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AND INLAND WATERWAYS

TENDER DOCUMENTS
FOR
NEW RAILWAY LINE FOR CENGKARENG AIRPORT
CONSTRUCTION PROJECT

QUANTITIES CALCULATION SHEETS

PACKAGE I CIVIL AND ARCHITECTURAL WORK

2 of 5

AUGUST 1984

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

QUANTITIES CALCULATION SHEETS

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§20. P.C. GIRDER

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Bridge Number	Girder Number	Station Beginning	Station Ending	Girder Length (m)	Girder Depth (m)	Track of Straight or Curve	Girder of Right Angle or Skew	Design Drawing: General View	Design Drawing: Main Beam	Design Drawing: Lateral Joint	Design Drawing: Material list	Structural Calculation Sheet	Material Calculation Sheet	Remark
B 01	PC 01	$10^{K}979^{M}$	$10^{K}999^{M}$	20	1.80	Straight	Skew Left 60°	○	○	○	○	○	●	Cengkareng Flood Way
	02	999^{M}	$11^{K}039^{M}$	40	2.40	〃	〃	○	○	○	○	○	●	〃
	03	$11^{K}039^{M}$	059^{M}	20	1.80	〃	〃	—	PC 01	—	—	—	—	〃
B 02	04	$13^{K}655^{M}$	$13^{K}680^{M}$	25	1.40	〃	Right Angle	○	○	○	○	○	●	JL. Kapuk Muara
B 03	05	774^{M}	794^{M}	20	1.80	〃	〃	○	— PC 01	—	—	—	●	Kali Muara Angke
	06	794^{M}	824^{M}	30	1.80	〃	〃	○	○	○	○	○	●	〃
	07	824^{M}	844^{M}	20	1.80	Transition Curve	90°00′00″ 90°00′09″	PC 05	— PC 01	—	—	—	PC 05	〃
	08	844^{M}	864^{M}	20	1.80	〃	90°05′11″ 90°09′01″	〃	— 〃	—	—	—	〃	
	09	864^{M}	864^{M}	20	1.80	〃	90°15′39″ 90°20′28″	〃	— 〃	—	—	—	〃	
	10	884^{M}	909^{M}	25	1.40	〃	90°36′09″ 90°40′52″	—	PC 04	—	—	—	—	JL. 8
	11	909^{M}	929^{M}	20	1.80	Curve R=1000m	90°34′23″	PC 05	— PC 01	—	—	—	PC 05	
B 04	12	$14^{K}041^{M}$	$14^{K}071^{M}$	30	2.15	Transition Curve	90°47′42″ 90°40′18″	PC 13	— PC 28	—	—	—	PC 13	JL. 2A
B 05	13	211^{M}	241^{M}	30	2.15	Straight	Right Angle	○	— 〃	—	—	—	●	〃
	14	241^{M}	271^{M}	30	2.15	〃	〃	PC 13	— 〃	—	—	—	PC 13	JL. VI
	15	271^{M}	306^{M}	35	2.00	〃	〃	○	○	○	○	○	●	JL. 11
	16	306^{M}	341^{M}	35	2.00	〃	〃	—	PC 15	—	—	—	—	Banjir Kanal
	17	341^{M}	381^{M}	40	2.40	〃	〃	○	— PC 02	—	—	—	●	〃
	18	381^{M}	416^{M}	35	2.00	〃	〃	—	PC 15	—	—	—	—	〃
B 06	19	775^{M}	815^{M}	40	2.40	〃	Skew Left 65°	—	PC 02	—	—	—	—	Kali Muara Karang
B 07	20	$15^{K}579^{M}$	$15^{K}609^{M}$	30	1.80	〃	Skew Left 85°	—	PC 06	—	—	—	—	JL. Jembatan Tiga
	21	609^{M}	639^{M}	30	1.80	〃	〃	—	〃	—	—	—	—	〃

Bridge Number	Girder Number	Station Beginning	Station Ending	Girder Length (m)	Girder Depth (m)	Track of Straight or Curve	Girder of Right Angle or Skew	Design Drawing General View	Design Drawing Main Beam	Design Drawing Lateral Joint	Design Drawing Material list	Structural Calculation Sheet	Material Calculation Sheet	Remark
B 08	PC 22	$17^{K}048^{M}$	$17^{K}073^{M}$	25	1.40	Straight	Right Angle	——	PC 04	——	——	——	——	JL. Gedong Panjang
	23	073^{M}	098^{M}	25	1.40	〃	〃	——	〃	——	——	——	——	〃
	24	098^{M}	123^{M}	25	2.35	〃	〃	○	PC 29	——	——	——	●	..
	25	123^{M}	148^{M}	25	2.35	〃	〃	PC 24	〃	——	——	——	PC 24	Kari Sunter
B 09	26	590^{M}	625^{M}	35	2.00	〃	〃	——	PC 15	——	——	——	——	Kari Krukut
B 10	27	759^{M}	784^{M}	25	1.40	〃	〃	——	PC 04	——	——	——	——	JL. Tongkol
B 11	28	$18^{K}106^{M}$	$18^{K}135^{M}$	30	2.15	Curve $R=500^{m}$	91°43′08″	○	○	○	○	○	●	Kari Ciliwung
B 12	29	720^{M}	745^{M}	25	2.35	〃	91°25′57″	○	○	○	○	○	●	Gudang Yard
	30	745^{M}	770^{M}	25	2.35	〃	〃	——	PC 29	——	——	——	——	〃
	31	770^{M}	795^{M}	25	2.35	〃	〃	——	〃	——	——	——	——	〃
	32	795^{M}	825^{M}	30	2.15	〃	91°43′08″	——	PC 28	——	——	——	——	〃
	33	825^{M}	850^{M}	25	2.35	〃	Left 69°34′03″	○	PC 29	——	——	——	●	〃
	34	850^{M}	880^{M}	30	2.15	〃	Left 72°43′08″	○	PC 28	——	——	——	●	JL. Raya Kampung
B 13	35	880^{M}	910^{M}	30	2.15	〃	91°43′08″	——	PC 28	——	——	——	——	
	36	910^{M}	940^{M}	30	2.15	〃	〃	——	〃	——	——	——	——	
	37	940^{M}	970^{M}	30	2.15	〃	〃	——	〃	——	——	——	——	
B 14	38	970^{M}	$19^{K}000^{M}$	30	2.15	Transition Curve	90°42′48″ 90°39′45″	——	〃	——	——	——	——	
	39	$19^{K}000^{M}$	028^{M}	28	2.15	〃	91°08′38″ 60°53′44″	○	PC 28	——	——	——	●	Kota Yard
	40	028^{M}	061^{M}	33	2.15	〃	120°25′19″ 70°08′11″	○	○	○	○	○	●	〃
	41	061^{M}	091^{M}	30	2.15	Straight	Right 70°	○	PC 40	——	——	——	●	〃
	42	091	117^{M}	26	2.35	〃	Right 70°	○	○	○	○	○	●	〃

No. 0-9

SUPERSTRUCTURE MATERIAL LIST NO.1 (P.C.)

Block Number	Bridge Number	Girder Length (m)	Girder Depth (m)	Track of Straight or Curve	Girder of Right Angle or Skew	Concrete Volume (m^3)			Area Form (m^2)			Prestressing Steel (kg)			Anchoring Devices		Sheath Length (m)			P.C. Grout Length (m)	
						Class A $400 kg/cm^2$	Class B $300 kg/cm^2$	Class C $240 kg/cm^2$	Main Beam	Slab and Cross Beam	Sidewalk	Strand 12T15.2mm	Strand 12T12.7mm	Bar φ23mm 15-110 kg/mm^2	For Strand	Anchor-Plate, Nut	φ75mm and φ82mm	φ65mm and φ70mm	φ35mm	Main Beam	Cross Beam
B 01	P.C 01	20	1.80	Straight	Skew Left 60°	52.2	5.8	11.5	229.3	26.3	57.2	—	1960.4	692.1	20	104	—	175.5 / 20.0	203.0	198.0	203.0
	02	40	2.40	〃	〃	211.3	15.3	27.3	968.3	46.0	106.4	15233.9	—	662.5	56	90	1046.0 / 56.0	—	195.2	1108.4	195.2
	03	20	1.60	〃	〃	52.2	5.8	11.5	229.3	26.3	57.2	—	1960.4	692.1	20	104	—	175.5 / 20.0	203.0	198.0	203.0
B 02	04	25	1.40	〃	Right Angle	106.7	8.7	10.5	426.1	26.1	46.6	—	5814.6	453.7	48	60	—	540.6 / 48.0	133.8	594.7	133.8
B 03	05	20	1.80	〃	〃	49.7	6.3	11.5	227.0	27.0	57.0	—	1960.4	601.7	20	104	—	175.5 / 20.0	175.3	198.0	175.3
	06	30	1.80	〃	〃	127.5	10.3	20.5	582.5	29.7	79.9	—	6936.7	430.9	48	68	—	661.4 / 48.0	126.1	715.5	126.1
	07	20	1.80	Transition Curve	90°00'00" 90°00'09"	49.7	6.3	11.5	227.0	27.0	57.0	—	1960.4	601.7	20	104	—	175.5 / 20.0	175.3	198.0	175.3
	08	20	1.80	〃	90°05'11" 90°09'01"	〃	〃	〃	〃	〃	〃	—	〃	〃	〃	〃	—	〃	〃	〃	〃
	09	20	1.80	〃	90°16'30" 90°20'26"	〃	〃	〃	〃	〃	〃	—	〃	〃	〃	〃	—	〃	〃	〃	〃
	10	25	1.40	〃	90°36'09" 90°40'52"	106.7	8.7	10.5	426.1	26.1	46.6	—	5814.6	453.7	48	60	—	540.6 / 48.0	133.8	594.7	133.8
	11	20	1.80	Curve R=1000m	90°34'23" 90°47'42"	49.7	6.3	11.5	227.0	27.0	57.0	—	1960.4	601.7	20	104	—	175.5 / 20.0	175.3	198.0	175.3
B 04	12	30	2.15	Transition Curve	90°40'18"	119.8	9.6	15.7	654.7	40.2	78.9	—	5784.8	557.0	40	88	—	551.6 / 40.0	163.0	596.7	163.0
B 05	13	30	2.15	Straight	Right Angle	〃	〃	〃	〃	〃	〃	—	〃	〃	〃	〃	—	〃	〃	〃	〃
	14	30	2.15	〃	〃	〃	〃	〃	〃	〃	〃	—	〃	〃	〃	〃	—	〃	〃	〃	〃
	15	35	2.00	〃	〃	165.7	11.8	23.9	725.4	33.7	93.0	11441.5	—	456.8	48	72	774.2 / 48.0	—	133.7	827.7	133.7
	16	35	2.00	〃	〃	〃	〃	〃	〃	〃	〃	〃	—	〃	〃	〃	〃	—	〃	〃	〃
	17	40	2.40	〃	〃	210.3	14.5	27.3	967.3	43.0	106.1	15233.9	—	569.0	56	90	1046.0 / 56.0	—	166.5	1108.4	166.5
	18	35	2.00	〃	〃	165.7	11.8	23.9	725.4	33.7	93.0	11441.5	—	456.8	48	72	774.2 / 48.0	—	133.7	827.7	133.7
B 06	19	40	2.40	〃	Skew Left 65°	211.3	15.3	27.3	968.3	46.0	106.4	15233.9	—	662.5	56	90	1046.0 / 56.0	—	195.2	1108.4	195.2
B 07	20	30	1.80	〃	Skew Left 85°	127.5	10.3	20.5	582.5	29.7	79.9	—	6936.7	430.9	48	68	—	661.4 / 48.0	126.1	715.5	126.1
	21	30	1.80	〃	〃	〃	〃	〃	〃	〃	〃	—	〃	〃	〃	〃	—	〃	〃	〃	〃
B 08	22	25	1.40	〃	Right Angle	106.7	8.7	10.5	426.1	26.1	46.6	—	5814.6	453.7	48	60	—	540.6 / 48.0	133.8	594.7	133.8
	23	25	1.40	〃	〃	〃	〃	〃	〃	〃	〃	—	〃	〃	〃	〃	—	〃	〃	〃	〃
	24	25	2.35	〃	〃	66.1	9.0	14.4	333.7	39.0	71.0	—	2429.2	721.3	20	124	—	225.9 / 20.0	210.2	248.5	210.2
	25	25	2.35	〃	〃	〃	〃	〃	〃	〃	〃	—	〃	〃	〃	〃	—	〃	〃	〃	〃
B 09	26	35	2.00	〃	〃	165.7	11.8	23.9	725.4	33.7	93.0	11441.5	—	456.8	48	72	774.2 / 48.0	—	133.7	827.7	133.7
B 10	27	25	1.40	〃	〃	106.7	8.7	10.5	426.1	26.1	46.6	—	5814.6	453.7	48	60	—	540.6 / 48.0	133.8	594.7	133.8
B 11	28	30	2.15	Curve R=500m	91°43'08"	119.8	9.6	15.7	670.6	40.2	80.0	—	5784.8	557.0	40	88	—	551.6 / 40.0	163.0	596.7	163.0
B 12	29	25	2.35	〃	91°25'57"	66.3	9.0	14.3	333.7	39.0	71.0	—	2429.2	721.3	20	124	—	225.9 / 20.0	210.2	248.5	210.2
	30	25	2.35	〃	〃	〃	〃	〃	〃	〃	〃	—	〃	〃	〃	〃	—	〃	〃	〃	〃
	31	25	2.35	〃	〃	〃	〃	〃	〃	〃	〃	—	〃	〃	〃	〃	—	〃	〃	〃	〃
	32	30	2.15	〃	91°43'08"	119.8	9.6	15.7	670.6	40.2	80.0	—	5784.8	557.0	40	88	—	551.6 / 40.0	163.0	596.7	163.0
	33	25	2.35	〃	Left 69°34'03"	66.2	9.1	14.4	334.3	39.4	71.1	—	2429.2	726.2	20	124	—	225.9 / 20.0	211.7	248.5	211.7
	34	30	2.15	〃	Left 72°43'08"	119.7	9.6	15.7	654.1	40.4	78.9	—	5784.8	560.2	40	88	—	551.6 / 40.0	164.0	596.7	164.0
B 13	35	30	2.15	〃	91°43'08"	119.8	9.6	15.7	670.6	40.2	80.0	—	5784.8	557.0	40	88	—	551.6 / 40.0	163.0	596.7	163.0
	36	30	2.15	〃	〃	〃	〃	〃	〃	〃	〃	—	〃	〃	〃	〃	—	〃	〃	〃	〃
	37	30	2.15	〃	〃	〃	〃	〃	〃	〃	〃	—	〃	〃	〃	〃	—	〃	〃	〃	〃
B 14	38	30	2.15	Transition Curve	91°42'48" 91°39'45"	〃	〃	〃	〃	〃	〃	—	〃	〃	〃	〃	—	〃	〃	〃	〃
	39	28	2.15	〃	91°08'38" 60°53'44"	112.1	9.3	14.7	612.1	39.7	73.8	—	5413.2	490.5	〃	76	—	511.6 / 40.0	143.7	556.7	143.7
	40	33	2.15	〃	120°25'19" 70°08'11"	131.8	10.5	17.4	715.0	42.8	87.4	—	7601.1	635.8	48	96	—	732.9 / 48.0	186.5	787.0	186.5
	41	30	2.15	Straight	Right 70°	121.2	19.0	16.9	657.4	78.2	83.9	—	6932.2	665.2	48	84	—	660.9 / 48.0	196.6	715.0	196.6
	42	26	2.35	〃	Right 70°	126.5	36.0	6.2	686.3	153.3	31.3	—	4991.6	1816.8	40	130	—	466.2 / 40.0	545.7	511.3	545.7
TOTAL	42	1182	—	—	—	4651.4	434.7	670.3	22592.5	1627.6	3061.1	91467.7	160967.2	25189.3	1580	3800	6234.8 / 360.0	15158.7 / 1220.0	7387.7	23170.0	7387.7

SUPERSTRUCTURE MATERIAL LIST NO 2 (P.C.)

Block Number	Bridge Number	Girder Length (m)	Girder Depth (m)	Track of Straight or Curve	Girder of Right Angle or Skew	Reinforcing Bar SD 30 (kg)					Bridge Railing and Duct		Mortal With Slope-Protective Mortal	Drainage (each)	Elastomeric Bearing Pads (each)			Anchoring Bar SS41 (each)		
						D 19	D16	D13	D10	Total	Volume (m3)	Form (m2)	m3		Fixed Support	Movable Support	A × B × t (mm) (3 plies)	Fixed Side	Movable Side	Length (mm) Weigth (kg)
B 01	PC 01	20	1.80	Straight	Skew Left 60°	—	1314.6	4567.0	140.9	6022.5	3.9	36.4	6.7	4	2	2	350×500×12	φ75mm - 2	φ70mm - 2	L-970, W-67.3 L-910, W-55.0
	02	40	2.40	〃	〃	2869.9	1423.6	12560.4	719.1	17573.0	7.8	72.3	13.4	8	4	4	400×600×16	φ95mm - 3	φ90mm - 3	L-970 W-201.8 L-910 W-172.2
	03	20	1.80	〃	〃	—	1314.6	4567.0	140.9	6022.5	3.9	36.4	6.7	4	2	2	350×500×12	φ75mm - 2	φ70mm - 2	L-970 W-67.3 L-910, W-55.0
B 02	04	25	1.40	〃	Right Angle	—	1913.2	6230.9	442.1	8586.2	4.9	45.3	8.4	4	4	4	200×600×14	φ75mm - 3	φ70mm - 3	L-970, W-101.0 L-910, W-82.4
B 03	05	20	1.80	〃	〃	—	1314.6	4567.0	140.9	6022.5	3.9	36.3	6.7	4	2	2	350×500×12	φ75mm - 2	φ70mm - 2	L-970, W-67.3 L-910, W-55.0
	06	30	1.80	〃	〃	—	2478.1	8165.8	525.5	11169.4	5.8	54.3	10.1	8	4	4	250×600×14	φ85mm - 3	φ75mm - 3	L-1090 W-145.5 L-970, W-101.0
	07	20	1.80	Transition Curve	90°00'00" 90°00'09"	—	1314.6	4567.0	140.9	6022.5	3.9	36.3	6.7	4	2	2	350×500×12	φ75mm - 2	φ70mm - 2	L-970, W-67.3 L-910, W-55.0
	08	20	1.80	〃	90°05'11" 90°09'01"	—	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃
	09	20	1.80	〃	90°16'39" 90°20'28"	—	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	
	10	25	1.40	〃	90°36'09" 90°40'52"	—	1913.2	6230.9	442.1	8586.2	4.9	45.3	8.4	4	4	4	200×600×14	φ75mm - 3	φ70mm - 3	L-970, W-101.0 L-910, W-82.4
	11	20	1.80	Curve R=1000m	90°34'23" 90°47'42"	—	1314.6	4567.0	140.9	6022.5	3.9	36.3	6.7	4	2	2	350×500×12	φ75mm - 2	φ70mm - 2	L-970, W-67.3 L-910, W-55.0
B 04	12	30	2.15	Transition Curve	90°40'18"	—	2484.7	8425.1	465.3	11375.1	5.8	54.3	10.1	8	4	4	300×500×14	φ80mm - 3	φ75mm - 3	L-1030 W-122.1 L-970, W-101.0
B 05	13	30	2.15	Straight	Right Angle	—	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃
	14	30	2.15	〃	〃	—	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	
	15	35	2.00	〃	〃	2509.9	1158.6	9872.1	609.2	14149.8	6.8	63.3	11.8	8	4	4	300×600×16	φ90mm - 3	φ80mm - 3	L-1150 W-172.2 L-1030, W-122.1
	16	35	2.00	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃
	17	40	2.40	〃	〃	2869.9	1423.6	12560.4	719.1	17573.0	7.8	72.3	13.4	8	4	4	400×600×16	φ95mm - 3	φ90mm - 3	L-1210 W-201.8 L-1150 W-172.2
	18	35	2.00	〃	〃	2509.9	1158.6	9872.1	609.2	14149.8	6.8	63.3	11.8	8	4	4	250×600×16	φ85mm - 3	φ75m - 3	L-1150 W-172.2 L-1030 W-122.1
B 06	19	40	2.40	〃	Skew Left 65°	2869.9	1423.6	12560.4	719.1	17573.0	7.8	72.3	13.4	8	4	4	400×600×16	φ95mm - 3	φ90mm - 3	L-1210 W-201.8 L-1150, W-172.2
B 07	20	30	1.80	〃	Skew Left 85°	—	2478.1	8165.8	525.5	11169.4	5.8	54.3	10.1	8	4	4	250×600×14	φ85mm - 3	φ75mm - 3	L-1090 W-145.5 L-970, W-101.0
	21	30	1.80	〃		—	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	
B 08	22	25	1.40	〃	Right Angle	—	1913.2	6230.9	442.1	8586.2	4.9	45.3	8.4	4	4	4	200×600×14	φ75mm - 3	φ70mm - 3	L-970 W-101.0 L-910, W-82.4
	23	25	1.40	〃	〃	—	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃
	24	25	2.35	〃	〃	—	1489.3	5549.3	179.3	7217.9	4.9	45.3	8.4	4	2	2	450×500×14	φ85mm - 2	φ75mm - 2	L-1090, W-97.0 L-970, W-67.3
	25	25	2.35	〃	〃	—	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃
B 09	26	35	2.00	〃	〃	2509.9	1158.6	9872.1	609.2	14149.8	6.8	63.3	11.8	8	4	4	300×600×16	φ90mm - 3	φ80mm - 3	L-1150, W-172.2 L-1030, W-122.1
B 10	27	25	1.40	〃	〃	—	1913.2	6230.9	442.1	8586.2	4.9	45.3	8.4	4	4	4	200×600×14	φ75mm - 3	φ70mm - 3	L-970 W-101.0 L-910, W-82.4
B 11	28	30	2.15	Curve R=500m	91°43'08"	—	2484.7	8425.1	465.3	11375.1	5.8	54.3	10.1	8	4	4	300×500×14	φ80mm - 3	φ75mm - 3	L-1030 W-122.1 L-970, W-101.0
B 12	29	25	2.35	〃	91°25'57"	—	1489.3	5549.3	179.3	7217.9	4.9	45.3	8.4	4	2	2	450×500×14	φ85mm - 2	φ75mm - 2	L-1090, W-97.0 L-970, W-67.3
	30	25	2.35	〃	〃	—	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃
	31	25	2.35	〃	〃	—	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	
	32	30	2.15	〃	91°43'08"	—	2484.7	8425.1	465.3	11375.1	5.8	54.3	10.1	8	4	4	300×500×14	φ80mm - 3	φ75mm - 3	L-1030, W-122.1 L-970, W-101.0
	33	25	2.35	〃	Left 69°34'03"	—	1489.3	5549.3	179.3	7217.9	4.8	44.6	8.4	4	2	2	450×500×14	φ85mm - 2	φ75mm - 2	L-1090, W-97.0 L-970, W-67.3
	34	30	2.15	〃	Left 72°43'08"	—	2484.7	8425.1	465.3	11375.1	5.9	54.8	10.1	8	4	4	300×500×14	φ80mm - 3	φ75mm - 3	L-1030, W-122.1 L-970, W-101.0
B 13	35	30	2.15	〃	91°43'08"	—	〃	〃	〃	〃	5.8	54.3	10.1	8	4	4	300×500×14	φ80mm - 3	φ75mm - 3	L-1030 W-122.1 L-970, W-101.0
	36	30	2.15	〃	〃	—	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃
	37	30	2.15	〃	〃	—	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃
B 14	38	30	2.15	Transition Curve	91°42'48" 91°39'45"	—	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃	〃
	39	28	2.15	〃	91°08'38" 60°53'41"	—	2351.9	7956.3	438.7	10746.9	5.6	51.7	9.4	〃	〃	〃	〃	〃	〃	〃
	40	33	2.15	〃	120°25'19" 70°08'11"	2429.2	1122.1	9230.2	511.9	13293.4	6.4	59.8	11.1	8	4	4	450×550×14	〃	〃	〃
	41	30	2.15	Straight	Right 70°	2240.2	1122.1	8942.2	511.9	12816.4	6.0	55.4	12.3	8	4	4	450×550×14	φ80mm - 3	φ75mm - 3	L-1030, W-122.1 L-970, W-101.0
	42	26	2.35		Right 70°	—	1728.0	11169.0	446.2	13343.2	6.9	61.9	14.3	6	4	4	450×550×14	φ8 mm - 3	φ75mm - 3	L-1030 W-122.1 L-970, W-101.0
TOTAL	42	1182	—	—	—	23318.7	75214.6	319635.0	17004.9	435173.2	232.1	2111.9	405.1	262	142	142		113	113	8921.0 Kg

L = 20 M, H = 1.80 M Skew Left 60°00′00″

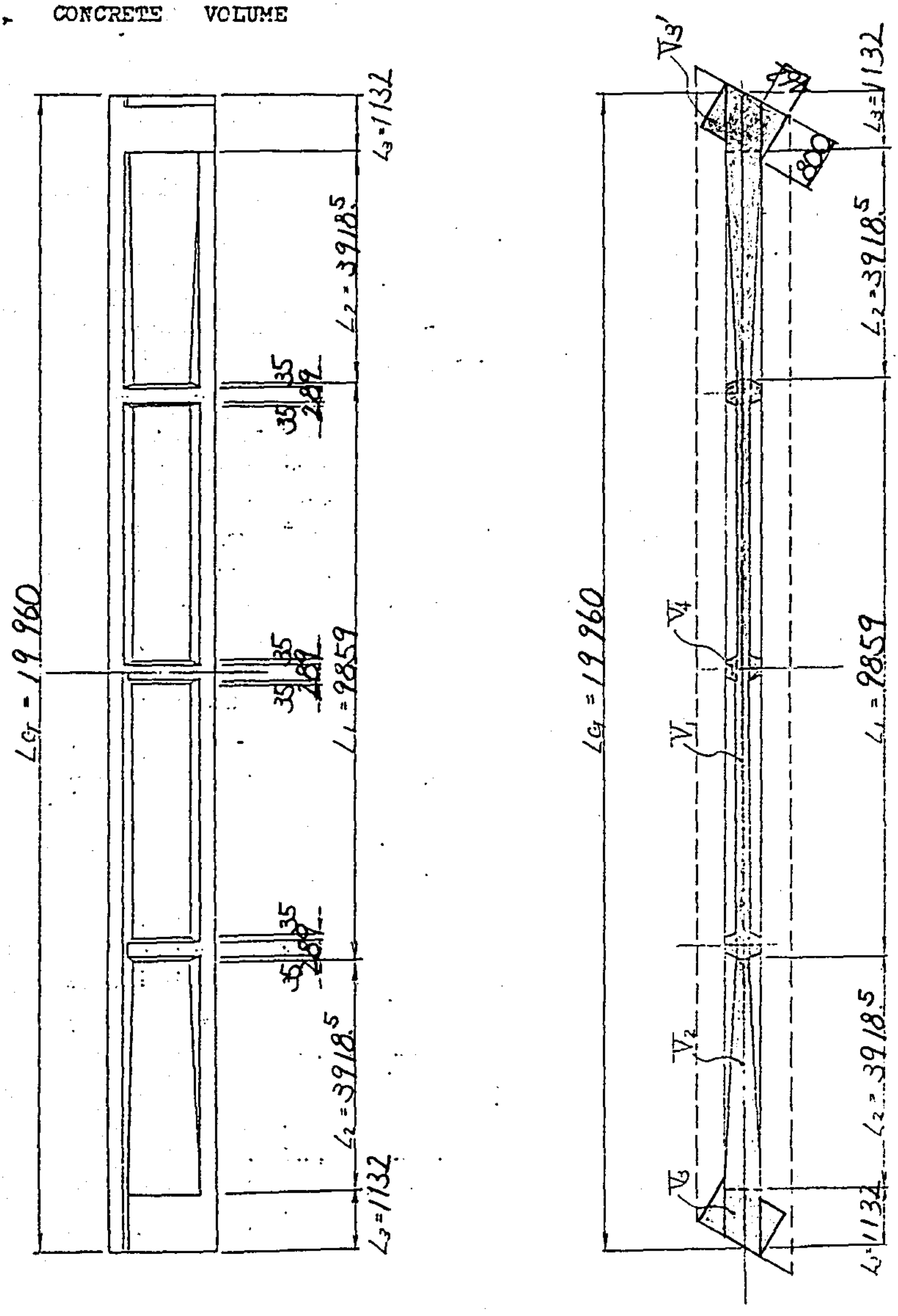
SUPERSTRUCTURE MATERIAL SCHEDULE

B 01 - PC01

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A ($f_c' = 400\ kg/cm^2$)	m^3	52.2
	P.C. STRAND	12T12.7 ($f_s' = 190\ kg/mm^2$)	kg	1960.4
	SHEATH	ϕ65 and ϕ70	m	175.5 20.0
	FORMS		m^2	229.3
	ANCHORING DEVICE	FOR 12T12.7	EACH	20
	REINFORCING BAR	19	kg	—
		16	〃	557.2
		13	〃	3029.6
		10	〃	74.2
		TOTAL	〃	3661.0
LATERAL JOINT	CONCRETE	CLASS B ($f_c' = 300\ kg/cm^2$)	m^3	5.8
	P.C. BAR	ϕ23 ($f_s' = 110\ kg/mm^2$)	kg	692.1
	SHEATH	ϕ35	m	203.0
	FORMS		m^2	26.3
	ANCHOR PLATE, NUT	FOR ϕ23	EACH	104
	REINFORCING BAR	16	kg	757.4
		13	〃	1537.4
		10	〃	66.7
		TOTAL	〃	2361.5
SIDEWALK CONCRETE		CLASS C ($f_c' = 240\ kg/cm^2$)	m^3	11.5
BRIDGE RAILING AND DUCT		CONCRETE	m^3	3.9
		FORMS	m^2	36.4
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m^3	6.7
DRAINAGE			EACH	4
ELASTOMERIC BEARING PADS		FIX. FOR R = 140 ton	〃	2
		MOV. FOR R = 140 ton	〃	2

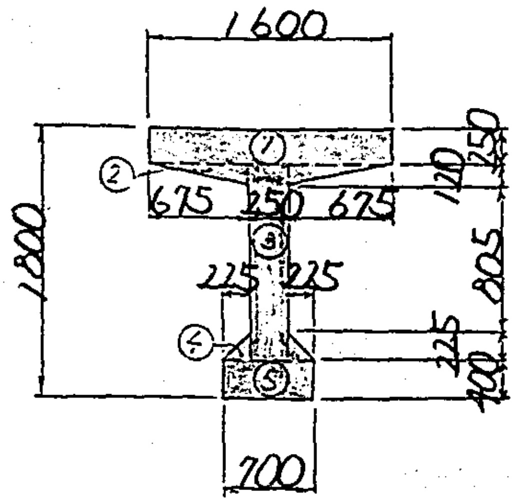
§ I MAIN BEAM

I. CONCRETE VOLUME



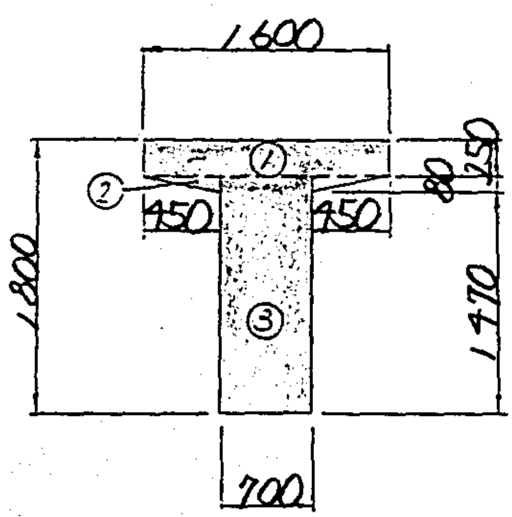
I) SECTION AREA

a) AT SPAN CENTER



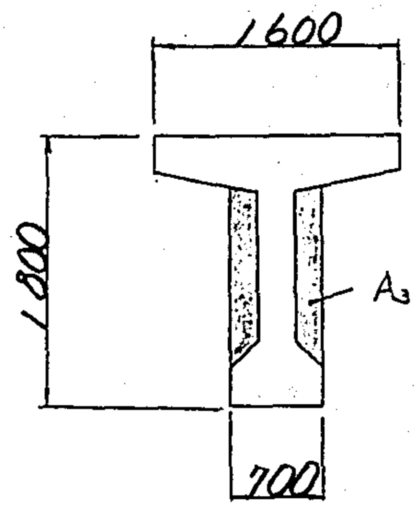
$$① \quad 1.600 \times 0.250 = 0.4000 \; m^2$$
$$② \quad \tfrac{1}{2} \times 0.675 \times 0.120 \times 2 = 0.0810$$
$$③ \quad 0.250 \times 1.150 = 0.2875$$
$$④ \quad \tfrac{1}{2} \times 0.225 \times 0.225 \times 2 = 0.0506$$
$$⑤ \quad 0.700 \times 0.400 = 0.2800$$
$$A_1 = 1.0991 \; m^2$$

b) AT SUPPORT POINT



$$① \quad 1.600 \times 0.250 = 0.4000 \; m^2$$
$$② \quad \tfrac{1}{2} \times 0.450 \times 0.080 \times 2 = 0.0360$$
$$③ \quad 0.700 \times 1.550 = 1.0850$$
$$A_2 = 1.5210 \; m^2$$

c) CENTRAL DIAPHRAGM



$$A_3 = A_2 - A_1$$
$$= 1.5210 - 1.0991$$
$$= 0.4219 \ m^2$$

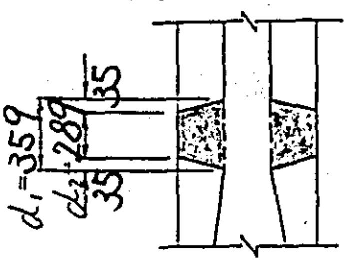
2) QUANTITY CALCULATION FOR CONCRETE VOLUME

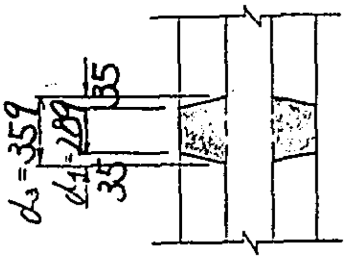
$$V_1 = A_1 \times L_1$$
$$= 1.0991 \times 9.859 = 10.836 \ m^3$$

$$V_2 = \frac{1}{2} \times (A_1 + A_2) \times L_2 \times 2$$
$$= \frac{1}{2} \times (1.0991 + 1.5210) \times 3.9185 \times 2 = 10.267 \ m^3$$

$$V_3 = A_2 \times L_3 \times 2$$
$$= 1.5210 \times 1.132 \times 2 = 3.444 \ m^3$$

$$V_3' = \frac{1}{2} \times 0.800 \times 0.462 \times 1.550 \times 2 \times 2 = 1.146 \ m^3$$





$$\nabla_4 = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2}\right) \times 2 + \left(\frac{d_3 + d_4}{2}\right) \right\}$$

$$= 0.4219 \times \left\{ \left(\frac{0.359 + 0.289}{2}\right) \times 2 + \left(\frac{0.359 + 0.289}{2}\right) \right\}$$

$$= 0.410 \ m^3$$

$$\Sigma \nabla = (\nabla_1 + \nabla_2 + \nabla_3 + \nabla_{3'} + \nabla_4) \times N_G$$

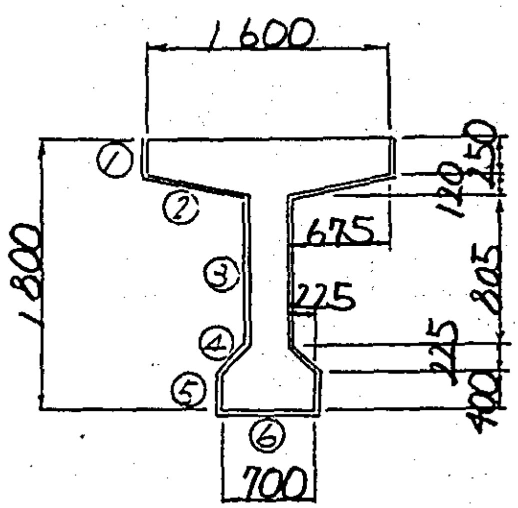
$$= (10.836 + 10.267 + 3.444 + 1.146 + 0.410) \times 2$$

$$= 52.206 \ m^3$$

2, FOR CONCRETE FORM AREA

I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



① $0.250 \times 2 = 0.500^{m}$

② $\sqrt{0.675^2 + 0.120^2} \times 2 = 1.371$

③ $0.805 \times 2 = 1.610$

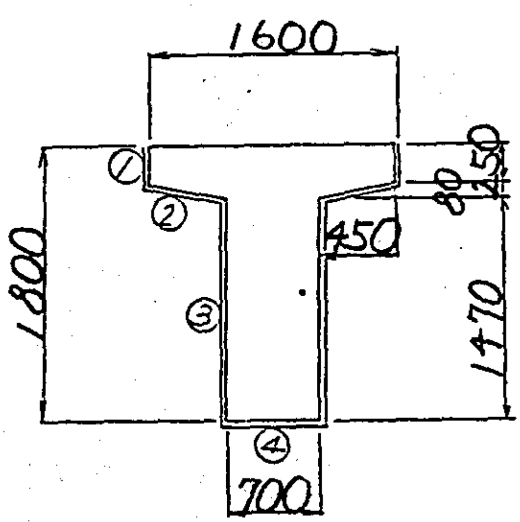
④ $\sqrt{0.225^2 + 0.225^2} \times 2 = 0.636$

⑤ $0.400 \times 2 = 0.800$

⑥ $= 0.700$

$L_1 = 5.617^{m}$

b) AT SUPPORT POINT



① $0.250 \times 2 = 0.500^{m}$

② $\sqrt{0.450^2 + 0.080^2} \times 2 = 0.914$

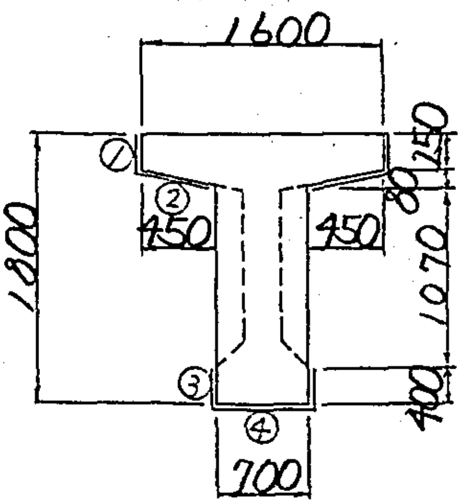
③ $1.470 \times 2 = 2.940$

④ $= 0.700$

$L_2 = 5.054^{m}$

$L_2' = L_2 - ③ - ②/2 = 1.657^{m}$

c) CENTRAL DIAPHRAGM



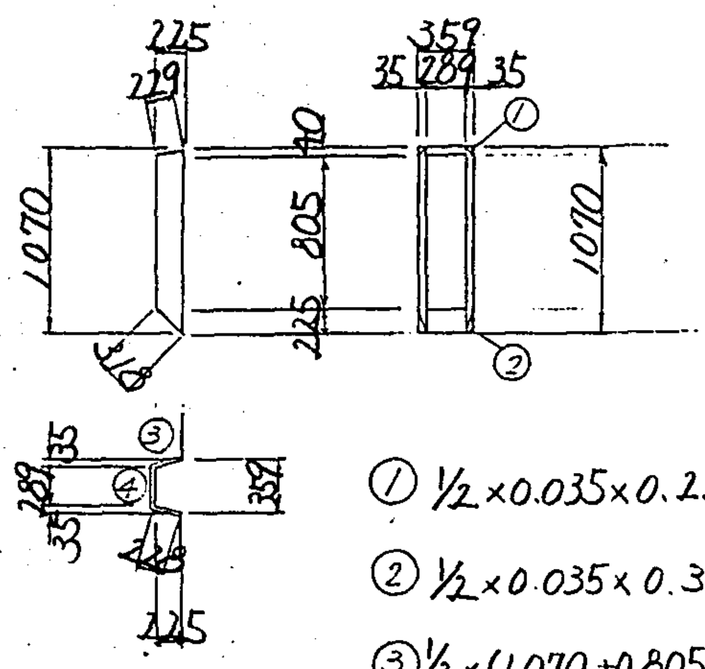
① $0.250 \times 2 = 0.500$ m

② $\sqrt{0.450^2 + 0.080^2} \times 2 = 0.914$

③ $0.400 \times 2 = 0.800$

④ $= 0.700$

$L_3 = 2.914$ m



① $\frac{1}{2} \times 0.035 \times 0.229 \times 2 = 0.0080$ m²

② $\frac{1}{2} \times 0.035 \times 0.318 \times 2 = 0.0111$

③ $\frac{1}{2} \times (1.070 + 0.805) \times 0.228 \times 2 = 0.4275$

④ $0.289 \times 1.070 = 0.3092$

$a_1 = 0.7558$ m²

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$$A_1 = L_1 \times 4.393 \times 2$$

$$= 5.617 \times 4.391 \times 2 \quad = 49.328 \ m^2$$

$$A_2 = (L_1 + L_2) \times \tfrac{1}{2} \times 3.9185 \times 2$$

$$= (5.617 + 5.054) \times \tfrac{1}{2} \times 3.9185 \times 2 \ - 41.814 \ m^2$$

** FOR CONCRETE VOLUME --- A2. **

$$A_3 = A_2 \times \mathrm{COSEC}\,\theta \times 2 + L_2' \times 1.132 \times 2$$

$$= 1.5210 \times 1.1547 \times 2 + 1.657 \times 1.132 \times 2$$

$$= 7.264 \ m^2$$

$$\mathrm{COSEC}\,60^\circ = 1.1547$$

$$A_3' = \left\{(0.800 + 0.462) \times 1.550 + \tfrac{1}{2} \times 0.800 \times 0.462\right\} \times 2 \times 2$$

$$= 8.564 \ m^2$$

$$A_4 = L_3 \times 0.359 \times 3$$

$$= 2.914 \times 0.359 \times 3 \quad = 3.138 \ m^2$$

$$A_5 = a_1 \times 2 \times 3$$

$$= 0.7558 \times 2 \times 3 \quad = 4.535 \ m^2$$

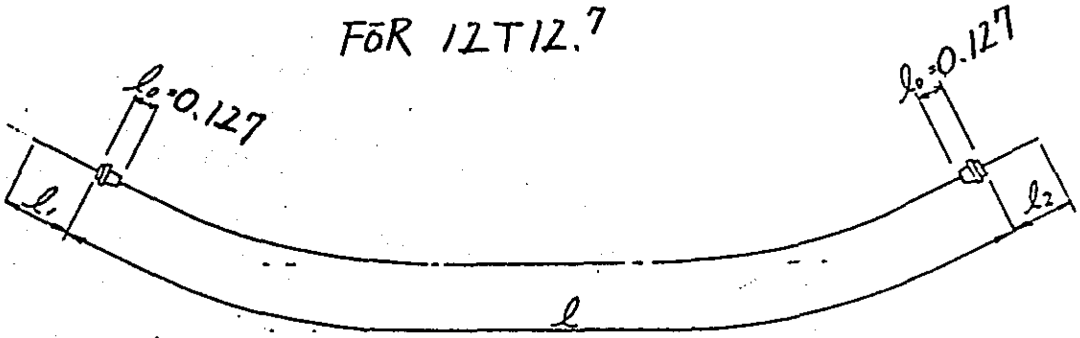
$$\Sigma A = (A_1 + A_2 + A_3 + A_3' + A_4 + A_5) \times N_G$$

$$= (49.328 + 41.814 + 7.264 + 8.564 + 3.138 + 4.535) \times 2$$

$$= 229.286 \ m^2$$

3. PRESTRESSING STEEL

I) MAIN CABLE



$$l_1 + l_2 = 1.300^m \qquad l_1 = l_2$$

$$l_p = l + l_1 + l_2$$

No	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_G	$L_p = N_G \times l_p$
C_1	19.938	1.300	21.238	2	42.476
C_2	19.852	1.300	21.152	2	42.304
C_3	19.794	1.300	21.094	2	42.188
C_4	19.736	1.300	21.036	2	42.072
C_5	19.692	1.300	20.992	2	41.984
TOTAL					$\Sigma L_p = 211.024^m$

$$\Sigma W_p = \gamma_p \times \Sigma L_p$$
$$= 9.29^{kg/m} \times 211.024$$
$$= 1960.41^{kg}$$

2) SHETH

$\phi\ 70^{mm}$,

$L_{s_1} = 2.000 \times 5 \times 2 = 20.000^{m}$

$\phi\ 65^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.554) \times 5 \times 2 = 175.484^{m}$

3) GROUT

$\phi\ 65^{mm}$

$L_G = \Sigma L_P - (\ell_1 + \ell_2) \times N_P \times N_G$

$= 211.024 - 1.300 \times 5 \times 2 = 198.024^{m}$

4) ANCHORING DEVICE

FOR $12T12.^{7}$ mm

$N_c = N_P \times N_G \times 2$

$= 5 \times 2 \times 2$

$= 20$

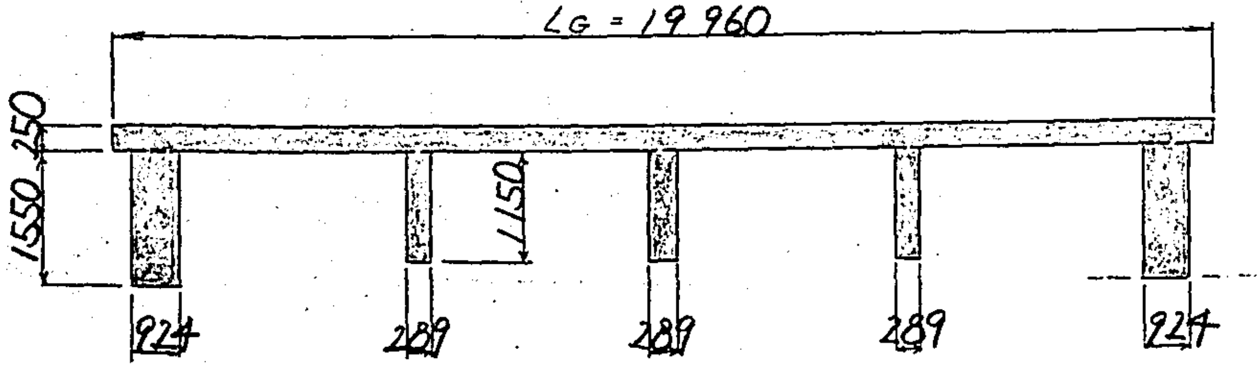
4. REINFORCING BAR (SD 30)

	W (Kg)
D 16	557.2
D 13	3029.6
D 10	74.2
TOTAL	3661.0

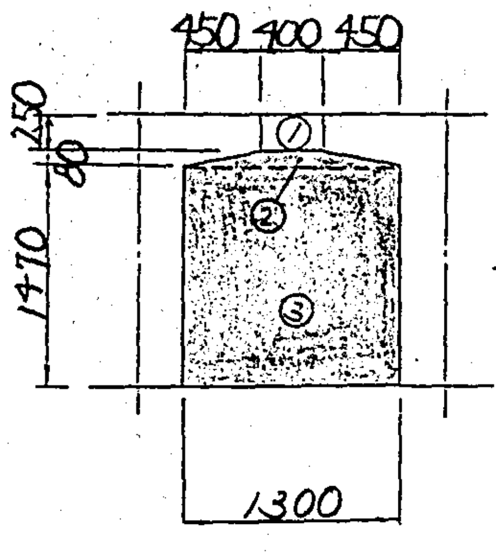
§2 LATERAL JOINT

I. CONCRETE VOLUME

I) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



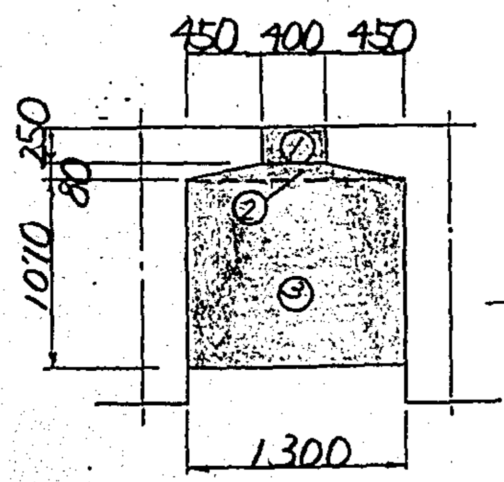
① $= A_F = 0.400 \times 0.250 = 0.1000 \, m^2$

② $1/2 \times (0.400 + 1.300) \times 0.080 = 0.0680$

③ $1.300 \times 1.470 = 1.9110$

② + ③ $= A_{D_1} = 1.9790 \, m^2$

b) CENTRAL CROSS BEAM



② $1/2 \times (0.400 + 1.300) \times 0.080 = 0.0680 \, m^2$

③ $1.300 \times 1.070 = 1.3910$

② + ③ $= A_{D_2} = 1.4590 \, m^2$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_F = A_F \times L_G \times N_F$$

$$= 0.1000 \times 19.960 \times 1 = 1.996^{m^3}$$

$$V_D = (A_{D1} \times t_1 \times 2 - V_3' + A_{D2} \times t_2 \times 3) \times N_F$$

$$= (1.9790 \times 0.924 \times 2 - 1.146 + 1.4590 \times 0.289 \times 3) \times 1$$

