete ②

$A_1 = 0.50 \times 8.40 = 4.200^{m^2}$

$A_2 = \frac{1}{2} \times (0.495 + 0.50 + 0.505 + 0.50) \times 0.20 = 0.200''$

$A_3 = \frac{1}{2} \times (0.419 + 0.185 + 0.381 + 0.215) \times 1.15 = 0.690''$

$A_4 = \frac{1}{2} \times (0.23 + 0.245 + 0.23 + 0.215) \times 0.60 = 0.276''$

$\sum_1^4 A = 5.366^{m^2}$

$V = 5.366 \times 7.00 = 37.562^{m^3}$

From

$l = (0.43 \times 2 + 1.219 \times 2 + 0.60 \times 2 + 0.50 \times 2 + 0.23 \times 2) + 8.700 = 19.358^{m}$

$A = 19.358 \times 7.00 + \Sigma A \times 2 = 100.506 + 10.732 = 111.238^{m^2}$

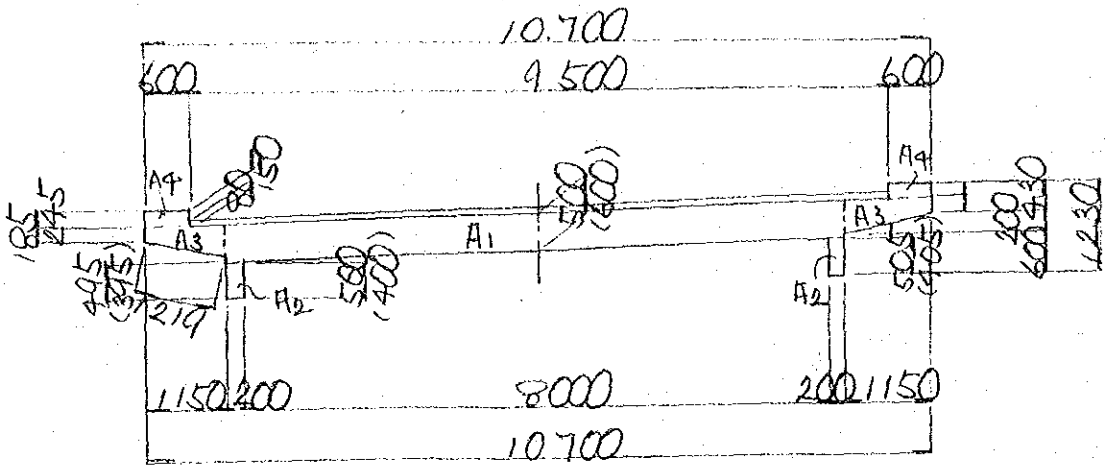
Pavement ($t = 80^{mm}$)

$A = 9.50 \times 7.00 = 66.50^{m^2}$

§4 Cor. Int. F-Rp. Br

MATERIAL TABLE

ITEM		UNIT	①	②	TOTAL	REMARK
CONCRETE		m^3	37.6	49.3	86.9	GRADE 30
FORM WORK		m^2	111.2	125.6	236.8	
REINFORCE-MENT	Φ12~Φ16	kg	2.382	2.951	5.333	H.Y.S.B
	Φ20~	"	1.822	2.390	4.212	"
	TOTAL	"	4.204	5.341	9.545	"
ASPHALT PAVEMENT		m^2	66.5	76.0	142.5	$t = 80^{mm}$



Concrete ①

$A_1 = 0.50 \times 8.40 = 4.200\ m^2$

$A_2 = \frac{1}{2} \times (0.495 + 0.50 + 0.505 + 0.50) \times 0.20 = 0.200\ "$

$A_3 = \frac{1}{2} \times (0.419 + 0.185 + 0.381 + 0.215) \times 1.15 = 0.690\ "$

$A_4 = \frac{1}{2} \times (0.23 + 0.245 + 0.23 + 0.215) \times 0.60 = 0.276\ "$

$\Sigma A = 5.366\ m^2$

$V = 5.366 \times 7.00 = 37.562\ m^3$

Form

$l = (0.43 \times 2 + 1.219 \times 2 + 0.60 \times 2 + 0.50 \times 2 + 0.23 \times 2) + 8.700 = 14.358\ m$

$A = 14.358 \times 7.00 + \Sigma A \times 2 = 111.238\ m^2$

Pavement ($t = 80^{mm}$)

$A = 9.50 \times 7.00 = 66.5^{m^2}$

Concrete ②

$A_1 = 0.60 \times 8.40 = 5.040^{m^2}$

$A_2 = \frac{1}{2} \times (0.395 + 0.40 + 0.405 + 0.40) \times 0.20 = 0.160''$

$A_3 = \frac{1}{2} \times (0.419 + 0.185 + 0.381 + 0.215) \times 1.15 = 0.690''$

$A_4 = \frac{1}{2} \times (0.23 + 0.245 + 0.23 + 0.215) \times 0.60 = 0.276''$

$\sum A = 6.166^{m^2}$

$V = 6.166 \times 8.00 = 49.328^{m^3}$

Form

$l = (0.43 \times 2 + 1.219 \times 2 + 0.60 \times 2 + 0.40 \times 2 + 0.23 \times 2) + 8.700 = 17.158^{m}$

$A = 17.158 \times 8.00 + \Sigma A \times 2 = 113.264 + 12.332 = 125.596^{m^2}$

Pavement ($t = 80^{mm}$)

$A = 9.50 \times 8.00 = 76.0^{m^2}$

3. Over Bridge

CONTENTS

§§1 P.C T-GIRDER

§1 OVER BRIDGE PC T-GIRDER MATERIAL TABLE

bridge name			unit	FALLES	A1 ROAD	C-T-RAMP	CORMANDEL	TOTAL
number of span				2	2	1	2	
girder	concrete	GRADE 40	m^3	193.3	270.6	63.2	216.2	743.3
	formwork		m^2	895.8	1 263.6	337.7	1 065.0	3 552.1
	reinforcement φ12	HIGH YIELD	kg	13 618	19 264	6 014	14 486	53 382
	reinforcement φ17	"	kg	7 150	10 010	——	7 752	24 912
	reinforcement total	"	kg	20 768	29 274	6 014	22 238	78 294
	pc cable	12-φ7mm (12T12.4mm)	kg	7 230	10 122	2 128	(10 088)	19 480 (10 088)
	duct	φ45mm (φ65mm)	m	1 972.0	2 760.8	580.0	(1 120.0)	5 312.8 (1 120.0)
	grout		m	1 996.0	2 794.4	585.5	(1 130.4)	5 377.2 (1 130.4)
	anchorage		set	200	280	56	(80)	536 (80)
deck slab and reinforcing	concrete	GRADE 30	m^3	45.8	70.9	14.9	52.8	184.4
	formwork		m^2	761.3	391.5	81.2	304.3	1 038.3
	reinforcement	HIGH YIELD	kg	2 376	3 286	721	2 568	8 951
	pc cable	12-φ5mm (12-φ7mm)	kg	(2 966)	(4 452)	687	(3 068)	687 (10 516)
	duct	φ35mm (φ45mm)	m	(797.8)	(1 319.0)	360.4	(821.8)	360.4 (2 938.6)
	grout		m	(818.4)	(1 342.0)	371.8	(846.8)	371.8 (3 007.2)
	anchorage		set	(172)	(192)	114	(208)	114 (672)
	asphalt pave.		m^2	303.8	498.0	116.1	313.6	1 231.5
	foot path		m^2	56.2	56.2	——	75.8	188.2
	Precast kerb		m	42.2	42.2		57.0	141.4