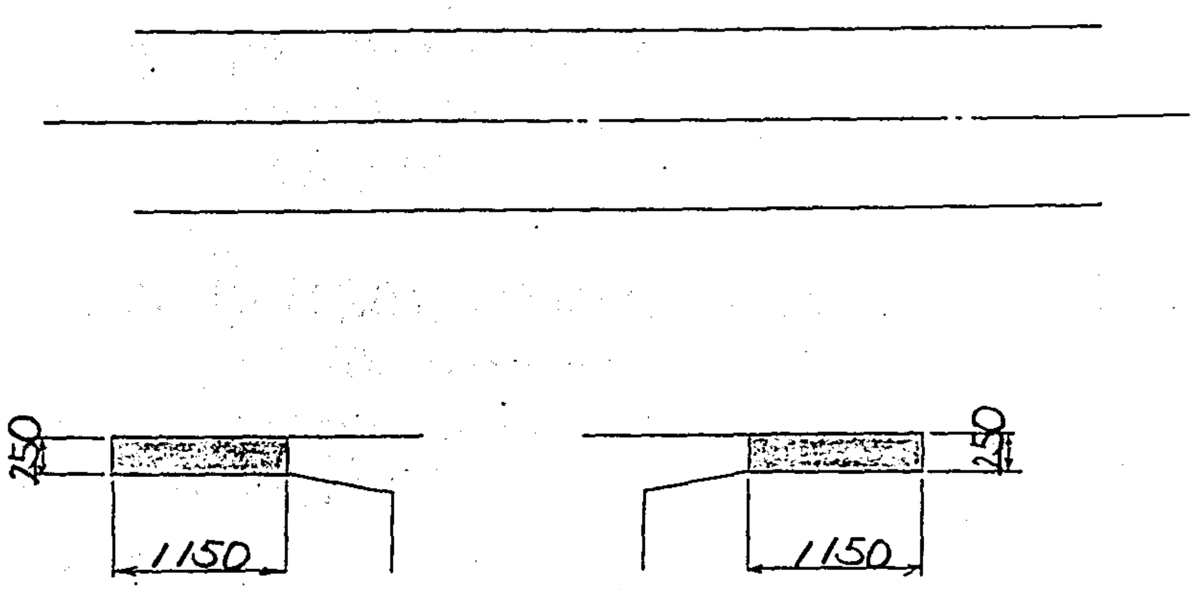
$$= 3.776^{m^3}$$

$$\Sigma V = V_F + V_D$$

$$= 1.996 + 3.776$$

$$= 5.772^{m^3}$$

3) SIDEWALK CONCRETE



① 1.150×0.250 $= 0.2875\ m^2$

② 〃 $= 0.2875$ 〃

$A_s = 0.5750\ m^2$

$$V_s = A_s \times L_G$$
$$= 0.5750 \times 19.960$$
$$= 11.477\ m^3$$

2. FOR CONCRETE FORM AREA

1) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{0.1000 \times 1.1547 \times 2$$
$$+0.400 \times (19.960 - 0.924 \times 2 - 0.289 \times 3\} \times 1$$
$$= 7.129\ m^2$$

$$A_2 = [\{1.9790 \times 1.1547 \times 2 - 0.462 \times 1.550 \times 2$$
$$+ (1.300 \times 1.1547 - 0.462) \times 0.800\} \times 2$$
$$+ (1.4590 \times 1.1547 \times 2 + 1.300 \times 0.289) \times 3.0\,] \times 1$$
$$= 19.174\ m^2$$

$$\Sigma A = A_1 + A_2$$
$$= 7.129 + 19.174 = 26.303\ m^2$$

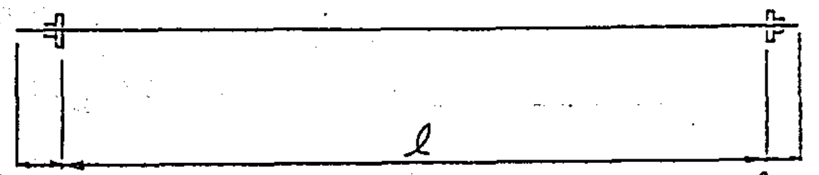
2) SIDEWALK

$$A = (1.150 + 0.250) \times 19.960 \times 2$$
$$+ 0.2875 \times 1.1547 \times 2 \times 2$$
$$= 57.216\ m^2$$

3. POST - TENSIONING BARS

I) P.C. BAR

ϕ 23 mm (SPECIAL GRADE)



$$l_1 + l_2 = 0.104 + 0.074 = 0.178^{m}$$

$$l_p = l + l_1 + l_2$$

	l (m)	l_1+l_2 (m)	l_p (m)	N_p	$L_p = N_p \cdot l_p$
SLAB	4.077	0.178	4.255	41	174.455
CROSS BEAM A	2.938	0.178	3.116	3	9.348
〃 B	3.383	0.178	3.561	8	28.488
TOTAL					$\Sigma L_p = 212.291^{m}$

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 212.291$$
$$= 692.07^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$L_s = \Sigma L_p - (l_1 + l_2) \times N_p$

$= 212.291 - 0.178 \times 52$

$= 203.035^{m}$

3) GROUT

$\phi 35^{mm}$

$L_G = L_s = 203.035^{m}$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$N_i = N_p \times 2$

$= 52 \times 2$

$= 104$

4. REINFORCING BAR (SD 30)

	W (kg)
D 16	757.4
D 13	1.537.4
D 10	66.7
TOTAL	2.361.5

5. ELASTOMERIC BEARING PADS

1) FIXED SUPPORT

FOR $R \fallingdotseq 140^{ton}$

$N = 2$, $350 \times 500 \times 12$

(3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 140^{ton}$

$N = 2$, $350 \times 500 \times 12$

(3 PLIES)

6. ANCHORIMG BAR (SS 41)

1) FIXED SIDE

FOR $\phi\ 75^{mm}$, $N = 2$

$l = 970^{mm}$, $W = 67.^{32\ kg}$

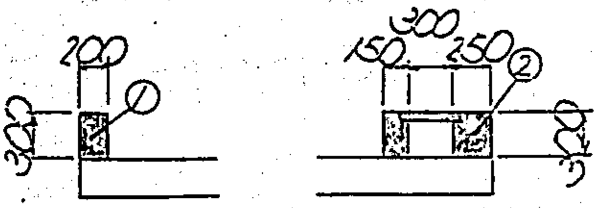
2) MOVABLE SIDE

FOR $\phi\ 70^{mm}$ $N = 2$

$l = 910.^{mm}$, $W = 54.^{96\ kg}$

§ 3. BRIDGE FACE WORK

I, BRIDGE RAILING AND DUCT



① $0.300 \times 0.200 = 0.0600\ m^2$

② 0.700×0.300

$- 0.300 \times 0.250 = 0.1350\ m^2$

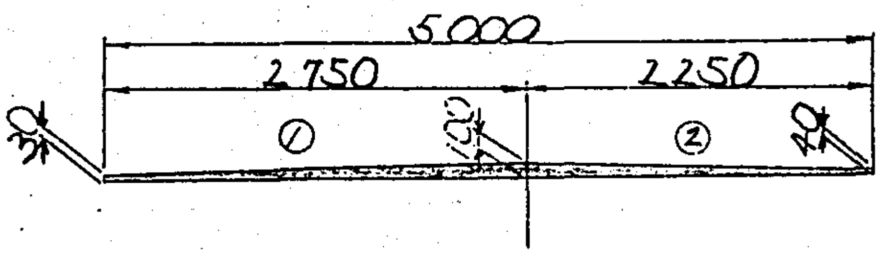
$\Sigma A_1 = 0.1950\ m^2$

$$\Sigma V = 0.1950\ m^2 \times 19.960 = 3.892\ m^3$$

$$\Sigma A = 0.300 \times 6 \times 19.960 + 0.1950 \times 2 \times 1.1547$$

$$= 36.378\ m^2$$

2, MORTAR WITH SLOPE-PROTECTIVE MORTAR



① $1/2 \times (0.030 + 0.100) \times 2.750 = 0.1788\ m^2$

② $1/2 \times (0.100 + 0.040) \times 2.250 = 0.1575$ "

$A_w = 0.3363\ m^2$

$$V = A_w \times L_G$$

$$= 0.3363 \times 19.960$$

$$= 6.713\ m^3$$

$L = 40^M$, $H = 2.40^M$

Skew
Left 60°00′00″

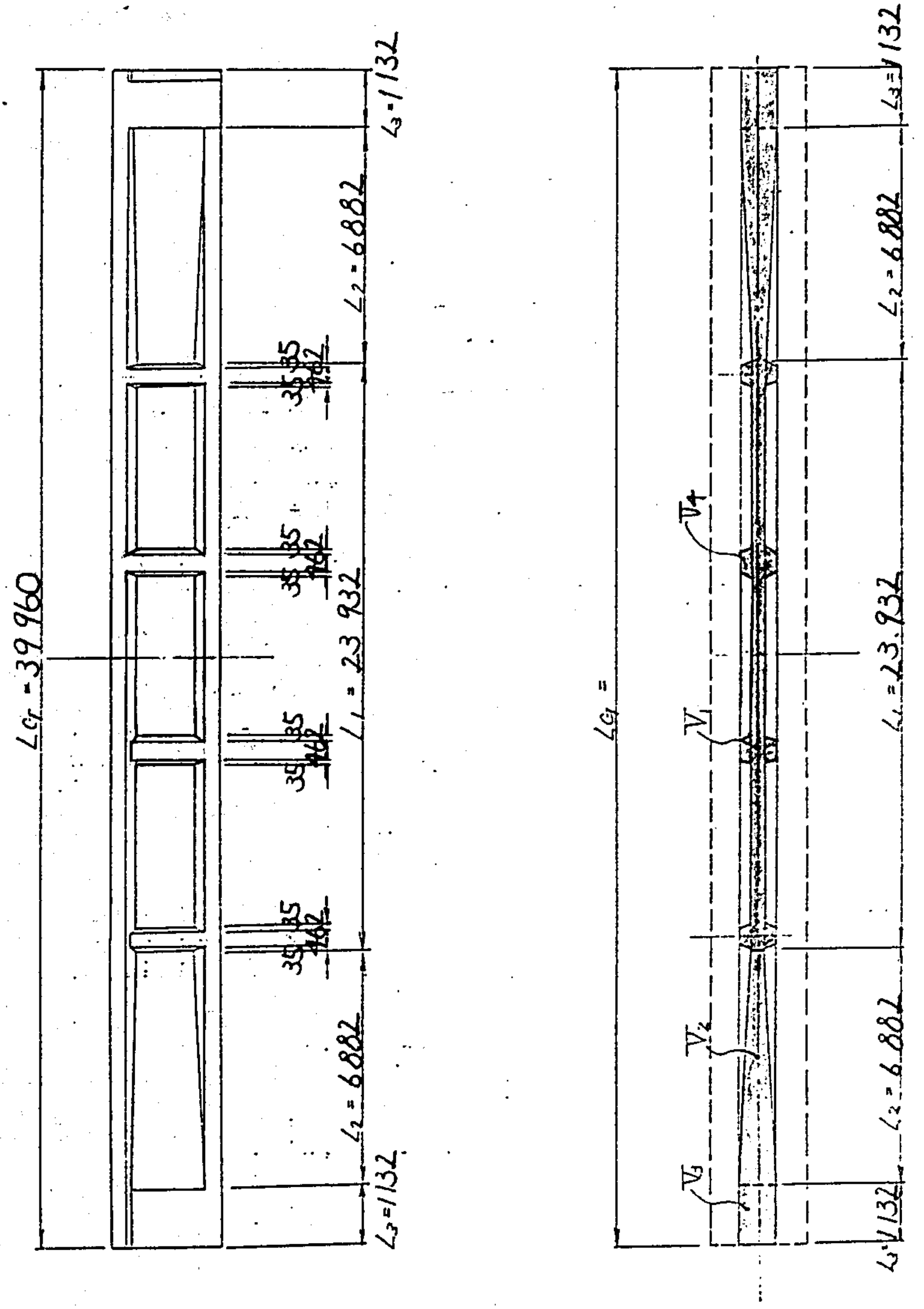
SUPERSTRUCTURE MATERIAL SCHEDULE

B 01 - PC02

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A ($fc' = 400\ kg/cm^2$)	m^3	211.3
	P.C. STRAND	12T15.2 ($fs' = 165\ kg/mm^2$)	kg	15233.9
	SHEATH	ϕ75 and ϕ82	m	1046.0 56.0
	FORMS		m^2	968.3
	ANCHORING DEVICE	FOR 12T15.2	EACH	56
	REINFORCING BAR	19	kg	2869.9
		16	〃	———
		13	〃	10581.2
		10	〃	69.6
		TOTAL	〃	13521.3
LATERAL JOINT	CONCRETE	CLASS B ($fc' = 300\ kg/cm^2$)	m^3	15.3
	P.C. BAR	ϕ23 ($fs' = 110\ kg/mm^2$)	kg	662.5
	SHEATH	ϕ35	m	195.2
	FORMS		m^2	46.0
	ANCHOR PLATE, NUT	FOR ϕ23	EACH	90
	REINFORCING BAR	16	kg	1423.6
		13	〃	1978.6
		10	〃	649.5
		TOTAL	〃	4051.7
SIDEWALK CONCRETE		CLASS C ($fc' = 240\ kg/cm^2$)	m^3	27.3
BRIDGE RAILING AND DUCT		CONCRETE	m^3	7.8
		FORMS	m^2	72.4
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m^3	13.4
DRAINAGE			EACH	8
ELASTOMERIC BEARING PADS		FIX. FOR R = 190 ton	〃	4
		MOV. FOR R = 190 ton	〃	4

§ I MAIN BEAM

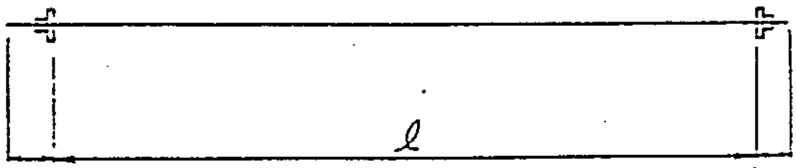
I, CONCRETE VOLUME



3. POST - TENSIONING BARS

I) P.C. BAR

$\phi\ 23^{mm}$ (SPECIAL GRADE)



$\ell_1 = 0.104$ $\ell_2 = 0.074$

$$\ell_1 + \ell_2 = 0.104 + 0.074 = 0.178^{m}$$

$$\ell_p = \ell + \ell_1 + \ell_2$$

	ℓ (m)	$\ell_1+\ell_2$ (m)	ℓ_p (m)	N_p	$L_p = N_p \cdot \ell_p$
SLAB	4.308	0.178	4.486	29	130.094
CROSS BEAM A	4.092	0.178	4.270	4	17.080
〃 B	4.492	0.178	4.670	12	56.040
TOTAL				ΣL_p =	203.214^{m}

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 203.214 = 662.48^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$$L_S = \Sigma L_P - (l_1 + l_2) \times N_P$$

$$= 203.214 - 0.178 \times 45$$

$$= 195.204^m$$

3) GROUT

$\phi 35^{mm}$

$$L_G = L_S = 195.204^m$$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$$N_C = N_P \times 2$$

$$= 45 \times 2$$

$$= 90$$

4. REINFORCING BAR (SD 30)

	W (kg)
D 16	1423.6
D 13	1978.6
D 10	649.5
TOTAL	4051.7

5. ELASTOMERIC BEARING PADS

I) FIXED SUPPORT

FOR $R = 190$ ton

$N = 4$, $400 \times 600 \times 16$
(3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 190$ ton

$N = 4$, $400 \times 600 \times 16$
(3 PLIES)

6. ANCHORING BAR (SS 41)

I) FIXED SIDE

FOR $\phi\ 95^{mm}$, $N = 3$

$l = 1210^{mm}$, $W = 201.98^{kg}$

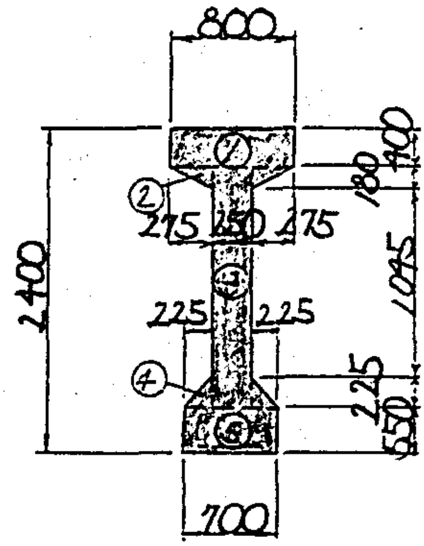
2) MOVABLE SIDE

FOR $\phi\ 90^{mm}$ $N = 3$

$l = 1150^{mm}$, $W = 172.29^{kg}$

I) SECTION AREA

a) AT SPAN CENTER



① $0.800 \times 0.400 = 0.3200\ m^2$

② $1/2 \times 0.275 \times 0.180 \times 2 = 0.0495$

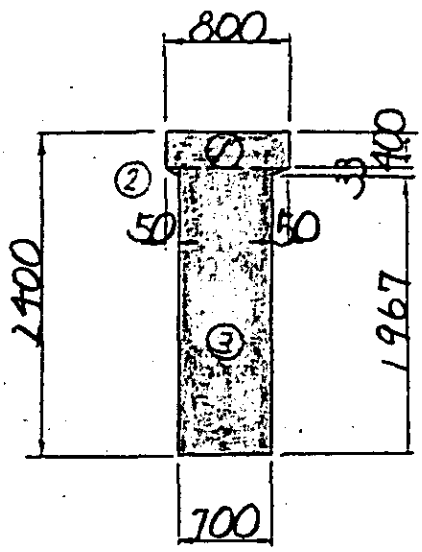
③ $0.250 \times 1.450 = 0.3625$

④ $1/2 \times 0.225 \times 0.225 \times 2 = 0.0506$

⑤ $0.700 \times 0.550 = 0.3850$

$A_1 = 1.1676\ m^2$

b) AT SUPPORT POINT



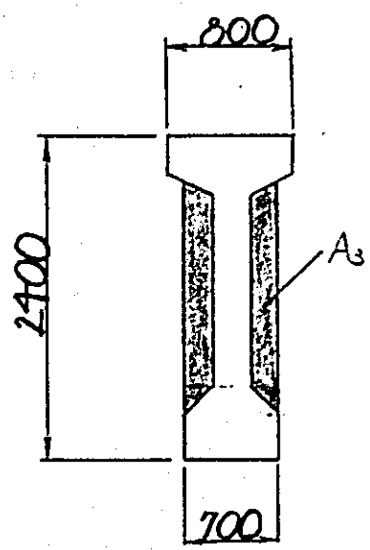
① $0.800 \times 0.400 = 0.3200\ m^2$

② $1/2 \times 0.050 \times 0.033 \times 2 = 0.0017$

③ $0.700 \times 2.000 = 1.4000$

$A_2 = 1.7217\ m^2$

c) CENTRAL DIRPHRAGM



$$A_3 = A_2 - A_1$$
$$= 1.7217 - 1.1676$$
$$= 0.5541 \ m^2$$

2) QUANTITY CALCULATION FOR COCRETE VOLUME ...

$$V_1 = A_1 \times L_1$$
$$= 1.1676 \times 23.932 = 27.943 \ m^3$$

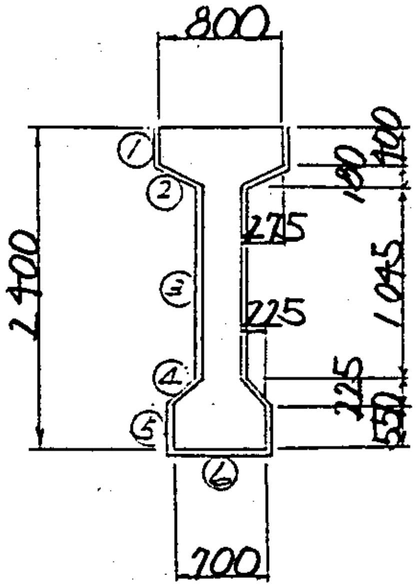
$$V_2 = \tfrac{1}{2} \times (A_1 + A_2) \times L_2 \times 2$$
$$= \tfrac{1}{2} \times (1.1676 + 1.7217) \times 6.882 \times 2$$
$$= 19.884 \ m^3$$

$$V_3 = A_2 \times L_3 \times 2$$
$$= 1.7217 \times 1.132 \times 2$$
$$= 3.898 \ m^3$$

2. FOR CONCRETE FORM AREA

I) SECTION AREA AND LENGTH

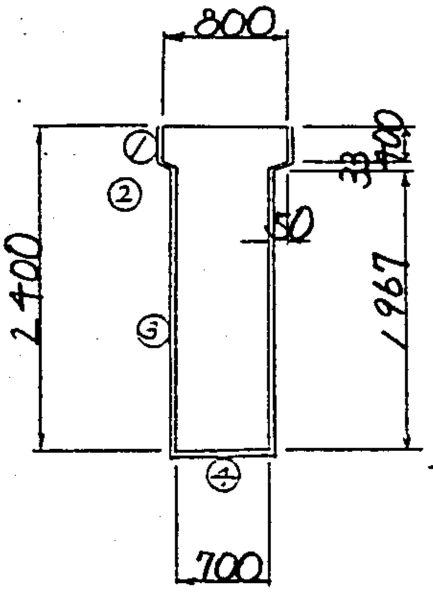
a) AT SPAN CENTER



①	0.400×2	$= 0.800$ m
②	$\sqrt{0.275^2 + 0.180^2} \times 2$	$= 0.657$
③	1.045×2	$= 2.090$
④	$\sqrt{0.225^2 + 0.225^2} \times 2$	$= 0.636$
⑤	0.550×2	$= 1.100$
⑥		$= 0.700$

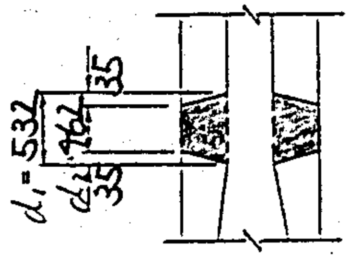
$L_1 = 5.983$ m

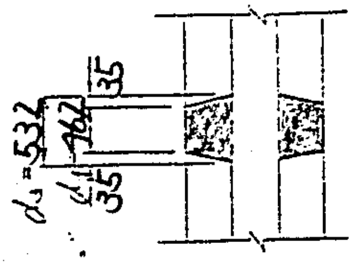
b) AT SUPPORT POINT



①	0.400×2	$= 0.800$ m
②	$\sqrt{0.050^2 + 0.033^2} \times 2$	$= 0.120$
③	1.967×2	$= 3.934$
④		$= 0.700$

$L_2 = 5.554$ m





$$\overline{V_4} = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2} \right) \times 2 \div \left(\frac{d_3 - d_4}{2} \right) \times 2 \right\}$$

$$= 0.5541 \times \left\{ \left(\frac{0.532 + 0.462}{2} \right) \times 2 + \left(\frac{0.532 + 0.462}{2} \right) \times 2 \right\}$$

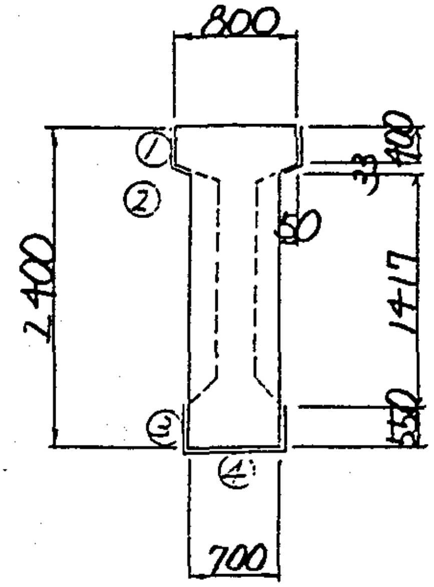
$$= 1.102 \ m^3$$

$$\sum \overline{V} = (\overline{V_1} + \overline{V_2} + \overline{V_3} + \overline{V_4}) \times N_G$$

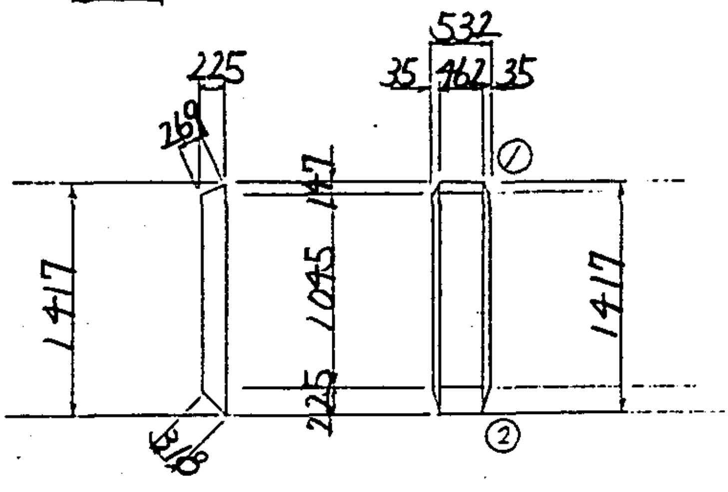
$$= (27.943 + 19.884 + 3.898 + 1.102) \times 4$$

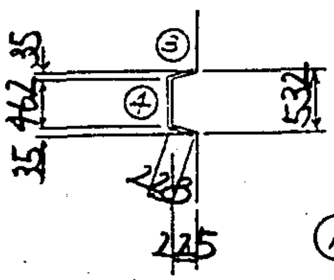
$$= 211.308 \ m^3$$

c) CENTRAL DIAPERAGM



1	0.400×2	=	0.800^{m}
2	$\sqrt{0.050^2 + 0.033^2} \times 2$	=	0.120
3	0.550×2	=	1.100
4		=	0.700
	L_3	=	2.720^{m}





1	$\frac{1}{2} \times 0.035 \times 0.269 \times 2$	=	0.0094^{m^2}
2	$\frac{1}{2} \times 0.035 \times 0.318 \times 2$	=	0.0111
3	$\frac{1}{2} \times (1.045 + 1.417) \times 0.228 \times 2$	=	0.5613
4	0.462×1.417	=	0.6547
	a_1	=	1.2365^{m^2}

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$$A_1 = L_1 \times 10.902 \times 2$$

$$= 5.983 \times 10.902 \times 2 \quad = 130.453\ m^2$$

$$A_2 = (L_1 + L_2) \times \tfrac{1}{2} \times 6.882 \times 2$$

$$= (5.983 + 5.554) \times \tfrac{1}{2} \times 6.882 \times 2 \quad = 79.398\ m^2$$

** FOR CONCRETE VOLUME --- A2 **

$$A_3 = A_2 \times \mathrm{COSEC}\,\theta \times 2 + L_2 \times 1.132 \times 2$$

$$= 1.7217 \times 1.1547 \times 2 + 5.554 \times 1.132 \times 2$$

$$= 16.550\ m^2$$

$$\mathrm{COSEC}\ 60°00'00'' = 1.1547$$

$$A_4 = L_3 \times 0.532 \times 4$$

$$= 2.720 \times 0.532 \times 4 \quad = 5.788\ m^2$$

$$A_5 = a_1 \times 2 \times 4$$

$$= 1.2365 \times 2 \times 4 \quad = 9.892\ m^2$$

$$\Sigma A = (A_1 + A_2 + A_3 + A_4 + A_5) \times N_G$$

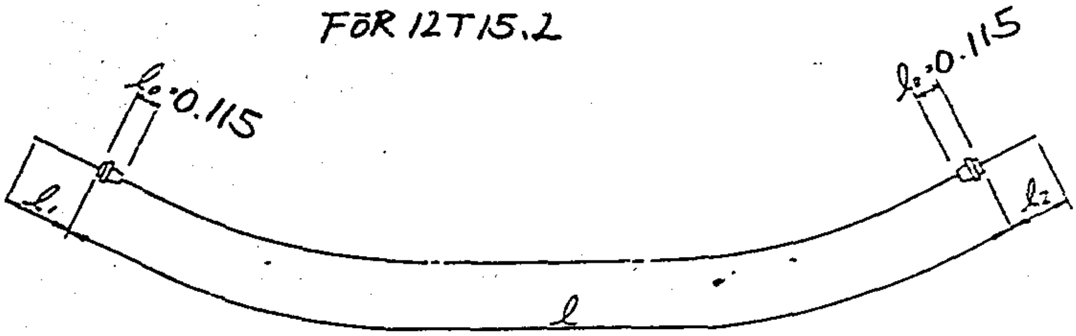
$$= (130.453 + 79.398 + 16.550 + 5.788 + 9.892) \times 4$$

$$= 968.324\ m^2$$

3, PRESTRESSING STEEL

I) MAIN CABLE

FOR 12T15.2



$$l_1 + l_2 = 1.600\ \mathrm{m} \qquad l_1 = l_2$$

$$l_p = l + l_1 + l_2$$

No	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_q	$L_p = N_q \times l_p$
C_1	37.680	1.600	39.280	4	157.120
C_2	40.188	1.600	41.788	4	167.152
C_3	40.036	1.600	41.636	4	166.544
C_4	39.910	1.600	41.510	4	166.040
C_5	39.832	1.600	41.432	4	165.728
C_6	39.758	1.600	41.358	4	165.432
C_7	39.698	1.600	41.298	4	165.192
TOTAL					$\Sigma L_p = 1153.208\ \mathrm{m}$

$$\Sigma W_p = \gamma_p \times \Sigma L_p$$

$$= 13.21\ \mathrm{kg/m} \times 1153.208$$

$$= 15233.88\ \mathrm{kg}$$

2) SHETH

$\phi\ 82^{mm}$

$L_{s_1} = 2.000 \times 7 \times 4 = 56.000^{m}$

$\phi\ 75^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.830) \times 7 \times 4 = 1045.968^{m}$

3) GROUT

$\phi\ 75^{mm},\ \phi 82^{mm}$

$L_G = \Sigma L_P - (l_1 + l_2) \times N_P \times N_G$

$= 1153.208 - 1.600 \times 7 \times 4 = 1108.408^{m}$

4) ANCHORING DEVICE

FOR 12T15.^{2mm}

$N_c = N_P \times N_G \times 2$

$= 7 \times 4 \times 2$

$= 56$

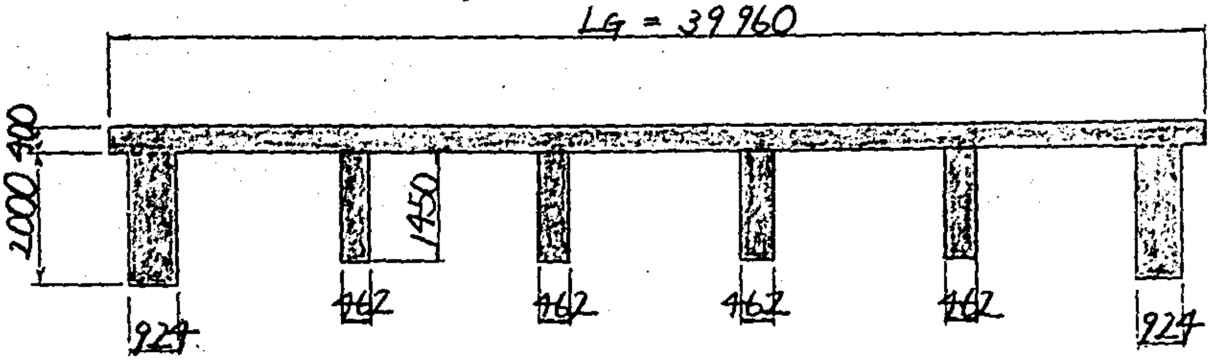
4. REINFORCING BAR (SD 30)

	W (Kg)
D 19	2869.9
D 13	10581.2
D 10	69.6
TOTAL	13521.3

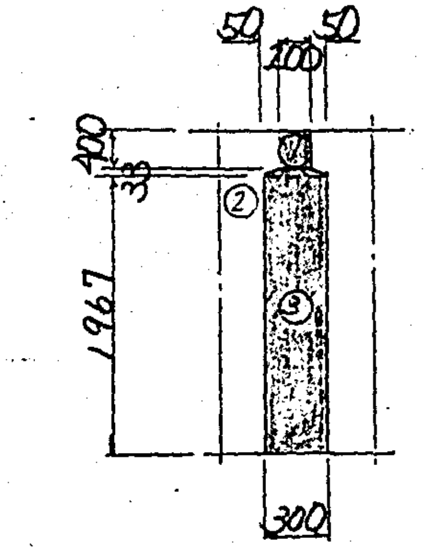
§ 2 LATERAL JOINT

I, CONCRETE VOLUME

I) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



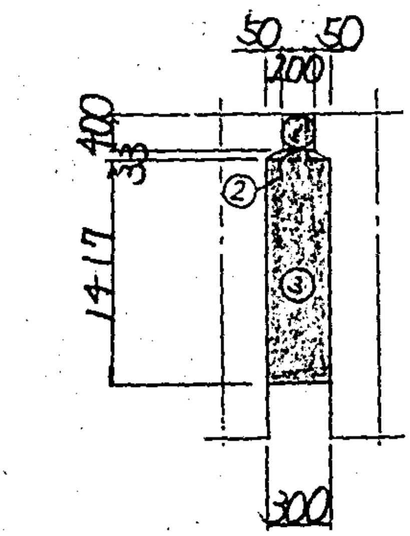
$① = A_F = 0.200 \times 0.400 = 0.0800 \; m^2$

$② \; \frac{1}{2} \times (0.200 + 0.300) \times 0.033 = 0.0083 \; m^2$

$③ \; 0.300 \times 1.967 = 0.5901$

$② + ③ = A_{D1} = 0.5984 \; m^2$

b) CENTRAL CROSS BEAM



$② \; \frac{1}{2} \times (0.200 + 0.300) \times 0.033 = 0.0083 \; m^2$

$③ \; 0.300 \times 1.417 = 0.4251$

$② + ③ = A_{D2} = 0.4334 \; m^2$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$\overline{V}_F = A_F \times L_G \times N_F$$

$$= 0.0800 \times 39.960 \times 3 = 9.590^{m^3}$$

$$\overline{V}_D = (A_{D1} \times t_1 \times 2 + A_{D2} \times t_2 \times 4) \times N_F$$

$$= (0.5984 \times 0.924 \times 2 + 0.4334 \times 0.462 \times 4) \times 3$$

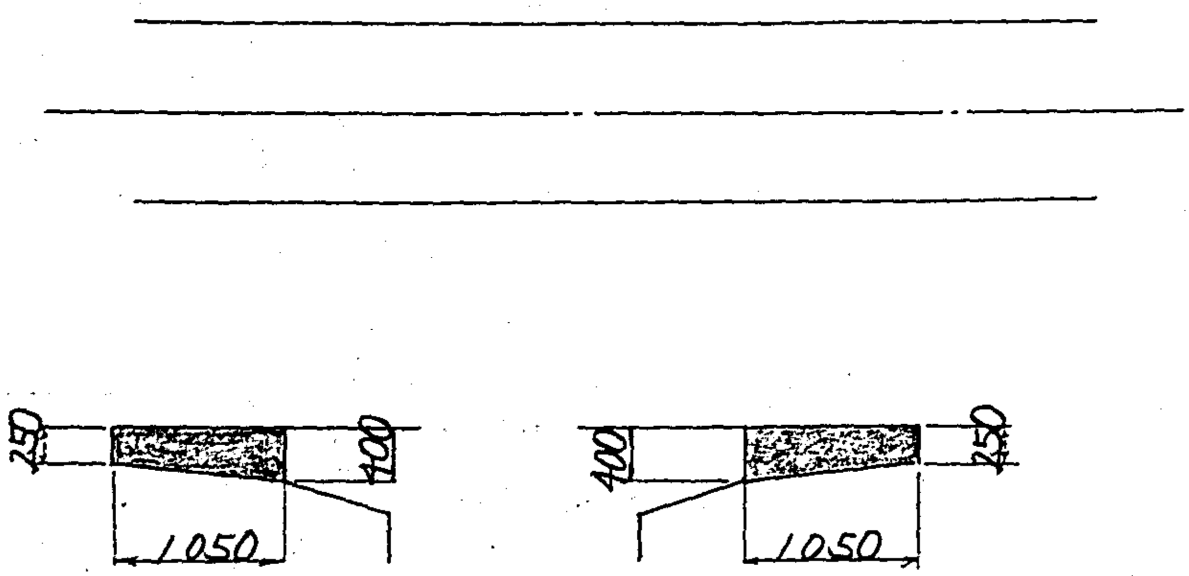
$$= 5.720^{m^3}$$

$$\Sigma \overline{V} = \overline{V}_F + \overline{V}_D$$

$$= 9.590 + 5.720$$

$$= 15.310^{m^3}$$

3) SIDEWALK CONCRETE



① $\frac{1}{2} \times (0.250 + 0.400) \times 1.050 = 0.3413\ m^2$

② 〃 $= 0.3413$ 〃

$A_s = 0.6826\ m^2$

$V_s = A_s \times L_G$

$= 0.6826 \times 39.960$

$= 27.277\ m^3$

2. FOR CONCRETE FORM AREA

1) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{0.0800 \times \overbrace{1.1547}^{\cos\sec\theta} \times 2 + 0.200 \times (39.960 - 0.924 \times 2 - 0.462 \times 4)\} \times 3$$
$$= 22.313 \; m^2$$

$$A_2 = \{(0.5984 \times 1.1547 \times 2 + 0.300 \times 0.942) \times 2 + (0.4334 \times 1.1547 \times 2 + 0.300 \times 0.462) \times 4\} \times 3$$
$$= (3.329 + 4.558) \times 3 = 23.661 \; m^2$$

$$\Sigma A = A_1 + A_2$$
$$= 22.313 + 23.661 = 45.974 \; m^2$$

2) SIDEWALK

$$A = (\sqrt{1.050^2 + 0.150^2} + 0.250) \times 39.960 \times 2 + 0.3413 \times 1.1547 \times 2 \times 2$$
$$= 106.352 \; m^2$$

5. ELASTOMERIC BEARING PADS

I) FIXED SUPPORT

FOR $R = 190^{ton}$

$N = 4$, $400 \times 600 \times 16$
(3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 190^{ton}$

$N = 4$, $400 \times 600 \times 16$
(3 PLIES)

6. ANCHORIMG BAR (SS 41)

I) FIXED SIDE

FOR $\phi\, 95^{mm}$, $N = 3$

$l = 1210^{mm}$, $W = 201.^{83}\ kg$

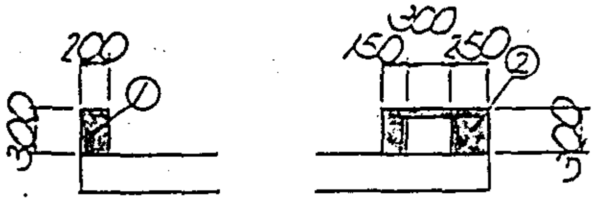
2) MOVABLE SIDE

FOR $\phi\, 90^{mm}$ $N = 3$

$l = 1150^{mm}$. $W = 172.^{16}\ kg$

§ 3 BRIDGE FACE WORK

1, BRIDGE RAILING AND DUCT



① $0.300 \times 0.200 = 0.0600\ m^2$

② 0.700×0.300

$- 0.300 \times 0.250 = 0.1350\ m^2$

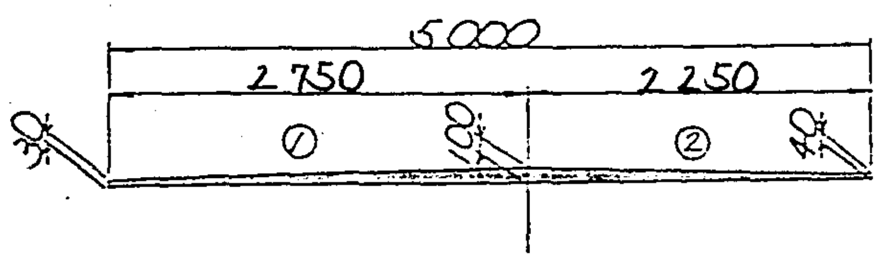
$\Sigma A_1 = 0.1950\ m^2$

$\Sigma V = 0.1950\ m^2 \times 39.960 = 7.792\ m^3$

$\Sigma A = 0.300 \times 6 \times 39.960 + 0.1950 \times 2 \times 1.1547$ cases

$= 72.378\ m^2$

2, MORTAR WITH SLOPE-PROTECTIVE MORTAR



① $1/2 \times (0.030 + 0.100) \times 2.750 = 0.1788\ m^2$

② $1/2 \times (0.100 + 0.040) \times 2.250 = 0.1575$ "

$A_w = 0.3363\ m^2$

$V = A_w \times L_G$

$= 0.3363 \times 39.960$

$= 13.439\ m^3$

L = 25 M, H = 1.40 M Straight

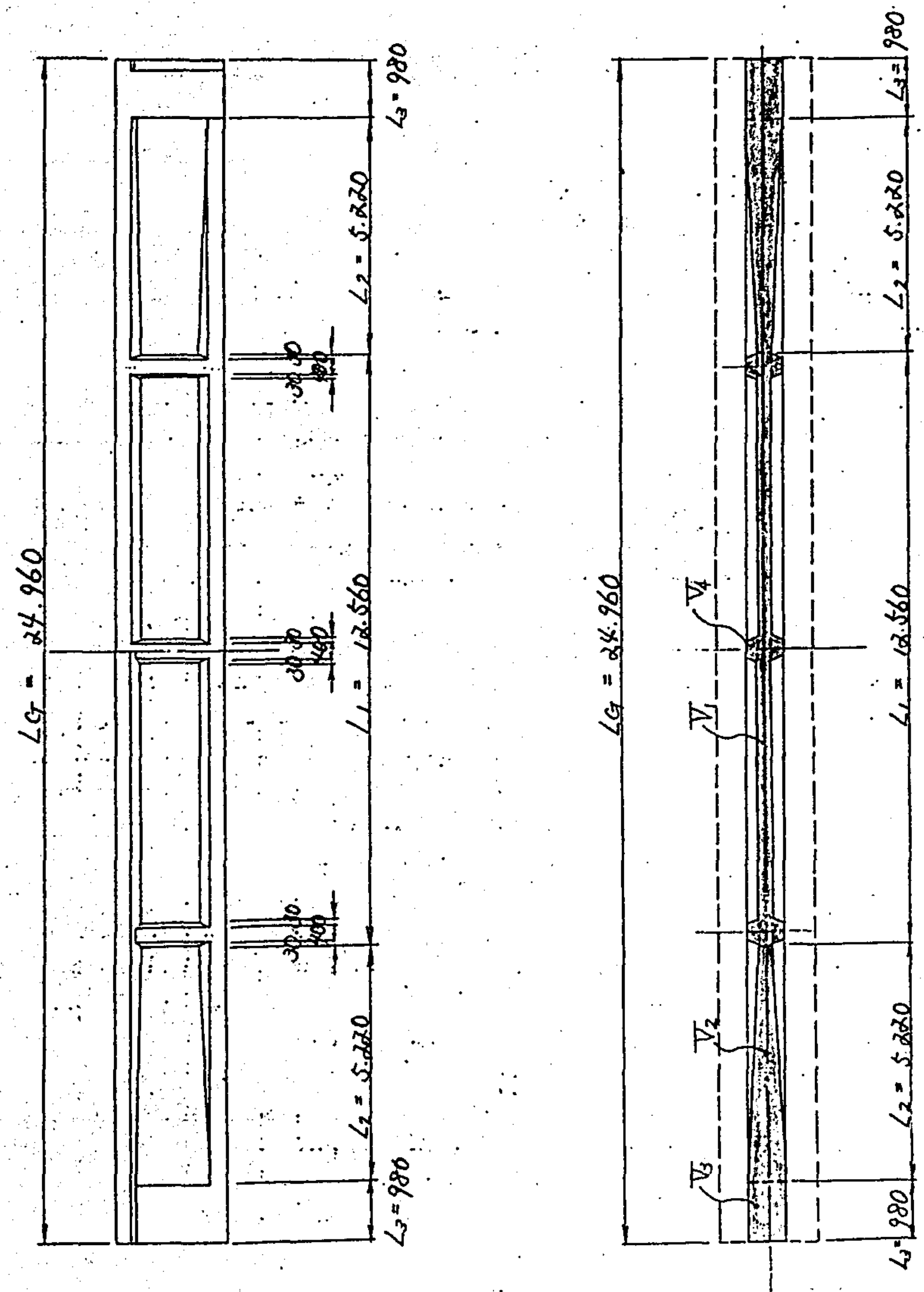
SUPERSTRUCTURE MATERIAL SCHEDULE

B 02 - PC04

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A (f_c'=400 kg/cm^2)	m^3	106.7
	P.C. STRAND	12T 12.7 (f_s'=190 kg/mm^2)	kg	5814.6
	SHEATH	ϕ65 and ϕ70	m	540.6 48.0
	FORMS		m^2	426.1
	ANCHORING DEVICE	FOR 12T 12.7	EACH	48
	REINFORCING BAR	19	kg	—
		16	〃	1241.0
		13	〃	5290.8
		10	〃	46.4
		TOTAL	〃	6578.2
LATERAL JOINT	CONCRETE	CLASS B (f_c'=300 kg/cm^2)	m^3	8.7
	P.C. BAR	ϕ23 (f_s'=110 kg/mm^2)	kg.	453.7
	SHEATH	ϕ35	m	133.8
	FORMS		m^2	26.1
	ANCHOR PLATE, NUT	FOR ϕ23	EACH	60
	REINFORCING BAR	16	kg	672.2
		13	〃	940.1
		10	〃	395.7
		TOTAL	〃	2008.0
SIDEWALK CONCRETE		CLASS C (f_c'=240 kg/cm^2)	m^3	10.5
BRIDGE RAILING AND DUCT		CONCRETE	m^3	4.9
		FORMS	m^2	45.3
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m^3	8.4
DRAINAGE			EACH	4
ELASTOMERIC BEARING PADS		FIX. FOR R = 100 ton	〃	4
		MOV. FOR R = 100 ton	〃	4

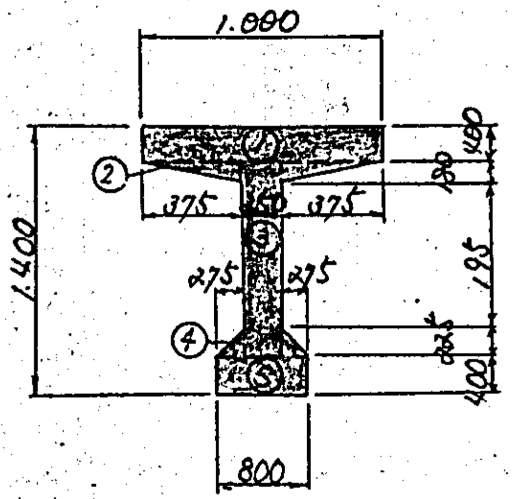
§ I MAIN BEAM

I. CONCRETE VOLUME



I) SECTION AREA

a) AT SPAN CENTER



① $1.000 \times 0.400 = 0.4000$ m^2

② $\frac{1}{2} \times 0.375 \times 0.180 \times 2 = 0.0675$

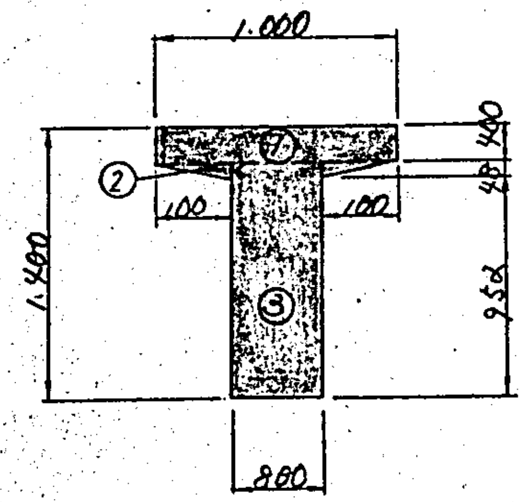
③ $0.250 \times 0.600 = 0.1500$

④ $\frac{1}{2} \times 0.275 \times 0.225 \times 2 = 0.0619$

⑤ $0.800 \times 0.400 = 0.3200$

$A_1 = 0.9994$ m^2

b) AT SUPPORT POINT



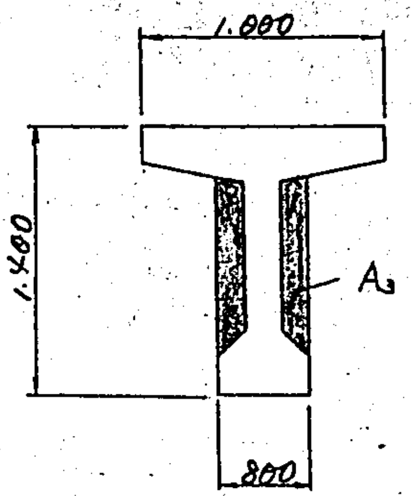
① $1.000 \times 0.400 = 0.4000$ m^2

② $\frac{1}{2} \times 0.100 \times 0.048 \times 2 = 0.0048$

③ $0.800 \times 1.000 = 0.8000$

$A_2 = 1.2048$ m^2

c) CENTRAL DIAPHRAGM



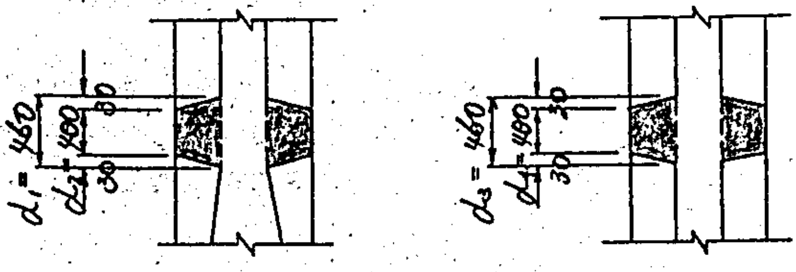
$$A_3 = A_2 - A_1$$
$$= 1.2048 - 0.9994$$
$$= 0.2054 \ m^2$$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_1 = A_1 \times L_1$$
$$= 0.9994 \times 12.560 = 12.552 \ m^3$$

$$V_2 = \frac{1}{2} \times (A_1 + A_2) \times L_2 \times 2$$
$$= \frac{1}{2} \times (0.9994 + 1.2048) \times 5.220 \times 2 = 11.506 \ m^3$$

$$V_3 = A_2 \times L_3 \times 2$$
$$= 1.2048 \times 0.980 \times 2 = 2.361 \ m^2$$



$$\nabla_4 = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2} \right) \times 2 + \left(\frac{d_3 + d_4}{2} \right) \right\}$$

$$= 0.2054 \times \left[\frac{0.460 + 0.400}{2} \times 2 + \frac{0.460 + 0.400}{2} \right]$$

$$= 0.265 \ m^3$$

$$\Sigma \nabla = (\nabla_1 + \nabla_2 + \nabla_3 + \nabla_4) \times N_G$$

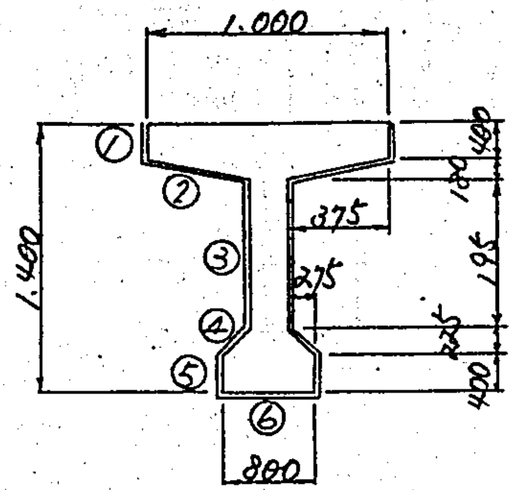
$$= (12.552 + 11.506 + 2.361 + 0.265) \times 4$$

$$= 106.736 \ m^3$$

2, FOR CONCRETE FORM AREA

I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



① $0.400 \times 2 = 0.800$ m

② $\sqrt{0.375^2 + 0.180^2} \times 2 = 0.832$

③ $0.195 \times 2 = 0.390$

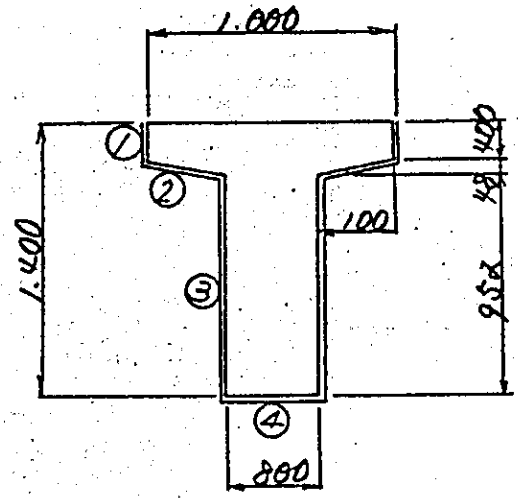
④ $\sqrt{0.275^2 + 0.225^2} \times 2 = 0.711$

⑤ $0.400 \times 2 = 0.800$

⑥ $= 0.800$

$L_1 = 4.333$ m

b) AT SUPPORT POINT



① $0.400 \times 2 = 0.800$ m

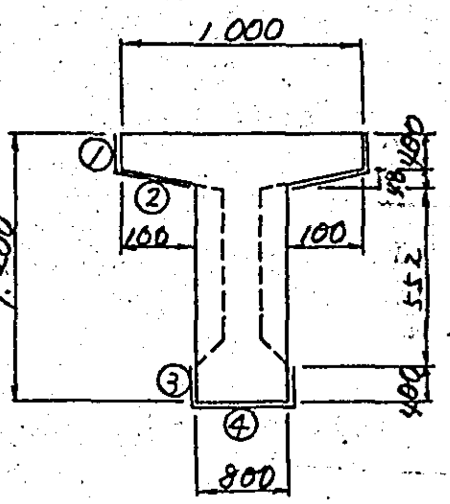
② $\sqrt{0.100^2 + 0.048^2} \times 2 = 0.222$

③ $0.952 \times 2 = 1.904$

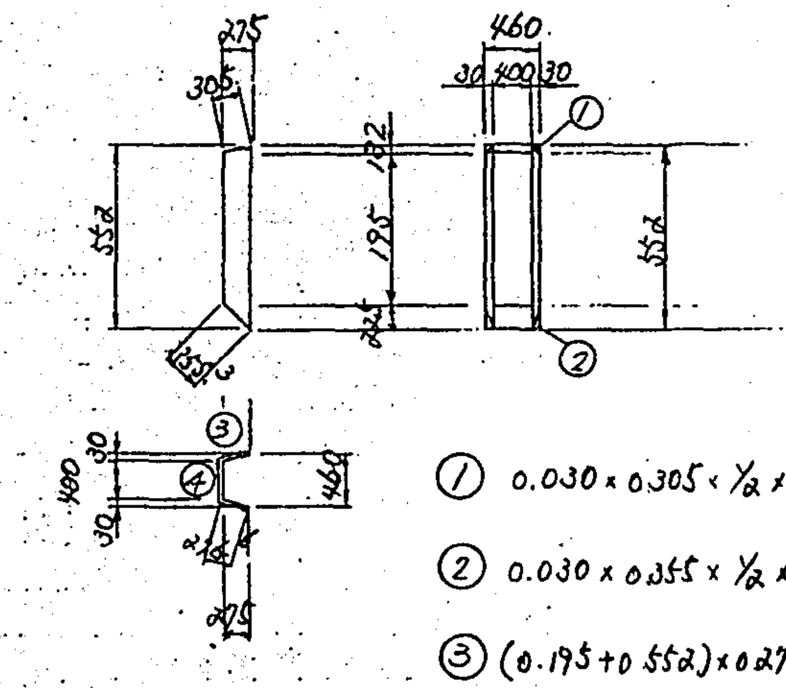
④ $= 0.800$

$L_2 = 3.726$ m

c) CENTRAL DIAPHRAGM



①	0.400×2	$= 0.800$	m
②	$\sqrt{0.100^2 + 0.048^2} \times 2$	$= 0.222$	
③	0.400×2	$= 0.800$	
④		$= 0.800$	
	L_3	$= 2.622$	m



①	$0.030 \times 0.305 \times 1/2 \times 2$	$= 0.0092$	m²
②	$0.030 \times 0.355 \times 1/2 \times 2$	$= 0.0107$	
③	$(0.195 + 0.552) \times 0.277 \times 1/2 \times 2$	$= 0.2069$	
④	0.400×0.552	$= 0.2208$	
	a_1	$= 0.4476$	m²

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$A_1 = L_1 \times 5.590 \times 2$

$= 4.333 \times 5.590 \times 2 = 48.443\ m^2$

$A_2 = (L_1 + L_2) \times 1/2 \times 5.220 \times 2$

$= (4.333 + 3.726) \times 1/2 \times 5.220 \times 2 = 42.068\ m^2$

** FOR CONCRETE VOLUME --- A2. **

$A_3 = A_2 \times COSEC\theta \times 2 + L_2 \times \quad \times 2$

$= 1.2048 \times 1.000 \times 2 + 3.726 \times 0.980 \times 2$

$= 9.713\ m^2$

$COSEC\ 90°00'00'' = 1.000$

$A_4 = L_3 \times 0.460 \times 3$

$= 2.622 \times 0.460 \times 3 \doteqdot 3.618\ m^2$

$A_5 = a_1 \times 2 \times 3$

$= 0.4476 \times 2 \times 3 = 2.686\ m^2$

$\Sigma A = (A_1 + A_2 + A_3 + A_4 + A_5) \times N_G$

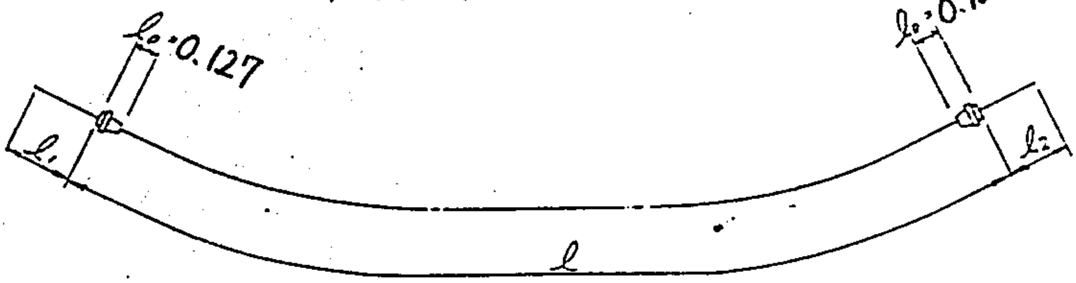
$= (48.443 + 42.068 + 9.713 + 3.618 + 2.686) \times 4$

$= 426.112\ m^2$

3, PRESTRESSING STEEL

I) MAIN CABLE

FOR 12T12.7



$l_1 + l_2 = 1.300^m$ $\quad l_1 = l_2$

$l_p = l + l_1 + l_2$

No	l (m)	$l_1 + l_2$ (m)	l_p (m)	NG	$L_p = N_G \times l_p$
C_1	24.864	1.300	26.164	4	104.656
C_2	24.864	1.300	26.164	4	104.656
C_3	24.772	1.300	26.072	4	104.288
C_4	24.786	1.300	26.086	4	104.344
C_5	24.716	1.300	26.016	4	104.064
C_6	24.672	1.300	25.972	4	103.888
TOTAL					$\Sigma L_p = 625.896^m$

$\Sigma W_p = \gamma_p \times \Sigma L_p$

$= 9.29^{kg/m} \times 625.896$

$= 5814.57^{kg}$

2) SHETH

$\phi 70^{mm}$,

$L_{s_1} = 2.000 \times 6 \times 4 = 48.000^{m}$

$\phi 65^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.554) \times 6 \times 4 = 540.600^{m}$

3) GROUT

$\phi 65^{mm}, \phi 70^{mm}$

$L_G = \Sigma L_p - (l_1 + l_2) \times N_p \times N_G$

$= 625.896 - 1.300 \times 6 \times 4 = 594.696^{m}$

4) ANCHORING DEVICE

FOR $12T12.7^{mm}$

$N_c = N_p \times N_G \times 2$

$= 6 \times 4 \times 2$

$= 48$

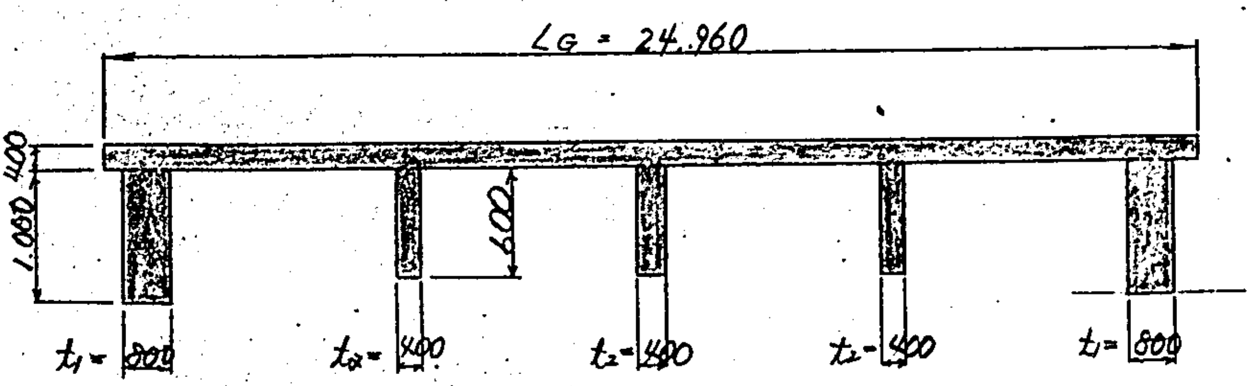
4, REINFORCING BAR (SD 30)

	W (Kg)
D 16	1241.0
D 13	5290.8
D 10	46.4
TOTAL	6578.2

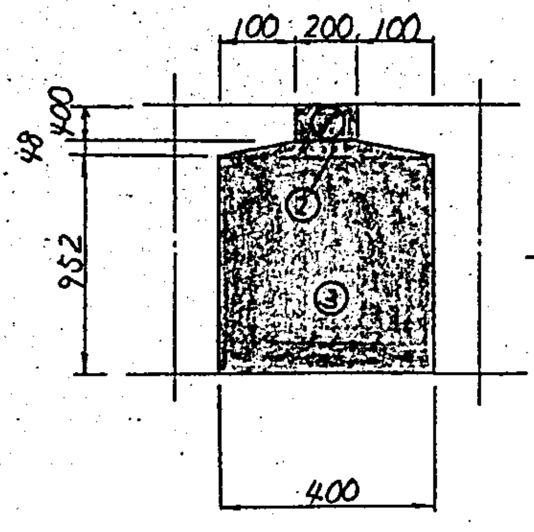
§2 LATERAL JOINT

I. CONCRETE VOLUME

I) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



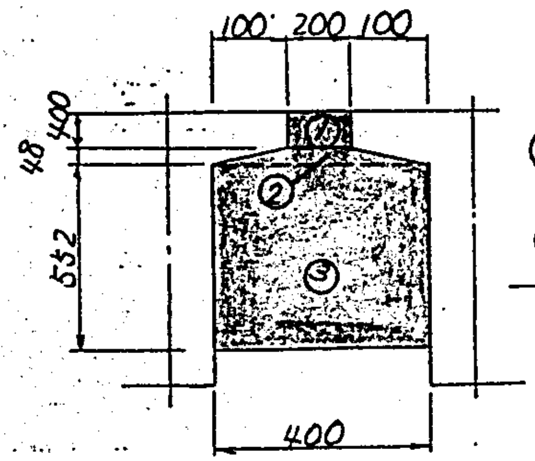
① $= A_F = 0.200 \times 0.400 = 0.080$ m^2

② $\frac{1}{2} \times (0.200 + 0.400) \times 0.048 = 0.0144$

③ $0.400 \times 0.952 = 0.3808$

② + ③ $= A_{D_1} = 0.3952$ m^2

b) CENTRAL CROSS BEAM



② $\frac{1}{2} \times (0.200 + 0.400) \times 0.048 = 0.0144$ m^2

③ $0.400 \times 0.552 = 0.2208$

② + ③ $= A_{D_2} = 0.2352$ m^2

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_F = A_F \times L_G \times N_F$$

$$= 0.080 \times 24.960 \times 3 = 5.990 \ m^3$$

$$V_D = A_{D1} \times t_1 \times 2 + A_{D2} \times t_2 \times 3$$

$$= (0.3952 \times 0.800 \times 2 + 0.2352 \times 0.400 \times 3) \times 3$$

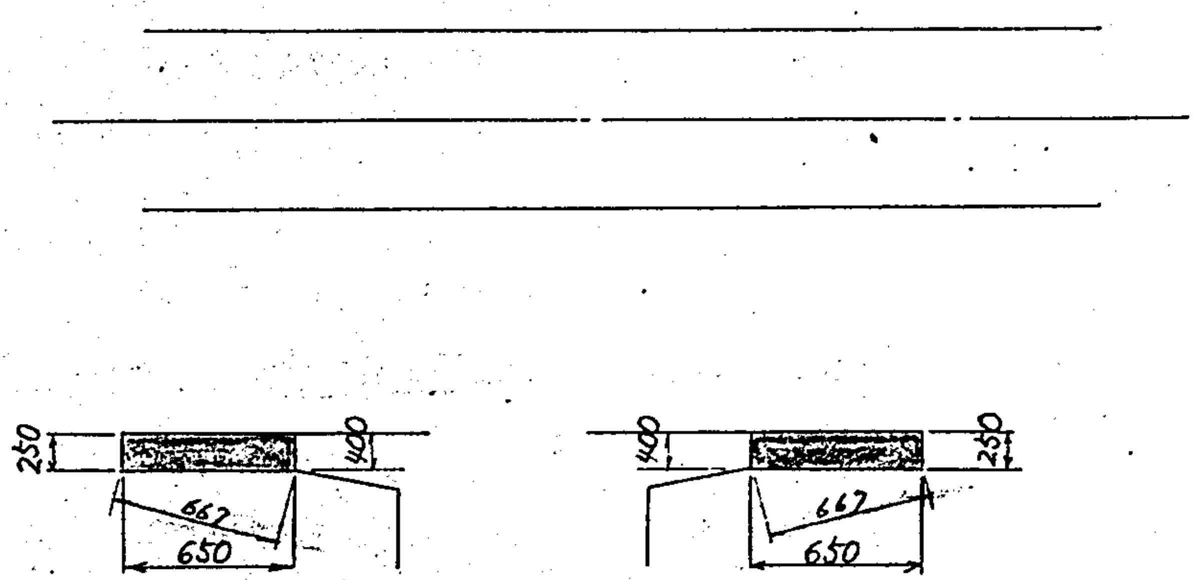
$$= 2.744$$

$$\Sigma V = V_F + V_D$$

$$= 5.990 + 2.744$$

$$= 8.734 \ m^3$$

3) SIDEWALK CONCRETE



① $\frac{1}{2} \times (0.250 + 0.400) \times 0.650 = 0.2113\ m^2$

② 〃 $= 0.2113$ 〃

$A_s = 0.4226\ m^2$

$$V_s = A_s \times L_G$$
$$= 0.4226 \times 24.960$$
$$= 10.548\ m^3$$

2. FOR CONCRETE FORM AREA

1) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{0.0800 \times 1.000 \times 2 + 0.200 \times (\overbrace{24.960 - 0.80 \times 2 - 0.40 \times 3}^{22.160})\}$$

$$\times 3 = 13.776\ m^2$$

$$A_2 = \{(\overbrace{0.3952 \times 1.000 \times 2 + 0.400 \times 0.800}^{1.1104}) \times 2$$

$$+ (\overbrace{0.2352 \times 1.000 \times 2 + 0.400 \times 0.400}^{0.6304}) \times 3\} \times 3.0$$

$$= 12.336\ m^2$$

$$\Sigma A = A_1 + A_2$$

$$= 13.776 + 12.336$$

$$= 26.112\ m^2$$

2) SIDEWALK

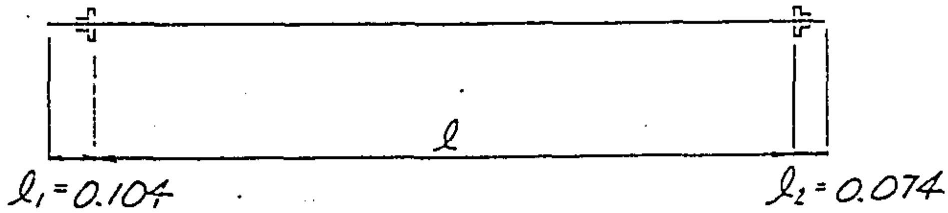
$$A = (0.667 + 0.250) \times 24.960 \times 1.000 \times 2$$

$$+ 0.2113 m^2 \times 1.000 \times 2 \times 2 = 46.622 m^2$$

3. POST - TENSIONING BARS

I) P.C. BAR

$\phi\ 23^{mm}$ (SPECIAL GRADE)



$$\ell_1 + \ell_2 = 0.104 + 0.074 = 0.178^{m}$$

$$\ell_p = \ell + \ell_1 + \ell_2$$

	ℓ (m)	$\ell_1+\ell_2$ (m)	ℓ_p (m)	N_p	$L_p = N_p \cdot \ell_p$
SLAB	4.600	0.178	4.778	19	90.782
CROSS BEAM	4.220	0.178	4.398	11	48.378
TOTAL					$\Sigma L_p = 139.160^{m}$

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 139.160$$
$$= 453.66^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$$L_S = \Sigma L_P - (l_1 + l_2) \times N_P$$
$$= 139.160 - 0.178 \times 30$$
$$= 133.820^{m}$$

3) GROUT

$\phi 35^{mm}$

$$L_G = L_S = 133.820^{m}$$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$$N_C = N_P \times 2$$
$$= 30 \times 2$$
$$= 60$$

4. REINFORCING BAR (SD 30)

	W (kg)
D16	672.2
D13	940.1
D10	395.7
TOTAL	2008.0

5. ELASTOMERIC BEARING PADS

1) FIXED SUPPORT

FOR $R = 100$ ton

$N = 4$, $200 \times 600 \times 14$ (3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 100$ ton

$N = 4$, $200 \times 600 \times 14$ (3 PLIES)

6. ANCHORIMG BAR (SS 41)

1) FIXED SIDE

FOR $\phi\ 75^{mm}$, $N = 3$

$l = 970^{mm}$, $W = 100.98^{kg}$

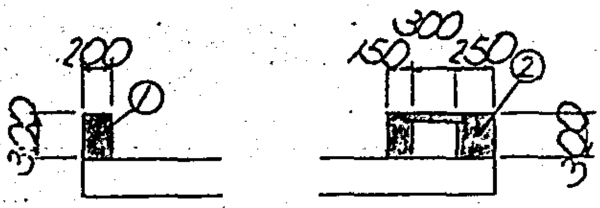
2) MOVABLE SIDE

FOR $\phi\ 70^{mm}$ $N = 3$

$l = 910^{mm}$, $W = 82.44^{kg}$

§ 3 BRIDGE FACE WORK

1, BRIDGE RAILING AND DUCT



① $0.300 \times 0.200 = 0.0600\ m^2$

② 0.700×0.300

$- 0.300 \times 0.250 = 0.1350\ m^2$

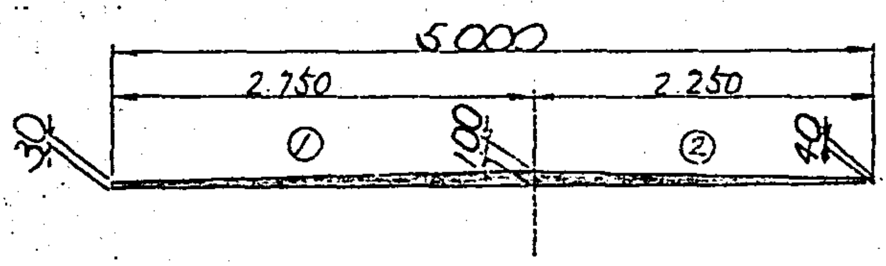
$\Sigma A_1 = 0.1950\ m^2$

$\Sigma V = 0.1950\ m^2 \times 24.960 = 4.867\ m^3$

$\Sigma A = 0.300 \times 6 \times 24.960 + 0.1950 \times 2 \times \overset{(CURB)}{1.000}$

$= 45.318\ m^2$

2, MORTAR WITH SLOPE-PROTECTIVE MORTAR



① $1/2 \times (0.030 + 0.100) \times 2.750 = 0.1788\ m^2$

② $1/2 \times (0.100 + 0.040) \times 2.250 = 0.1575$ "

$A_w = 0.3363\ m^2$

$V = A_w \times L_G$

$= 0.3363 \times 24.960$

$= 8.394\ m^3$

$L = 20^{M}$, $H = 1.80^{M}$ Straight

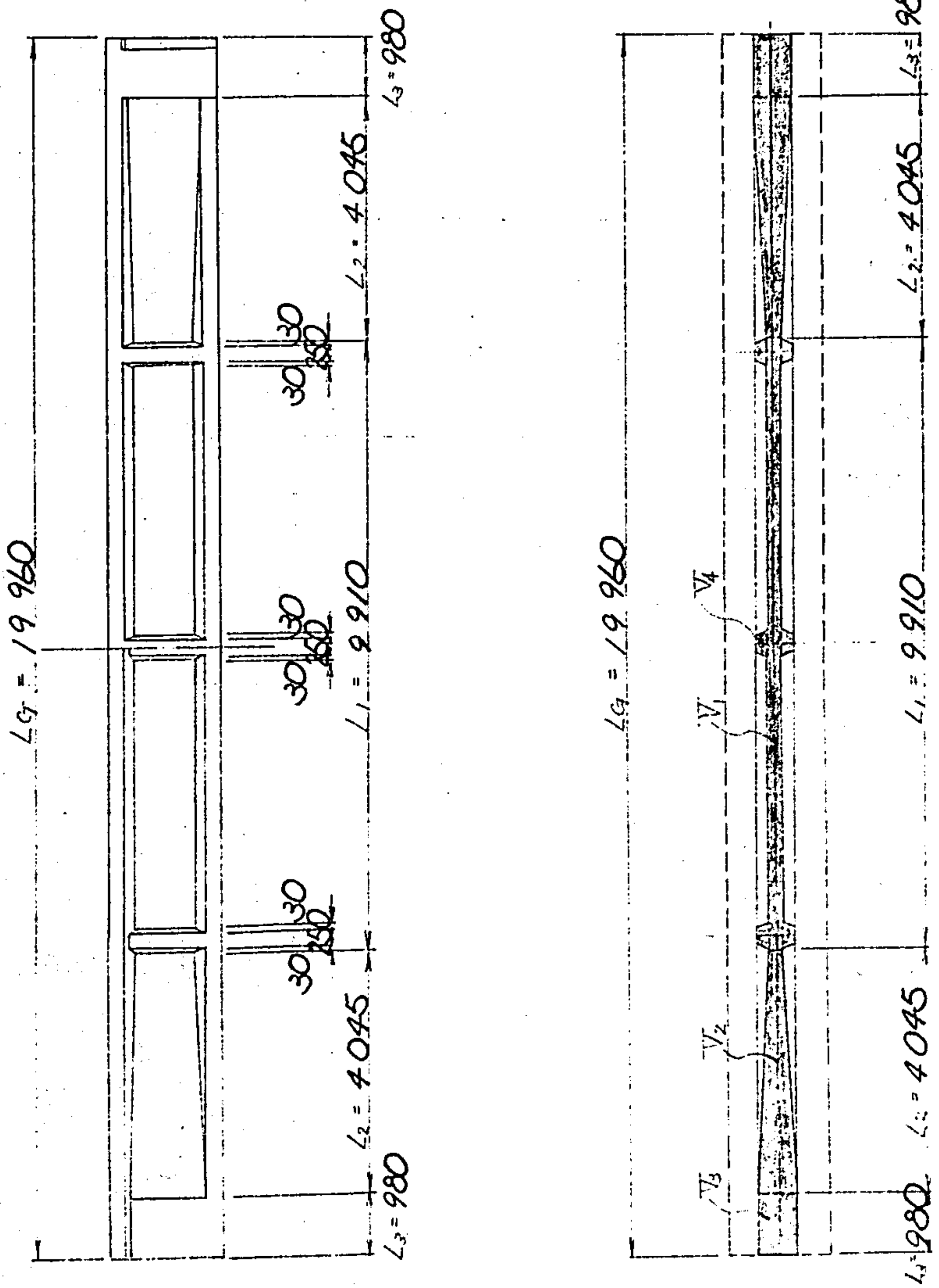
SUPERSTRUCTURE MATERIAL SCHEDULE

B 03 - PC05

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A ($fc' = 400$ kg/cm²)	m³	49.7
	P.C.	12 T 12.7 ($fs' = 190$ kg/mm²)	kg	1960.4
	SHEATH	φ65 and φ70	m	175.5 20.0
	FORMS		m²	227.0
	ANCHORING DEVICE	FOR 12 T 12.7	EACH	20
	REINFORCING BAR	19	kg	—
		16	〃	557.2
		13	〃	3029.6
		10	〃	74.2
		TOTAL	〃	3661.0
LATERAL JOINT	CONCRETE	CLASS B ($fc' = 300$ kg/cm²)	m³	6.3
	P.C. BAR	φ23 ($fs' = 110$ kg/mm²)	kg	601.7
	SHEATH	φ35	m	175.3
	FORMS		m²	27.0
	ANCHOR PLATE, NUT	FOR φ23	EACH	104
	REINFORCING BAR	16	kg	757.4
		13	〃	1537.4
		10	〃	66.7
		TOTAL	〃	2361.5
SIDEWALK CONCRETE		CLASS C ($fc' = 240$ kg/cm²)	m³	11.5
BRIDGE RAILING AND DUCT		CONCRETE	m³	3.9
		FORMS	m²	36.3
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m³	6.7
DRAINAGE			EACH	4
ELASTOMERIC BEARING PADS		FIX. FOR R = 140 ton	〃	2
		MOV. FOR R = 140 ton	〃	2

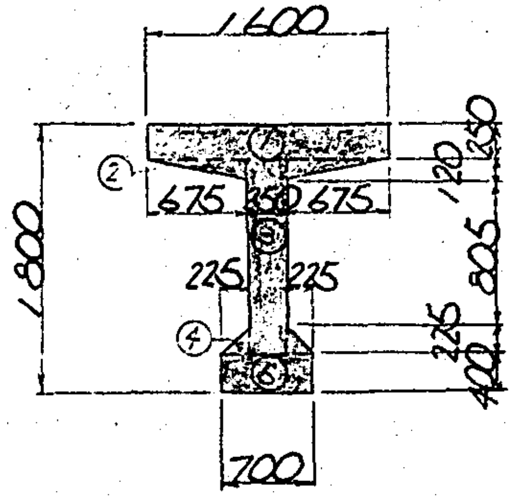
§ I MAIN BEAM

I, CONCRETE VOLUME



I) SECTION AREA

a) AT SPAN CENTER



$$① \quad 1.600 \times 0.250 = 0.4000 \; m^2$$

$$② \quad \tfrac{1}{2} \times 0.675 \times 0.120 \times 2 = 0.0810 \; ''$$

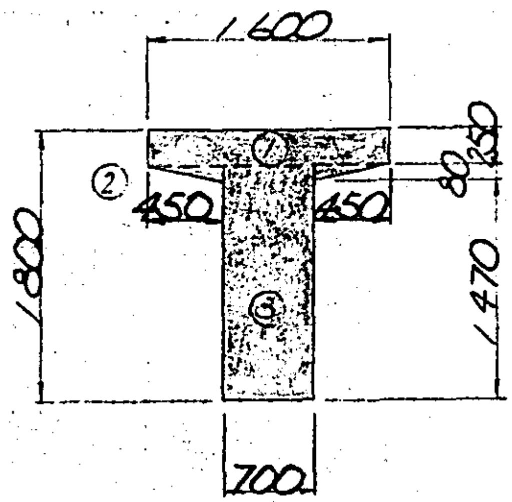
$$③ \quad 0.250 \times 1.150 = 0.2875 \; ''$$

$$④ \quad \tfrac{1}{2} \times 0.225 \times 0.225 \times 2 = 0.0506 \; ''$$

$$⑤ \quad 0.700 \times 0.400 = 0.2800 \; ''$$

$$A_1 = 1.0991 \; m^2$$

b) AT SUPPORT POINT



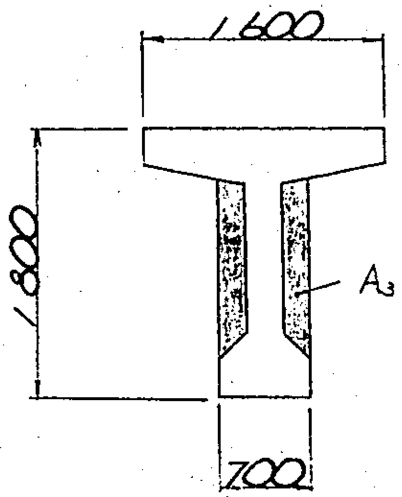
$$① \quad 1.600 \times 0.250 = 0.4000 \; m^2$$

$$② \quad \tfrac{1}{2} \times 0.450 \times 0.080 \times 2 = 0.0360 \; ''$$

$$③ \quad 0.700 \times 1.550 = 1.0850 \; ''$$

$$A_2 = 1.5210 \; m^2$$

c) CENTRAL DIAPHRAGM



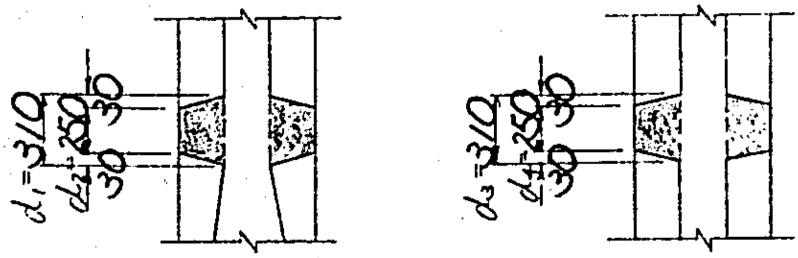
$$A_3 = A_2 - A_1$$
$$= 1.5210 - 1.0991$$
$$= 0.4219 \ m^2$$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_1 = A_1 \times L_1$$
$$= 1.0991 \times 9.910 = 10.892 \ m^3$$

$$V_2 = \tfrac{1}{2} \times (A_1 + A_2) \times L_2 \times 2$$
$$= \tfrac{1}{2} \times (1.0991 + 1.5210) \times 4.045 \times 2 = 10.598 \ m^3$$

$$V_3 = A_2 \times L_3 \times 2$$
$$= 1.5210 \times 0.980 \times 2 = 2.981 \ m^3$$



$$\nabla_4 = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2} \right) \times 2 + \left(\frac{d_3 + d_4}{2} \right) \right\}$$

$$= 0.4219 \times \left\{ \left(\frac{0.310 + 0.250}{2} \right) \times 2 + \left(\frac{0.310 + 0.250}{2} \right) \right\}$$

$$= 0.354 \ m^3$$

$$\sum \nabla = (\nabla_1 + \nabla_2 + \nabla_3 + \nabla_4) \times N_G$$

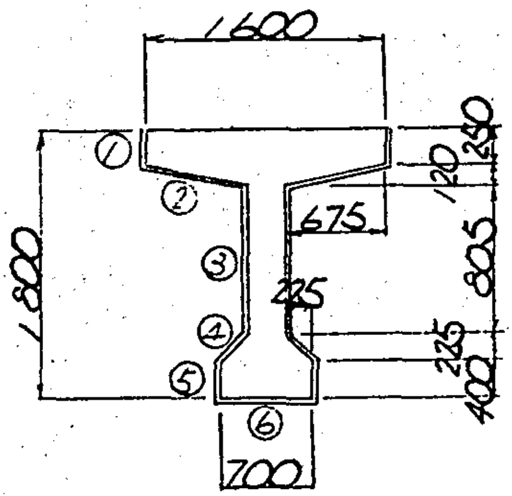
$$= (10.892 + 10.598 + 2.981 + 0.354) \times 2$$

$$= 49.650 \ m^3$$

2, FOR CONCRETE FORM AREA

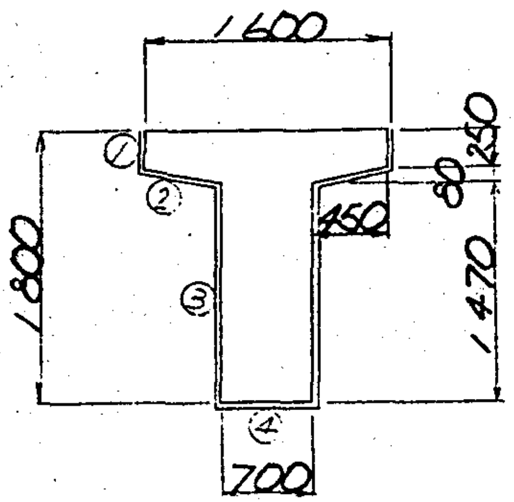
I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



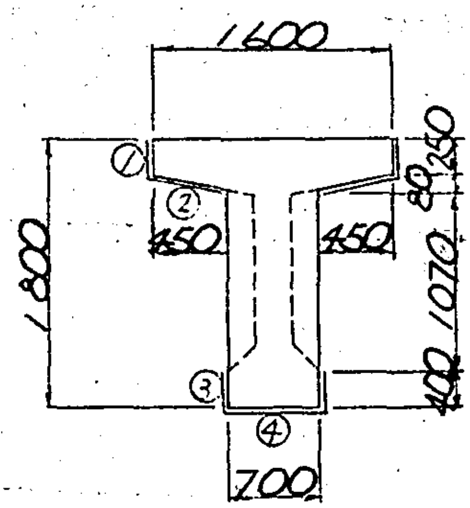
①	0.250×2	$= 0.500$ m
②	$\sqrt{0.675^2 + 0.120^2} \times 2$	$= 1.371$ "
③	0.805×2	$= 1.610$ "
④	$\sqrt{0.225^2 + 0.225^2} \times 2$	$= 0.636$ "
⑤	0.400×2	$= 0.800$ "
⑥		$= 0.700$ "
	L_1	$= 5.617$ m

b) AT SUPPORT POINT



①	0.250×2	$= 0.500$ m
②	$\sqrt{0.450^2 + 0.080^2} \times 2$	$= 0.914$ "
③	1.470×2	$= 2.940$ "
④		$= 0.700$ "
	L_2	$= 5.054$ m

c) CENTRAL DIAPHRAGM



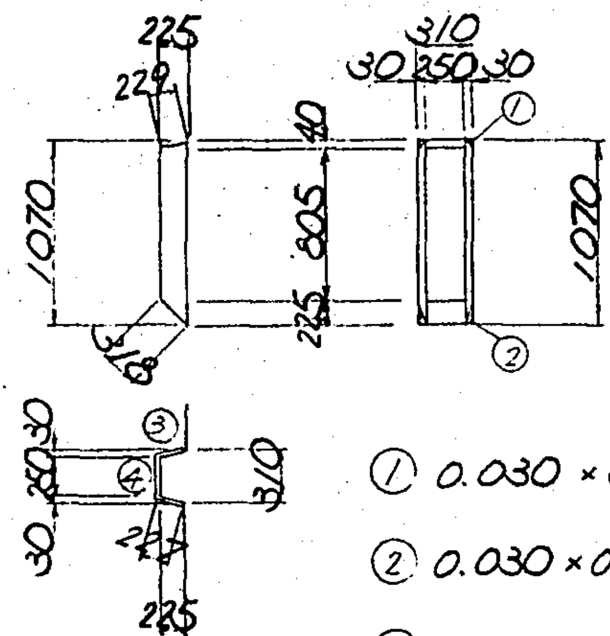
① $0.250 \times 2 = 0.500$ m

② $\sqrt{0.450^2 + 0.080^2} \times 2 = 0.914$ 〃

③ $0.400 \times 2 = 0.800$ 〃

④ $= 0.700$ 〃

$L_3 = 2.914$ m



① $0.030 \times 0.229 \times \frac{1}{2} \times 2 = 0.0069$ m²

② $0.030 \times 0.318 \times \frac{1}{2} \times 2 = 0.0095$ 〃

③ $(1.070 + 0.805) \times 0.227 \times \frac{1}{2} \times 2 = 0.4256$ 〃

④ $0.250 \times 1.070 = 0.2675$ 〃

$a_1 = 0.7095$ m²

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$$A_1 = L_1 \times 4.490 \times 2$$

$$= 5.617 \times 4.490 \times 2 = 50.441 \ m^2$$

$$A_2 = (L_1 + L_2) \times \frac{1}{2} \times 4.045 \times 2$$

$$= (5.617 + 5.054) \times \frac{1}{2} \times 4.045 \times 2 = 43.164 \ m^2$$

** FOR CONCRETE VOLUME --- A2 **

$$A_3 = A_2 \times \text{COSEC}\theta \times 2 + L_2 \times 0.980 \times 2$$

$$= 1.5210 \ m^2 \times 1.000 \times 2 + 5.054 \times 0.980 \times 2$$

$$= 12.948 \ m^2$$

$$\text{COSEC } 90°00'00'' = 1.000$$

$$A_4 = L_3 \times 0.310 \times 3$$

$$= 2.914 \times 0.310 \times 3 = 2.710 \ m^2$$

$$A_5 = a_1 \times 2 \times 3$$

$$= 0.7095 \ m^2 \times 2 \times 3 = 4.257 \ m^2$$

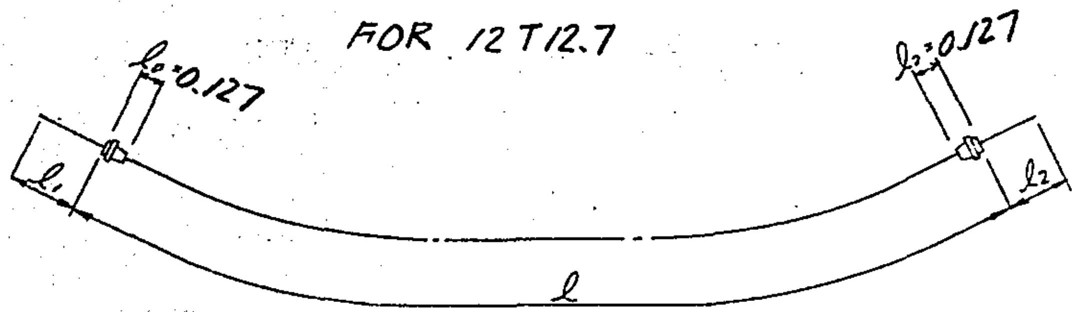
$$\Sigma A = (A_1 + A_2 + A_3 + A_4 + A_5) \times N_G$$

$$= (50.441 + 43.164 + 12.948 + 2.710 + 4.257) \times 2$$

$$= 227.040 \ m^2$$

3, PRESTRESSING STEEL

I) MAIN CABLE



$$l_1 + l_2 = 1.300^{m} \qquad l_1 = l_2$$

$$\therefore l_p = l + l_1 + l_2$$

No	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_p	$L_p = N_p \times l_p$
C_1	19.938	1.300	21.238	2	42.476
C_2	19.852	〃	21.152	2	42.304
C_3	19.794	〃	21.094	2	42.188
C_4	19.736	〃	21.036	2	42.072
C_5	19.692	〃	20.992	2	41.984
TOTAL	$\Sigma L_p = 211.024^{m}$				

$$\Sigma W_p = \gamma_p \times \Sigma L_p$$

$$= 9.29^{kg/m} \times 211.024$$

$$= 1960.41^{kg}$$

2) SHETH

$\phi 70^{mm}$,

$L_{s_1} = 2.000 \times 5 \times 2 = 20.000^{m}$

$\phi 65^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.554) \times 5 \times 2 = 175.484^{m}$

3) GROUT

$\phi 65^{mm}, \phi 70^{m}$

$L_G = \Sigma L_p - (l_1 + l_2) \times N_p \times N_G$

$= 211.024 - 1.300 \times 5 \times 2 = 198.024^{m}$

4) ANCHORING DEVICE

FOR $12T12.7^{mm}$

$N_c = N_p \times N_G \times 2$

$= 5 \times 2 \times 2$

$= 20$

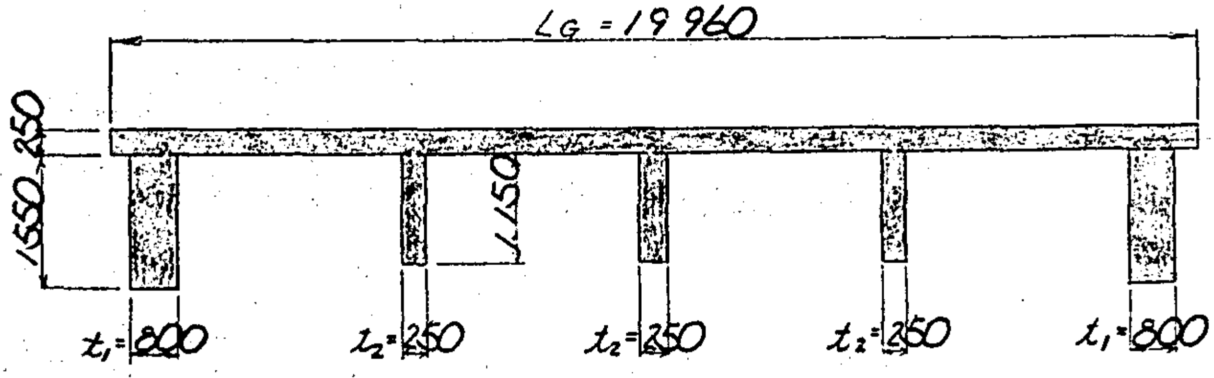
4, REINFORCING BAR (SD30)

	W (Kg)
D16	557.2
D13	3029.6
D10	74.2
TOTAL	3661.0

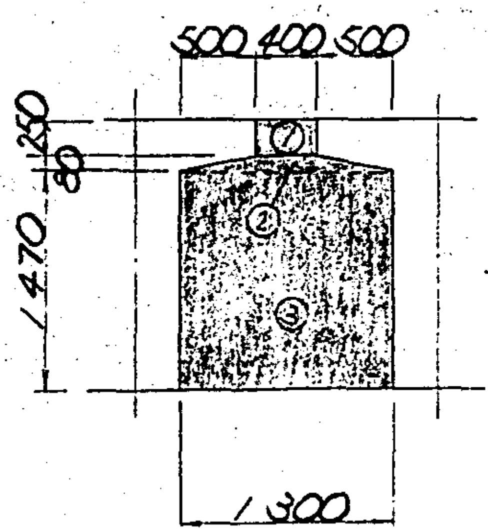
§2 LATERAL JOINT

I. CONCRETE VOLUME

I) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



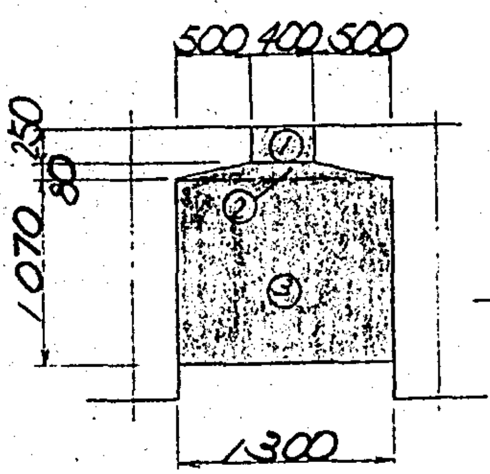
① = A_F = 0.400 × 0.250 = 0.1000 m^2

② ½ × (0.400 + 1.300) × 0.080 = 0.0680 "

③ 1.470 × 1.300 = 1.9110 "

② + ③ = A_{D_1} = 1.9790 m^2

b) CENTRAL CROSS BEAM



② ½ × (0.400 + 1.300) × 0.080 = 0.0680 m^2

③ 1.070 × 1.300 = 1.3910 "

② + ③ = A_{D_2} = 1.4590 m^2

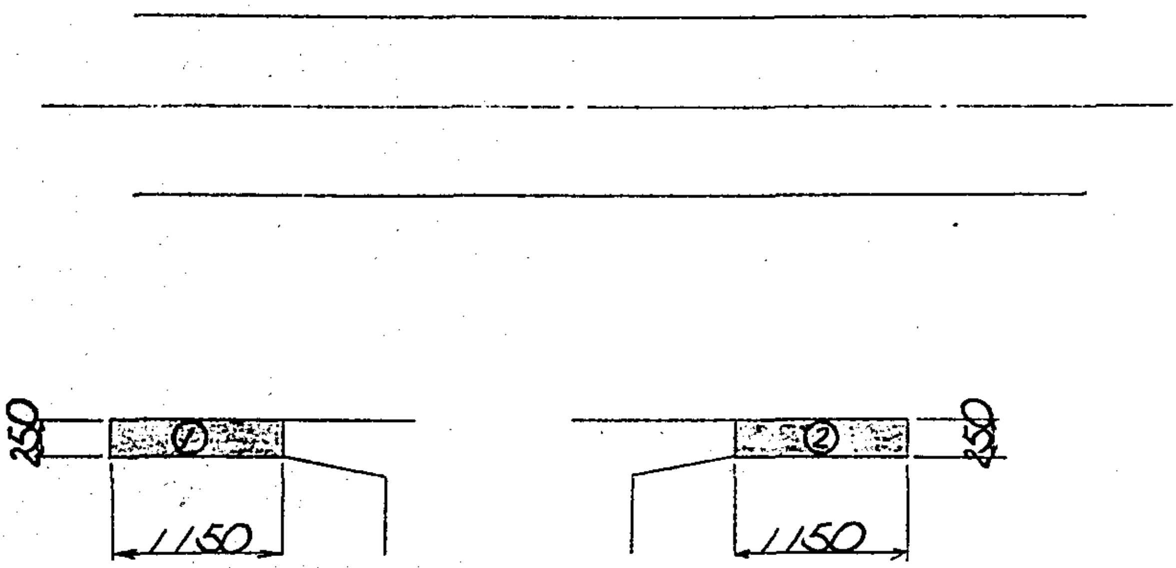
2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_F = A_F \times L_G \times N_F$$
$$= 0.1000^{m^2} \times 19.960 \times 1.0 = 1.996 \ m^3$$

$$V_D = A_{D1} \times t_1 \times 2 + A_{D2} \times t_2 \times 3$$
$$= 1.9790^{m^2} \times 0.800 \times 2 + 1.4590^{m^2} \times 0.250 \times 3$$
$$= 4.261 \ m^3$$

$$\Sigma V = V_F + V_D$$
$$= 1.996 + 4.261$$
$$= 6.257 \ m^3$$

3) SIDEWALK CONCRETE



① $1.150 \times 0.250 \qquad = 0.2875\ m^2$

② $\quad ″ \qquad = 0.2875\ ″$

$A_s = 0.5750\ m^2$

$$V_s = A_s \times L_G$$
$$= 0.5750 \times 19.960$$
$$= 11.477\ m^3$$

2. FOR CONCRETE FORM AREA

I) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{0.1000^{m^2} \times \overset{\text{corr}\theta}{\overset{\shortparallel}{1.000}} \times 2 + 0.400 \times (19.960 - 0.80 \times 2 - 0.250 \times 3)\} \times 1 = 7.244^{m^2}$$

$$A_2 = \{(1.9790^{m^2} \times 1.000 \times 2 + 1.300 \times 0.800) \times 2 + (1.4590^{m^2} \times 1.000 \times 2 + 1.300 \times 0.250) \times 3\} \times 1.0 = 19.725^{m^2}$$

$$\Sigma A = A_1 + A_2 = 7.244 + 19.725 = 26.969^{m^2}$$

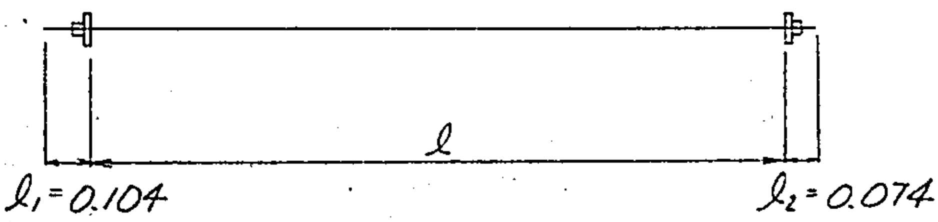
2) SIDEWALK

$$A = (1.150 + 0.250) \times 19.960 \times 1.000 \times 2 + 0.2875^{m^2} \times 1.000 \times 2 \times 2 = 57.038^{m^2}$$

3. POST - TENSIONING BARS

I) P.C. BAR

$\phi\ 23^{mm}$ (SPECIAL GRADE)



$$l_1 + l_2 = 0.104 + 0.074 = 0.178^{m}$$

$$l_p = l + l_1 + l_2$$

	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_p	$L_p = N_p \cdot l_p$
SLAB	3.600	0.178	3.778	41	154.898
CROSS BEAM	2.520	0.178	2.698	11	29.678
TOTAL	$\Sigma L_p = 184.576^{m}$				

$$\Sigma W_p = 3.26^{kg/m} \times 184.576 = 601.72^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$$L_S = \Sigma L_P - (l_1 + l_2) \times N_P$$
$$= 184.576 - 0.178 \times 52$$
$$= 175.320^{m}$$

3) GROUT

$\phi 35^{mm}$

$$L_G = L_S = 175.320^{m}$$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$$N_C = N_P \times 2$$
$$= 52 \times 2$$
$$= 104$$

4. REINFORCING BAR (SD 30)

	W (kg)
D16	757.4
D13	1537.4
D10	66.7
TOTAL	2361.5

5. ELASTOMERIC BEARING PADS

I) FIXED SUPPORT

FOR $R = 140^{ton}$

$N = 2$, $350 \times 500 \times 12$
(3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 140^{ton}$

$N = 2$, $350 \times 500 \times 12$
(3 PLIES)

6. ANCHORIMG BAR (SS 4I)

I) FIXED SIDE

FOR $\phi\ 75^{mm}$, $N = 2$

$\ell = 970^{mm}$, $W = 67.32^{kg}$

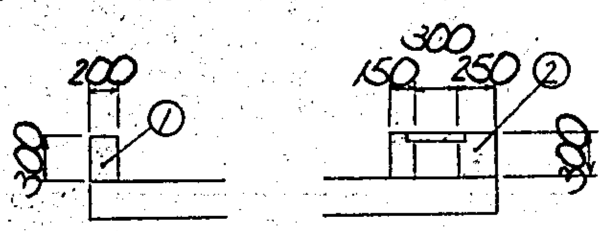
2) MOVABLE SIDE

FOR $\phi\ 70^{mm}$ $N = 2$

$\ell = 910^{mm}$, $W = 54.96^{kg}$

§ 3 BRIDGE FACE WORK

1, BRIDGE RAILING AND DUCT



① $0.300 \times 0.200 = 0.0600 \ m^2$

② 0.700×0.300 〃

$-0.300 \times 0.250 = 0.1350$

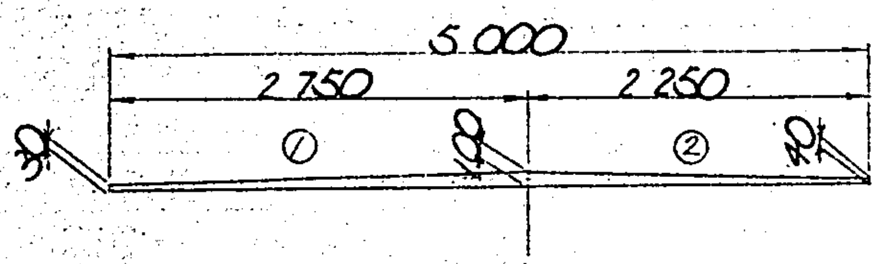
$\Sigma A = 0.1950 \ m^2$

$$\Sigma V = 0.1950^{m^2} \times 19.960 = 3.892^{m^3}$$

coleco

$$\Sigma A = 0.300 \times 6 \times 19.960 + 0.1950 \times 2 \times 1.000$$
$$= 36.318^{m^2}$$

2, MORTAR WITH SLOPE-PROTECTIVE MORTAR



① $\frac{1}{2} \times (0.030 + 0.100) \times 2.750 = 0.1788 \ m^2$

② $\frac{1}{2} \times (0.100 + 0.040) \times 2.250 = 0.1575$ 〃

$A_w = 0.3363 \ m^2$

$$V = A_w \times L_G$$
$$= 0.3363 \times 19.960$$
$$= 6.713 \ m^3$$

L = 30 M, H = 1.80 M Straight

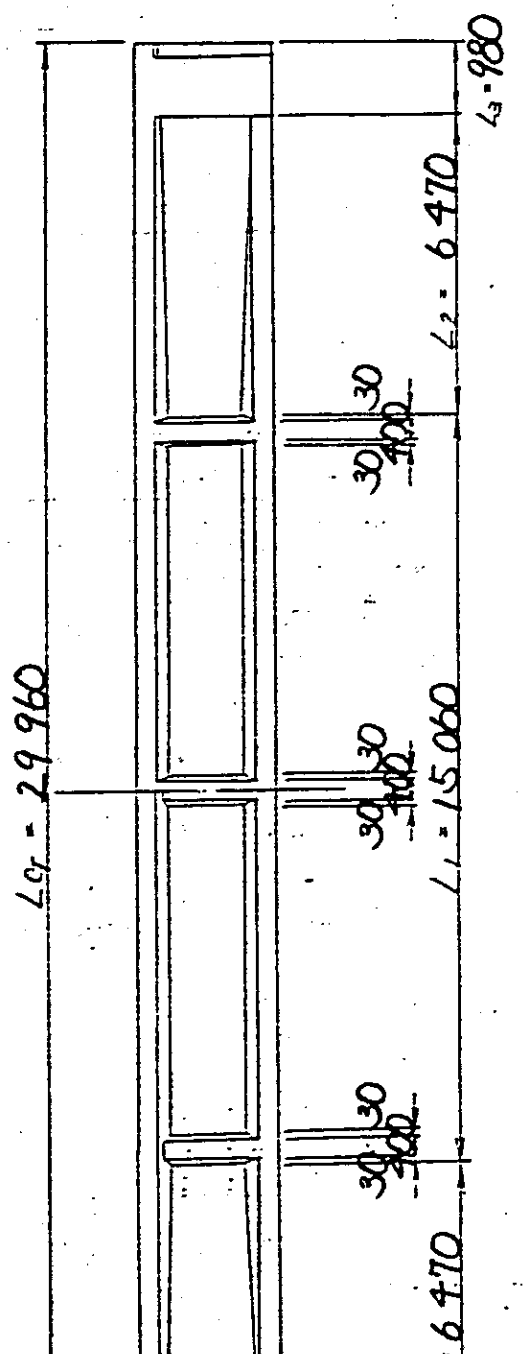
SUPERSTRUCTURE MATERIAL SCHEDULE

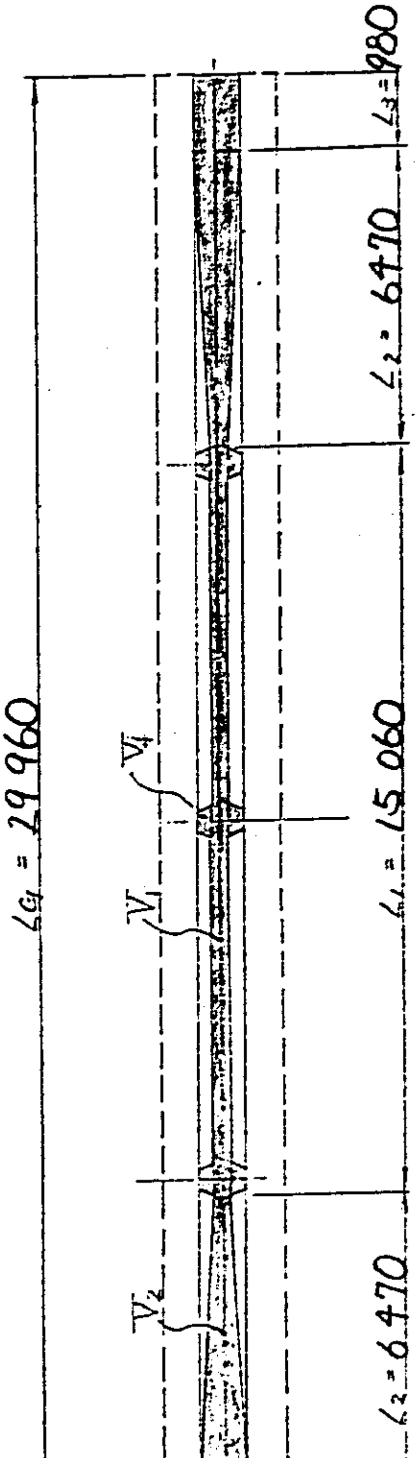
B 03 - PC06

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A (f_c'=400 kg/cm²)	m³	127.5
	P.C. STRAND	12T 12.7 (f_s'= 190 kg/mm²)	kg	6936.7
	SHEATH	φ65 and φ70	m	661.4 48.0
	FORMS		m²	582.5
	ANCHORING DEVICE	FOR 12T12.7	EACH	48
	REINFORCING BAR	19	kg	—
		16	〃	1490.6
		13	〃	6660.5
		10	〃	52.6
		TOTAL	〃	8203.7
LATERAL JOINT	CONCRETE	CLASS B (f_c'=300 kg/cm²)	m³	10.3
	P.C. BAR	φ23 (f_s'=110 kg/mm²)	kg	430.9
	SHEATH	φ35	m	126.1
	FORMS		m²	29.7
	ANCHOR PLATE, NUT	FOR φ23	EACH	68
	REINFORCING BAR	16	kg	987.5
		13	〃	1505.3
		10	〃	472.9
		TOTAL	〃	2965.7
SIDEWALK CONCRETE		CLASS C (f_c'=240 kg/cm²)	m³	20.5
BRIDGE RAILING AND DUCT		CONCRETE	m³	5.8
		FORMS	m²	54.3
MORTAR WITH SLOPE-PROTECTIVE MORTAR		-	m³	10.1
DRAINAGE			EACH	8
ELASTOMERIC BEARING PADS		FIX. FOR R = 120 ton	〃	4
		MOV. FOR R = 120 ton	〃	4

§ I MAIN BEAM

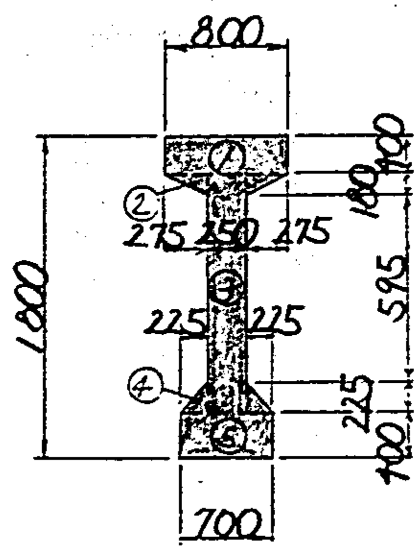
I. CONCRETE VOLUME





I) SECTION AREA

a) AT SPAN CENTER



① $0.800 \times 0.400 = 0.3200\ m^2$

② $\frac{1}{2} \times 0.275 \times 0.180 \times 2 = 0.0495$

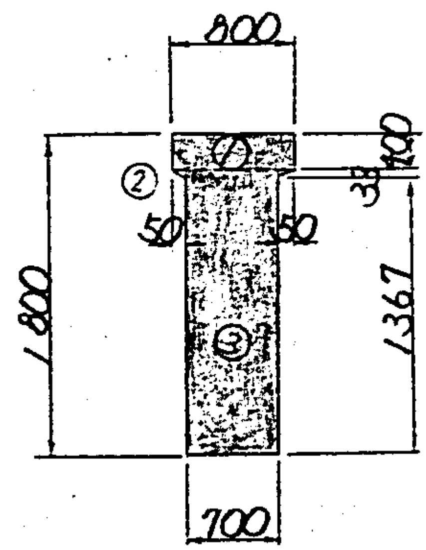
③ $1.000 \times 0.250 = 0.2500$

④ $\frac{1}{2} \times 0.225 \times 0.225 \times 2 = 0.0506$

⑤ $0.700 \times 0.400 = 0.2800$

$A_1 = 0.9501\ m^2$

b) AT SUPPORT POINT



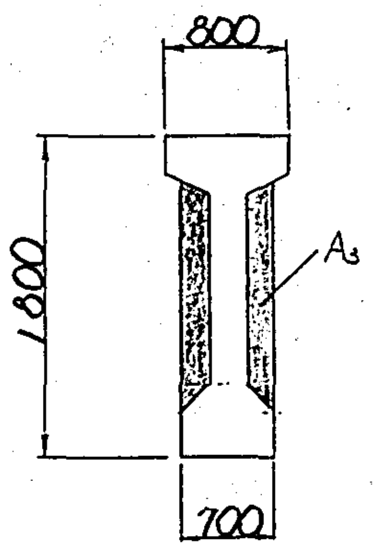
① $0.800 \times 0.400 = 0.3200\ m^2$

② $\frac{1}{2} \times 0.050 \times 0.033 \times 2 = 0.0017$

③ $1.400 \times 0.700 = 0.9800$

$A_2 = 1.3017\ m^2$

c) CENTRAL DIRPERAGM



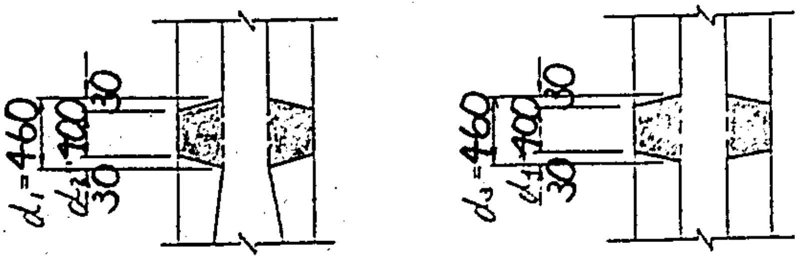
$$A_3 = A_2 - A_1$$
$$= 1.3017 - 0.9501$$
$$= 0.3516 \ m^2$$

2) QUANTITY CALCULATION FOR COCRETE VOLUME ...

$$V_1 = A_1 \times L_1$$
$$= 0.9501 \times 15.060 = 14.309 \ m^3$$

$$V_2 = \frac{1}{2} \times (A_1 + A_2) \times L_2 \times 2$$
$$= \frac{1}{2} \times (0.9501 + 1.3017) \times 6.470 \times 2$$
$$= 14.569 \ m^3$$

$$V_3 = A_2 \times L_3 \times 2$$
$$= 1.3017 \times 0.980 \times 2$$
$$= 2.551 \ m^3$$



$$\nabla_4 = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2} \right) \times 2 + \left(\frac{d_3 + d_4}{2} \right) \right\}$$

$$= 0.3516 \times \left\{ \left(\frac{0.460 + 0.400}{2} \right) \times 2 + \left(\frac{0.460 + 0.400}{2} \right) \right\}$$

$$= 0.454 \ m^3$$

$$\Sigma \nabla = (\nabla_1 + \nabla_2 + \nabla_3 + \nabla_4) \times N_G$$

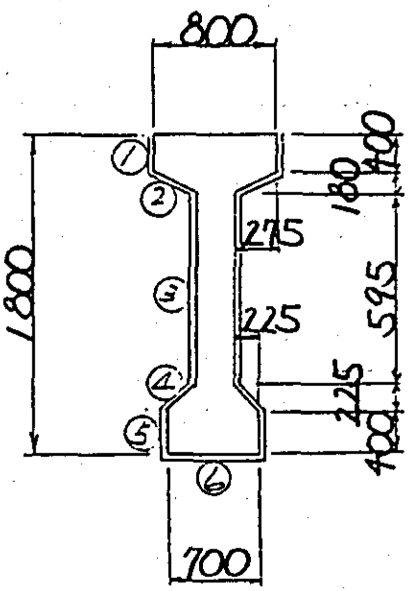
$$= (14.309 + 14.569 + 2.551 + 0.454) \times 4$$

$$= 127.532 \ m^3$$

2. FOR CONCRETE FORM AREA

I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



① $0.400 \times 2 = 0.800$ m

② $\sqrt{0.275^2+0.180^2} \times 2 = 0.657$

③ $0.595 \times 2 = 1.190$

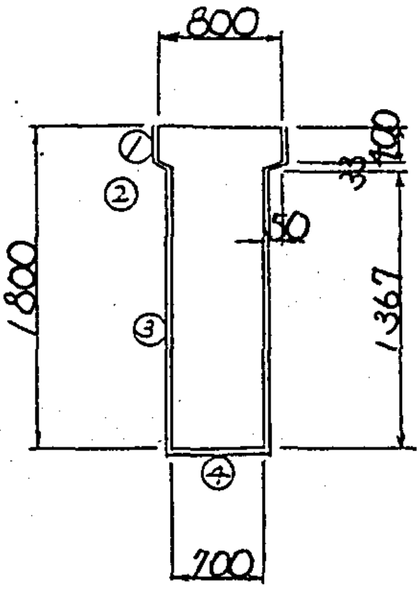
④ $\sqrt{0.225^2+0.225^2} \times 2 = 0.636$

⑤ $0.400 \times 2 = 0.800$

⑥ $= 0.700$

$L_1 = 4.783$ m

b) AT SUPPORT POINT



① $0.400 \times 2 = 0.800$ m

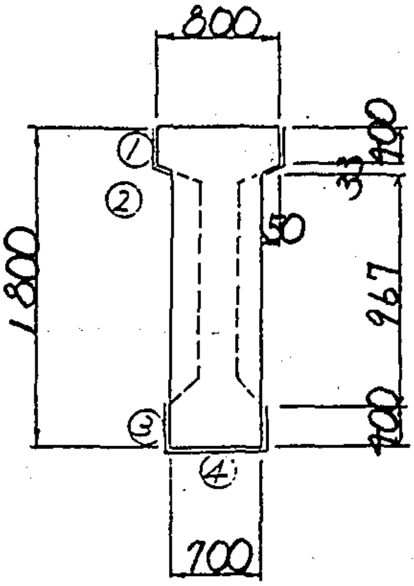
② $\sqrt{0.050^2+0.033^2} \times 2 = 0.120$

③ $1.367 \times 2 = 2.734$

④ $= 0.700$

$L_2 = 4.354$ m

c) CENTRAL DIAPHRAGM



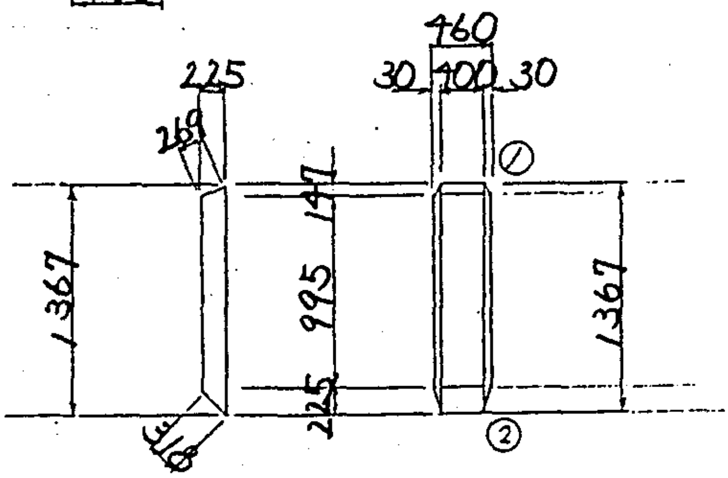
① $0.400 \times 2 = 0.800^{m}$

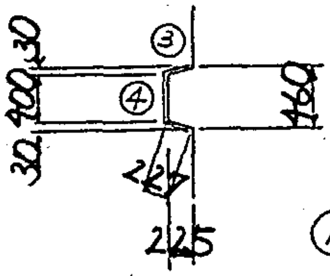
② $\sqrt{0.050^2 + 0.033^2} \times 2 = 0.120$

③ $0.400 \times 2 = 0.800$

④ $= 0.700$

$L_3 = 2.420^{m}$





① $0.030 \times 0.269 \times 1/2 \times 2 = 0.0081^{m^2}$

② $0.030 \times 0.318 \times 1/2 \times 2 = 0.0095$

③ $(0.995 + 1.367) \times 1/2 \times 0.227 \times 2 = 0.5362$

④ $0.4 \times 1.367 = 0.5468$

$a_1 = 1.1006^{m^2}$

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$A_1 = L_1 \times 6.84 \times 2$

$= 4.783 \times 6.84 \times 2 = 65.431\ m^2$

$A_2 = (L_1 + L_2) \times 1/2 \times 6.470 \times 2$

$= (4.783 + 4.354) \times 1/2 \times 6.470 \times 2 = 59.116\ m^2$

** FOR CONCRETE VOLUME --- A2 **

$A_3 = A_2 \times COSEC\theta \times 2 + L_2 \times 0.980 \times 2$

$= 1.3017 \times 1.000 \times 2 + 4.354 \times 0.980 \times 2$

$= 11.137\ m^2$

$COSEC\ 90°00'00'' = 1.000$

$A_4 = L_3 \times 0.460 \times 3$

$= 2.420 \times 0.460 \times 3 = 3.340\ m^2$

$A_5 = a_1 \times 2 \times 3$

$= 1.1006 \times 2 \times 3 = 6.604\ m^2$

$\Sigma A = (A_1 + A_2 + A_3 + A_4 + A_5) \times N_G$

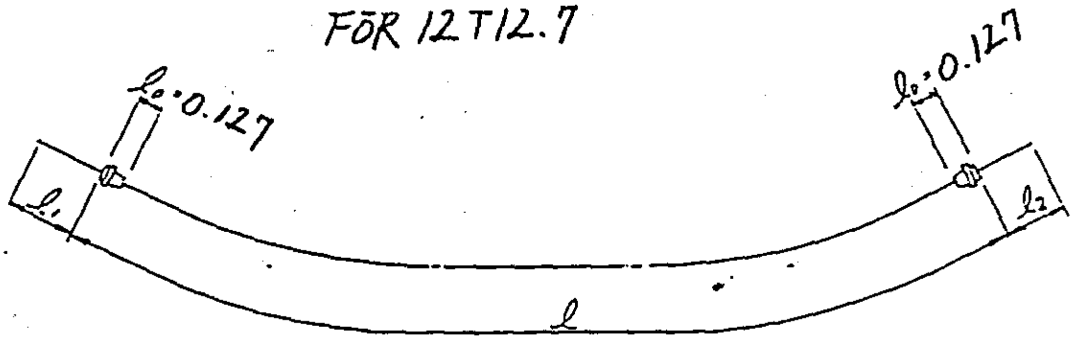
$= (65.431 + 59.116 + 11.137 + 3.340 + 6.604) \times 4$

$= 582.512\ m^2$

3, PRESTRESSING STEEL

I) MAIN CABLE

FOR 12T12.7



$l_1 + l_2 = 1.300$ m $\quad l_1 = l_2$

$l_p = l + l_1 + l_2$

No	l (m)	$l_1 + l_2$ (m)	l_p (m)	Nq	$L_p = Nq \times l_p$
C_1	29.928	1.300	31.228	4	124.912
C_2	29.928	1.300	31.228	4	124.912
C_3	29.842	1.300	31.142	4	124.568
C_4	29.782	1.300	31.082	4	124.328
C_5	29.716	1.300	31.016	4	124.064
C_6	29.676	1.300	30.976	4	123.904
TOTAL					$\Sigma L_p = 746.688$ m

$\Sigma W_p = \gamma_p \times \Sigma L_p$

$= 9.29^{kg/m} \times 746.688$

$= 6936.73^{kg}$

2) SHETH

$\phi 70^{mm}$,

$L_{S_1} = 2.000 \times 6 \times 4 = 48.000^{m}$

$\phi 65^{mm}$

$L_{S_2} = \Sigma L_p - (2.000 + 1.554) \times 6 \times 4 = 661.392^{m}$

3) GROUT

$\phi 65^{mm}$

$L_G = \Sigma L_p - (l_1 + l_2) \times N_p \times N_G$

$= 746.688 - 1.300 \times 6 \times 4 = 715.488^{m}$

4) ANCHORING DEVICE

FOR $12T12.7^{mm}$

$N_c = N_p \times N_G \times 2$

$= 6 \times 4 \times 2$

$= 48$

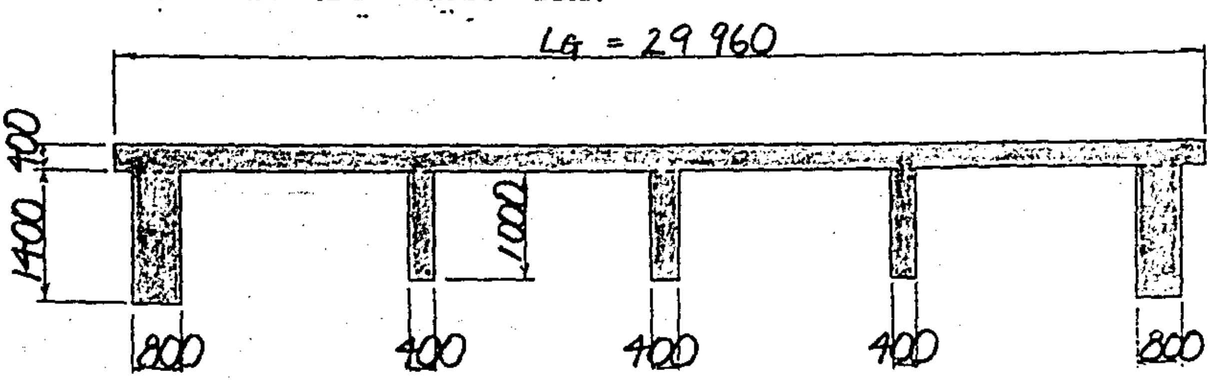
4, REINFORCING BAR (SD 30)

	W (Kg)
D16	1490.6
D13	6660.5
D10	52.6
TOTAL	8203.7

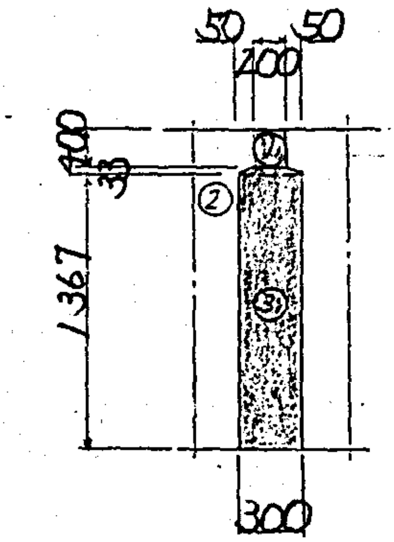
§ 2 LATERAL JOINT

I, CONCRETE VOLUME

I) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



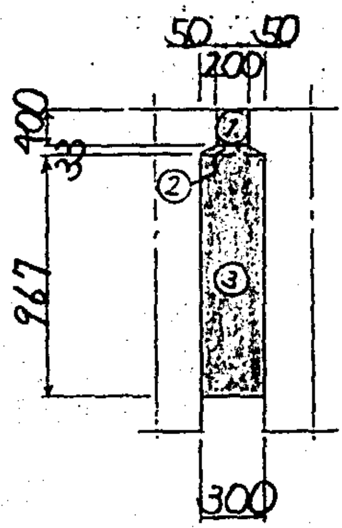
$① = A_F = 0.200 \times 0.400 = 0.0800 \ m^2$

$② \ \frac{1}{2} \times (0.200+0.300) \times 0.033 = 0.0083 \ m^2$

$③ \ 0.300 \times 1.367 = 0.4101$

$② + ③ = A_{D1} = 0.4184 \ m^2$

b) CENTRAL CROSS BEAM



$② \ \frac{1}{2} \times (0.200+0.300) \times 0.033 = 0.0083 \ m^2$

$③ \ 0.300 \times 0.967 = 0.2901$

$② + ③ = A_{D2} = 0.2984 \ m^2$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_F = A_F \times L_G \times N_F$$

$$= 0.0800 \times 29.960 \times 3 = 7.190\ m^3$$

$$V_D = (A_{D1} \times t_1 \times 2 + A_{D2} \times t_2 \times 3) \times N_F$$

$$= (0.4184 \times 0.800 \times 2 + 0.2984 \times 0.400 \times 3) \times 3$$

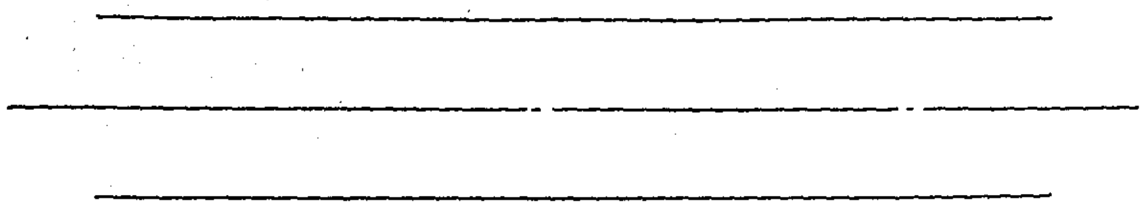
$$= 3.083\ m^3$$

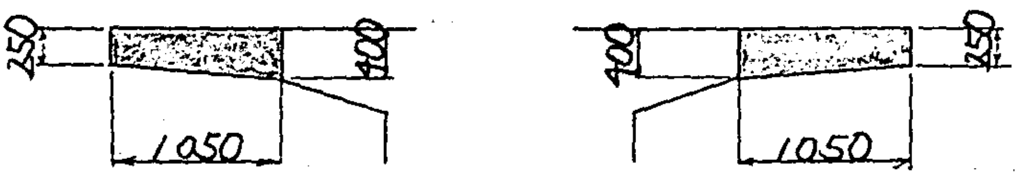
$$\Sigma V = V_F + V_D$$

$$= 7.190 + 3.083$$

$$= 10.273\ m^3$$

3) SIDEWALK CONCRETE





① $1/2 \times (0.250 + 0.400) \times 1.050 = 0.3413\ m^2$

② 〃 $= 0.3413$ 〃

$A_s = 0.6826\ m^2$

$V_s = A_s \times L_G$

$= 0.6826 \times 29.960$

$= 20.451\ m^3$

2. FOR CONCRETE FORM AREA

1) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{ 0.0800 \times 1.000 \times 2 + 0.200 \times (29.960 - 0.800 \times 2 - 0.400 \times 3) \} \times 3 = 16.776 \text{ m}^2$$

$$A_2 = \{ (0.4184 \times 1.000 \times 2 + 0.300 \times 0.800) \times 2 + (0.2984 \times 1.000 \times 2 + 0.300 \times 0.400) \times 3 \} \times 3 = 12.912 \text{ m}^2$$

$$\Sigma A = A_1 + A_2 = 16.776 + 12.912 = 29.688 \text{ m}^2$$

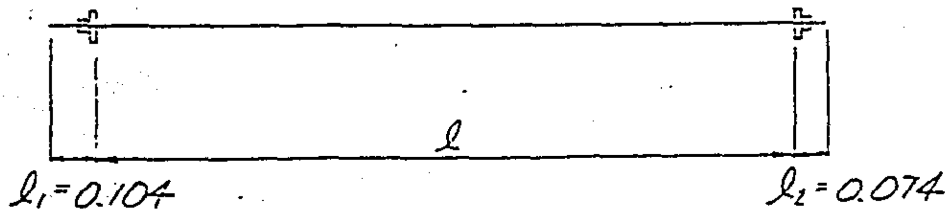
2) SIDEWALK

$$A = (\sqrt{1.050^2 + 0.150^2} + 0.250) \times 29.960 \times 2 + 0.3413 \times 1.000 \times 2 \times 2 = 79.920 \text{ m}^2$$

3. POST - TENSIONING BARS

I) P.C. BAR

$\phi\ 23^{mm}$ (SPECIAL GRADE)



$$l_1 + l_2 = 0.104 + 0.074 = 0.178^{m}$$

$$l_p = l + l_1 + l_2$$

	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_p	$L_p = N_p \cdot l_p$
SLAB	3.800	0.178	3.978	23	91.494
CROSS BEAM	3.520	0.178	3.698	11	40.678
TOTAL					$\Sigma L_p = 132.172^{m}$

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 132.172 = 430.88^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$$L_S = \Sigma L_P - (l_1 + l_2) \times N_P$$

$$= 132.172 - 0.178 \times 34$$

$$= 126.120^{m}$$

3) GROUT

$\phi 35^{mm}$

$$L_G = L_S = 126.120^{m}$$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$$N_c = N_P \times 2$$

$$= 34 \times 2$$

$$= 68$$

4) REINFORCING BAR (SD 30)

	W (kg)
D 16	987.5
D 13	1505.3
D 10	472.9
TOTAL	2965.7

5. ELASTOMERIC BEARING PADS

I) FIXED SUPPORT

FOR $R = 120$ ton

$N = 4$, $250 \times 600 \times 14$
(3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 120$ ton

$N = 4$, $250 \times 600 \times 14$
(3 PLIES)

6. ANCHORING BAR (SS 41)

I) FIXED SIDE

FOR ϕ 85 mm, $N = 3$

$l = 1090$ mm, $W = 145.52$ kg

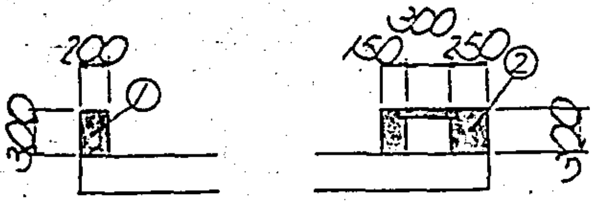
2) MOVABLE SIDE

FOR ϕ 75 mm $N = 3$

$l = 970$ mm, $W = 100.98$ kg

§ 3 BRIDGE FACE WORK

1, BRIDGE RAILING AND DUCT



① $0.300 \times 0.200 = 0.0600\ m^2$

② 0.700×0.300

$-0.300 \times 0.250 = 0.1350\ m^2$

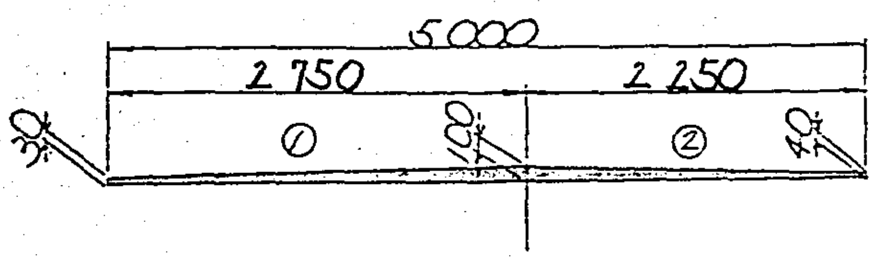
$\Sigma A_1 = 0.1950\ m^2$

$$\Sigma V = 0.1950\ m^2 \times 29.960 = 5.842\ m^3$$

$$\Sigma A = 0.300 \times 6 \times 29.960 + 0.1950 \times 2 \times \overset{\text{cases}}{1.000}$$

$$= 54.318\ m^2$$

2, MORTAR WITH SLOPE-PROTECTIVE MORTAR



① $1/2 \times (0.030 + 0.100) \times 2.750 = 0.1788\ m^2$

② $1/2 \times (0.100 + 0.040) \times 2.250 = 0.1575$ "

$A_w = 0.3363\ m^2$

$$V = A_w \times L_G$$

$$= 0.3363 \times 29.960$$

$$= 10.076\ m^3$$

$L=30^{M}$, $H=2.15^{M}$ Straight

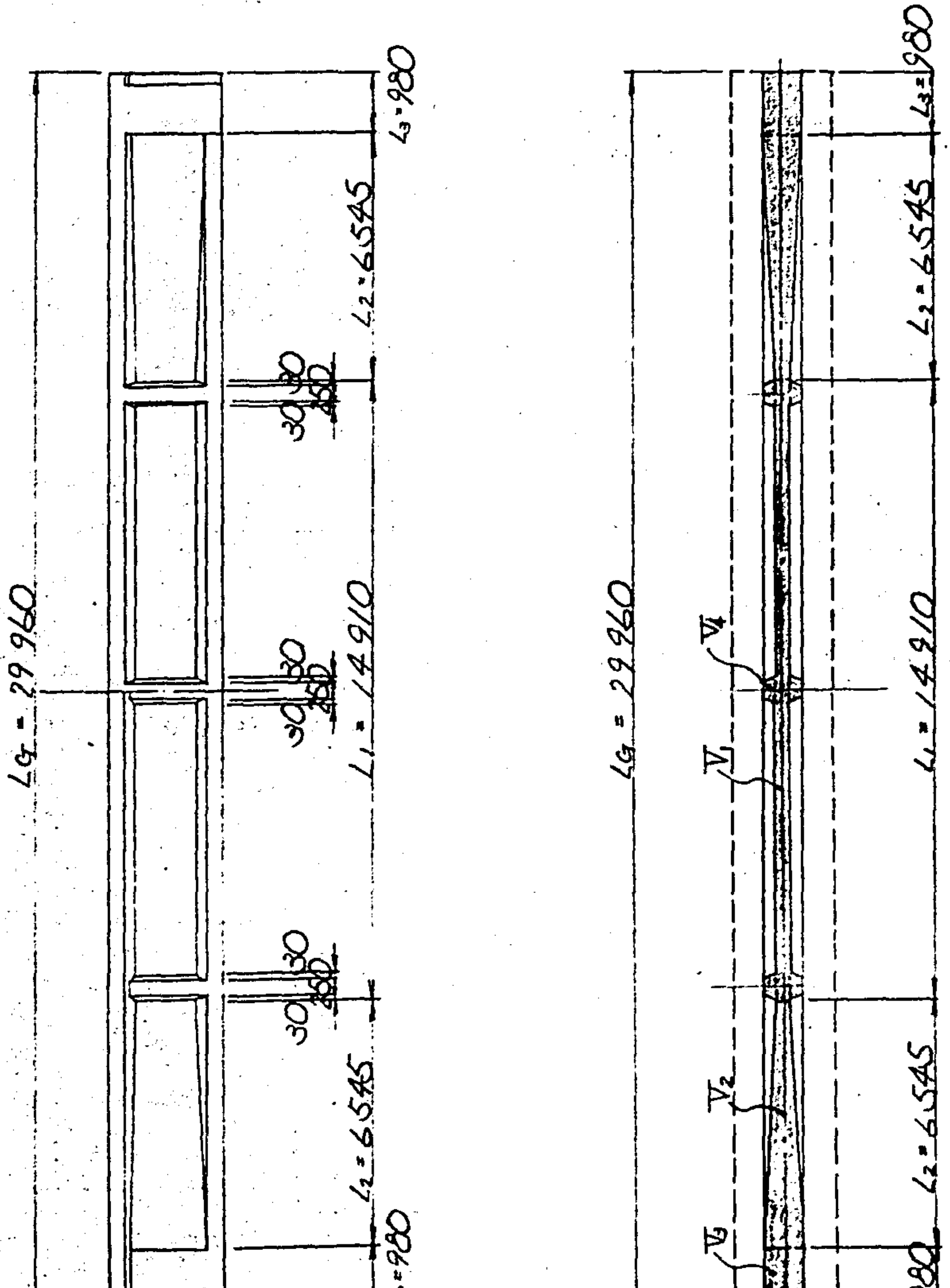
SUPERSTRUCTURE MATERIAL SCHEDULE

B05-PC13

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A ($fc'=400\,kg/cm^2$)	m^3	119.8
	P.C STRAND	12T12.7 ($fs'=190\,kg/mm^2$)	kg	5784.8
	SHEATH	φ65 and 70	m	5516 80.0
	FORMS		m^2	654.7
	ANCHORING DEVICE	FOR 12T12.7	EACH	40
	REINFORCING BAR	19	kg	—
		16	〃	1490.6
		13	〃	6755.4
		10	〃	68.0
		TOTAL	〃	8314.0
LATERAL JOINT	CONCRETE	CLASS B ($fc'=300\,kg/cm^2$)	m^3	9.6
	P.C BAR	φ23 ($fs'=110\,kg/mm^2$)	kg	557.0
	SHEATH	φ35	m	163.0
	FORMS		m^2	40.2
	ANCHOR PLATE,NUT	FOR φ23	EACH	88
	REINFORCING BAR	16	kg	994.1
		13	〃	1669.5
		10	〃	397.3
		TOTAL	〃	3060.9
SIDEWALK CONCRETE		CLASS C ($fc'=240\,kg/cm^2$)	m^3	15.7
BRIDGE RAILING AND DUCT		CONCRETE	m^3	5.8
		FORMS	m^2	54.3
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m^3	10.1
DRAINAGE			EACH	8
ELASTOMERIC BEARING PADS		FIX. FOR R= 120 ton	〃	4
		MOV. FOR R= 120 ton	〃	4

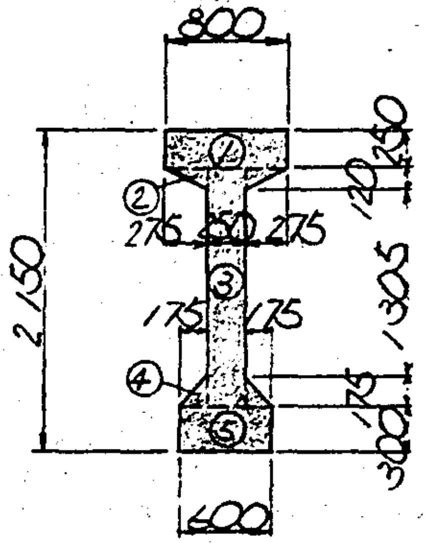
§ I MAIN BEAM

I. CONCRETE VOLUME



I) SECTION AREA

a) AT SPAN CENTER



① $0.800 \times 0.250 = 0.2000\ m^2$

② $\frac{1}{2} \times 0.275 \times 0.120 \times 2 = 0.0330$ "

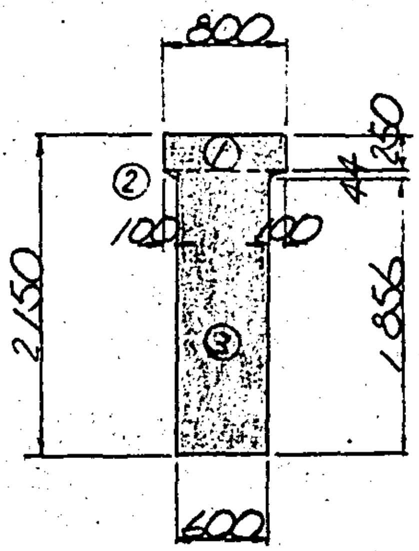
③ $0.250 \times 1.600 = 0.4000$ "

④ $0.175 \times 0.175 \times \frac{1}{2} \times 2 = 0.0306$ "

⑤ $0.600 \times 0.300 = 0.1800$ "

$A_1 = 0.8436\ m^2$

b) AT SUPPORT POINT



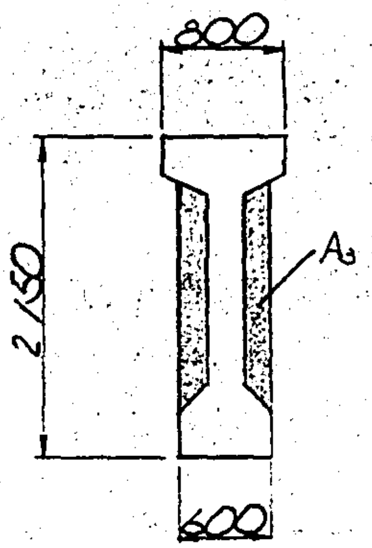
① $0.800 \times 0.250 = 0.2000\ m^2$

② $\frac{1}{2} \times 0.100 \times 0.044 \times 2 = 0.0044$ "

③ $0.600 \times 1.900 = 1.1400$ "

$A_2 = 1.3444\ m^2$

c) CENTRAL DIRPHRAGM



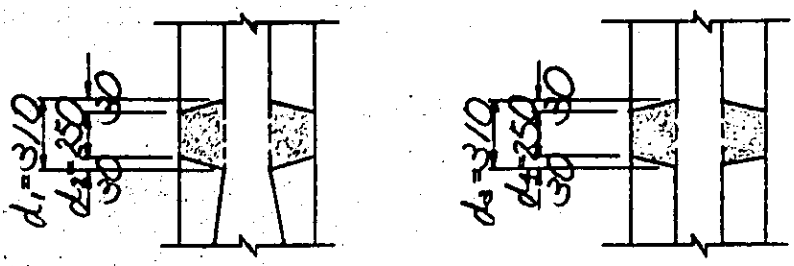
$$A_3 = A_2 - A_1$$
$$= 1.3444 - 0.8436$$
$$= 0.5008 \ m^2$$

2) QUANTITY CALCULATION FOR COCRETE VOLUME

$$V_1 = A_1 \times L_1$$
$$= 0.8436 \times 14.910 = 12.578 \ m^3$$

$$V_2 = \tfrac{1}{2} \times (A_1 + A_2) \times L_2 \times 2$$
$$= \tfrac{1}{2} \times (0.8436 + 1.3444) \times 6.545 \times 2$$
$$= 14.320 \ m^3$$

$$V_3 = A_2 \times L_3 \times 2$$
$$= 1.3444 \times 0.980 \times 2$$
$$= 2.635 \ m^3$$



$$V_4 = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2}\right) \times 2 + \left(\frac{d_3 + d_4}{2}\right) \right\}$$

$$= 0.5008^{m^2} \times \left\{ \left(\frac{0.310 + 0.250}{2}\right) \times 2 + \frac{(0.310 + 0.250)}{2} \right\}$$

$$= 0.421 \ m^3$$

$$\Sigma V = (V_1 + V_2 + V_3 + V_4) \times N_G$$

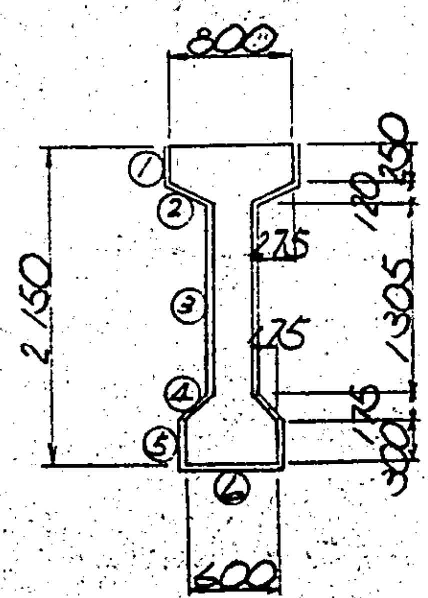
$$= (12.578 + 14.320 + 2.635 + 0.421) \times 4$$

$$= 119.816 \ m^3$$

2. FOR CONCRETE FORM AREA

I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



① $0.250 \times 2 = 0.500$ m

② $\sqrt{0.275^2 + 0.120^2} \times 2 = 0.600$ "

③ $1.305 \times 2 = 2.610$ "

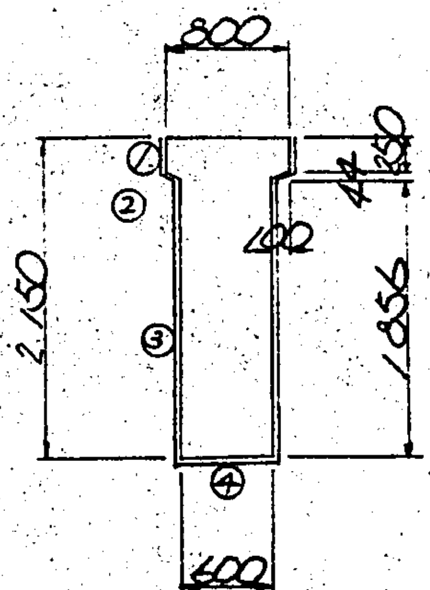
④ $\sqrt{0.175^2 + 0.175^2} \times 2 = 0.495$ "

⑤ $0.300 \times 2 = 0.600$ "

⑥ $= 0.600$ "

$L_1 = 5.405$ m

b) AT SUPPORT POINT



① $0.250 \times 2 = 0.500$ m

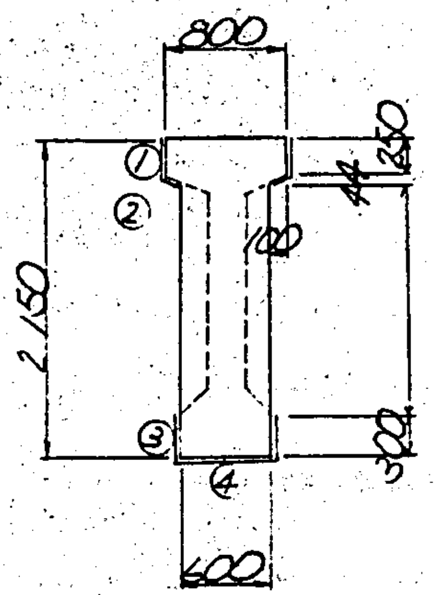
② $\sqrt{0.100^2 + 0.044^2} \times 2 = 0.219$

③ $1.856 \times 2 = 3.712$

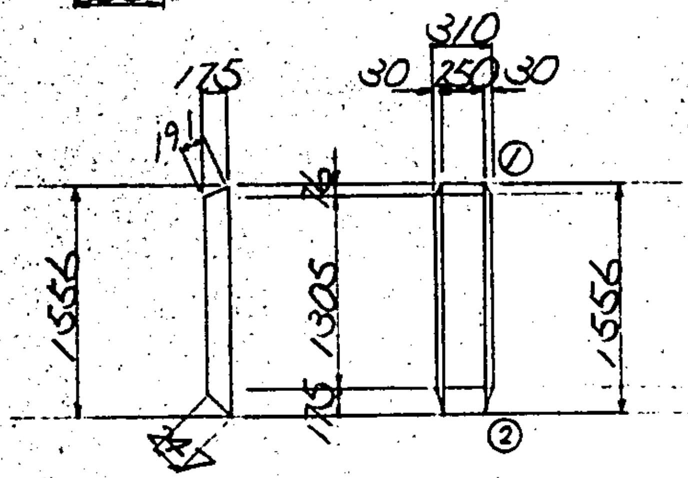
④ $= 0.600$

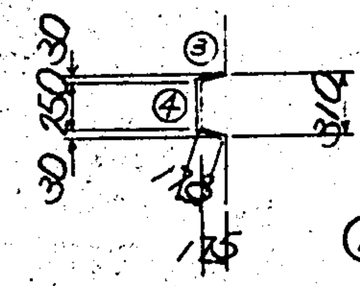
$L_2 = 5.031$ m

c) CENTRAL DIAPHRAGM



①	0.250×2	$= 0.500$ m
②	$\sqrt{0.100^2 + 0.044^2} \times 2$	$= 0.219$
③	0.300×2	$= 0.600$
④		$= 0.600$
	L_3	$= 1.919$ m





①	$0.030 \times 0.191 \times 1/2 \times 2$	$= 0.0057$ m²
②	$0.030 \times 0.247 \times 1/2 \times 2$	$= 0.0074$ "
③	$(1.305 + 1.556) \times 1/2 \times 0.178 \times 2$	$= 0.5093$ "
④	0.250×1.556	$= 0.3890$ "
	a_1	$= 0.9114$ m²

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$$A_1 = L_1 \times 6.990 \times 2$$

$$= 5.405 \times 6.990 \times 2 = 75.562\ m^2$$

$$A_2 = (L_1 + L_2) \times 1/2 \times 6.545 \times 2$$

$$= (5.405 + 5.031) \times 1/2 \times 6.545 \times 2 = 68.304\ m^2$$

** FOR CONCRETE VOLUME --- A2 **

$$A_3 = A_2 \times COSEC\theta \times 2 + L_2 \times 0.980 \times 2$$

$$= 1.3444\ m^2 \times 1.000 \times 2 + 5.031 \times 0.980 \times 2$$

$$= 12.550\ m^2$$

$$COSEC\ 90^\circ 00' 00'' = 1.000$$

$$A_4 = L_3 \times 0.310 \times 3$$

$$= 1.919 \times 0.310 \times 3 = 1.785\ m^2$$

$$A_5 = a_1 \times 2 \times 3$$

$$= 0.9114\ m^2 \times 2 \times 3 = 5.468\ m^2$$

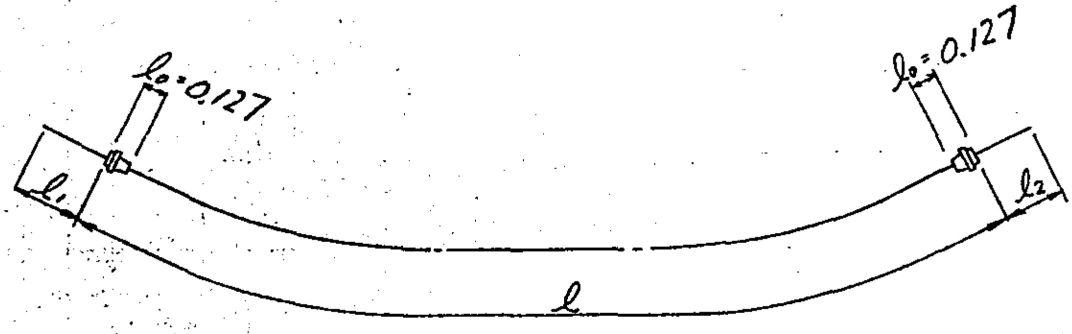
$$\Sigma A = (A_1 + A_2 + A_3 + A_4 + A_5) \times N_G$$

$$= (75.562 + 68.304 + 12.550 + 1.785 + 5.468) \times 4$$

$$= 654.676\ m^2$$

3. PRESTRESSING STEEL

I) MAIN CABLE



$$l_1 + l_2 = 1.300^{m} \qquad l_1 = l_2$$

$$l_p = l + l_1 + l_2$$

No	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_p	$L_p = N_p \times l_p$
C_1	29.996	1.300	31.294	4	125.184
C_2	29.894	〃	31.194	4	124.776
C_3	29.824	〃	31.124	4	124.496
C_4	29.754	〃	31.054	4	124.216
C_5	29.704	〃	31.004	4	124.016
TOTAL	$\Sigma L_p = 622.688^{m}$				

$$\Sigma W_p = \gamma_p \times \Sigma L_p$$

$$= 9.29^{kg/m} \times 622.688$$

$$= 5784.77^{kg}$$

2) SHETH

$\phi\ 70^{mm}$,

$L_{s_1} = 2.000 \times 5 \times 4 = 80.000^{m}$

$\phi\ 65^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.554) \times 5 \times 4 = 551.608^{m}$

3) GROUT

ϕ

$L_G = \Sigma L_p - (l_1 + l_2) \times N_p \times N_G$

$= 622.688 - 1.300 \times 5 \times 4 = 596.688^{m}$

4) ANCHORING DEVICE

FOR $12T12.7^{mm}$

$N_c = N_p \times N_G \times 2$

$= 5 \times 4 \times 2$

$= 40$

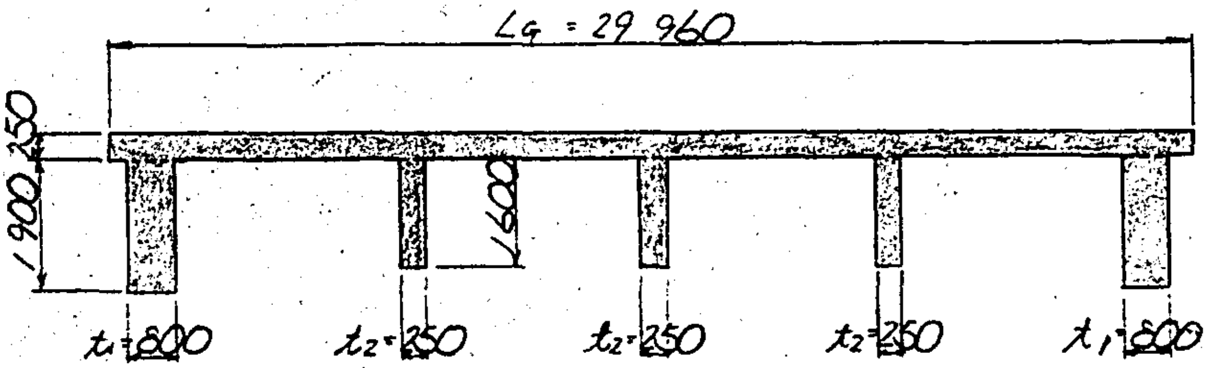
4. REINFORCING BAR (SD30)

	W (Kg)
D16	1490.6
D13	6755.4
D10	68.0
TOTAL	8314.0

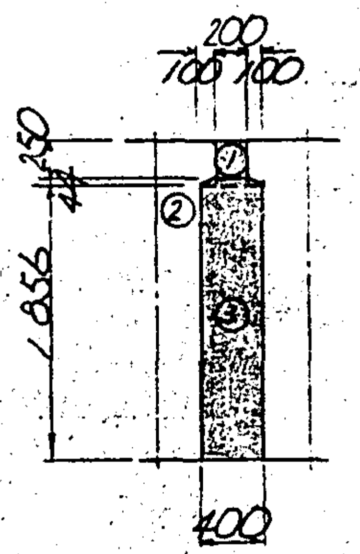
§ 2 LATERAL JOINT

I, CONCRETE VOLUME

I) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



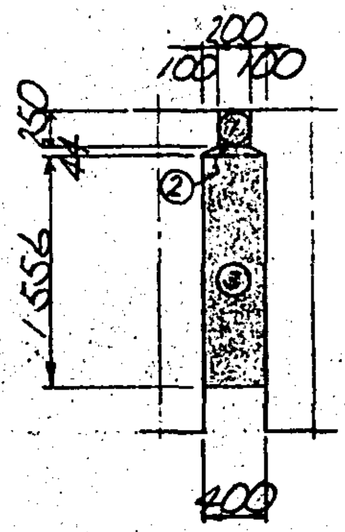
① $= A_F = 0.200 \times 0.250 = 0.0500$ m²

② $\frac{1}{2} \times (0.200 + 0.400) \times 0.044 = 0.0132$ m²

③ $0.400 \times 1.856 = 0.7424$ "

② + ③ $= A_{D1} = 0.7556$ m²

b) CENTRAL CROSS BEAM



② $\frac{1}{2} \times (0.200 + 0.400) \times 0.044 = 0.0132$ m²

③ $0.400 \times 1.556 = 0.6224$ "

② + ③ $= A_{D2} = 0.6356$ m²

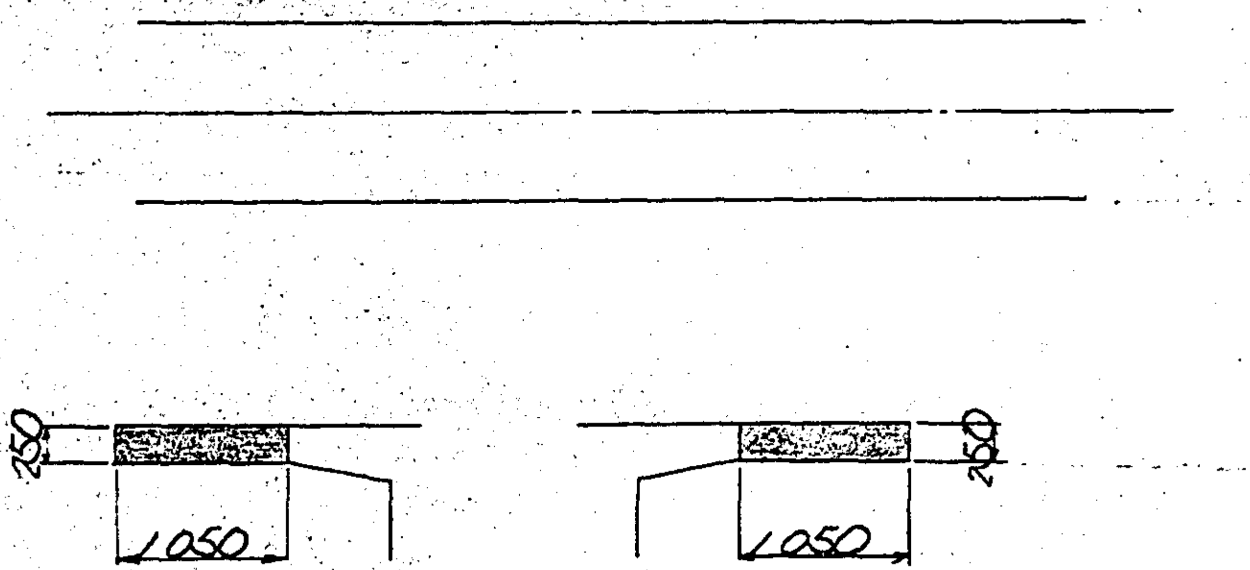
2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_F = A_F \times L_G \times N_F$$
$$= 0.0500 \times 29.960 \times 3 \quad = 4.494 \ m^3$$

$$V_D = \{ A_{D1} \times t_1 \times 2 + A_{D2} \times t_2 \times 3 \} \times N_F$$
$$= \{0.7556 \times 0.800 \times 2 + 0.6356 \times 0.250 \times 3\} \times 3$$
$$= 5.057 \ m^3$$

$$\Sigma V = V_F + V_D$$
$$= 4.494 + 5.057$$
$$= 9.551 \ m^3$$

3) SIDEWALK CONCRETE



① $0.250 \times 1.050 = 0.2625\ m^2$

② 〃 $= 0.2625$ 〃

$A_s = 0.5250\ m^2$

$$V_s = A_s \times L_G$$
$$= 0.5250\ m^2 \times 29.960$$
$$= 15.729\ m^3$$

2. FOR CONCRETE FORM AREA

1) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{0.050 \times \overset{\cos\theta}{1.000} \times 2 + 0.200 \times (29.960 - 0.800 \times 2 - 0.250 \times 3)\} \times 3 = 16.866^{m^2}$$

$$A_2 = \{(0.7556^{m^2} \times 1.000 \times 2 + 0.400 \times 0.800) \times 2 + (0.6356^{m^2} \times 1.000 \times 2 + 0.400 \times 0.250) \times 3\} \times 3 = 23.328^{m^2}$$

$$\Sigma A = A_1 + A_2 = 16.866 + 23.328 = 40.194^{m^2}$$

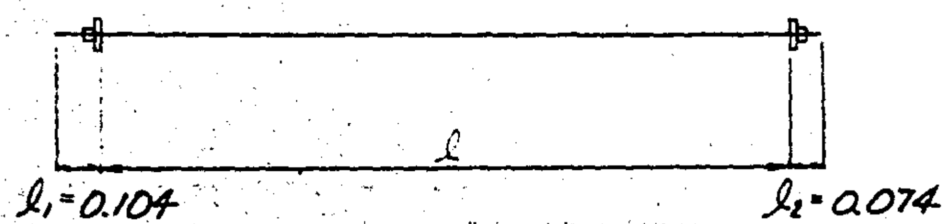
2) SIDEWALK

$$A = (1.050 + 0.250) \times 29.960 \times 2 + 0.2625^{m^2} \times \overset{\cos\theta}{1.000} \times 2 \times 2 = 78.946^{m^2}$$

3. POST - TENSIONING BARS

I) P.C. BAR

$\phi\ 23^{mm}$ (SPECIAL GRADE)



$$l_1 + l_2 = 0.104 + 0.074 = 0.178^m$$

$$l_p = l + l_1 + l_2$$

	l (m)	l_1+l_2 (m)	l_p (m)	N_p	$L_p = N_p \cdot l_p$
SLAB	3.800	0.178	3.978	33	131.274
CROSS BEAM	3.420	0.178	3.598	11	39.578
TOTAL					$\Sigma L_p = 170.852^m$

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 170.852 = 556.98^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$$L_S = \Sigma L_P - (l_1 + l_2) \times N_P$$
$$= 170.852 - 0.178 \times 44$$
$$= 163.020^{m}$$

3) GROUT

$\phi 35^{mm}$

$$L_G = L_S = 163.020$$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$$N_C = N_P \times 2$$
$$= 44 \times 2$$
$$= 88$$

4. REINFORCING BAR (SD 30)

	W (kg)
D16	994.1
D13	1669.5
D10	397.3
TOTAL	3060.9

5. ELASTOMERIC BEARING PADS

1) FIXED SUPPORT

FOR $R = 120^{ton}$

$N = 4$, $300 \times 500 \times 14$
(3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 120^{ton}$

$N = 4$, $300 \times 500 \times 14$
(3 PLIES)

6. ANCHORING BAR (SS 41)

1) FIXED SIDE

FOR $\phi 80^{mm}$, $N = 3$

$l = 1030^{mm}$, $W = 122.06^{kg}$

2) MOVABLE SIDE

FOR $\phi 75^{mm}$ $N = 3$

$l = 970^{mm}$ $W = 100.98^{kg}$

§ 3 BRIDGE FACE WORK

1. BRIDGE RAILING AND DUCT

① $0.300 \times 0.200 = 0.0600\ m^2$

② 0.700×0.300

$- 0.300 \times 0.250 = 0.1350\ m^2$

$\Sigma A = 0.1950\ m^2$

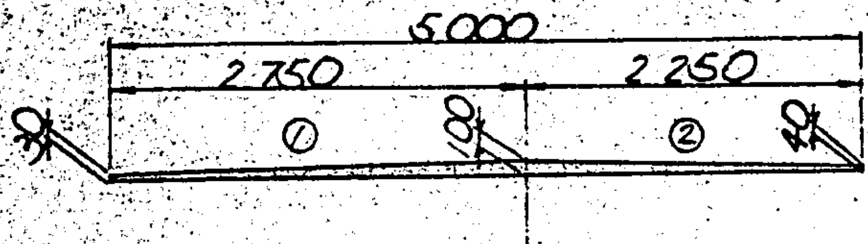
$\Sigma V = 0.1950\ m^2 \times 29.960 = 5.842\ m^3$

curb

$\Sigma A = 0.300 \times 6 \times 29.960 + 0.1950 \times 2 \times 1.000$

$= 54.318\ m^2$

2. MORTAR WITH SLOPE-PROTECTIVE MORTAR



① $\frac{1}{2} \times (0.030 + 0.100) \times 2.750 = 0.1788\ m^2$

② $\frac{1}{2} \times (0.100 + 0.040) \times 2.250 = 0.1575$ "

$A_w = 0.3363\ m^2$

$V = A_w \times L_G$

$= 0.3363 \times 29.960$

$= 10.076\ m^3$

L = 35 M, H = 2.00 M Straight

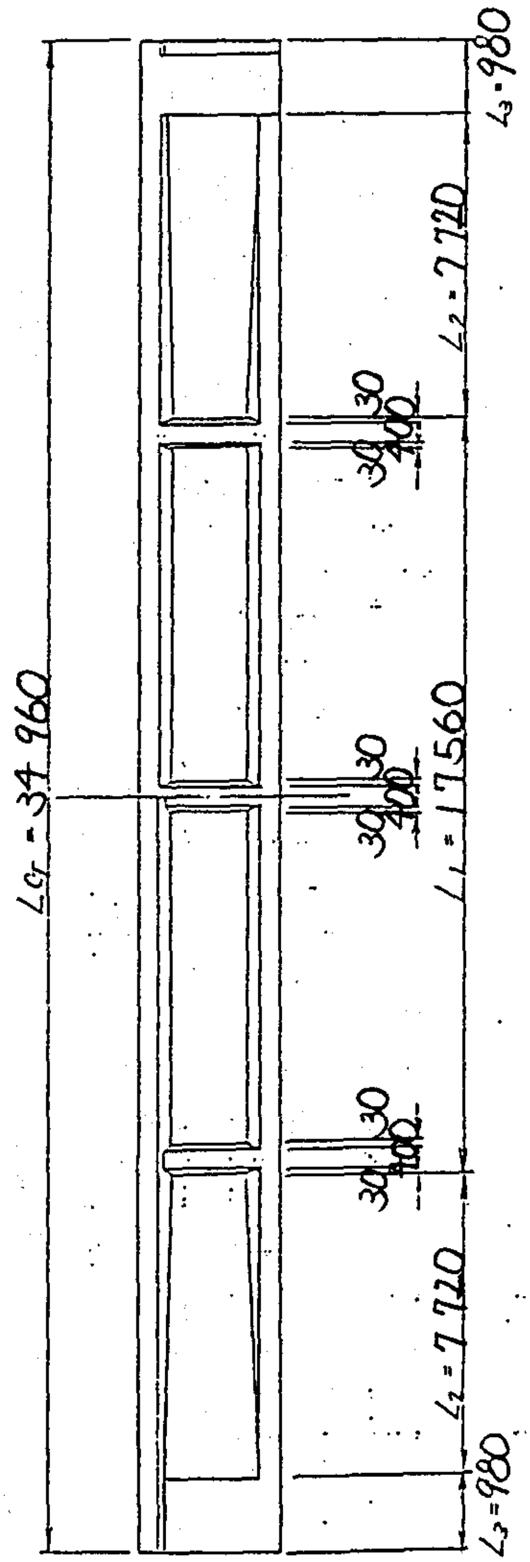
SUPERSTRUCTURE MATERIAL SCHEDULE

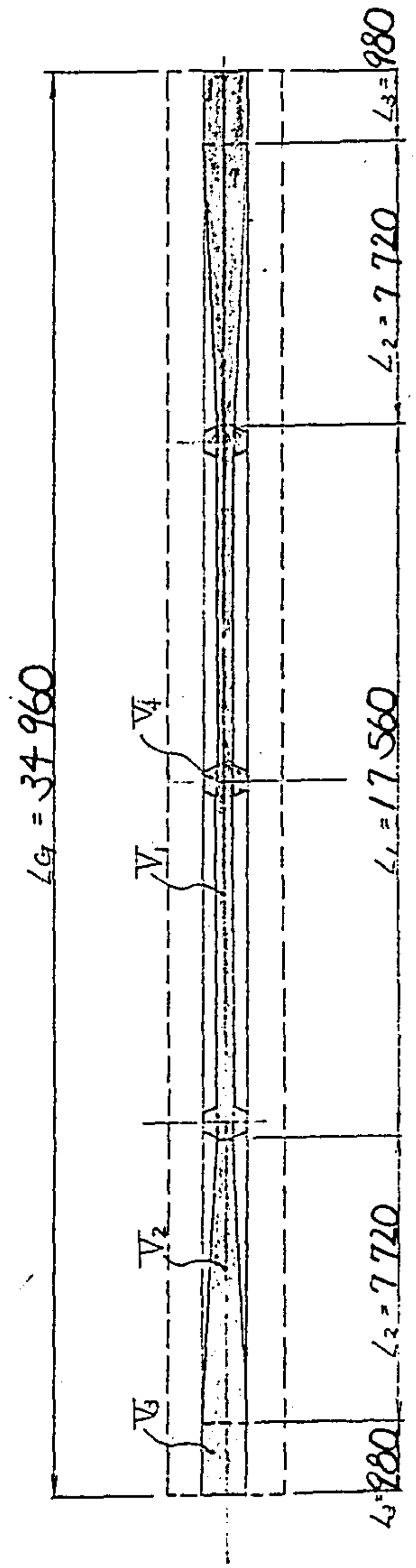
B05 - PC15

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A (f_c'=400 kg/cm²)	m^3	165.7
	P.C. STRAND	12T15.2 (f_s'=165 kg/mm²)	kg	11441.5
	SHEATH	φ75 and φ82	m	174.2 48.0
	FORMS		m^2	725.4
	ANCHORING DEVICE	FOR 12T15.2	EACH	48
	REINFORCING BAR	19	kg	2509.9
		16	〃	———
		13	〃	8218.4
		10	〃	55.6
		TOTAL	〃	10783.9
LATERAL JOINT	CONCRETE	CLASS B (f_c'=300 kg/cm²)	m^3	11.8
	P.C. BAR	φ23 (f_s'=110 kg/mm²)	kg	456.8
	SHEATH	φ35	m	133.7
	FORMS		m^2	33.7
	ANCHOR PLATE, NUT	FOR φ23	EACH	72
	REINFORCING BAR	16	kg	1158.6
		13	〃	1727.7
		10	〃	553.6
		TOTAL	〃	3439.9
SIDEWALK CONCRETE		CLASS C (f_c'=240 kg/cm²)	m^3	23.9
BRIDGE RAILING AND DUCT		CONCRETE	m^3	6.8
		FORMS	m^2	63.3
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m^3	11.8
DRAINAGE			EACH	8
ELASTOMERIC BEARING PADS		FIX. FOR R= 140 ton	〃	4
		MOV. FOR. R= 140 ton	〃	4

§ I MAIN BEAM

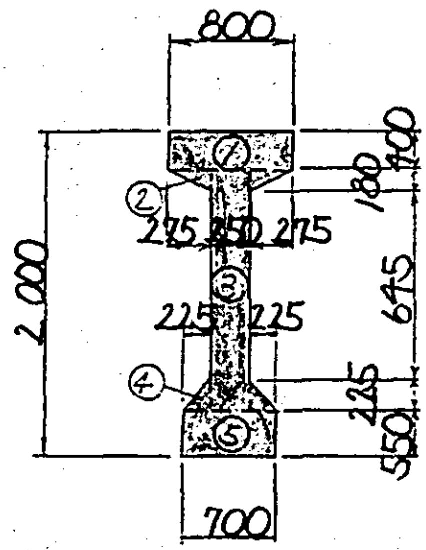
I. CONCRETE VOLUME





I) SECTION AREA

a) AT SPAN CENTER



① $0.800 \times 0.400 = 0.3200\ m^2$

② $\frac{1}{2} \times 0.275 \times 0.180 \times 2 = 0.0495$

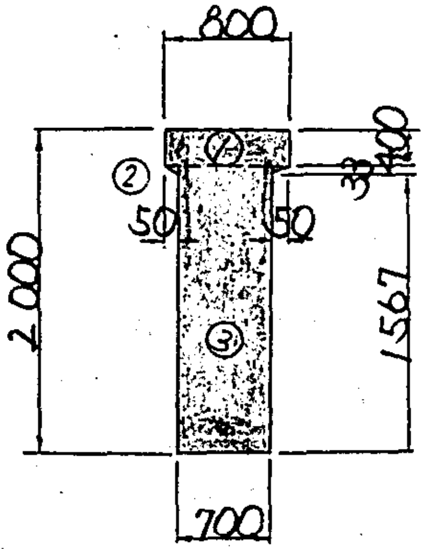
③ $0.250 \times 1.050 = 0.2625$

④ $\frac{1}{2} \times 0.225 \times 0.225 \times 2 = 0.0506$

⑤ $0.700 \times 0.550 = 0.3850$

$A_1 = 1.0676\ m^2$

b) AT SUPPORT POINT



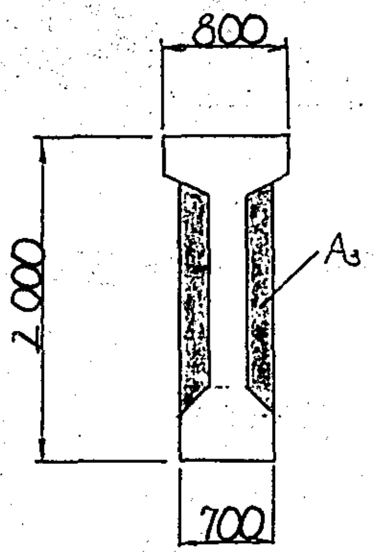
① $0.800 \times 0.400 = 0.3200\ m^2$

② $\frac{1}{2} \times 0.050 \times 0.033 \times 2 = 0.0017$

③ $0.700 \times 1.600 = 1.1200$

$A_2 = 1.4417\ m^2$

c) CENTRAL DIRPERAGM



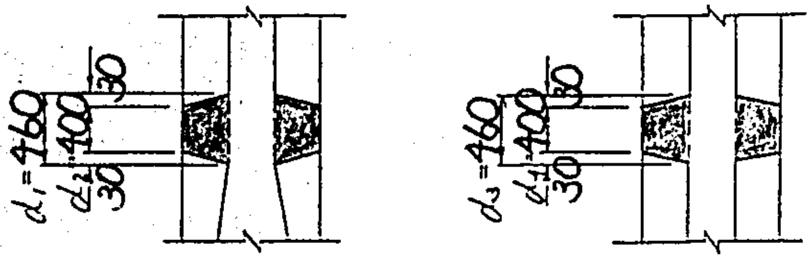
$$A_3 = A_2 - A_1$$
$$= 1.4417 - 1.0676$$
$$= 0.3741 \ m^2$$

2) QUANTITY CALCULATION FOR COCRETE VOLUME ···

$$V_1 = A_1 \times L_1$$
$$= 1.0676 \times 17.560 = 18.747 \ m^3$$

$$V_2 = \frac{1}{2} \times (A_1 + A_2) \times L_2 \times 2$$
$$= \frac{1}{2} \times (1.0676 + 1.4417) \times 7.720 \times 2$$
$$= 19.372 \ m^3$$

$$V_3 = A_2 \times L_3 \times 2$$
$$= 1.4417 \times 0.980 \times 2$$
$$= 2.826 \ m^3$$



$$V_4 = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2} \right) \times 2 + \left(\frac{d_3 + d_4}{2} \right) \right\}$$

$$= 0.3741 \times \left\{ \left(\frac{0.460 + 0.400}{2} \right) \times 2 + \left(\frac{0.460 + 0.400}{2} \right) \right\}$$

$$= 0.483 \ m^3$$

$$\Sigma V = (V_1 + V_2 + V_3 + V_4) \times N_G$$

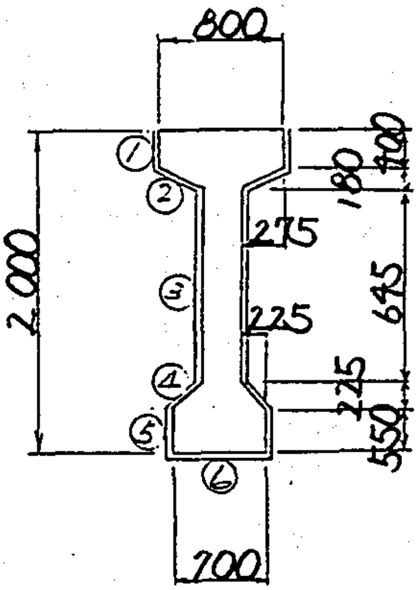
$$= (18.747 + 19.372 + 2.826 + 0.483) \times 4$$

$$= 165.712 \ m^3$$

2. FOR CONCRETE FORM AREA

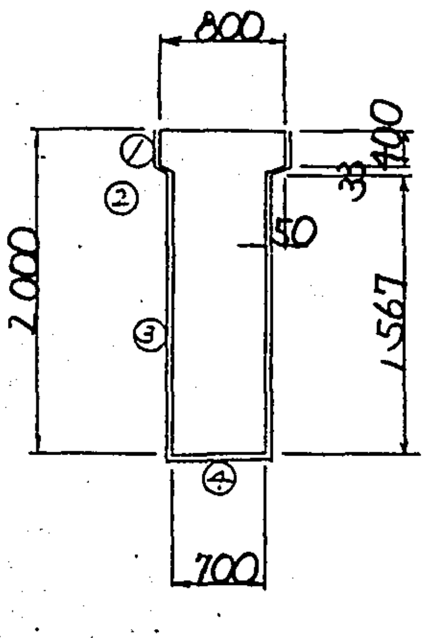
I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



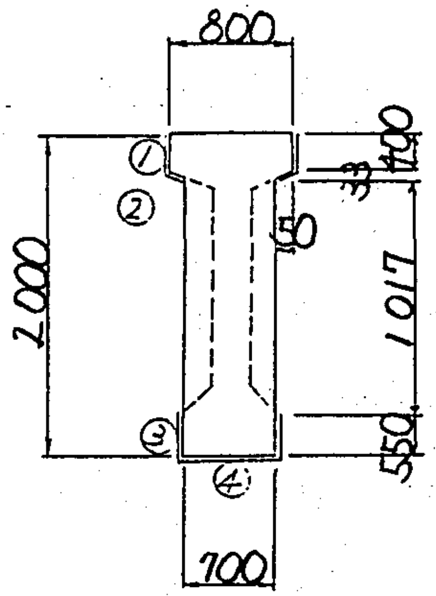
①	0.400×2	$= 0.800$ m
②	$\sqrt{0.275^2+0.180^2} \times 2$	$= 0.657$
③	0.645×2	$= 1.290$
④	$\sqrt{0.225^2+0.225^2} \times 2$	$= 0.636$
⑤	0.550×2	$= 1.100$
⑥		$= 0.700$
	L_1	$= 5.183$ m

b) AT SUPPORT POINT



①	0.400×2	$= 0.800$ m
②	$\sqrt{0.050^2+0.033^2} \times 2$	$= 0.120$
③	1.567×2	$= 3.134$
④		$= 0.700$
	L_2	$= 4.754$ m

c) CENTRAL DIAPERAGM



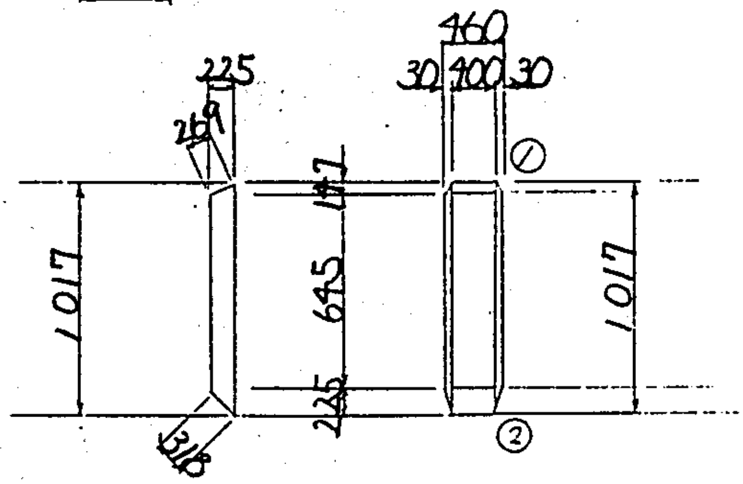
$$① \quad 0.400 \times 2 = 0.800\ m$$

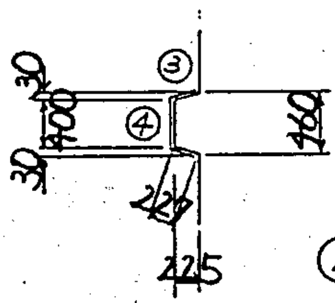
$$② \quad \sqrt{0.050^2 + 0.033^2} \times 2 = 0.120$$

$$③ \quad 0.550 \times 2 = 1.100$$

$$④ \quad = 0.700$$

$$L_3 = 2.720\ m$$





$$① \quad 1/2 \times 0.030 \times 0.269 \times 2 = 0.0081\ m^2$$

$$② \quad 1/2 \times 0.030 \times 0.318 \times 2 = 0.0095$$

$$③ \quad 1/2 \times (0.645 + 1.017) \times 0.227 \times 2 = 0.3773$$

$$④ \quad 0.400 \times 1.017 = 0.4068$$

$$a_1 = 0.8017\ m^2$$

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$$A_1 = L_1 \times 8.090 \times 2$$

$$= 5.183 \times 8.090 \times 2 = 83.861\ m^2$$

$$A_2 = (L_1 + L_2) \times \tfrac{1}{2} \times 7.720 \times 2$$

$$= (5.183 + 4.754) \times \tfrac{1}{2} \times 7.720 \times 2 - 76.714\ m^2$$

** FOR CONCRETE VOLUME --- A2 **

$$A_3 = A_2 \times COSEC\theta \times 2 + L_2 \times 0.980 \times 2$$

$$= 1.4417 \times 1.000 \times 2 + 4.754 \times 0.980 \times 2$$

$$= 12.201\ m^2$$

$$COSEC\ 90°00'00'' = 1.000$$

$$A_4 = L_3 \times 0.460 \times 3$$

$$= 2.720 \times 0.460 \times 3 = 3.754\ m^2$$

$$A_5 = a_1 \times 2 \times 3$$

$$= 0.8017\ m^2 \times 2 \times 3 = 4.810\ m^2$$

$$\Sigma A = (A_1 + A_2 + A_3 + A_4 + A_5) \times N_G$$

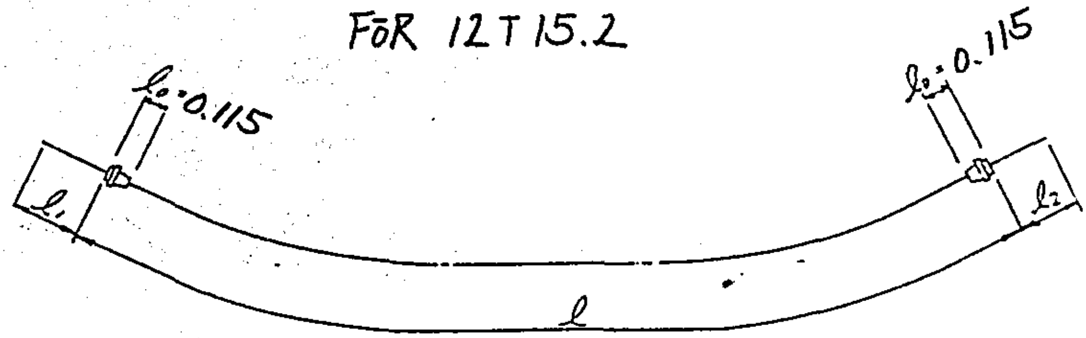
$$= (83.861 + 76.714 + 12.201 + 3.754 + 4.810) \times 4$$

$$= 725.360\ m^2$$

3, PRESTRESSING STEEL

I) MAIN CABLE

FOR 12T15.2



$\ell_1 + \ell_2 = 1.600$ m $\quad \ell_1 = \ell_2$

$\ell_p = \ell + \ell_1 + \ell_2$

No.	ℓ (m)	$\ell_1 + \ell_2$ (m)	ℓ_p (m)	N_g	$L_p = N_g \times \ell_p$
C_1	32.606	1.600	34.206	4	136.824
C_2	35.088	1.600	36.688	4	146.752
C_3	34.938	1.600	36.538	4	146.152
C_4	34.852	1.600	36.452	4	145.808
C_5	34.752	1.600	36.352	4	145.408
C_6	34.694	1.600	36.294	4	145.176
TOTAL					$\Sigma L_p = 866.120$ m

$$\Sigma W_p = \gamma_p \times \Sigma L_p$$
$$= 13.21 \text{ kg/m} \times 866.120$$
$$= 11441.45 \text{ kg}$$

2) SHETH

$\phi 82^{mm}$,

$L_{s_1} = 2.000 \times 6 \times 4 = 48.000^{m}$

$\phi 75^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.830) \times 6 \times 4 = 774.200^{m}$

3) GROUT

$\phi 75^{mm}$, $\phi 82^{mm}$

$L_G = 866.120 - 1.600 \times 6 \times 4 = 827.720^{m}$

4) ANCHORING DEVICE

FOR $12T15.2^{mm}$

$N_c = N_p \times N_G \times 2$

$= 6 \times 4 \times 2$

$= 48$

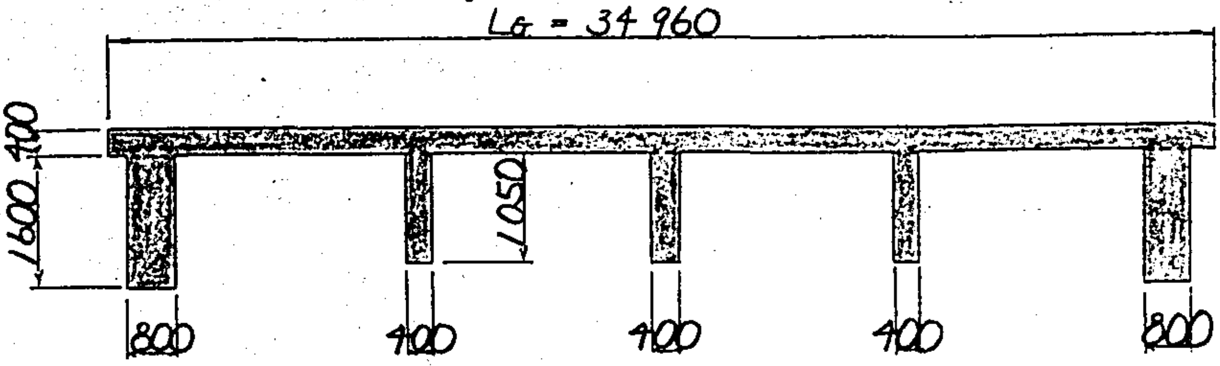
4. REINFORCING BAR (SD 30)

	W (Kg)
D19	2509.9
D13	8218.4
D10	55.6
TOTAL	10783.9

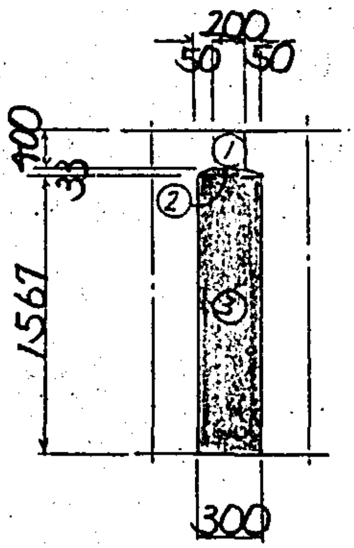
§ 2 LATERAL JOINT

I. CONCRETE VOLUME

I) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



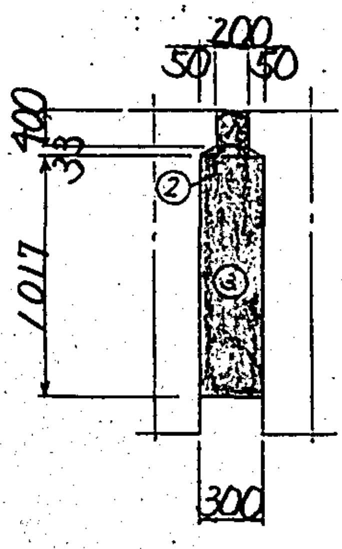
$$① = A_F = 0.200 \times 0.400 = 0.0800\ m^2$$

$$② \ 1/2 \times (0.200+0.300) \times 0.033 = 0.0083\ m^2$$

$$③ \ 0.300 \times 1.567 = 0.4701$$

$$② + ③ = A_{D1} = 0.4784\ m^2$$

b) CENTRAL CROSS BEAM



$$② \ 1/2 \times (0.200+0.300) \times 0.033 = 0.0083\ m^2$$

$$③ \ 0.300 \times 1.017 = 0.3051$$

$$② + ③ = A_{D2} = 0.3134\ m^2$$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$\overline{V_F} = A_F \times L_G \times N_F$$

$$= 0.0800 \times 34.960 \times 3 = 8.390 \ m^3$$

$$\overline{V_D} = (A_{D1} \times t_1 \times 2 + A_{D2} \times t_2 \times 3) \times N_F$$

$$= (0.4784 \times 0.800 \times 2 + 0.3134 \times 0.400 \times 3) \times 3$$

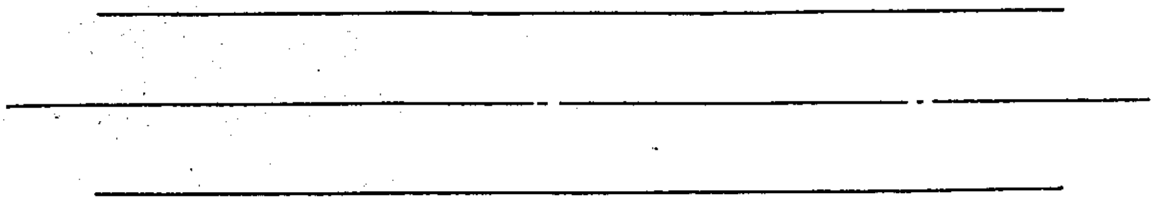
$$= 3.425 \ m^3$$

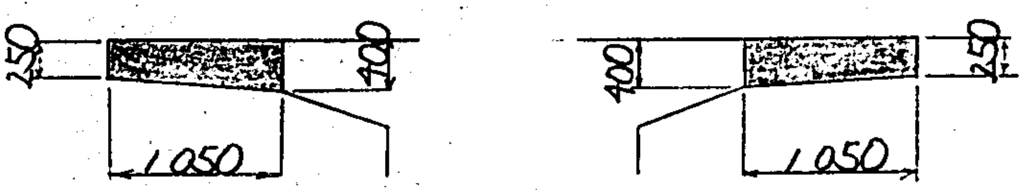
$$\Sigma \overline{V} = \overline{V_F} + \overline{V_D}$$

$$= 8.390 + 3.425$$

$$= 11.815 \ m^3$$

3) SIDEWALK CONCRETE





① $1/2 \times (0.250 + 0.400) \times 1.050 \qquad = 0.3413\ m^2$

② $\qquad \text{"} \qquad = 0.3413\ \text{"}$

$A_s = 0.6826\ m^2$

$$V_s = A_s \times L_G$$
$$= 0.6826 \times 34.960$$
$$= 23.864\ m^3$$

2. FOR CONCRETE FORM AREA

1) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{0.0800 \times 1.000 \times 2$$
$$+ 0.200 \times (34.960 - 0.800 \times 2 - 0.400 \times 3)\} \times 3$$
$$= 19.776\ m^2$$

$$A_2 = \{(0.4784 \times 1.000 \times 2 + 0.300 \times 0.800) \times 2$$
$$+ (0.3134 \times 1.000 \times 2 + 0.300 \times 0.400) \times 3\} \times 3$$
$$= 13.902\ m^2$$

$$\Sigma A = A_1 + A_2$$
$$= 19.776 + 13.902 = 33.678\ m^2$$

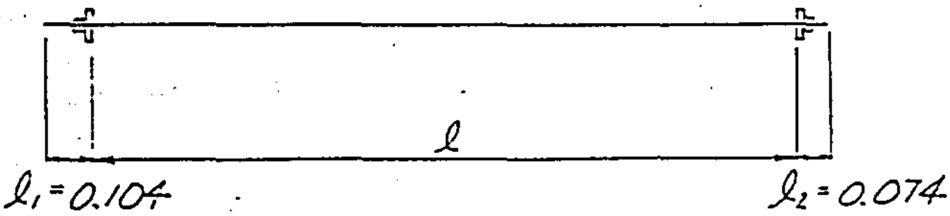
2) SIDEWALK

$$A = (\sqrt{1.050^2 + 0.150^2} + 0.250) \times 34.960 \times 2$$
$$+ 0.3413 \times 1.000 \times 2 \times 2$$
$$= 93.030\ m^2$$

3. POST - TENSIONING BARS

I) P.C. BAR

$\phi\ 23^{mm}$ (SPECIAL GRADE)



$$\ell_1 + \ell_2 = 0.104 + 0.074 = 0.178^{m}$$

$$\ell_p = \ell + \ell_1 + \ell_2$$

	ℓ (m)	$\ell_1+\ell_2$ (m)	ℓ_p (m)	N_p	$L_p = N_p \cdot \ell_p$
SLAB	3.800	0.178	3.978	25	99.450
CROSS BEAM	3.520	0.178	3.698	11	40.678
TOTAL				$\Sigma L_P =$	140.128^{m}

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 140.128 = 456.82^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$$L_S = \Sigma L_P - (l_1 + l_2) \times N_P$$

$$= 140.128 - 0.178 \times 36$$

$$= 133.720^{m}$$

3) GROUT

$\phi 35^{mm}$

$$L_G = L_S = 133.720^{m}$$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$$N_C = N_P \times 2$$

$$= 36 \times 2$$

$$= 72$$

4. REINFORCING BAR (SD 30)

	W (kg)
D 16	1158.6
D 13	1727.7
D 10	553.6
TOTAL	3439.9

5. ELASTOMERIC BEARING PADS

1) FIXED SUPPORT

FOR $R = 140^{ton}$

$N = 4$, $300 \times 600 \times 16$ (3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 140^{ton}$

$N = 4$, $300 \times 600 \times 16$ (3 PLIES)

6. ANCHORIMG BAR (SS 41)

1) FIXED SIDE

FOR $\phi\ 90^{mm}$, $N = 3$

$l = 1{,}150^{mm}$, $\overline{W} = 172.^{16}\,kg$

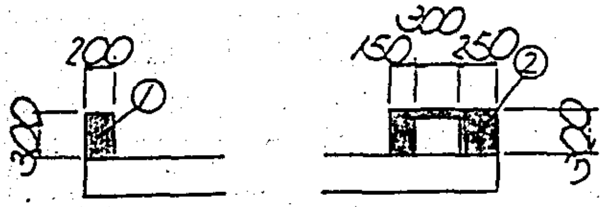
2) MOVABLE SIDE

FOR $\phi\ 80^{mm}$ $N = 3$

$l = 1030^{mm}$, $\overline{W} = 122.^{06}\,kg$

§ 3 BRIDGE FACE WORK

I, BRIDGE RAILING AND DUCT



$① \; 0.300 \times 0.200 = 0.0600 \; m^2$

$② \; 0.700 \times 0.300$

$\quad - 0.300 \times 0.250 = 0.1350 \; m^2$

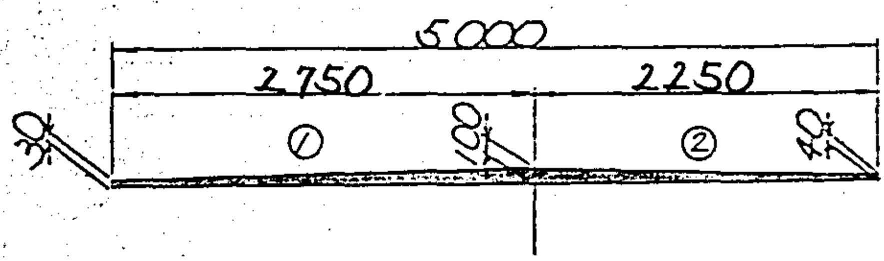
$\Sigma A = 0.1950 \; m^2$

$$\Sigma V = 0.1950 \; m^2 \times 34.960 = 6.817 \; m^3$$

case
"

$$\Sigma A = 0.300 \times 6 \times 34.960 + 0.1950 \times 2 \times 1.000$$
$$= 63.318 \; m^2$$

2, MORTAR WITH SLOPE-PROTECTIVE MORTAR



$① \; 1/2 \times (0.030 + 0.100) \times 2.750 = 0.1788 \; m^2$

$② \; 1/2 \times (0.100 + 0.040) \times 2.250 = 0.1575 \; "$

$A_w = 0.3363 \; m^2$

$$V = A_w \times L_G$$
$$= 0.3363 \times 34.960$$
$$= 11.757 \; m^3$$

L = 40 M , H = 24 M Straight

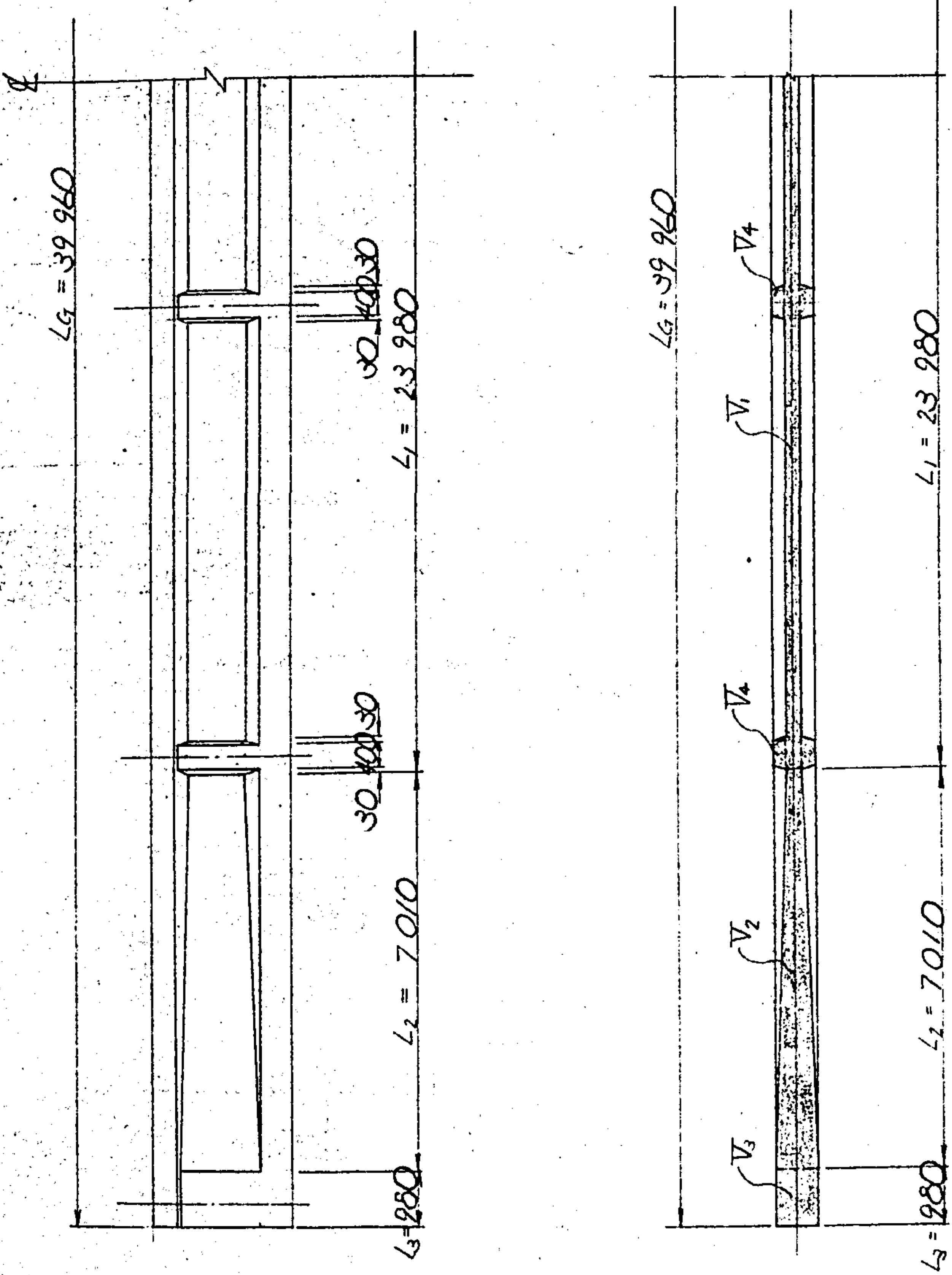
SUPERSTRUCTURE MATERIAL SCHEDULE

B05 - PC17

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A (f_c'=400 kg/cm²)	m³	210.3
	P.C STRAND	12T15.2 (f_s'=165 kg/mm²)	kg	15233.9
	SHEATH	φ75 and φ82	m	1046.0 56.0
	FORMS		m²	967.3
	ANCHORING DEVICE	FOR 15T15.2	EACH	56
	REINFORCING BAR	19	kg	2869.9
		16	〃	—
		13	〃	10581.2
		10	〃	69.6
		TOTAL	〃	13521.3
LATERAL JOINT	CONCRETE	CLASS B (f_c'=300 kg/cm²)	m³	14.5
	P.C BAR	φ23 (f_s'=110 kg/mm²)	kg	569.0
	SHEATH	φ35	m	166.5
	FORMS		m²	43.0
	ANCHOR PLATE, NUT	FOR φ23	EACH	90
	REINFORCING BAR	16	kg	1423.6
		13	〃	1978.6
		10	〃	649.7
		TOTAL	〃	4051.7
SIDEWALK CONCRETE		CLASS C (f_c'=240 kg/cm²)	m³	27.3
BRIDGE RAILING AND DUCT		CONCRETE	m³	7.8
		FORMS	m²	72.3
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m³	13.4
DRAINAGE			EACH	8
ELASTOMERIC BEARING PADS		FIX. FOR R = 190 ton	〃	4
		MOV. FOR R = 190 ton	〃	4

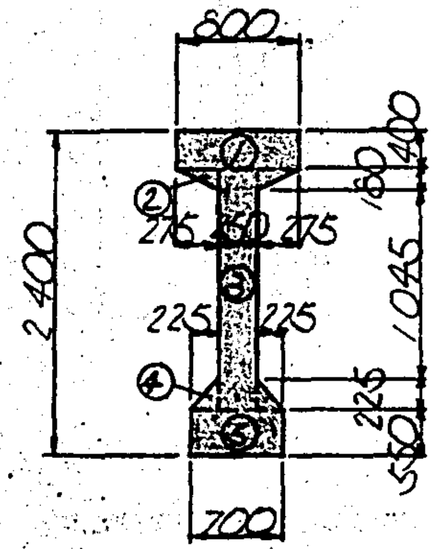
§I MAIN BEAM

I. CONCRETE VOLUME



I) SECTION AREA

a) AT SPAN CENTER



① $0.800 \times 0.400 = 0.3200$ m²

② $0.275 \times 0.180 \times \frac{1}{2} \times 2 = 0.0495$ ″

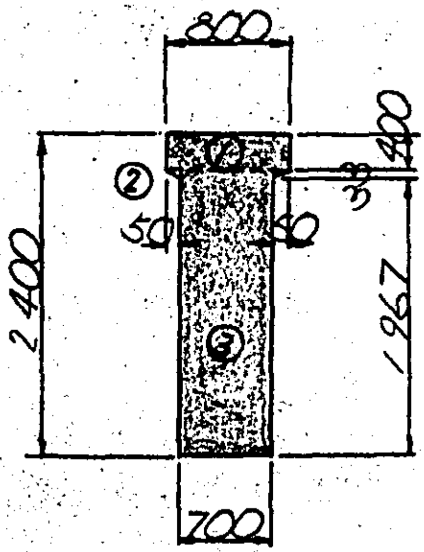
③ $0.250 \times 1.450 = 0.3625$ ″

④ $0.225 \times 0.225 \times \frac{1}{2} \times 2 = 0.0506$ ″

⑤ $0.700 \times 0.550 = 0.3850$ ″

$A_1 = 1.1676$ m²

b) AT SUPPORT POINT



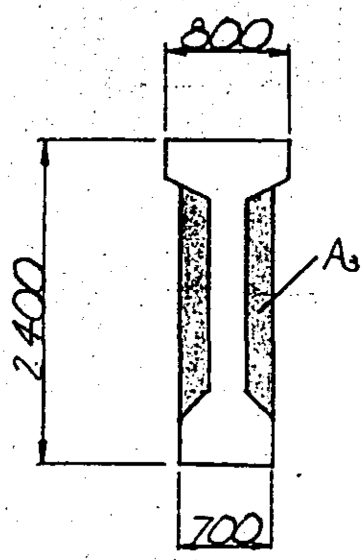
① $0.800 \times 0.400 = 0.3200$ m²

② $0.050 \times 0.033 \times \frac{1}{2} \times 2 = 0.0017$ ″

③ $0.700 \times 2.000 = 1.4000$ ″

$A_2 = 1.7217$ m²

c) CENTRAL DIRPHRAGM



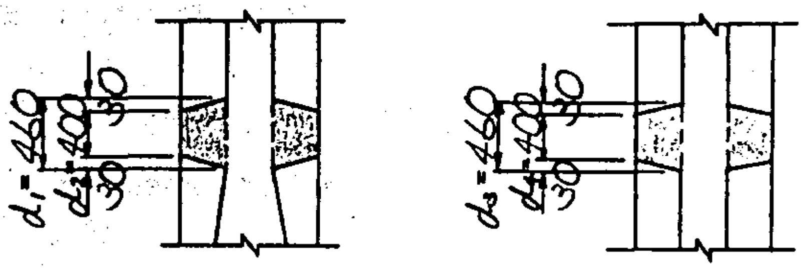
$$A_3 = A_2 - A_1$$
$$= 1.7217 - 1.1676$$
$$= 0.5541 \ m^2$$

2) QUANTITY CALCULATION FOR COCRETE VOLUME

$$V_1 = A_1 \times L_1$$
$$= 1.1676 \ m^2 \times 23.980 = 27.999 \ m^3$$

$$V_2 = \frac{1}{2} \times (A_1 + A_2) \times L_2 \times 2$$
$$= \frac{1}{2} \times (1.1676 + 1.7217) \times 7.010 \times 2$$
$$= 20.254 \ m^3$$

$$V_3 = A_2 \times L_3 \times 2$$
$$= 1.7217 \times 0.980 \times 2$$
$$= 3.375 \ m^3$$



$$\nabla_4 = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2}\right) \times 2 + \left(\frac{d_3 + d_4}{2}\right) \cdot \times 2 \right\}$$

$$= 0.5541 \times \left\{ \left(\frac{0.460 + 400}{2}\right) \times 2 + \left(\frac{0.460 + 400}{2}\right) \times 2 \right\}$$

$$= 0.953 \ m^3$$

$$\Sigma \nabla = (\nabla_1 + \nabla_2 + \nabla_3 + \nabla_4) \times N_G$$

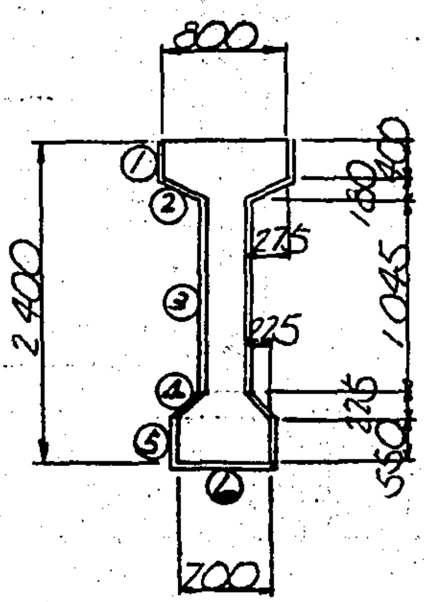
$$= (27.999 + 20.254 + 3.375 + 0.953) \times 4$$

$$= 210.324 \ m^3$$

2. FOR CONCRETE FORM AREA

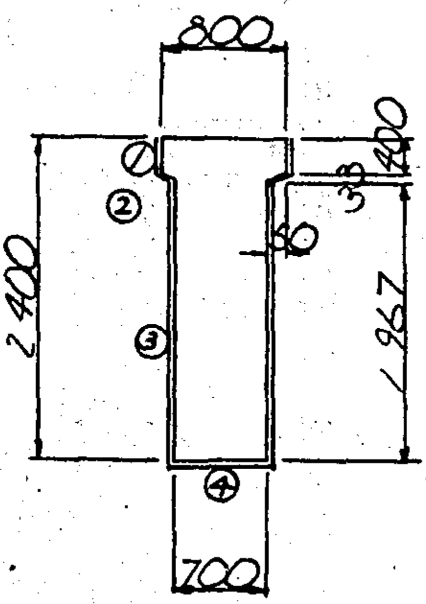
I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



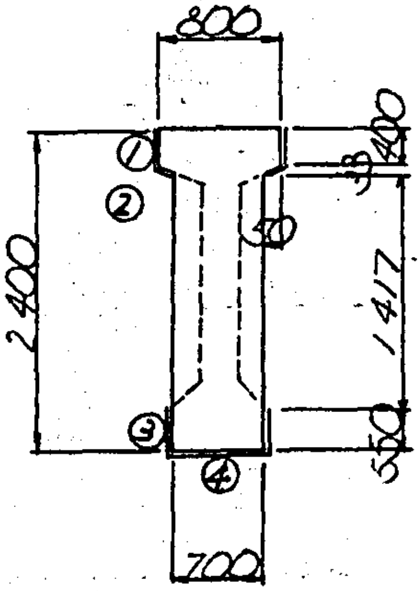
①	0.400×2	$= 0.800$ m
②	$\sqrt{0.275^2 + 0.180^2} \times 2$	$= 0.657$ "
③	1.045×2	$= 2.090$ "
④	$\sqrt{0.225^2 + 0.225^2} \times 2$	$= 0.636$ "
⑤	0.550×2	$= 1.100$ "
⑥		$= 0.700$ "
	L_1	$= 5.983$ m

b) AT SUPPORT POINT

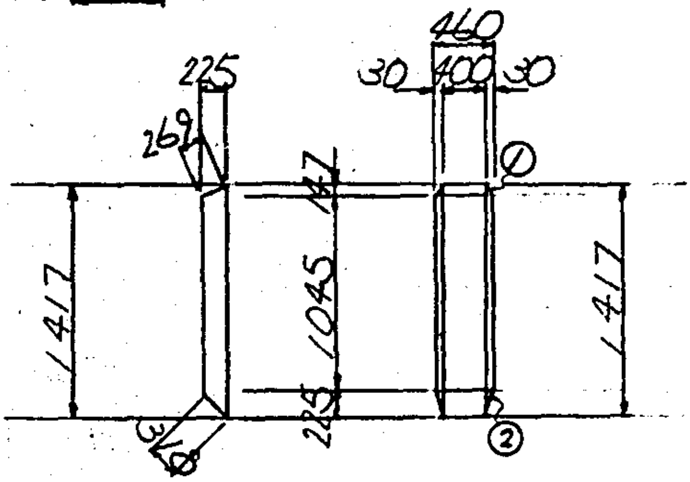


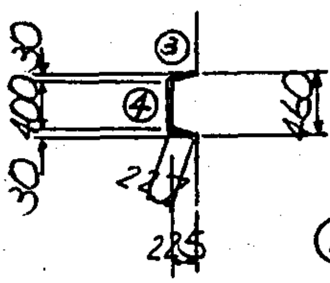
①	0.400×2	$= 0.800$ m
②	$\sqrt{0.050^2 + 0.033^2} \times 2$	$= 0.120$ "
③	1.967×2	$= 3.934$ "
④		$= 0.700$ "
	L_2	$= 5.554$ m

c) CENTRAL DIAPHRAGM



①	0.400×2	$= 0.800$	m
②	$\sqrt{0.050^2 + 0.033^2} \times 2$	$= 0.120$	"
③	0.550×2	$= 1.100$	"
④		$= 0.700$	"
	L_3	$= 2.720$	m





①	$0.030 \times 0.269 \times \frac{1}{2} \times 2$	$= 0.0081$	m²
②	$0.030 \times 0.318 \times \frac{1}{2} \times 2$	$= 0.0095$	"
③	$(1.417 + 1.045) \times 0.227 \times \frac{1}{2} \times 2$	$= 0.5589$	"
④	0.400×1.417	$= 0.5668$	"
	a_1	$= 1.1433$	m²

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$A_1 = L_1 \times 7.380 \times 3$

$= 5.983 \times 7.380 \times 3 = 132.464\ m^2$

$A_2 = (L_1 + L_2) \times 1/2 \times 7.010 \times 2$

$= (5.983 + 5.554) \times 1/2 \times 7.010 \times 2 = 80.874\ m^2$

** FOR CONCRETE VOLUME --- A2 **

$A_3 = A_2 \times \underset{}{COSEC\theta} \times 2 + L_2 \times 0.980 \times 2$

$= 1.7217 \times \overset{cosec\theta}{1.000} \times 2 + 5.554 \times 0.980 \times 2$

$= 14.329\ m^2$

COSEC 90° = 1.000

$A_4 = L_3 \times 0.460 \times 4$

$= 2.720 \times 0.460 \times 4 = 5.005\ m^2$

$A_5 = a_1 \times 2 \times 4$

$= 1.1433 \times 2 \times 4 = 9.146\ m^2$

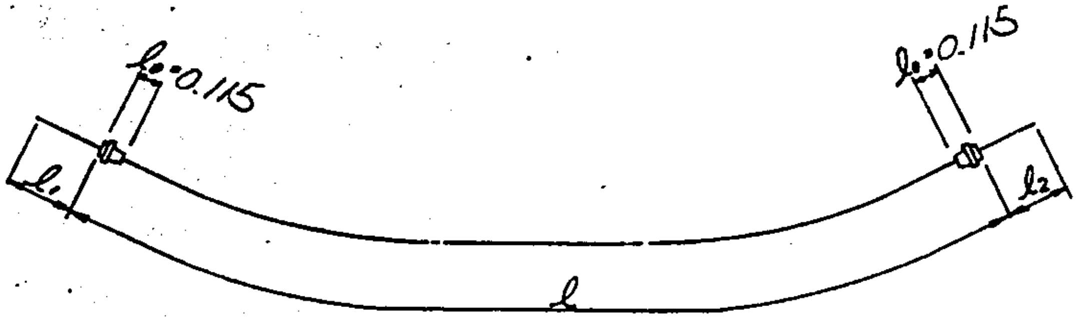
$\Sigma A = (A_1 + A_2 + A_3 + A_4 + A_5) \times N_G$

$= (132.464 + 80.874 + 14.329 + 5.005 + 9.146) \times 4$

$= 967.272\ m^2$

3. PRESTRESSING STEEL

I) MAIN CABLE



$\ell_1 + \ell_2 = 1.600$ m $\quad \ell_1 = \ell_2$

$\ell_p = \ell + \ell_1 + \ell_2$

No	ℓ (m)	$\ell_1 + \ell_2$ (m)	ℓ_p (m)	N_p	$L_p = N_p \times \ell_p$
C_1	37.680	1.600	39.280	4	157.120
C_2	40.188	〃	41.788	4	167.152
C_3	40.036	〃	41.636	4	166.544
C_4	39.910	〃	41.510	4	166.040
C_5	39.832	〃	41.432	4	165.728
C_6	39.758	〃	41.358	4	165.432
C_7	39.698	〃	41.298	4	165.192
TOTAL	$\Sigma L_p = 1153.208$ m				

$\Sigma W_p = \gamma_p \times \Sigma L_p$

$= 13.21$ kg/m $\times 1153.208$

$= 15233.88$ kg

2) SHETH

$\phi 82^{mm}$,

$L_{s_1} = 2.000 \times 7 \times 4 = 56.000^{m}$

$\phi 75^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.830) \times 7 \times 4 = 1045.968^{m}$

3). GROUT

$\phi 75^{mm}$, $\phi 82^{mm}$

$L_G = \Sigma L_p - (l_1 + l_2) \times N_p \times N_G$

$= 1153.208 - 1.600 \times 7 \times 4 = 1108.408^{m}$

4) ANCHORING DEVICE

FOR $12T15.^{2\ mm}$

$N_c = N_p \times N_G \times 2$

$= 7 \times 4 \times 2$

$= 56$

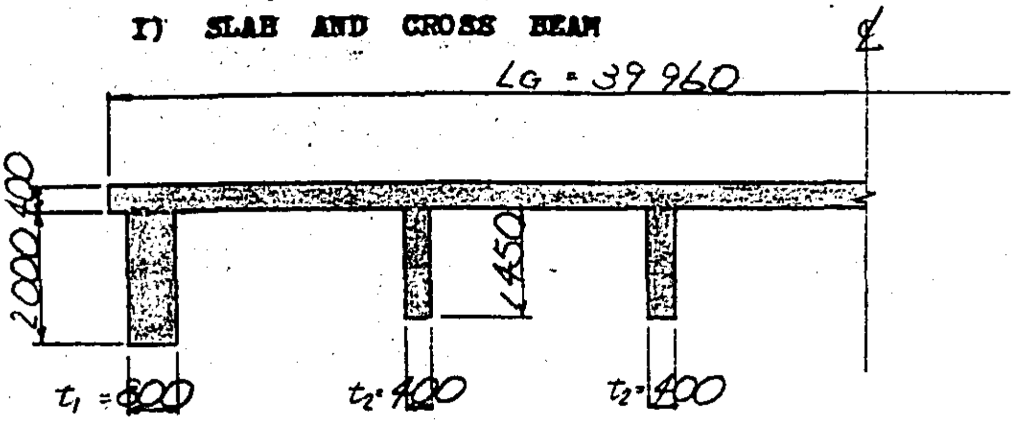
4. REINFORCING BAR (SD30)

	W (kg)
D19	2869.9
D13	10581.2
D10	69.6
TOTAL	13521.3

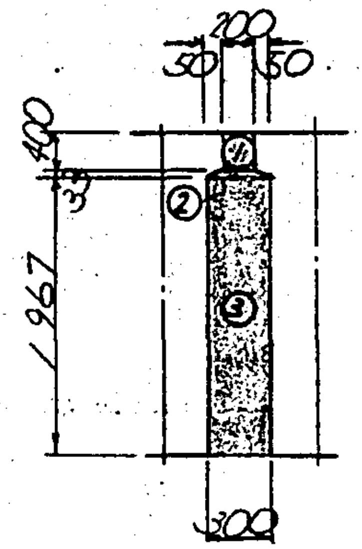
§ 2 LATERAL JOINT

I. CONCRETE VOLUME

1) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



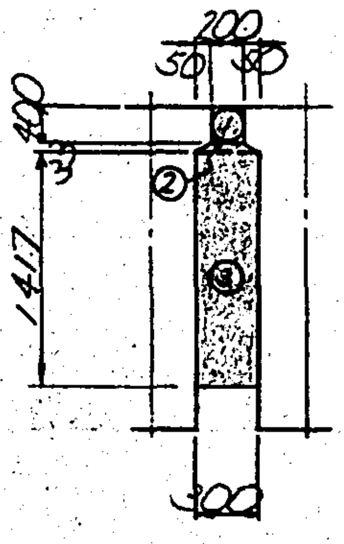
$$① = A_F = 0.200 \times 0.400 = 0.0800 \ m^2$$

$$② \ (0.200 + 0.300) \times 1/2 \times 0.033 = 0.0083 \ m^2$$

$$③ \ 0.300 \times 1.967 = 0.5901 \ ''$$

$$② + ③ = A_{D1} = 0.5984 \ m^2$$

b) CENTRAL CROSS BEAM



$$② \ (0.200 + 0.300) \times 1/2 \times 0.033 = 0.0083 \ m^2$$

$$③ \ 0.300 \times 1.417 = 0.4251 \ ''$$

$$② + ③ = A_{D2} = 0.4334 \ m^2$$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_F = A_F \times L_G \times N_F$$

$$= \overset{m^2}{0.0800} \times 39.960 \times 3 = 9.590\ m^3$$

$$V_D = \{A_{D1} \times t_1 \times 2 + A_{D2} \times t_2 \times 4\} \times N_F$$

$$= \{0.5984 \times 0.800 \times 2 + 0.4334 \times 0.400 \times 4\} \times 3$$

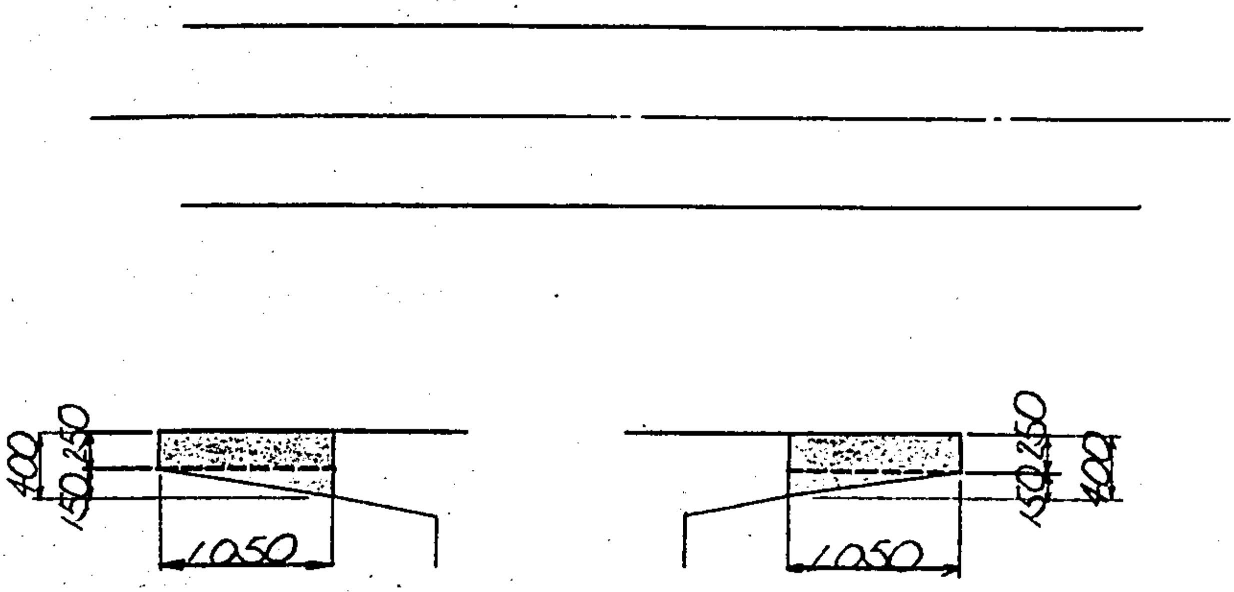
$$= 4.953\ m^3$$

$$\Sigma V = V_F + V_D$$

$$= 9.590 + 4.953$$

$$= 14.543\ m^3$$

3) SIDEWALK CONCRETE



① $(0.250 + 0.400) \times \frac{1}{2} \times 1.050 = 0.3413\ m^2$

② 〃 $= 0.3413$ 〃

$A_s = 0.6826\ m^2$

$$V_s = A_s \times L_G$$
$$= 0.6826 \times 39.960$$
$$= 27.277\ m^3$$

2. FOR CONCRETE FORM AREA

1) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{0.0800^{m^2} \times 1.000 \times 2 - 0.200 \times (39.960 - 0.80 \times 2 - 0.400 \times 4)\} \times 3 = 22.536^{m^2}$$

$$A_2 = \{(0.5984^{m^2} \times 1.000 \times 2 + 0.300 \times 0.800) \times 2 + (0.4334 \times 1.000 \times 2 + 0.300 \times 0.400) \times 4\} \times 3 = 20.462^{m^2}$$

$$\Sigma A = A_1 + A_2 = 22.536 + 20.462 = 42.998^{m^2}$$

2) SIDEWALK

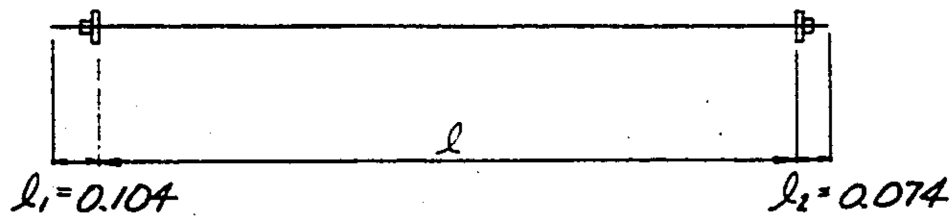
$$l_x = \sqrt{1.050^2 + 0.150^2} = 1.061^{m}$$

$$A = (1.061 + 0.250) \times 39.960 \times 2 + 0.3413^{m^2} \times 1.000 \times 2 \times 2 = 106.140^{m^2}$$

3. POST - TENSIONING BARS

I) P.C. BAR

ϕ 23 mm (SPECIAL GRADE)



$$l_1 + l_2 = 0.104 + 0.074 = 0.178^{m}$$

$$l_p = l + l_1 + l_2$$

	l (m)	l_1+l_2 (m)	l_p (m)	N_p	$L_p = N_p \cdot l_p$
SLAB	3.800	0.178	3.978	29	115.362
CROSS BEAM	3.520	0.178	3.698	16	59.168
TOTAL	$\Sigma L_p = 174.530^{m}$				

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 174.530 = 568.97^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$$L_s = \Sigma L_p - (l_1 + l_2) \times N_p$$
$$= 174.530 - 0.178 \times 45$$
$$= 166.520^{m}$$

3) GROUT

$\phi 35^{mm}$

$$L_G = L_s = 166.520^{m}$$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$$N_c = N_p \times 2$$
$$= 45 \times 2$$
$$= 90$$

4. REINFORCING BAR (SD30)

	W (kg)
D16	1423.6
D13	1978.6
D10	649.5
TOTAL	4051.7

5. ELASTOMERIC BEARING PADS

1) FIXED SUPPORT

FOR $R = 190$ ton

$N = 4$, $400 \times 600 \times 16$
(3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 190$ ton

$N = 4$, $400 \times 600 \times 16$
(3 PLIES)

6. ANCHORING BAR (SS 41)

1) FIXED SIDE

FOR $\phi\ 95$ mm , $N = 3$

$l = 1210$ mm, $W = 201.83$ kg

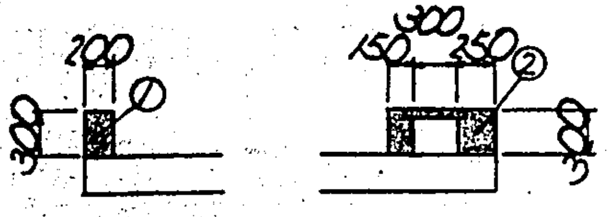
2) MOVABLE SIDE

FOR $\phi\ 90$ mm $N = 3$

$l = 1150$ mm, $W = 172.16$ kg

§ 3 BRIDGE FACE WORK

1. BRIDGE RAILING AND DUCT



① $0.300 \times 0.200 = 0.0600\ m^2$

② 0.700×0.300

$- 0.300 \times 0.250 = 0.1350\ m^2$

$\Sigma A = 0.1950\ m^2$

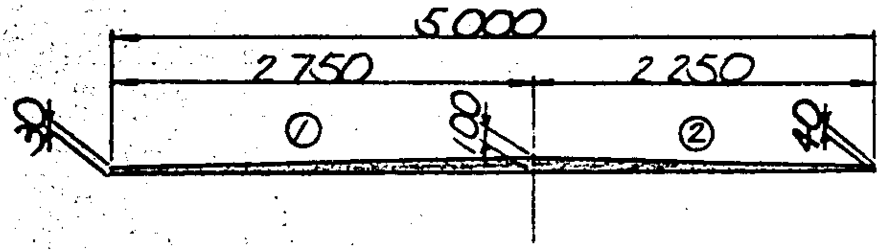
$$\Sigma V = 0.1950\ m^2 \times 39.960 = 7.792\ m^3$$

cosseo

$$\Sigma A = 0.300 \times 6 \times 39.960 + 0.1950 \times 2 \times 1.000$$

$$= 72.318\ m^2$$

2. MORTAR WITH SLOPE-PROTECTIVE MORTAR



① $\frac{1}{2} \times (0.030 + 0.100) \times 2.750 = 0.1788\ m^2$

② $\frac{1}{2} \times (0.100 + 0.040) \times 2.250 = 0.1575$ "

$A_w = 0.3363\ m^2$

$$V = A_w \times L_G$$

$$= 0.3363 \times 39.960$$

$$= 13.439\ m^3$$

$L = 25^M$, $H = 2.35^M$ Straight

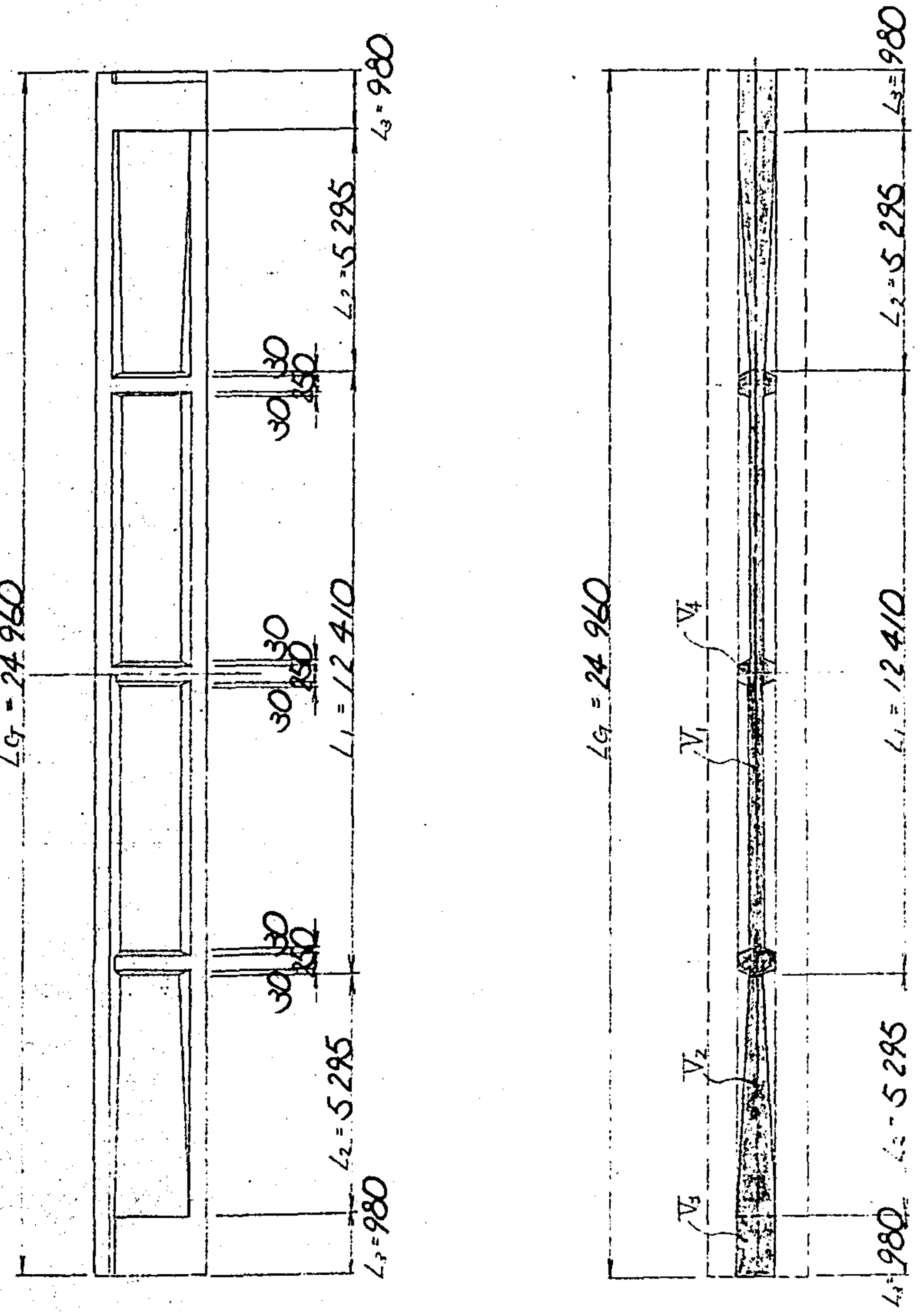
SUPERSTRUCTURE MATERIAL SCHEDULE

B08-PC24

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A ($f_c' = 400\ kg/cm^2$)	m^3	66.1
	P.C STRAND	12 T 12.7 ($f_s' = 190\ kg/mm^2$)	kg	2429.0
	SHEATH	ϕ65 and ϕ70	m	~~220.0~~ 225.9
	FORMS		m^2	333.7
	ANCHORING DEVICE	FOR 12 T 12.7	EACH	20
	REINFORCING BAR	19	kg	—
		16	〃	620.5
		13	〃	3612.2
		10	〃	95.8
		TOTAL	〃	4328.5
LATERAL JOINT	CONCRETE	CLASS B ($f_c' = 300\ kg/cm^2$)	m^3	9.0
	P.C BAR	ϕ23 ($f_s' = 110\ kg/mm^2$)	kg	721.3
	SHEATH	ϕ35	m	210.2
	FORMS		m^2	39.0
	ANCHOR PLATE, NUT	FOR ϕ23	EACH	124
	REINFORCING BAR	16	kg	868.8
		13	〃	1937.1
		10	〃	83.5
		TOTAL	〃	2889.4
SIDEWALK CONCRETE		CLASS C ($f_c' = 240\ kg/cm^2$)	m^3	14.4
BRIDGE RAILING AND DUCT		CONCRETE	m^3	4.9
		FORMS	m^2	45.3
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m^3	8.4
DRAINAGE			EACH	4
ELASTOMERIC BEARING PADS		FIX. FOR R = 170 ton	〃	2
		MOV. FOR R = 170 ton	〃	2

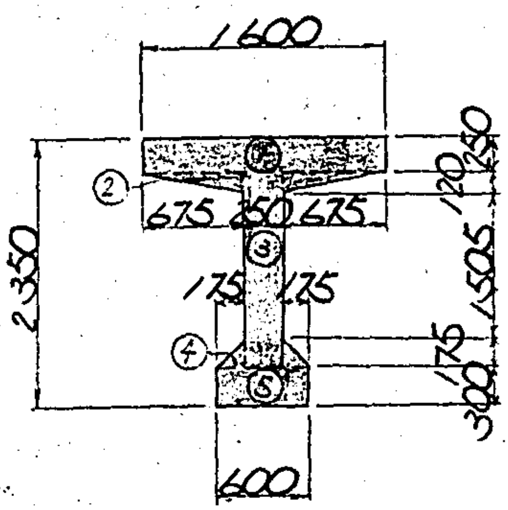
§ I MAIN BEAM

I. CONCRETE VOLUME



I) SECTION AREA

a) AT SPAN CENTER



① $1.600 \times 0.250 = 0.4000\ m^2$

② $\frac{1}{2} \times 0.675 \times 0.120 \times 2 = 0.0810$ "

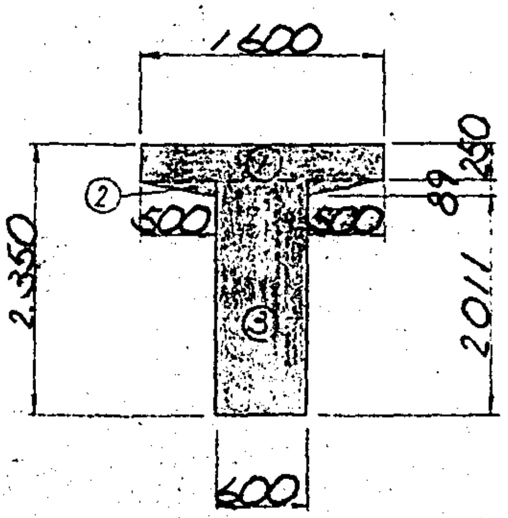
③ $0.250 \times 1.800 = 0.4500$ "

④ $\frac{1}{2} \times 0.175 \times 0.175 \times 2 = 0.0306$ "

⑤ $0.600 \times 0.300 = 0.1800$ "

$A_1 = 1.1416\ m^2$

b) AT SUPPORT POINT



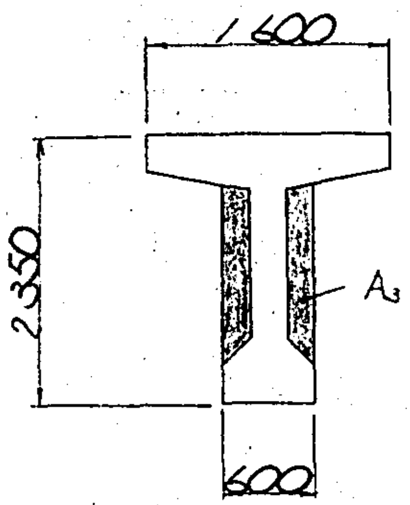
① $1.600 \times 0.250 = 0.4000\ m^2$

② $\frac{1}{2} \times 0.500 \times 0.089 \times 2 = 0.0445$ "

③ $0.600 \times 2.100 = 1.2600$ "

$A_2 = 1.7045\ m^2$

c) CENTRAL DIAPHRAGM



$A_3 = A_2 - A_1$

$= 1.7045 - 1.1416$

$= 0.5629 \ m^2$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$V_1 = A_1 \times L_1$

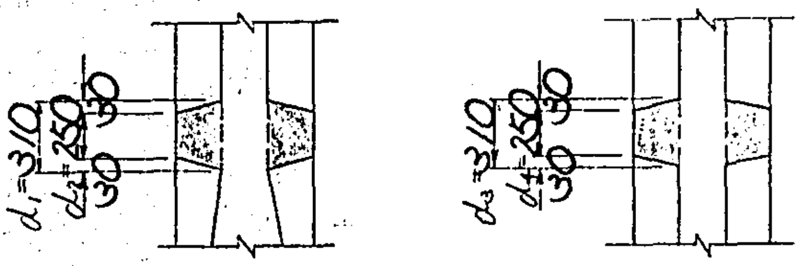
$= 1.1416 \times 12.410 = 14.167 \ m^3$

$V_2 = \frac{1}{2} \times (A_1 + A_2) \times L_2 \times 2$

$= \frac{1}{2} \times (1.1416 + 1.7045) \times 5.295 \times 2 = 15.070 \ m^3$

$V_3 = A_2 \times L_3 \times 2$

$= 1.7045 \times 0.980 \times 2 = 3.341 \ m^3$



$$\nabla_4 = A_3 \times \left\{\left(\frac{d_1+d_2}{2}\right)\times 2 + \left(\frac{d_3+d_4}{2}\right)\right\}$$

$$= 0.5629 \times \left\{\left(\frac{0.310+0.250}{2}\right)\times 2 + \left(\frac{0.310+0.250}{2}\right)\right\}$$

$$= 0.473 \quad m^3$$

$$\Sigma \nabla = (\nabla_1 + \nabla_2 + \nabla_3 + \nabla_4) \times N_G$$

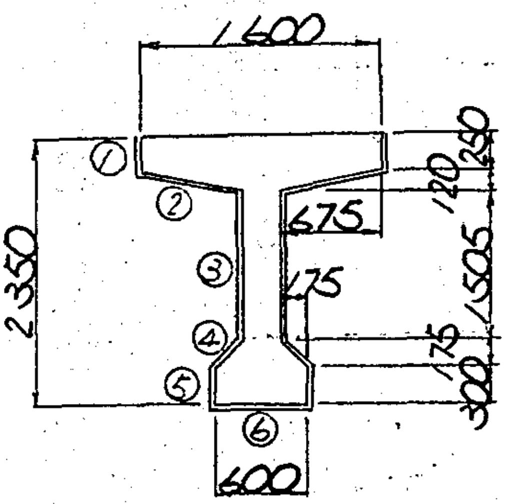
$$= (14.167 + 15.070 + 3.341 + 0.473) \times 2$$

$$= 66.102 \quad m^3$$

2, FOR CONCRETE FORM AREA

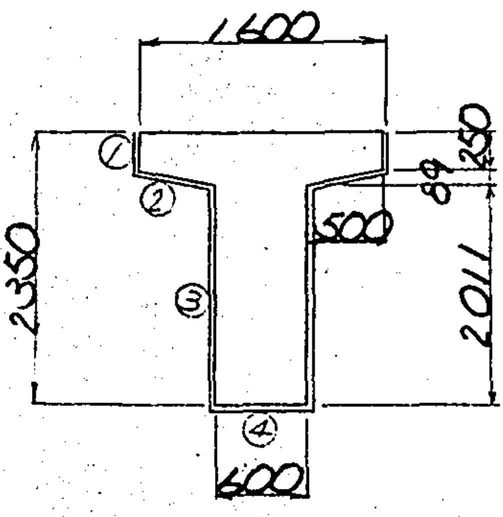
I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



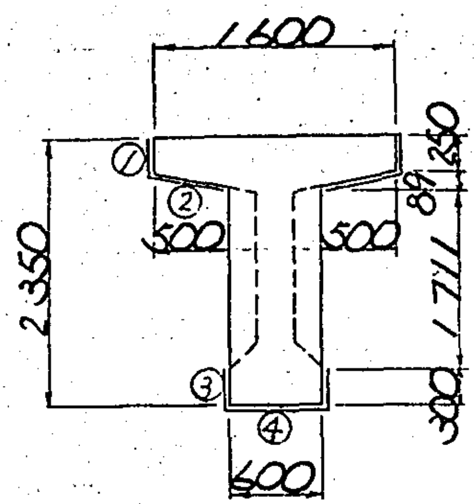
①	0.250×2	$= 0.500^{m}$
②	$\sqrt{0.675^2 + 0.120^2} \times 2$	$= 1.371$ "
③	1.505×2	$= 3.010$ "
④	$\sqrt{0.175^2 + 0.175^2} \times 2$	$= 0.495$ "
⑤	0.300×2	$= 0.600$ "
⑥		$= 0.600$ "
	L_1	$= 6.576^{m}$

b) AT SUPPORT POINT



①	0.250×2	$= 0.500^{m}$
②	$\sqrt{0.500^2 + 0.089^2} \times 2$	$= 1.016$ "
③	2.011×2	$= 4.022$ "
④		$= 0.600$ "
	L_2	$= 6.138^{m}$

c) CENTRAL DIAPHRAGM



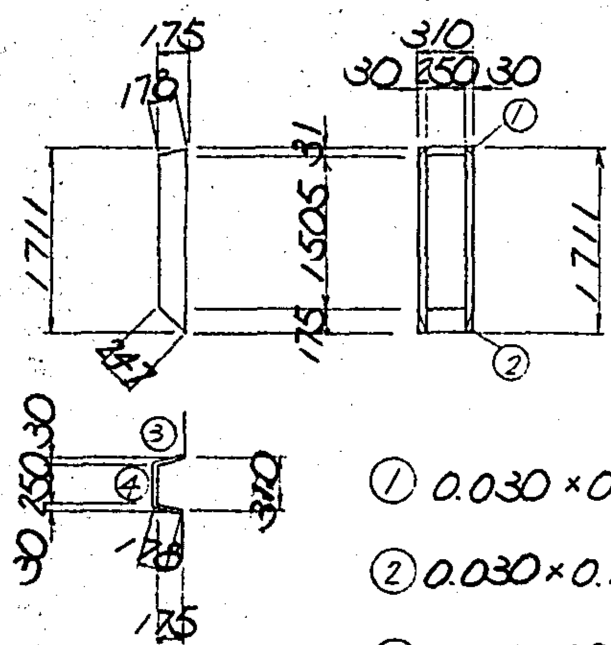
① $0.250 \times 2 = 0.500$ m

② $\sqrt{0.500^2 + 0.089^2} \times 2 = 1.016$ "

③ $0.300 \times 2 = 0.600$ "

④ $= 0.600$ "

$\ell_3 = 2.716$ m



① $0.030 \times 0.178 \times \frac{1}{2} \times 2 = 0.0053$ m²

② $0.030 \times 0.247 \times \frac{1}{2} \times 2 = 0.0074$ "

③ $(1.711 + 1.505) \times 0.178 \times \frac{1}{2} \times 2 = 0.5724$ "

④ $0.250 \times 1.711 = 0.4278$ "

$a_1 = 1.0129$ m²

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$A_1 = L_1 \times 5.740 \times 2$

$= 6.576 \times 5.740 \times 2 = 75.492 \; m^2$

$A_2 = (L_1 + L_2) \times 1/2 \times 5.295 \times 2$

$= (6.576 + 6.138) \times 1/2 \times 5.295 \times 2 = 67.321 \; m^2$

** FOR CONCRETE VOLUME --- A2. **

$A_3 = A_2 \times \mathrm{COSEC}\,\theta \times 2 + L_2 \times 0.980 \times 2$

$= 1.7045 \times \underset{}{\overset{\mathrm{COSEC}\,\theta}{1.000}} \times 2 + 6.138 \times 0.980 \times 2$

$= 15.439 \; m^2$

$\mathrm{COSEC}\, 90°00'00'' = 1.000$

$A_4 = L_3 \times 0.310 \times 3$

$= 2.716 \times 0.310 \times 3 = 2.526 \; m^2$

$A_5 = a_1 \times 2 \times 3$

$= 1.0129 \times 2 \times 3 = 6.077 \; m^2$

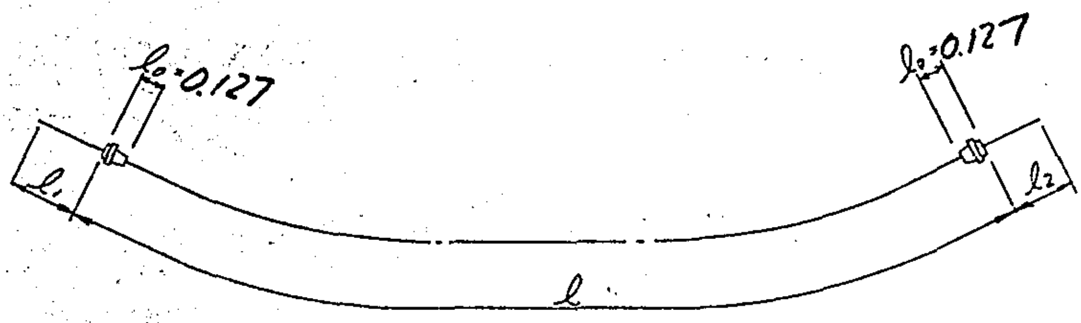
$\Sigma A = (A_1 + A_2 + A_3 + A_4 + A_5) \times N_{G}$

$= (75.492 + 67.321 + 15.439 + 2.526 + 6.077) \times 2$

$= 333.710 \; m^2$

3, PRESTRESSING STEEL

I) MAIN CABLE



$$l_1 + l_2 = 1.300^{m} \qquad l_1 = l_2$$

$$l_p = l + l_1 + l_2$$

No	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_p	$L_p = N_p \times l_p$
C_1	25.030	1.300	26.330	2	52.660
C_2	24.916	〃	26.216	2	52.432
C_3	24.836	〃	26.136	2	52.272
C_4	24.758	〃	26.058	2	52.116
C_5	24.702	〃	26.002	2	52.004
TOTAL					$\Sigma L_p = 261.484^{m}$

$$\Sigma W_p = \gamma_p \times \Sigma L_p$$
$$= 9.29^{kg/m} \times 261.484$$
$$= 2429.19^{kg}$$

2) SHETH

$\phi 70^{mm}$,

$L_{s_1} = 2.000 \times 5 \times 2 = 20.000^{m}$

$\phi 65^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.554) \times 5 \times 2 = 225.944^{m}$

3) GROUT

$\phi 65^{mm}$, $\phi 70^{mm}$

$L_G = \Sigma L_p - (l_1 + l_2) \times N_p \times N_G$

$= 261.484 - 1.300 \times 5 \times 2 = 248.484^{m}$

4) ANCHORING DEVICE

FOR $12T12.7^{mm}$

$N_c = N_p \times N_G \times 2$

$= 5 \times 2 \times 2$

$= 20$

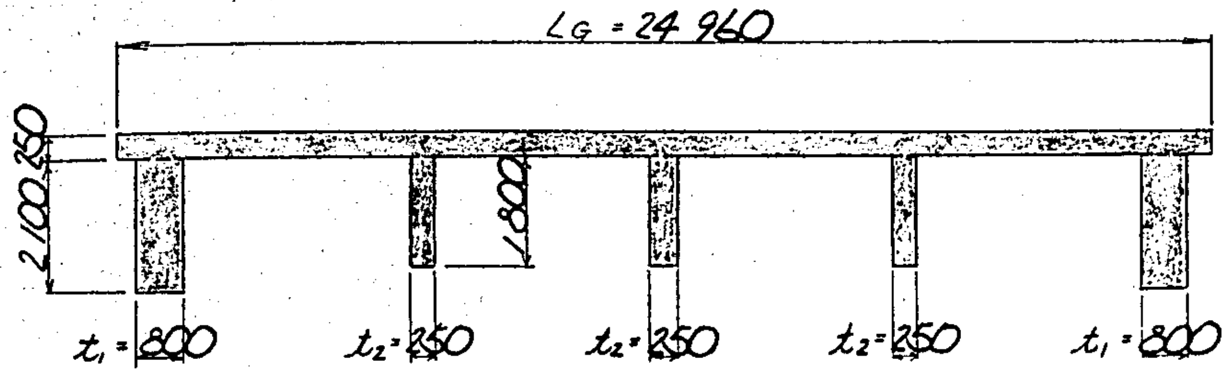
4. REINFORCING BAR (SD30)

	W (Kg)
D16	620.5
D13	3612.2
D10	95.8
TOTAL	4328.5

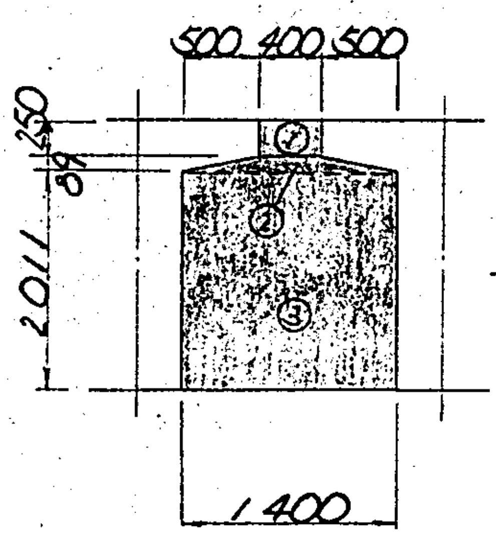
§2 LATERAL JOINT

I. CONCRETE VOLUME

I) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



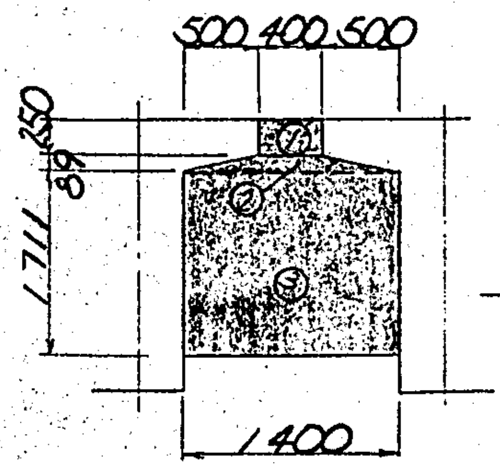
① $= A_F = 0.400 \times 0.250 = 0.1000\ m^2$

② $\frac{1}{2} \times (0.400 + 1.400) \times 0.089 = 0.0801$ "

③ $2.011 \times 1.400 = 2.8154$ "

② + ③ $= A_{D_1} = 2.8955\ m^2$

b) CENTRAL CROSS BEAM



② $\frac{1}{2} \times (0.400 + 1.400) \times 0.089 = 0.0801\ m^2$

③ $1.711 \times 1.400 = 2.3954$

② + ③ $= A_{D_2} = 2.4755\ m^2$

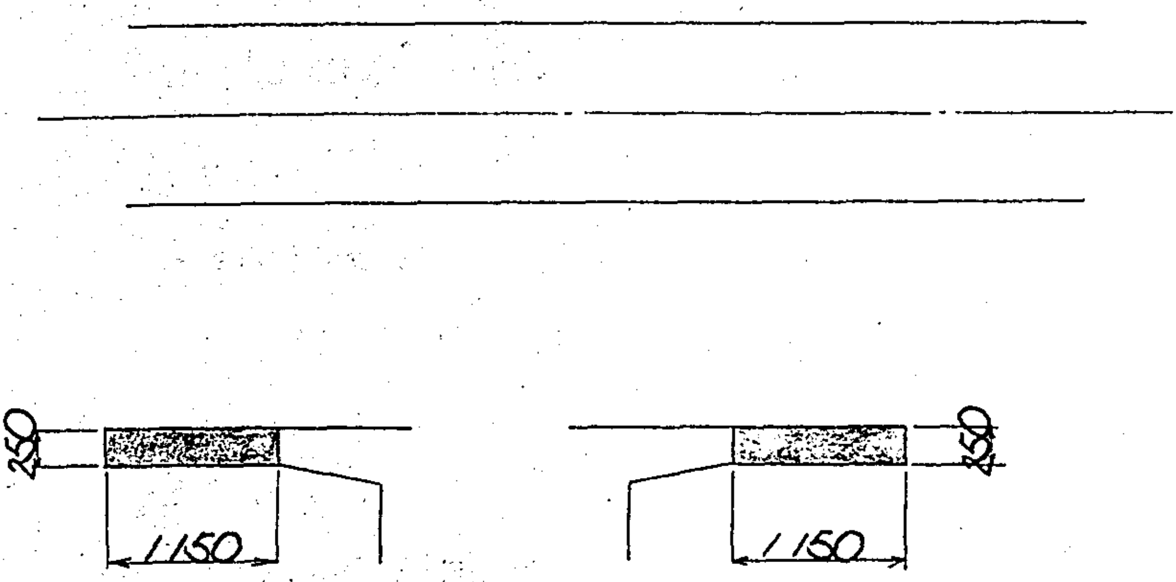
2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_F = A_F \times L_G \times N_F$$
$$= 0.1000^{m^2} \times 24.960 \times 1 = 2.496 \ m^3$$

$$V_D = A_{D1} \times t_1 \times 2 + A_{D2} \times t_2 \times 3$$
$$= 2.8955 \times 0.800 \times 2 + 2.4755 \times 0.250 \times 3$$
$$= 6.489 \ m^3$$

$$\Sigma V = V_F + V_D$$
$$= 2.496 + 6.489$$
$$= 8.985 \ m^3$$

3) SIDEWALK CONCRETE



① $1.150 \times 0.250 = 0.2875 \; m^2$

② 〃 $= 0.2875$ 〃

$$A_s = 0.5750 \; m^2$$

$$V_s = A_s \times L_G$$

$$= 0.5750 \times 24.960$$

$$= 14.352^{3}$$

2. FOR CONCRETE FORM AREA

1) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{ 0.1000^{m^2} \times \overset{\text{coseco}}{1.000} \times 2 + 0.400 \times (24.960 - 0.800 \times 2 - 0.250 \times 3) \} \times 1 = 9.244^{m^2}$$

$$A_2 = \{ (2.8955^{m^2} \times 1.000 \times 2 + 1.400 \times 0.800) \times 2 + (2.4755^{m^2} \times 1.000 \times 2 + 1.400 \times 0.250) \times 3 \} \times 1 = 29.725^{m^2}$$

$$\Sigma A = A_1 + A_2 = 9.244 + 29.725 = 38.969^{m^2}$$

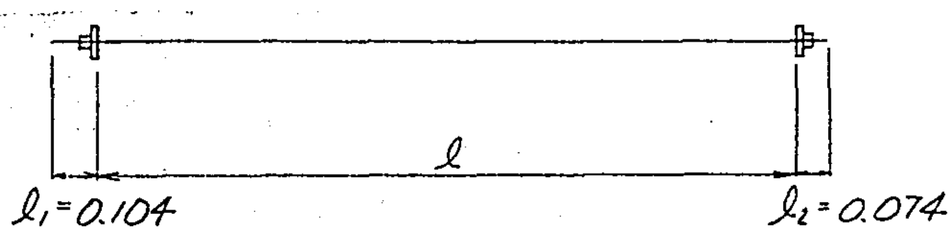
2) SIDEWALK

$$A = (1.150 + 0.250) \times 24.960 \times 1.000 \times 2 + 0.2875^{m^2} \times 1.000 \times 2 \times 2 = 71.038^{m^2}$$

3. POST - TENSIONING BARS

I) P.C. BAR

- $\phi\ 23^{mm}$ (SPECIAL GRADE)



$$l_1 + l_2 = 0.104 + 0.074 = 0.178^{m}$$

$$l_p = l + l_1 + l_2$$

	l (m)	l_1+l_2 (m)	l_p (m)	N_p	$L_p = N_p \cdot l_p$
SLAB	3.600	0.178	3.778	51	192.678
CROSS BEAM	2.420	0.178	2.598	11	28.578
TOTAL				$\Sigma L_P =$	221.256^{m}

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 221.256 = 721.29^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$$L_S = \Sigma L_P - (l_1 + l_2) \times N_P$$
$$= 221.256 - 0.178 \times 62$$
$$= 210.220^{m}$$

3) GROUT

$\phi 35^{mm}$

$$L_G = L_S = 210.220^{m}$$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$$N_C = N_P \times 2$$
$$= 62 \times 2$$
$$= 124$$

4. REINFORCING BAR (SD30)

	W (kg)
D16	868.8
D13	1937.1
D10	83.5
TOTAL	2889.4

5. ELASTOMERIC BEARING PADS

1) FIXED SUPPORT

FOR $R = 170^{ton}$

$N = 2$, $450 \times 500 \times 14$
(3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 170^{ton}$

$N = 2$, $450 \times 500 \times 14$
(3 PLIES)

6. ANCHORIMG BAR (SS 41)

1) FIXED SIDE

FOR $\phi\ 85^{mm}$, $N = 2$

$l = 1090^{mm}$, $W = 97.01^{kg}$

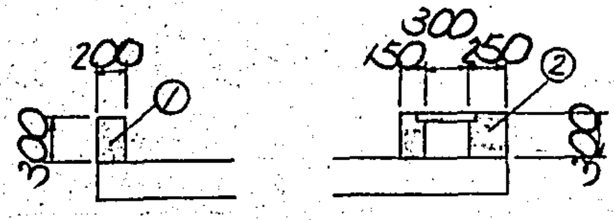
2) MOVABLE SIDE

FOR $\phi\ 75^{mm}$ $N = 2$

$l = 970^{mm}$, $W = 67.32^{kg}$

§ 3 BRIDGE FACE WORK

1, BRIDGE RAILING AND DUCT



① $0.300 \times 0.200 = 0.0600 \, m^2$

② 0.700×0.300

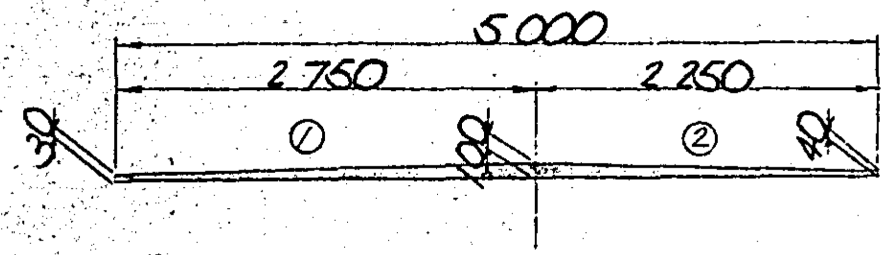
$- 0.300 \times 0.250 = 0.1350 \, "$

$\Sigma A = 0.1950 \, m^2$

$$\Sigma V = 0.1950^{m^2} \times 24.960 = 4.867 \, m^3$$

$$\Sigma A = 0.300 \times 6 \times 24.960 + 0.1950 \times 2 \times 1.000 \text{ (case θ)}$$
$$= 45.318 \, m^2$$

2, MORTAR WITH SLOPE-PROTECTIVE MORTAR



① $\frac{1}{2} \times (0.030 + 0.100) \times 2.750 = 0.1788 \, m^2$

② $\frac{1}{2} \times (0.030 + 0.100) \times 2.250 = 0.1575 \, "$

$A_w = 0.3363 \, m^2$

$$V = A_w \times L_G$$
$$= 0.3363^{m^2} \times 24.960$$
$$= 8.394 \, m^3$$

L = 30 M, H = 2.15 M Curve R = 500 m

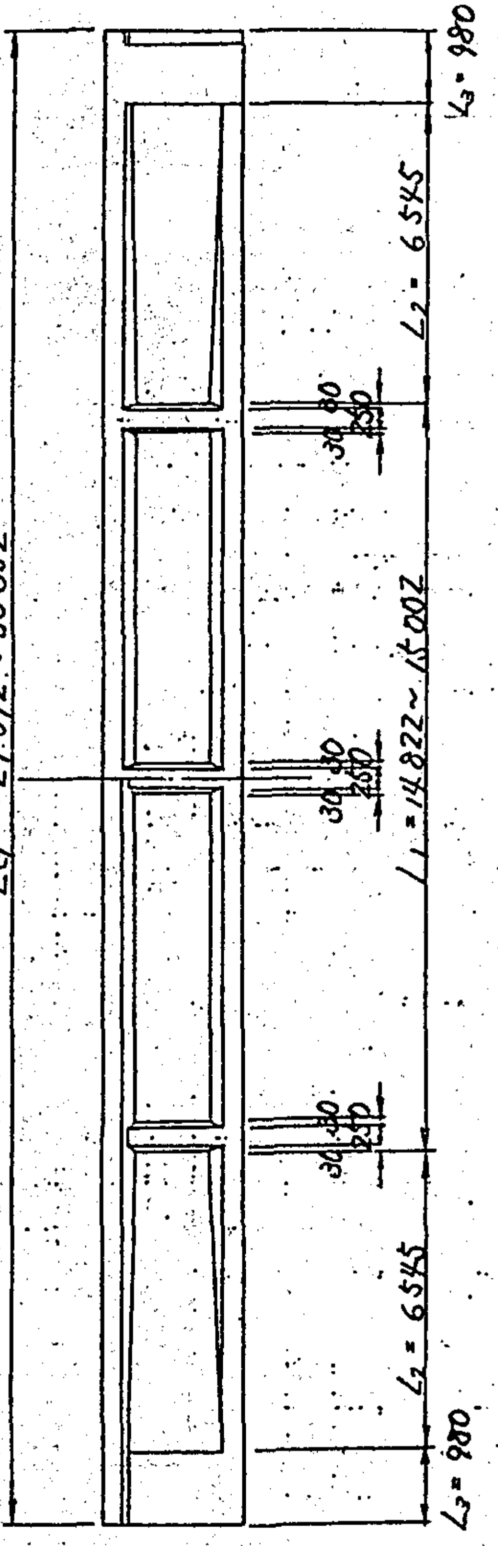
SUPERSTRUCTURE MATERIAL SCHEDULE

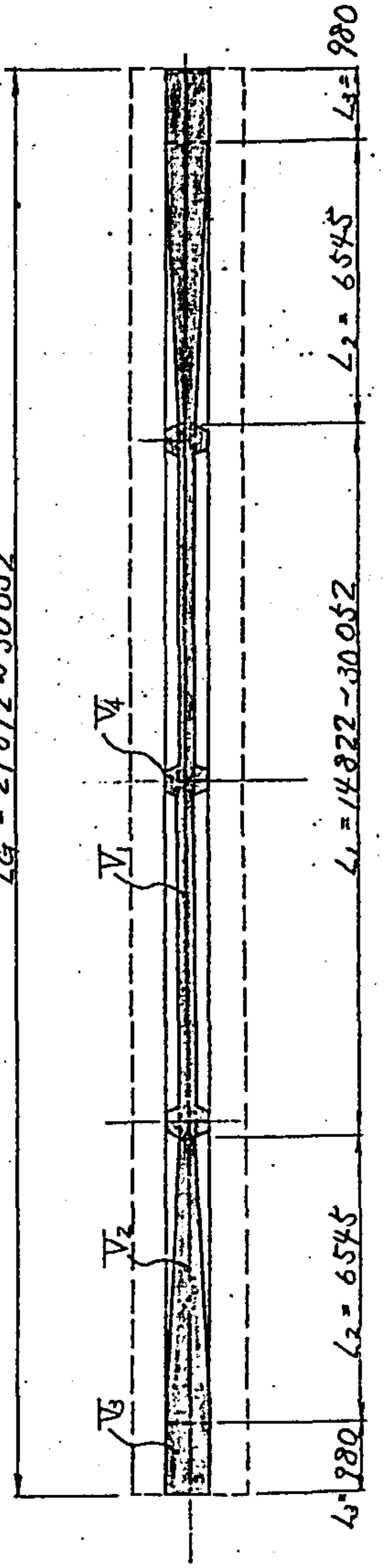
B11 - PC28

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A ($fc' = 400$ kg/cm²)	m^3	119.8
	P.C. STRAND	12T 12.7 ($fs' = 190$ kg/mm²)	kg	5784.8
	SHEATH	φ65 and φ70	m	5516 40.0
	FORMS		m^2	670.6
	ANCHORING DEVICE	FOR 12T 12.7	EACH	40
	REINFORCING BAR	19	kg	——
		16	〃	1490.6
		13	〃	6755.4
		10	〃	68.0
		TOTAL	〃	8314.0
LATERAL JOINT	CONCRETE	CLASS B ($fc' = 300$ kg/cm²)	m^3	9.6
	P.C. BAR	φ23 ($fs' = 110$ kg/mm²)	kg	557.0
	SHEATH	φ35	m	163.0
	FORMS		m^2	40.2
	ANCHOR PLATE, NUT	FOR φ23	EACH	88
	REINFORCING BAR	16	kg	994.1
		13	〃	1669.5
		10	〃	397.3
		TOTAL	〃	3060.9
SIDEWALK CONCRETE		CLASS C ($fc' = 240$ kg/cm²)	m^3	15.7
BRIDGE RAILING AND DUCT		CONCRETE	m^3	5.8
		FORMS	m^2	54.3
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m^3	10.1
DRAINAGE			EACH	8
ELASTOMERIC BEARING PADS		FIX. FOR R = 120 ton	〃	4
		MOV. FOR R = 120 ton	〃	4

§ I MAIN BEAM

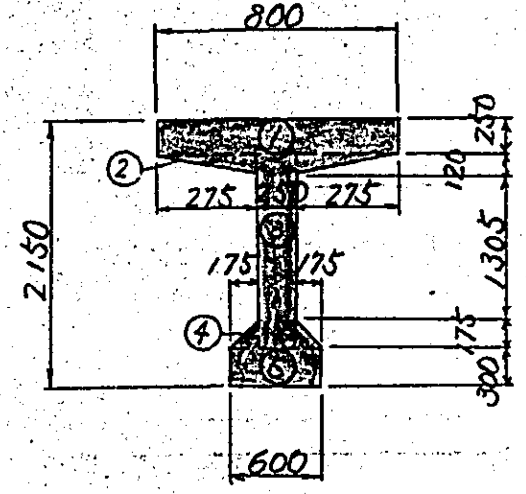
I. CONCRETE VOLUME





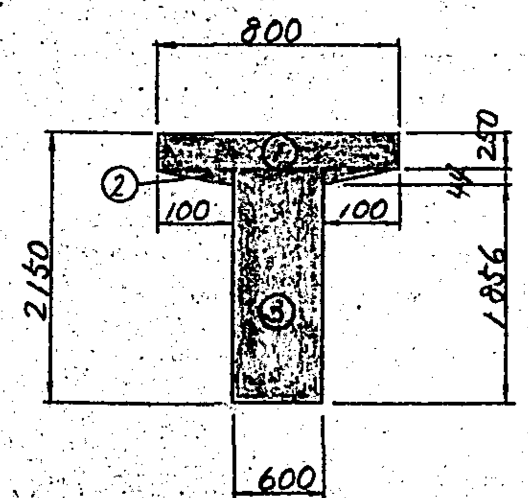
I) SECTION AREA

a) AT SPAN CENTER



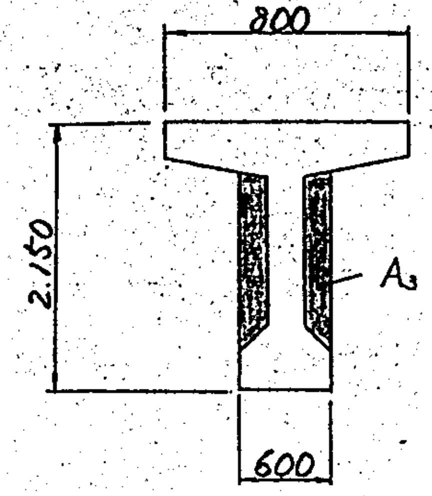
①	0.800×0.250	$= 0.2000$ m^2
②	$\frac{1}{2} \times 0.275 \times 0.120 \times 2$	$= 0.0330$
③	0.250×1.600	$= 0.4000$
④	$\frac{1}{2} \times 0.175 \times 0.175 \times 2$	$= 0.0306$
⑤	0.600×0.300	$= 0.1800$
	A_1	$= 0.8436$ m^2

b) AT SUPPORT POINT



①	0.800×0.250	$= 0.2000$ m^2
②	$\frac{1}{2} \times 0.100 \times 0.044 \times 2$	$= 0.0044$
③	0.600×1.900	$= 1.1400$
	A_2	$= 1.3444$ m^2

c) CENTRAL DIAPHRAGM



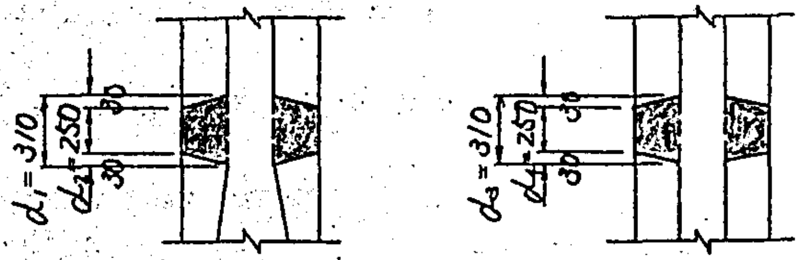
$$A_3 = A_2 - A_1$$
$$= 1.3444 - 0.8436$$
$$= 0.5008 \quad m^2$$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_1 = A_1 \times L_1$$
$$= 0.8436 \times \frac{14.822+15.002}{2} \quad 12.680 \quad m^3$$

$$V_2 = \tfrac{1}{2} \times (A_1 + A_2) \times L_2 \times 2$$
$$= \tfrac{1}{2} \times (0.8436 + 1.3444) \times 6.545 \times 2 = 14.320 \quad m^3$$

$$V_3 = A_2 \times L_3 \times 2$$
$$= 1.3444 \times 0.980 \times 2 = 2.635 \quad m^3$$



$$\nabla_4 = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2} \right) \times 2 + \left(\frac{d_3 + d_4}{2} \right) \right\}$$

$$= 0.5008 \times \left\{ \frac{0.310 + 0.250}{2} \times 2 + \frac{0.310 + 0.250}{2} \right\}$$

$$= 0.421 \quad m^3$$

$$\Sigma \nabla = (\nabla_1 + \nabla_2 + \nabla_3 + \nabla_4) \times N_G$$

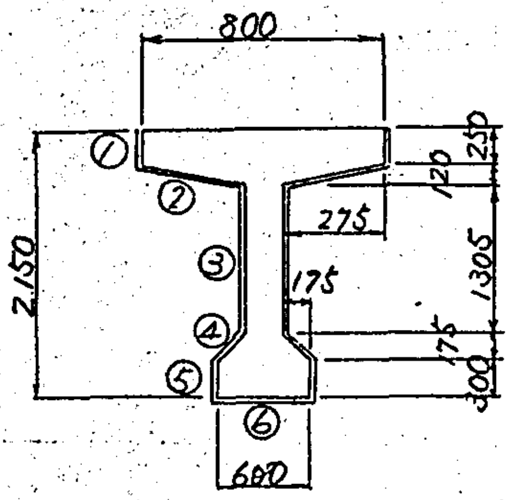
$$= (12.580 + 14.320 + 2.635 + 0.421) \times 4$$

$$= 119.824 \quad m^3$$

2, FOR CONCRETE FORM AREA

I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



① $0.250 \times 2 = 0.500$ m

② $\sqrt{0.275^2 + 0.120^2} \times 2 = 0.600$

③ $1.305 \times 2 = 2.610$

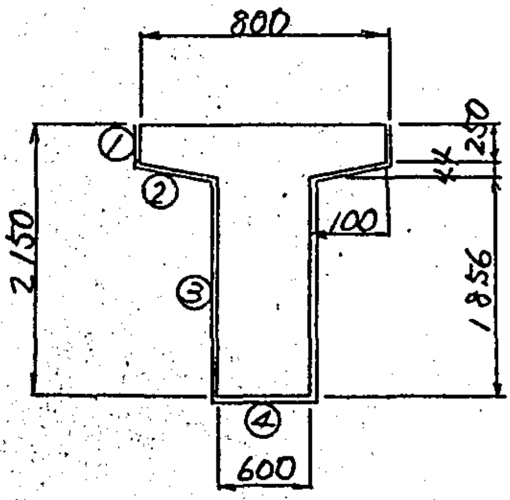
④ $\sqrt{0.175^2 + 0.175^2} \times 2 = 0.495$

⑤ $0.300 \times 2 = 0.600$

⑥ $= 0.600$

$L_1 = 5.405$ m

b) AT SUPPORT POINT



① $0.250 \times 2 = 0.500$ m

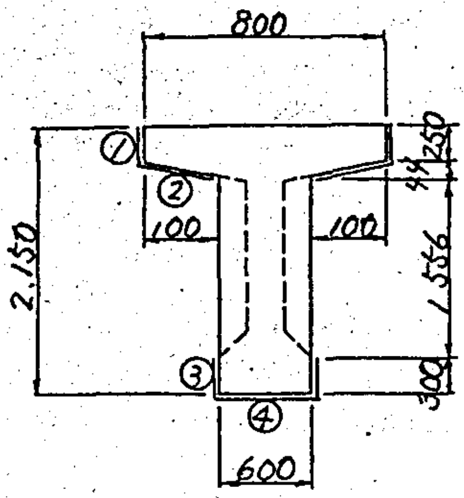
② $\sqrt{0.100^2 + 0.074^2} \times 2 = 0.219$

③ $1.856 \times 2 = 3.712$

④ $= 0.600$

$L_2 = 5.031$ m

a) CENTRAL DIAPHRAGM



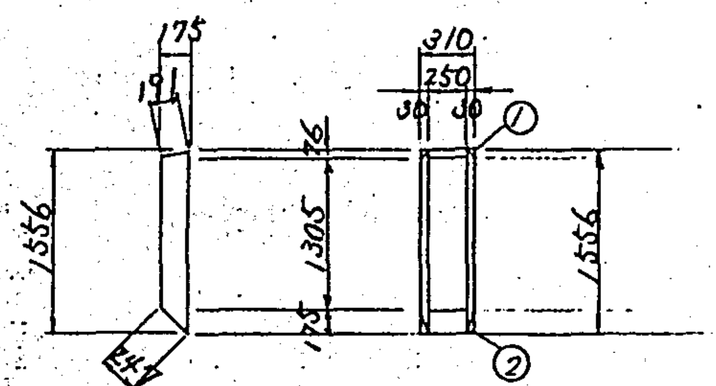
① $0.250 \times 2 \quad = 0.500$ m

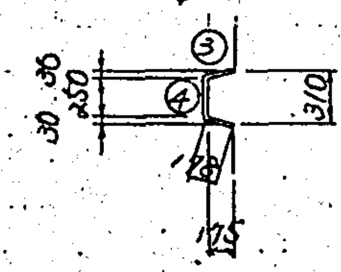
② $\sqrt{0.100^2 + 0.044^2} \times 2 \quad = 0.219$

③ $0.300 \times 2 \quad = 0.600$

④ $\quad = 0.600$

$L_3 = 1.919$ m





① $0.030 \times 0.191 \times \frac{1}{2} \times 2 \quad = 0.0057$ m²

② $0.030 \times 0.247 \times \frac{1}{2} \times 2 \quad = 0.0074$

③ $(1.556 + 1.305) \times 0.178 \times \frac{1}{2} \times 2 \quad = 0.5093$

④ $0.250 \times 1.556 \quad = 0.3890$

$a_1 = 0.9114$ m²

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$A_1 = L_1 \times 6.991 \times 2$

$= 5.405 \times 6.991 \times 2 = 75.573 \ m^2$

$A_2 = (L_1 + L_2) \times 1/2 \times 6.545 \times 2$

$= (5.405 + 5.031) \times 1/2 \times 6.545 \times 2 = 68.304 \ m^2$

** FOR CONCRETE VOLUME --- A2. **

$A_3 = A_2 \times COSEC\theta \times 2 + L_2 \times 0.980 \times 2$

$= 1.3444 \times 1.0005 \times 2 + 5.031 \times 0.980 \times 2$

$= 12.551 \ m^2$

$COSEC\ 88^\circ 16' 52'' = 1.0005$

$A_4 = L_3 \times 0.310 \times 3$

$= 1.919 \times 1.0005 \times 3 = 5.760 \ m^2$

$A_5 = a_1 \times 2 \times 3$

$= 0.9114 \times 2 \times 3 = 5.468 \ m^2$

$\Sigma A = (A_1 + A_2 + A_3 + A_4 + A_5) \times N_G$

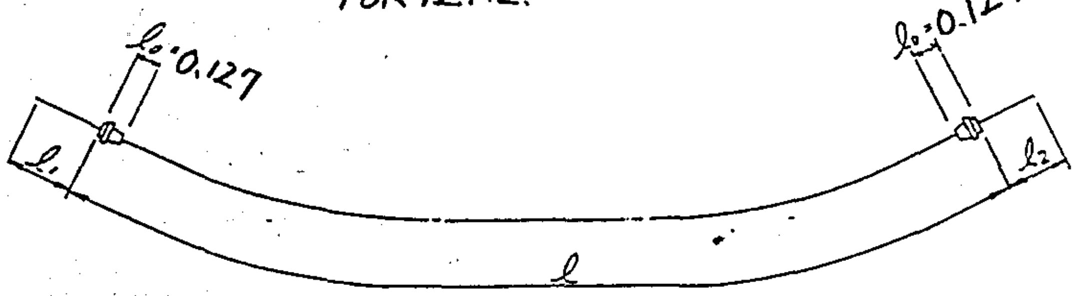
$= (75.573 + 68.304 + 12.551 + 5.760 + 5.468) \times 4$

$= 670.624 \ m^2$

3, PRESTRESSING STEEL

I) MAIN CABLE

FOR 12T12.7



$l_1 + l_2 = 1.300$ m $l_1 = l_2$

$l_p = l + l_1 + l_2$

No	l (m)	l_1+l_2 (m)	l_p (m)	Nq	$L_p = Nq \times l_p$
C_1	29.996	1.300	31.296	4	125.184
C_2	29.894	1.300	31.194	4	124.776
C_3	29.824	1.300	31.124	4	124.496
C_4	29.754	1.300	31.054	4	124.216
C_5	29.704	1.300	31.004	4	124.016
TOTAL	$\Sigma L_p = 622.688$ m				

$\Sigma W_p = \gamma_p \times \Sigma L_p$

$= 9.29$ kg/m $\times 622.688$

$= 5784.77$

2) SHETH

$\phi 70^{mm}$,

$L_{s_1} = 2.000 \times 5 \times 4 = 40.000^{m}$

$\phi 65^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.554) \times 5 \times 4 = 551.608^{m}$

3) GROUT

$\phi 65^{mm}, \phi 70^{mm}$

$L_G = \Sigma L_p - (l_1 + l_2) \times N_p \times N_G$

$= 622.688 - 1.300 \times 5 \times 4 = 596.688^{m}$

4) ANCHORING DEVICE

FOR $12T12.7^{mm}$

$N_c = N_p \times N_G \times 2$

$= 5 \times 4 \times 2$

$= 40$

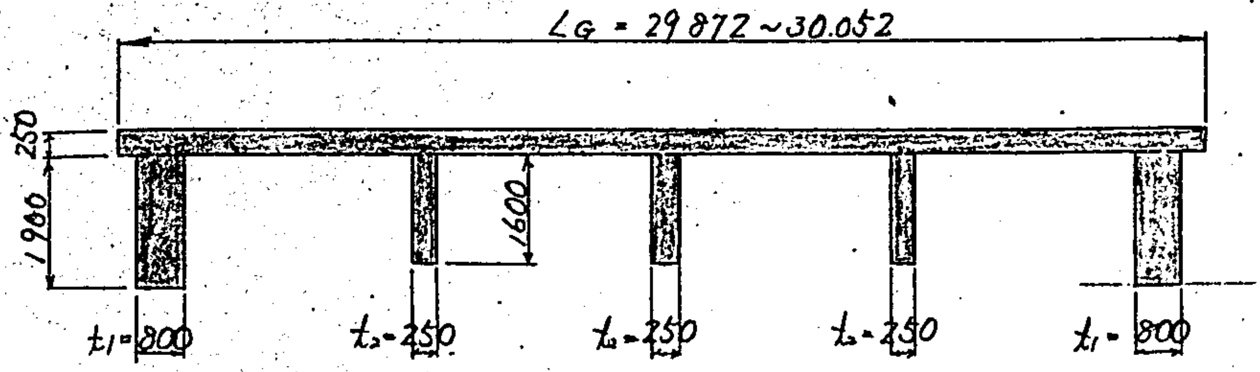
4. REINFORCING BAR (SD 30)

	W (Kg)
D 16	1490.6
D 13	6755.4
D 10	68.0
TOTAL	8314.0

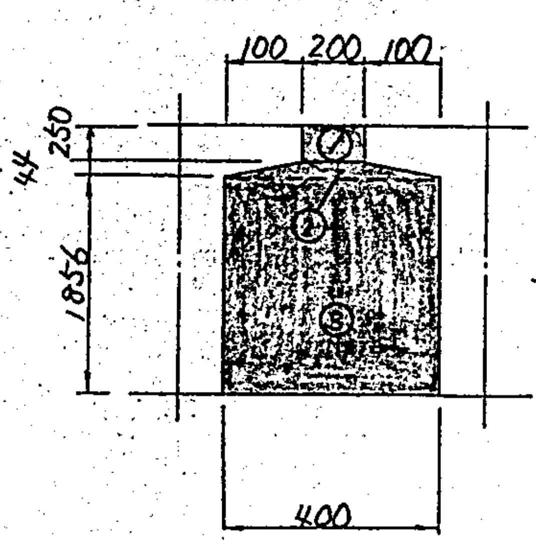
§2 LATERAL JOINT

I. CONCRETE VOLUME

I) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



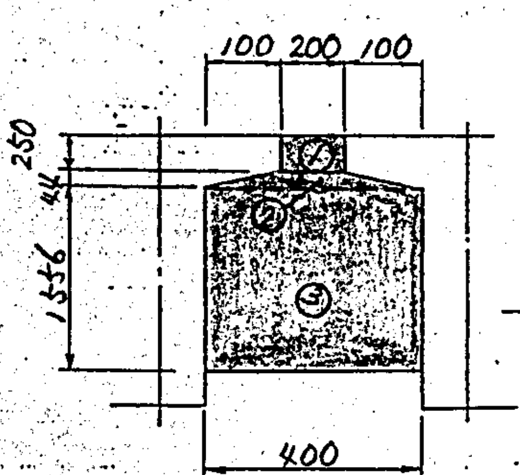
① $= A_F = 0.200 \times 0.250 = 0.050\ m^2$

② $\frac{1}{2} \times (0.200 + 0.400) \times 0.044 = 0.0132$

③ $1.856 \times 0.400 = 0.7424$

② + ③ $= A_{D_1} = 0.7556\ m^2$

b) CENTRAL CROSS BEAM



② $\frac{1}{2} \times (0.200 + 0.400) \times 0.044 = 0.0132\ m^2$

③ $1.556 \times 0.400 = 0.6224$

② + ③ $= A_{D_2} = 0.6356\ m^2$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_F = A_F \times L_G \times N_F$$

$$= 0.050 \times \frac{29.872 + 30.052}{2} \times 3 = 4.494\ m^3$$

$$V_D = (A_{D1} \times t_1 \times 2 + A_{D2} \times t_2 \times 3) \times 3$$

$$= (0.7556 \times 0.866 \times 2 + 0.6356 \times 0.250 \times 3) \times 3$$

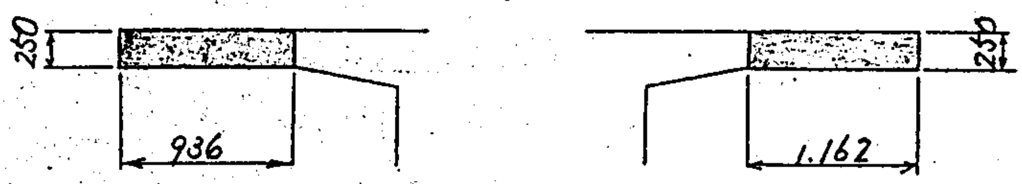
$$= 5.057\ m^3$$

$$\Sigma V = V_F + V_D$$

$$= 4.494 + 5.057$$

$$= 9.551\ m^3$$

3) SIDEWALK CONCRETE



① $0.936 \times 0.250 = 0.2340\ m^2$

② $1.162 \times 0.250 = 0.2905$ 〃

$A_s = 0.5245\ m^2$

$$V_s = A_s \times L_G$$

$$= 0.5245 \times \frac{29.872 + 30.052}{2}$$

$$= 15.715\ m^3$$

2. FOR CONCRETE FORM AREA

1) SLAB AND CROSS BEAM

$\frac{29.872+30.052}{2} = 29.962$

** FOR CONCRETE VOLUME ** calc.

$A_1 = \{ 0.050 \times 1.0005 \times 2 + 0.200 \times (29.962 - 0.80 \times 2$

$- 0.250 \times 3) \} \times 3 = 16.867$

$A_2 = \{ (0.7556 \times 1.0005 \times 2 + 0.400 \times 0.800) \times 2$

$+ (0.6356 \times 1.0005 \times 2 + 0.400 \times 0.250) \times 3 \} \times 3.0$

$= 23.338$

$\Sigma A = A_1 + A_2$

$= 16.867 + 23.338$

$= 40.205 \ m^2$

2) SIDEWALK

$A = (0.936 + 0.250) \times 30.052$

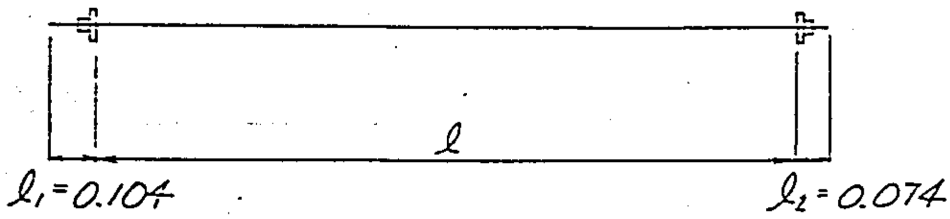
$+ (1.162 + 0.250) \times 29.872$

$+ 0.5245 m^2 \times 1.0005 \times 2 = 78.870 \ m^2$

3. POST - TENSIONING BARS

I) P.C. BAR

$\phi\ 23^{mm}$ (SPECIAL GRADE)



$$l_1 + l_2 = 0.104 + 0.074 = 0.178^{m}$$

$$l_p = l + l_1 + l_2$$

	l (m)	l_1+l_2 (m)	l_p (m)	N_p	$L_p = N_p \cdot l_p$
SLAB	3.800	0.178	3.978	33	131.274
CROSS BEAM	3.420	0.178	3.598	11	39.578
TOTAL	$\Sigma L_P = 170.852^{m}$				

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 170.852$$
$$= 556.98^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$$L_S = \Sigma L_P - (l_1 + l_2) \times N_P$$
$$= 170.852 - 0.178 \times 44$$
$$= 163.020^{m}$$

3) GROUT

$\phi 35^{mm}$

$$L_G = L_S = 163.020^{m}$$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$$N_C = N_P \times 2$$
$$= 44 \times 2$$
$$= 88$$

4. REINFORCING BAR (SD 30)

	W (kg)
D16	994.1
D13	1669.5
D10	397.3
TOTAL	3060.9

5. ELASTOMERIC BEARING PADS

1) FIXED SUPPORT

FOR $R = 120^{ton}$

$N = 4$, $300 \times 500 \times$ (3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 120^{ton}$

$N = 4$, $300 \times 500 \times$ (3 PLIES)

6. ANCHORIMG BAR (SS 41)

1) FIXED SIDE

FOR $\phi\ 80^{mm}$, $N = 3$

$l = 1030^{mm}$, $W = 122.06^{kg}$

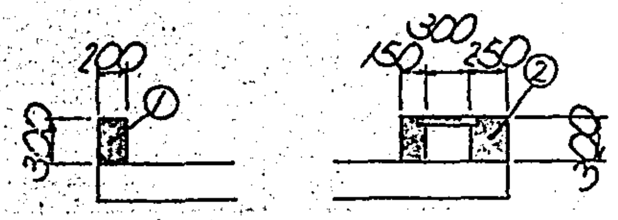
2) MOVABLE SIDE

FOR $\phi\ 75^{mm}$ $N = 3$

$l = 970^{mm}$, $W = 100.98^{kg}$

§ 3 BRIDGE FACE WORK

1, BRIDGE RAILING AND DUCT



$$① \quad 0.300 \times 0.200 = 0.0600 \ m^2$$

$$② \quad 0.700 \times 0.300 - 0.300 \times 0.250 = 0.1350 \ m^2$$

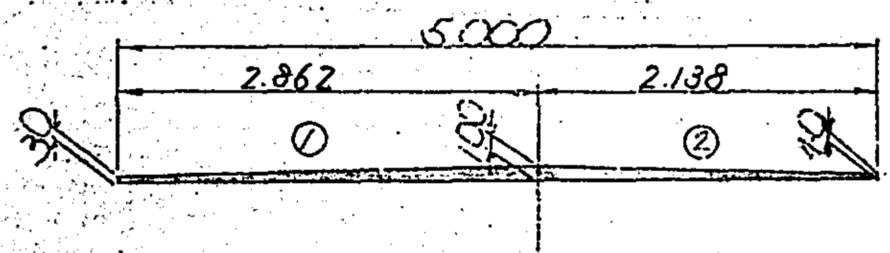
$$\Sigma A_1 = 0.1950 \ m^2$$

$$\Sigma V = 0.1950 \ m^2 \times 29.962 = 5.843 \ m^3$$

$$\Sigma A = 0.300 \times 6 \times \underbrace{29.962}_{=\frac{29.872+30.052}{2}} + 0.1950 \times 2 \times 1.0005$$

$$= 54.322 \ m^2$$

2, MORTAR WITH SLOPE-PROTECTIVE MORTAR



$$① \quad 1/2 \times (0.030 + 0.100) \times 2.862 = 0.1860 \ m^2$$

$$② \quad 1/2 \times (0.100 + 0.040) \times 2.138 = 0.1497 \ ''$$

$$A_w = 0.3357 \ m^2$$

$$V = A_w \times L_G$$

$$= 0.3357 \times 29.962$$

$$= 10.058 \ m^3$$

$L = 25^{M}$, $H = 2.35^{M}$ Curve $R = 500^{m}$

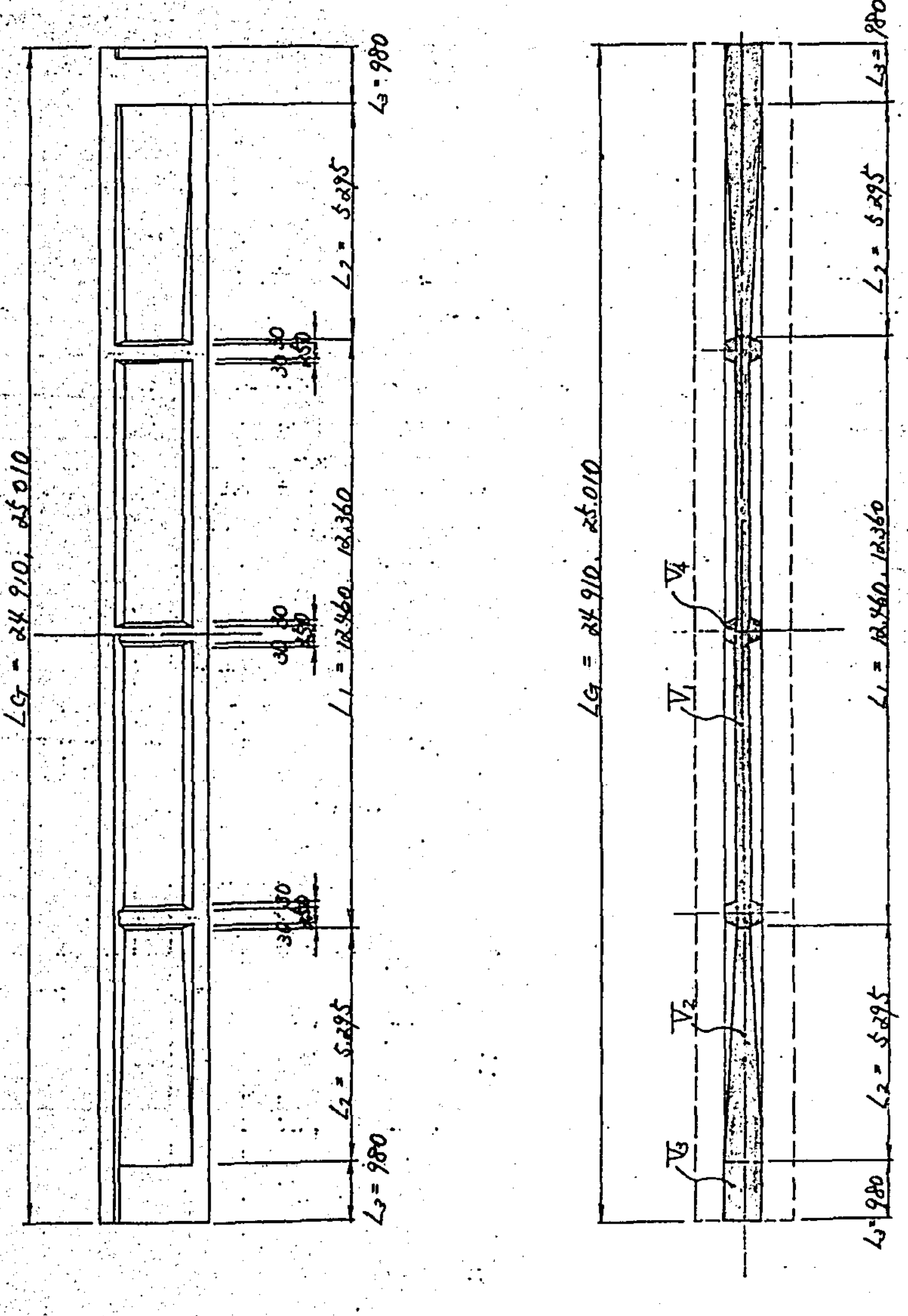
SUPERSTRUCTURE MATERIAL SCHEDULE

B 12 — PC29

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A ($f_c' = 400\ kg/cm^2$)	m^3	66.3
	P.C.STRAND	12T12.7 ($f_s' = 190\ kg/mm^2$)	kg	2429.2
	SHEATH	ϕ65 and ϕ70	m	225.9 20.0
	FORMS		m^2	333.7
	ANCHORING DEVICE	FOR 12T12.7	EACH	20
	REINFORCING BAR	19	kg	—
		16	〃	620.5
		13	〃	3612.2
		10	〃	95.8
		TOTAL	〃	4328.5
LATERAL JOINT	CONCRETE	CLASS B ($f_c' = 300\ kg/cm^2$)	m^3	9.0
	P.C. BAR	ϕ23 ($f_s' = 110\ kg/mm^2$)	kg	721.3
	SHEATH	ϕ35	m	210.2
	FORMS		m^2	39.0
	ANCHOR PLATE, NUT	FOR ϕ 23	EACH	124
	REINFORCING BAR	16	kg	868.8
		13	〃	1937.1
		10	〃	83.5
		TOTAL	〃	2889.4
SIDEWALK CONCRETE		CLASS C ($f_c' = 240\ kg/cm^2$)	m^3	14.3
BRIDGE RAILING AND DUCT		CONCRETE	m^3	4.9
		FORMS	m^2	45.3
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m^3	8.4
DRAINAGE			EACH	4
ELASTOMERIC BEARING PADS		FIX. FOR R = 170 ton	〃	2
		MOV. FOR R = 170 ton	〃	2

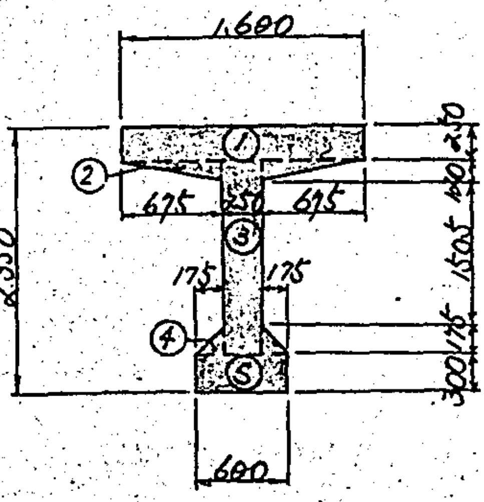
§ I MAIN BEAM

I. CONCRETE VOLUME



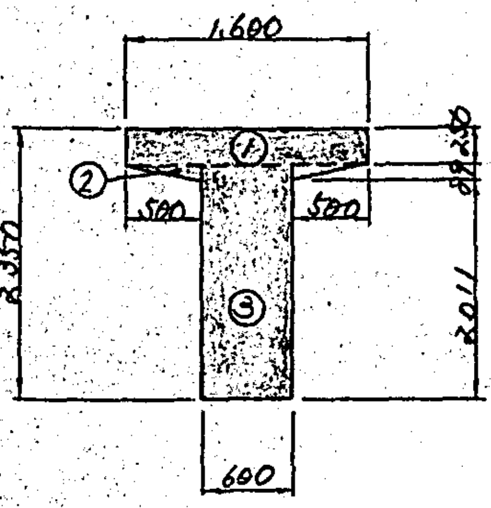
I) SECTION AREA

a) AT SPAN CENTER



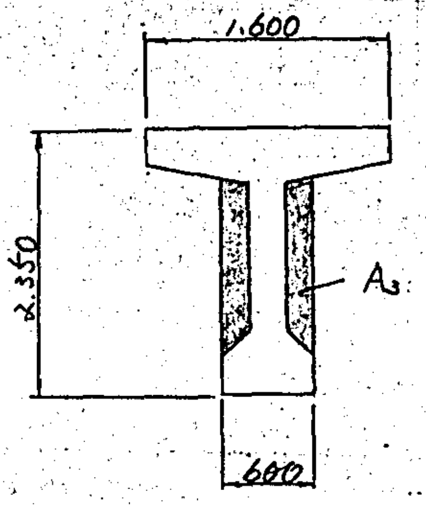
①	1.600 x 0.250	=	0.4000 m^2
②	½ x 0.675 x 0.120 x 2	=	0.0810
③	0.250 x 1.800	=	0.450
④	½ x 0.175 x 0.175 x 2	=	0.0306
⑤	0.600 x 0.300	=	0.1800
	A_1	=	1.1416 m^2

b) AT SUPPORT POINT



①	1.600 x 0.250	=	0.4000 m^2
②	½ x 0.500 x 0.089 x 2	=	0.0445
③	0.600 x 2.100	=	1.2600
	A_2	=	1.7045 m^2

c) CENTRAL DIAPHRAGM



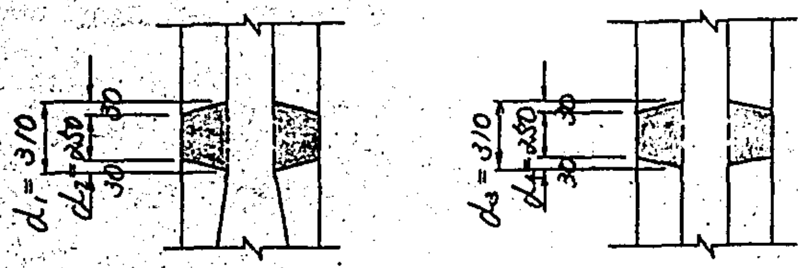
$$A_3 = A_2 - A_1$$
$$= 1.7045 - 1.1416$$
$$= 0.5629 \quad m^2$$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_1 = A_1 \times L_1$$
$$= 1.1416 \times \begin{matrix} 12.460 \\ (12.360) \end{matrix} = \begin{matrix} 14.461 \\ (14.110) \end{matrix} \; m^3$$

$$V_2 = 1/2 \times (A_1 + A_2) \times L_2 \times 2$$
$$= 1/2 \times (1.1416 + 1.7045) \times 5.295 \times 2 = 15.070 \quad m^3$$

$$V_3 = A_2 \times L_3 \times 2$$
$$= 1.7045 \times 0.980 \times 2 = 3.341 \quad m^3$$



$$\nabla_4 = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2} \right) \times 2 + \left(\frac{d_3 + d_4}{2} \right) \right\}$$

$$= 0.5629 \times \left[\frac{0.310 + 0.250}{2} \times 2 + \frac{0.310 + 0.250}{2} \right]$$

$$= 0.473 \quad m^3$$

$$\Sigma \nabla = (\nabla_1 + \nabla_2 + \nabla_3 + \nabla_4) \times N_G$$

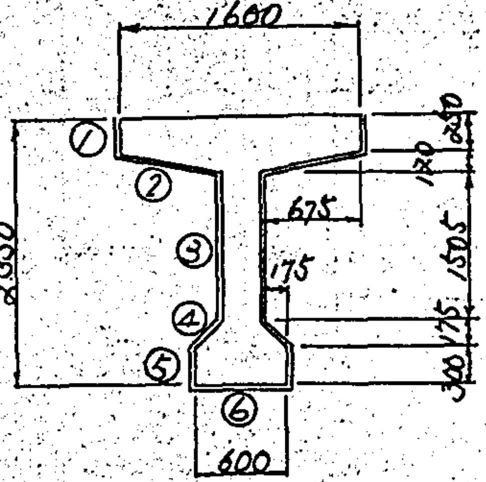
$$= 14.401 + 14.110 + (15.070 + 3.341 + 0.473) \times 2$$

$$= 66.339 \quad m^3$$

2, FOR CONCRETE FORM AREA

I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



① $0.250 \times 2 = 0.500$ m

② $\sqrt{0.675^2 + 0.120^2} \times 2 = 1.371$

③ $1.505 \times 2 = 3.010$

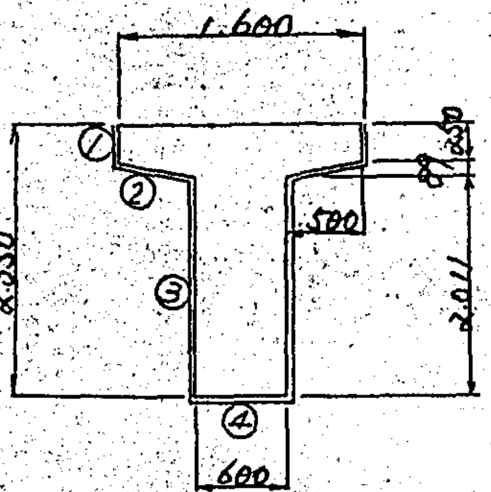
④ $\sqrt{0.175^2 + 0.175^2} \times 2 = 0.495$

⑤ $0.300 \times 2 = 0.600$

⑥ $= 0.600$

$L_1 = 6.576$ m

b) AT SUPPORT POINT



① $0.250 \times 2 = 0.500$ m

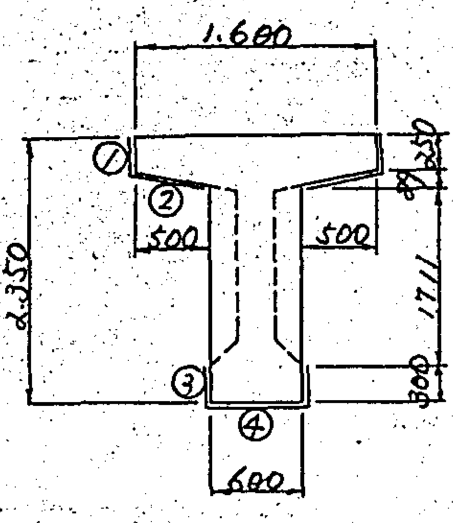
② $\sqrt{0.500^2 + 0.089^2} \times 2 = 1.016$

③ $2.011 \times 2 = 4.022$

④ $= 0.600$

$L_2 = 6.138$ m

c) CENTRAL DIAPHRAGM



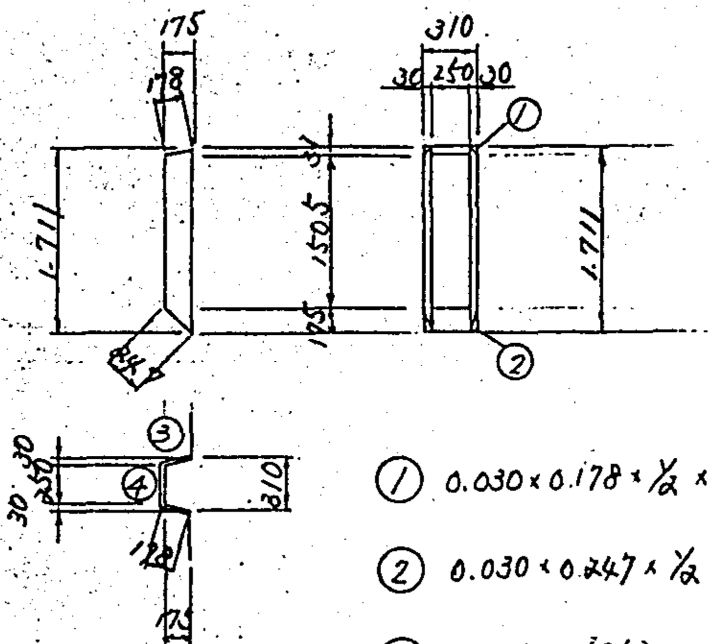
① $0.250 \times 2 = 0.500$ m

② $\sqrt{0.500^2 + 0.089^2} \times 2 = 1.016$

③ $0.300 \times 2 = 0.600$

④ $= 0.600$

$L_3 = 2.716$ m



① $0.030 \times 0.178 \times \frac{1}{2} \times 2 = 0.0053$ m²

② $0.030 \times 0.247 \times \frac{1}{2} \times 2 = 0.0074$

③ $(1.711 + 1.505) \times 0.178 \times \frac{1}{2} \times 2 = 0.5724$

④ $0.250 \times 1.711 = 0.4278$

$a_1 = 1.0129$ m²

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$$A_1 = L_1 \times \frac{5.765}{(5.715)} \times 2$$

$$= 6.576 \times \frac{5.765}{(5.715)} \times 2 = \frac{75.821}{(75.164)} \ m^2$$

$$A_2 = (L_1 + L_2) \times 1/2 \times 5.295 \times 2$$

$$= (6.576 + 6.138) \times 1/2 \times 5.295 \times 2 = 67.321 \ m^2$$

** FOR CONCRETE VOLUME --- A2. **

$$A_3 = A_2 \times COSEC\theta \times 2 + L_2 \times 0.980 \times 2$$

$$= 1.7045 \times 1.0003 \times 2 + 6.138 \times 0.980 \times 2$$

$$= 15.441 \ m^2$$

$$COSEC\ 88°34'03'' = 1.0003$$

$$A_4 = L_3 \times 0.310 \times 3$$

$$= 2.716 \times 0.310 \times 3 = 2.526 \ m^2$$

$$A_5 = a_1 \times 2 \times 3$$

$$= 1.0129 \times 2 \times 3 = 6.077 \ m^2$$

$$\Sigma A = (A_1 + A_2 + A_3 + A_4 + A_5) \times N_G$$

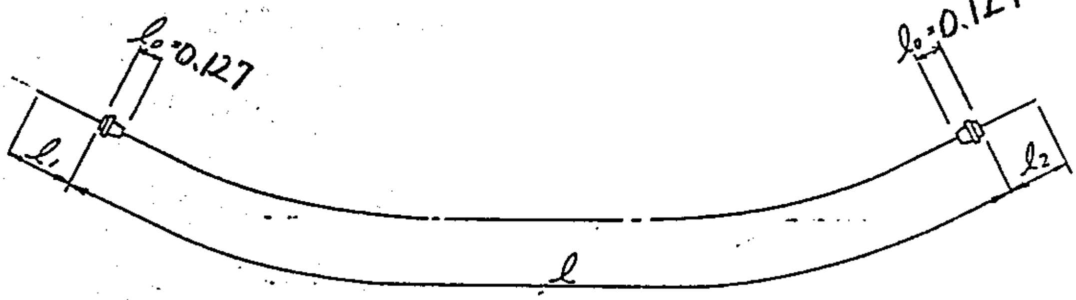
$$= 75.821 + 75.164 + (67.321 + 15.441 + 2.526 + 6.077) \times 2$$

$$= 333.715 \ m^2$$

3. PRESTRESSING STEEL

I) MAIN CABLE

FOR 12T12.7



$l_1 + l_2 = 1.300^m$ $\quad l_1 = l_2$

$l_p = l + l_1 + l_2$

No	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_G	$L_p = N_G \times l_p$
C_1	25.030	1.300	26.330	2	52.660
C_2	24.916	1.300	26.216	2	52.432
C_3	24.836	1.300	26.136	2	52.272
C_4	24.758	1.300	26.058	2	52.116
C_5	24.702	1.300	26.002	2	52.004
TOTAL					$\Sigma L_p = 261.484^m$

$$\Sigma W_p = \gamma_p \times \Sigma L_p$$
$$= 9.29^{kg/m} \times 261.484$$
$$= 2429.19^{kg}$$

2) SHETH

$\phi 70^{mm}$,

$L_{s_1} = 2.000 \times 5 \times 2 = 20.000^{m}$

$\phi 65^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.554) \times 5 \times 2 = 225.944^{m}$

3) GROUT

$\phi 65^{mm}$

$L_G = \Sigma L_p - (l_1 + l_2) \times N_p \times N_G$

$= 261.484 - 1.300 \times 5 \times 2 = 248.484^{m}$

4) ANCHORING DEVICE

FOR $12T12.^{7}$ mm

$N_c = N_p \times N_G \times 2$

$= 5 \times 2 \times 2$

$= 20$

4. REINFORCING BAR (SD 30)

	$\overline{W}$ (Kg)
D 16	$620.^{5}$
D 13	$3612.^{2}$
D 10	$95.^{8}$
TOTAL	$4328.^{5}$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_F = A_F \times L_G \times N_F$$

$$= 0.1000 \times \frac{24.910 + 25.010}{2} \times 1 = 2.496 \ m^3$$

$$V_D = A_{D1} \times t_1 \times 2 + A_{D2} \times t_2 \times 3$$

$$= 2.8955 \times 0.800 \times 2 + 2.4755 \times 0.250 \times 3$$

$$= 6.489 \ m^3$$

$$\Sigma V = V_F + V_D$$

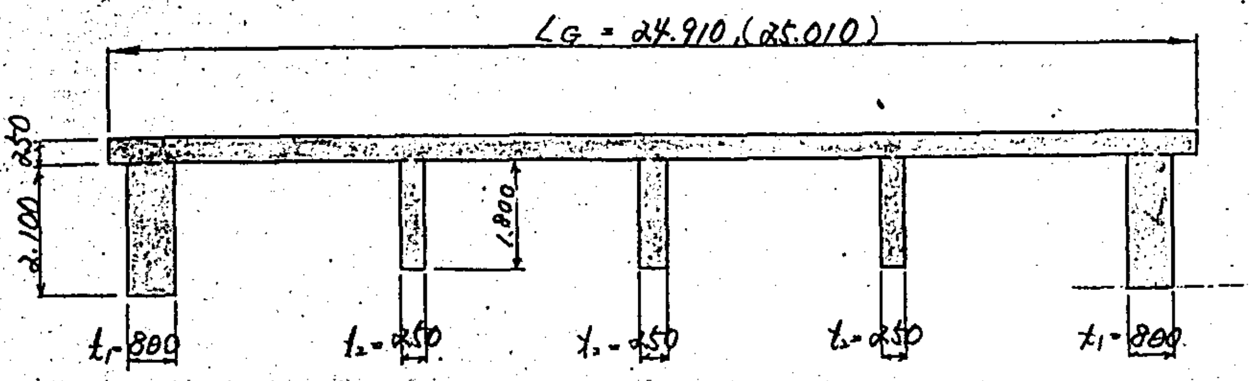
$$= 2.496 + 6.489$$

$$= 8.985 \ m^3$$

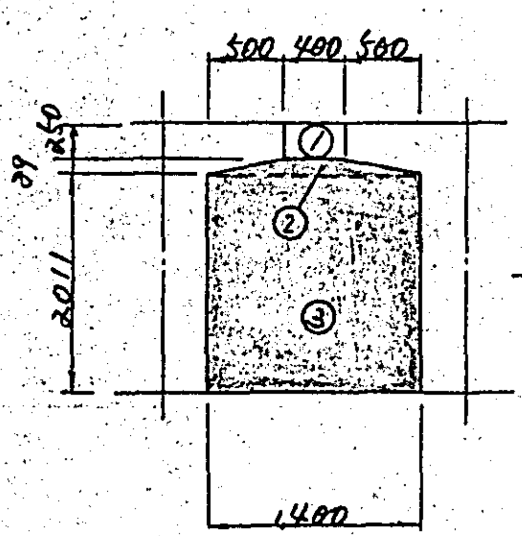
§2 LATERAL JOINT

I. CONCRETE VOLUME

1) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



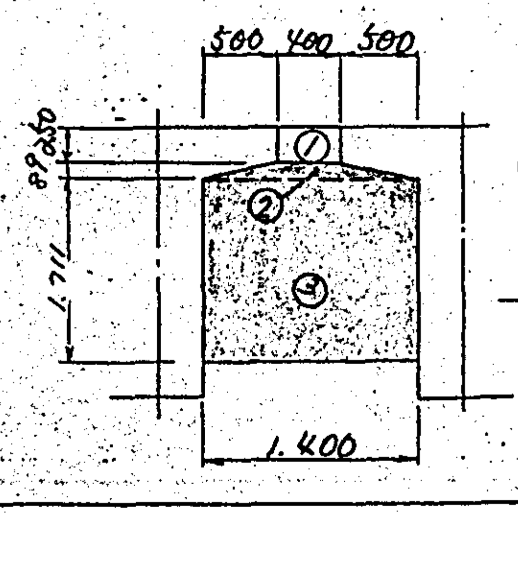
① $= A_F = 0.400 \times 0.250 = 0.1000 \ m^2$

② $\frac{1}{2} \times (0.400 + 1.400) \times 0.089 = 0.0801$

③ $2.011 \times 1.400 = 2.8154$

② + ③ $= A_{D1} = 2.8955 \ m^2$

b) CENTRAL CROSS BEAM

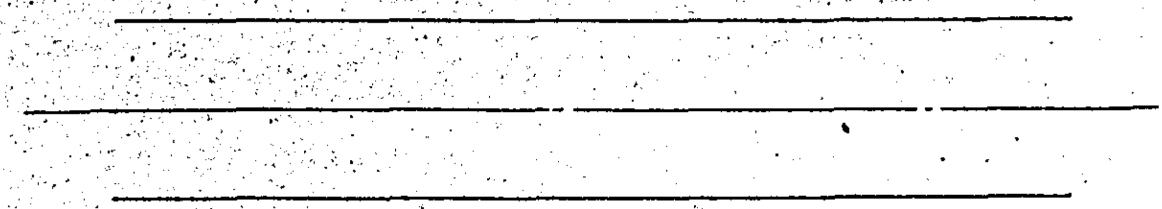


② $\frac{1}{2} \times (0.400 + 1.400) \times 0.089 = 0.0801 \ m^2$

③ $1.711 \times 1.400 = 2.3954$

② + ③ $= A_{D2} = 2.4755 \ m^2$

3) SIDEWALK CONCRETE



① $1.071 \times 0.250 \qquad = 0.2678 \ m^2$

② $1.227 \times 0.250 \qquad = 0.3068 \ $ 〃

$A_s = 0.5746 \ m^2$

$V_s = A_s \times L_G$

$= 0.2678 \times 24.910 + 0.3068 \times 25.010$

$= 14.344 \ m^3$

2. FOR CONCRETE FORM AREA

1) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{ 0.1000 \times 1.0003 \times 2 + 0.400 \left(\frac{24.910 + 25.010}{2} - 0.800 \times 2 - 0.250 \times 3 \right\} \times 1 = 9.244\ m^2$$

$$A_2 = \{ (2.8955 \times 1.000 \times 2 + 1.400 \times 0.800) \times 2 + (2.4755 \times 1.000 \times 2 + 1.400 \times 0.250) \times 3 \} \times 1.0 = 29.725\ m^2$$

$$\Sigma A = A_1 + A_2 = 9.244 + 29.725 = 38.969$$

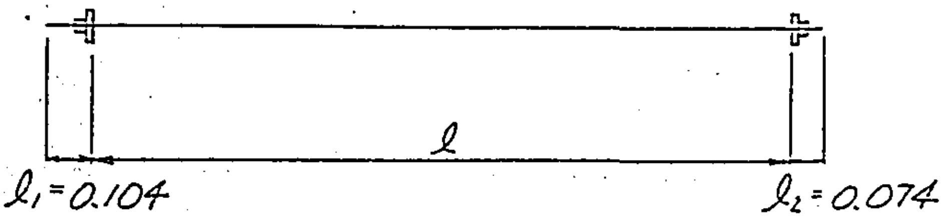
2) SIDEWALK

$$A = (1.071 + 0.250) \times 25.010 \times 1.000 + (1.227 + 0.250) \times 24.910 \times 1.000 + (0.2678 + 0.3068) \times 1.000 \times 2 = 70.979\ m^2$$

3. POST - TENSIONING BARS

I) P.C. BAR

$\phi\ 23^{mm}$ (SPECIAL GRADE)



$$l_1 + l_2 = 0.104 + 0.074 = 0.178^{m}$$

$$l_P = l + l_1 + l_2$$

	l (m)	l_1+l_2(m)	l_P (m)	N_P	$L_P = N_P \cdot l_P$
SLAB	3.600	0.178	3.778	51	192.678
CROS BEAM	2.420	0.178	2.598	11	28.578
TOTAL					$\Sigma L_P = 221.256^{m}$

$$\Sigma W_P = \gamma_P \times \Sigma L_P = 3.26^{kg/m} \times 221.256$$
$$= 721.29^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$$L_S = \Sigma L_P - (l_1 + l_2) \times N_P$$
$$= 221.256 - 0.178 \times 62$$
$$= 210.220^{m}$$

3) GROUT

$\phi 35^{mm}$

$$L_G = L_S = 210.220^{m}$$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$.

$$N_C = N_P \times 2$$
$$= 62 \times 2$$
$$= 124$$

4. REINFORCING BAR (SD 30)

	W (kg)
D 16	868.8
D 13	1937.1
D 10	83.5
TOTAL	2889.4

5. ELASTOMERIC BEARING PADS

1) FIXED SUPPORT

FOR $R = 170$ ton

$N = 2$, $450 \times 500 \times 14$
(3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 170$ ton

$N = 2$, $450 \times 500 \times 14$
(3 PLIES)

6. ANCHORIMG BAR (SS 41)

1) FIXED SIDE

FOR $\phi\ 85^{mm}$, $N = 2$

$l = 1090^{mm}$, $W = 97.01^{kg}$

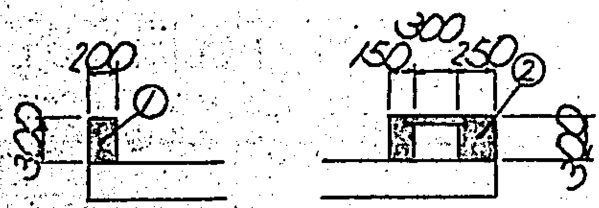
2) MOVABLE SIDE

FOR $\phi\ 75^{mm}$ $N = 2$

$l = 970^{mm}$, $W = 67.32\ kg$

§ 3 BRIDGE FACE WORK

1, BRIDGE RAILING AND DUCT



① $0.300 \times 0.200 = 0.0600 \, m^2$

② 0.700×0.300

$-0.300 \times 0.250 = 0.1350 \, m^2$

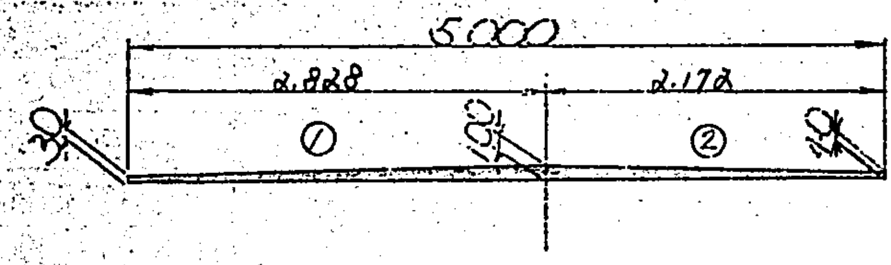
$\Sigma A = 0.1950 \, m^2$

$$\Sigma V = 0.0600 \, m^2 \times 25.010 = \quad m^3$$
$$+ 0.1350 \times 24.910 = 4.863 \, m^3$$

CELLO
"

$$\Sigma A = 0.300 \times 6 \times \frac{25.010 + 24.910}{2} + 0.1950 \times 2 \times 1.0003$$
$$= 45.318 \, m^2$$

2, MORTAR WITH SLOPE-PROTECTIVE MORTAR



① $\frac{1}{2} \times (0.030 + 0.100) \times 2.828 = 0.1838 \, m^2$

② $\frac{1}{2} \times (0.100 + 0.040) \times 2.172 = 0.1520$ "

$A_w = 0.3358 \, m^2$

$$V = A_w \times L_G$$
$$= 0.3358 \, m^2 \times \frac{1}{2} \times (25.010 + 24.910)$$
$$= 8.382 \, m^3$$

L = 25 M , H = 2.35 M Curve Left 69°34′03″

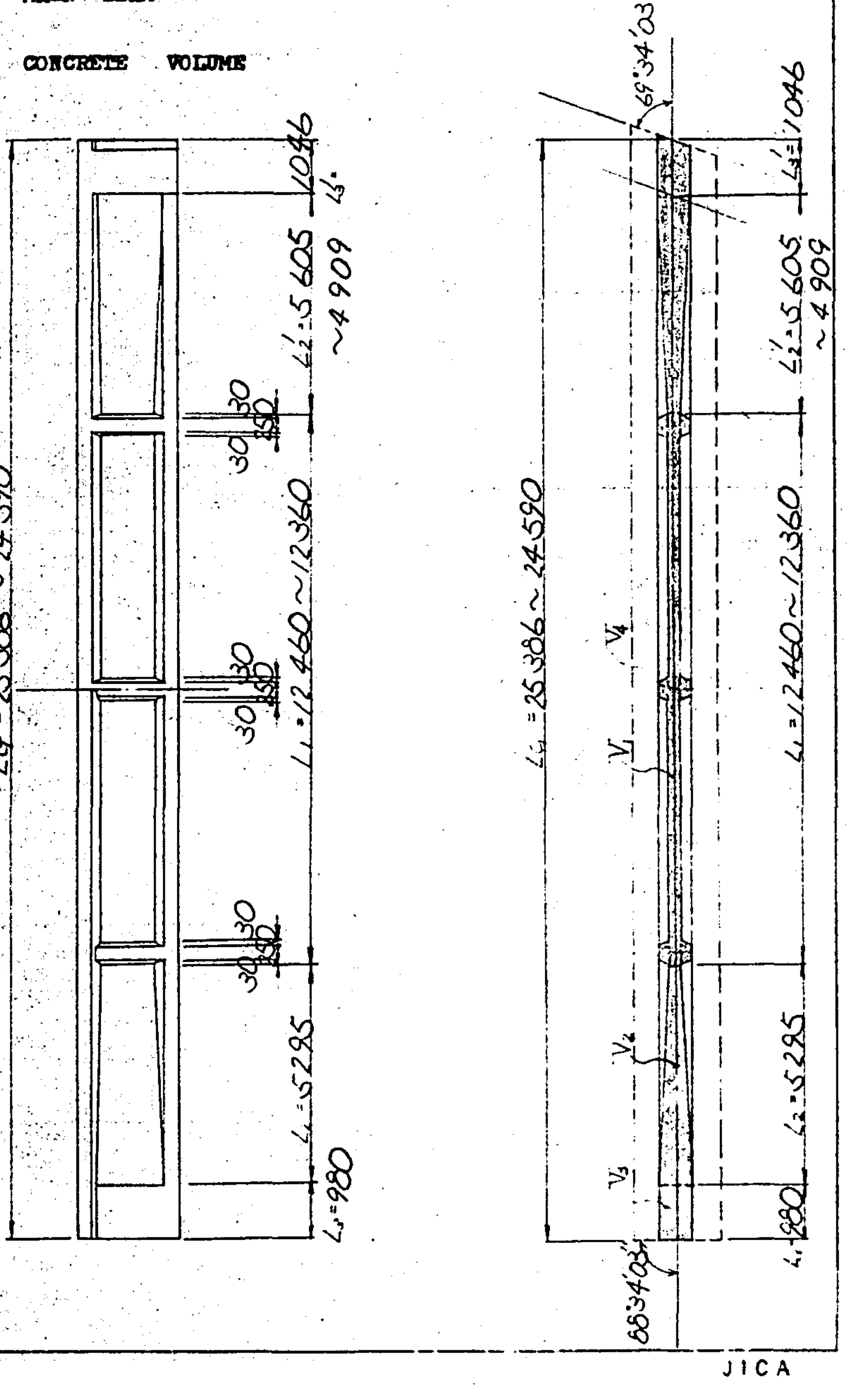
SUPERSTRUCTURE MATERIAL SCHEDULE

B 12 – PC33

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A (f_c'=400 kg/cm^2)	m^3	66.2
	P.C STRAND	12T12.7 (f_s'=190 kg/mm^2)	kg	2429.2
	SHEATH	ϕ65 and ϕ70	m	225.9 20.0
	FORMS		m^2	334.3
	ANCHORING DEVICE	FOR 12T12.7	EACH	20
	REINFORCING BAR	19	kg	—
		16	〃	620.5
		13	〃	3612.2
		10	〃	95.8
		TOTAL	〃	4328.5
LATERAL JOINT	CONCRETE	CLASS B (f_c'=300 kg/cm^2)	m^3	9.1
	P.C BAR	ϕ23 (f_s'=110 kg/mm^2)	kg	726.2
	SHEATH	ϕ35	m	211.7
	FORMS		m^2	39.7
	ANCHOR PLATE, NUT	FOR ϕ23	EACH	124
	REINFORCING BAR	16	kg	868.8
		13	〃	1937.1
		10	〃	83.5
		TOTAL	〃	2889.4
SIDEWALK CONCRETE		CLASS C (f_c'=240 kg/cm^2)	m^3	14.4
BRIDGE RAILING AND DUCT		CONCRETE	m^3	4.8
		FORMS	m^2	44.6
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m^3	8.4
DRAINAGE			EACH	4
ELASTOMERIC BEARING PADS		FIX. FOR R= 170 ton	〃	2
		MOV. FOR R= 170 ton	〃	2

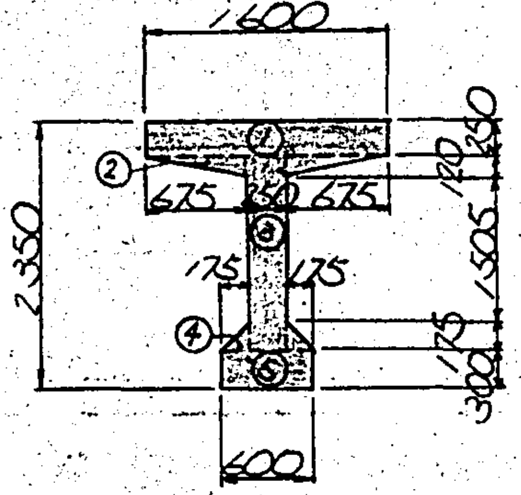
§ I MAIN BEAM

I-1 CONCRETE VOLUME



I) SECTION AREA

a) AT SPAN CENTER



① $1.600 \times 0.250 = 0.4000\ m^2$

② $\frac{1}{2} \times 0.675 \times 0.120 \times 2 = 0.0810$ "

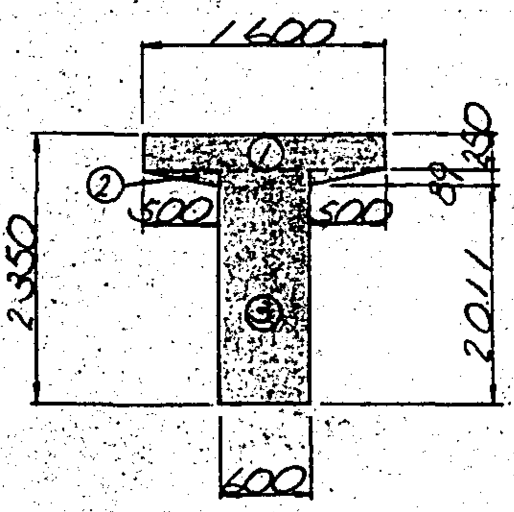
③ $0.250 \times 1.800 = 0.4500$ "

④ $\frac{1}{2} \times 0.175 \times 0.175 \times 2 = 0.0306$ "

⑤ $0.600 \times 0.300 = 0.1800$ "

$A_1 = 1.1416\ m^2$

b) AT SUPPORT POINT



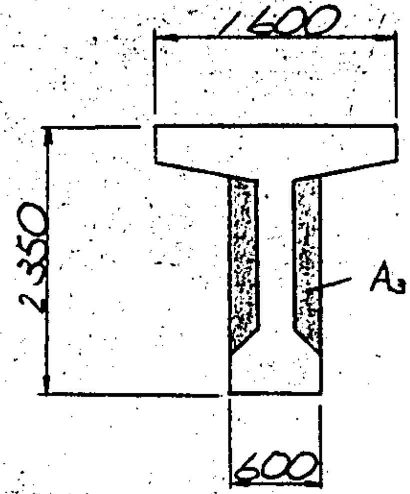
① $1.600 \times 0.250 = 0.4000\ m^2$

② $\frac{1}{2} \times 0.500 \times 0.089 \times 2 = 0.0445$ "

③ $0.600 \times 2.100 = 1.2600$ "

$A_2 = 1.7045\ m^2$

c) CENTRAL DIAPHRAGM



$$A_3 = A_2 - A_1$$
$$= 1.7045 - 1.1416$$
$$= 0.5629 \quad m^2$$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

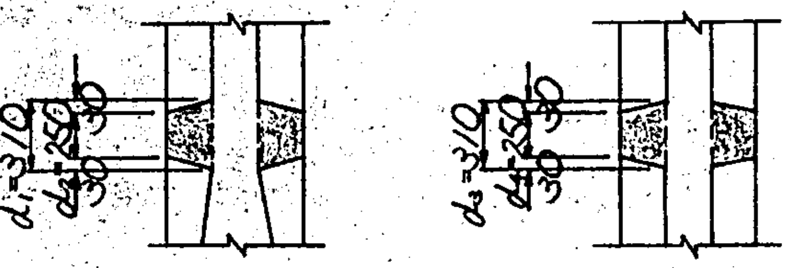
$$V_1 = A_1 \times L_1$$
$$= 1.1416 \times 12.410^{*} = 14.167 \; m^3$$

※ $L_1 = \frac{1}{2} \times (12.460 + 12.360) = 12.410^m$

$$V_2 = \frac{1}{2} \times (A_1 + A_2) \times L_2 \times 2$$
$$= \frac{1}{2} \times (1.1416 + 1.7045) \times 5.276^{*} \times 2 = 15.016 \; m^3$$

※ $L_2 = \frac{1}{4} \times (5.295 \times 2 + 5.605 + 4.909) = 5.276^m$

$$V_3 = A_2 \times (L_3 + L_3')$$
$$= 1.7045 \times (0.980 + 1.046) = 3.453 \; m^3$$



$$\nabla_4 = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2}\right) \times 2 + \left(\frac{d_3 + d_4}{2}\right) \right\}$$

$$= 0.5629 \times \left\{ \left(\frac{0.310 + 0.250}{2}\right) \times 2 + \left(\frac{0.310 + 0.250}{2}\right) \right\}$$

$$= 0.473 \ m^3$$

$$\Sigma \nabla = (\nabla_1 + \nabla_2 + \nabla_3 + \nabla_4) \times N_G$$

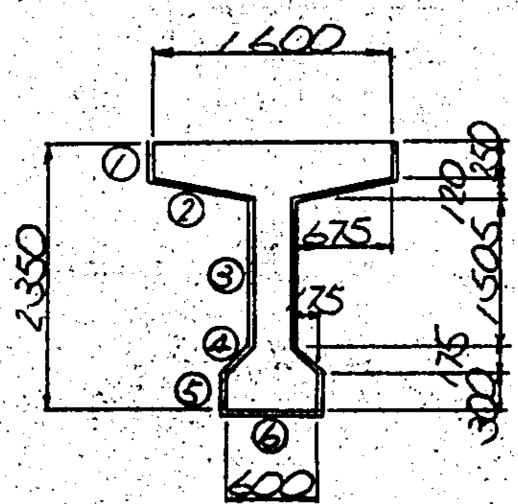
$$= (14.167 + 15.016 + 3.453 + 0.473) \times 2$$

$$= 66.218 \ m^3$$

2, FOR CONCRETE FORM AREA

I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



① $0.250 \times 2 = 0.500$ m

② $\sqrt{0.675^2 + 0.120^2} \times 2 = 1.371$ "

③ $1.505 \times 2 = 3.010$ "

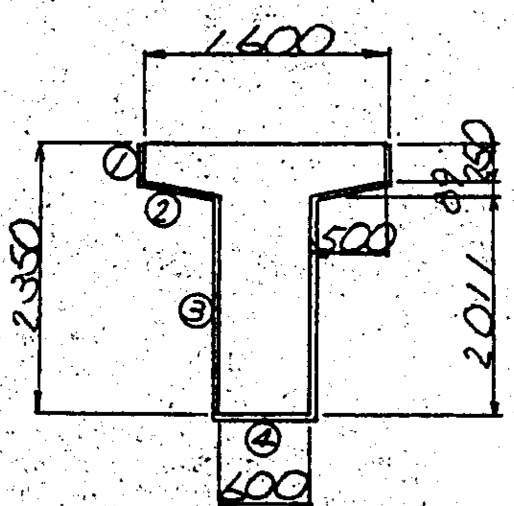
④ $\sqrt{0.175^2 + 0.175^2} \times 2 = 0.495$ "

⑤ $0.300 \times 2 = 0.600$ "

⑥ $= 0.600$ "

$\therefore L_1 = 6.576$ m

b) AT SUPPORT POINT



① $0.250 \times 2 = 0.500$ m

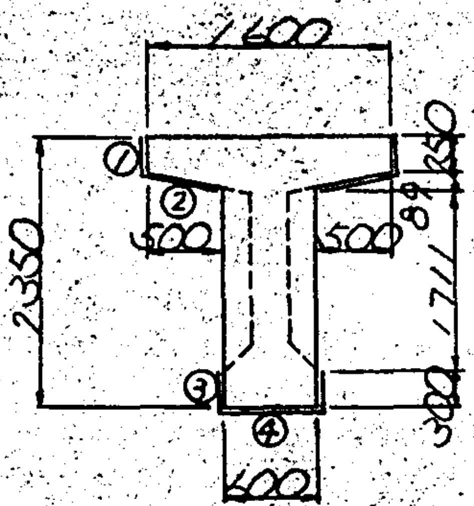
② $\sqrt{0.500^2 + 0.089^2} \times 2 = 1.016$ "

③ $2.011 \times 2 = 4.022$ "

④ $= 0.600$ "

$L_2 = 6.138$ m

c) CENTRAL DIAPHRAGM



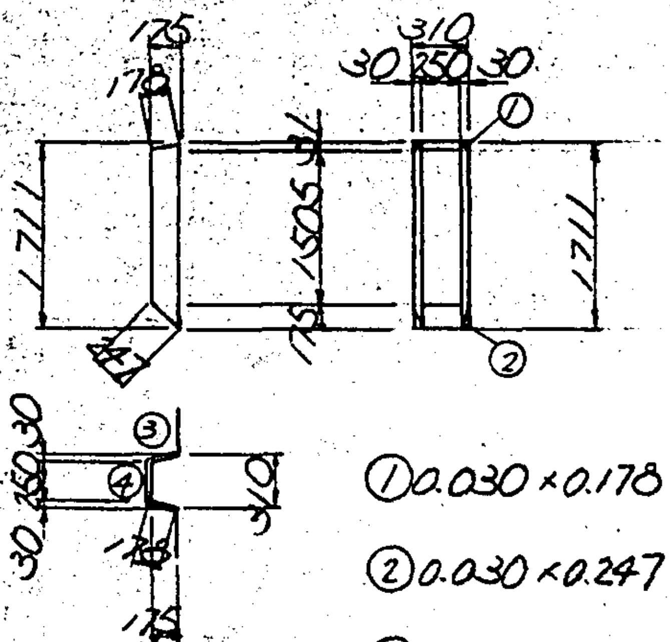
① $0.250 \times 2 = 0.500$ m

② $\sqrt{0.500^2 + 0.089^2} \times 2 = 1.016$ "

③ $0.300 \times 2 = 0.600$ "

④ $= 0.600$ "

$L_3 = 2.716$ m



① $0.030 \times 0.178 \times \frac{1}{2} \times 2 = 0.0053$ m²

② $0.030 \times 0.247 \times \frac{1}{2} \times 2 = 0.0074$ "

③ $(1.711 + 1.505) \times 0.178 \times \frac{1}{2} \times 2 = 0.5724$ "

④ $0.250 \times 1.711 = 0.4278$ "

$a_1 = 1.0129$ m²

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$A_1 = L_1 \times \overset{*}{5.740} \times 2$

$= 6.576 \times 5.740 \times 2 = 75.492\ m^2$

$※\ l = \frac{1}{2} \times (6.075 + 6.025) - 0.250 - 0.060 = 5.740\ m$

$A_2 = (L_1 + L_2) \times \frac{1}{2} \times \overset{*}{5.276} \times 2$

$= (6.576 + 6.138) \times \frac{1}{2} \times 5.276 \times 2 = 67.079\ m^2$

** FOR CONCRETE VOLUME --- A2. **

$A_3 = A_2 \times (\text{COSEC}\,\theta_1 + \theta_2) + L_2 \times (0.980 + 1.046)$

$= 1.7045\ m^2 \times (1.000313 + 1.067140) + 6.138 \times (0.980 + 1.046)$

$= 15.960\ m^2$

$\text{COSEC}\ 88°34'03'' = 1.000313$
$\text{COSEC}\ 69°34'03'' = 1.067140$

$A_4 = L_3 \times 0.310 \times 3$

$= 2.716 \times 0.310 \times 3 = 2.526\ m^2$

$A_5 = a_1 \times 2 \times 3$

$= 1.0129\ m^2 \times 2 \times 3 = 6.077\ m^2$

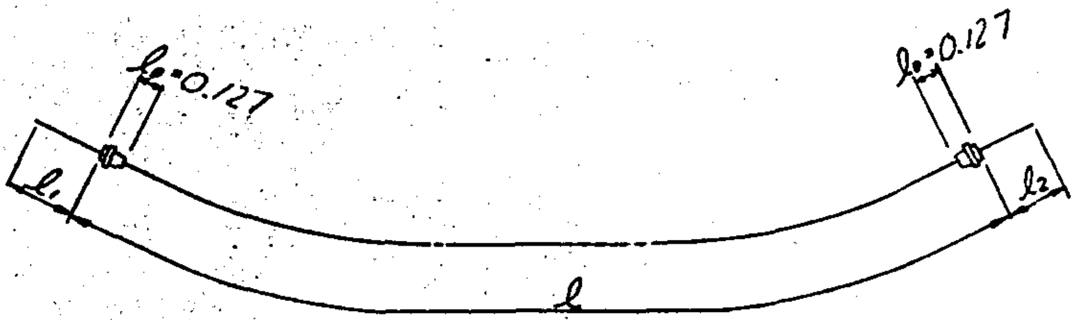
$\Sigma A = (A_1 + A_2 + A_3 + A_4 + A_5) \times N_G$

$= (75.492 + 67.079 + 15.960 + 2.526 + 6.077) \times 2$

$= 334.268\ m^2$

3. PRESTRESSING STEEL

I) MAIN CABLE



$l_1 + l_2 = 1.300^{m}$ $l_1 = l_2$

$l_p = l + l_1 + l_2$

No	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_p	$L_p = N_p \times l_p$
C_1	25.030	1.300	26.330	2	52.660
C_2	24.916	"	26.216	2	52.432
C_3	24.836	"	26.136	2	52.272
C_4	24.758	"	26.058	2	52.116
C_5	24.702	"	26.002	2	52.004
TOTAL	$\Sigma L_p = 261.484^{m}$				

$$\Sigma W_p = \gamma_p \times \Sigma L_p$$

$$= 9.29^{kg/m} \times 261.484$$

$$= 2429.19^{kg}$$

2) SHETH

$\phi 70^{mm}$,

$L_{s_1} = 2.000 \times 5 \times 2 = 20.000^{m}$

$\phi 65^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.554) \times 5 \times 2 = 225.944^{m}$

3) GROUT

$\phi 65^{mm}, \phi 70^{mm}$

$L_G = \Sigma L_p - (l_1 + l_2) \times N_p \times N_G$

$= 261.484 - 1.300 \times 5 \times 2 = 248.484^{m}$

4) ANCHORING DEVICE

FOR $12T12.7^{mm}$

$N_c = N_p \times N_G \times 2$

$= 5 \times 2 \times 2$

$= 20$

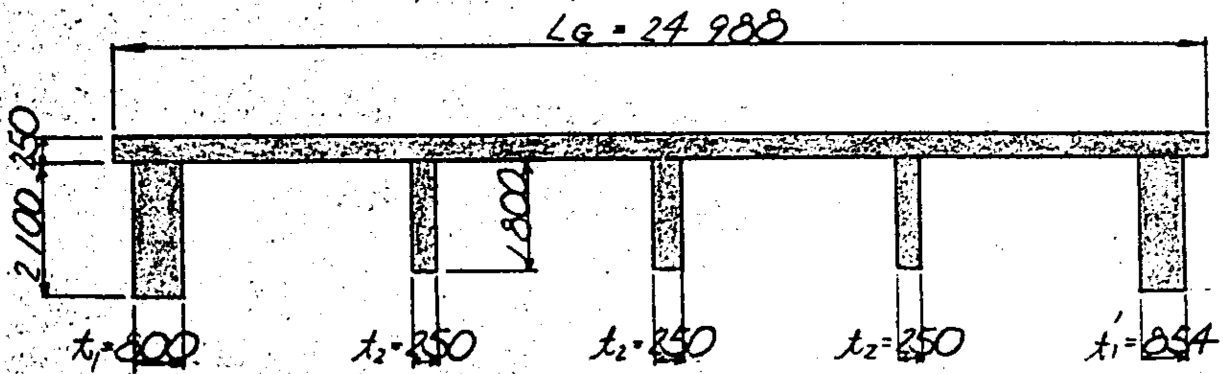
4. REINFORCING BAR (SD30)

	W (Kg)
D16	$620.^5$
D13	$3612.^2$
D10	$95.^8$
TOTAL	$4328.^5$

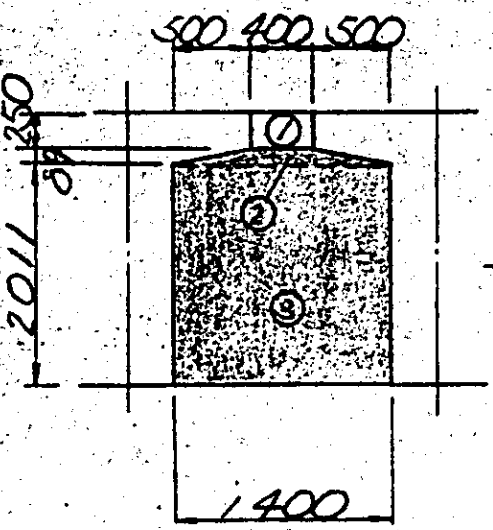
§2 LATERAL JOINT

I. CONCRETE VOLUME

1) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



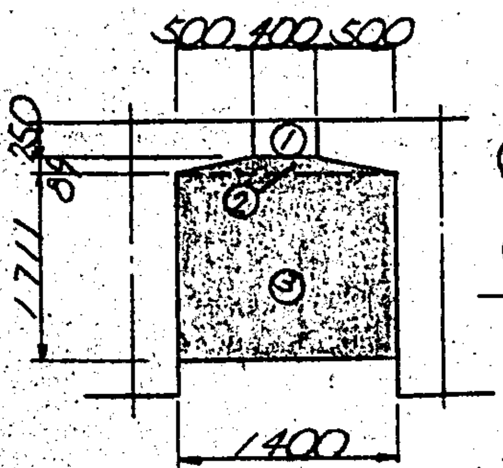
① $= A_F = 0.400 \times 0.250 = 0.1000\ m^2$

② $\frac{1}{2} \times (0.400 + 1.400) \times 0.089 = 0.0801$ "

③ $2.011 \times 1.400 = 2.8154$ "

② + ③ $= A_{D_1} = 2.8955\ m^2$

b) CENTRAL CROSS BEAM



② $\frac{1}{2} \times (0.400 + 1.400) \times 0.089 = 0.0801\ m^2$

③ $1.711 \times 1.400 = 2.3954$ "

② + ③ $= A_{D_2} = 2.4755\ m^2$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$\nabla_F = A_F \times L_G \times N_F$$

$$= 0.1000^{m^2} \times 24.988 \times 1 = 2.499\ m^3$$

$$\nabla_D = A_{D1} \times (t_1 + t_1') + A_{D2} \times t_2 \times 3$$

$$= 2.8955 \times (0.800 + 0.854) + 2.4755 \times 0.250 \times 3$$

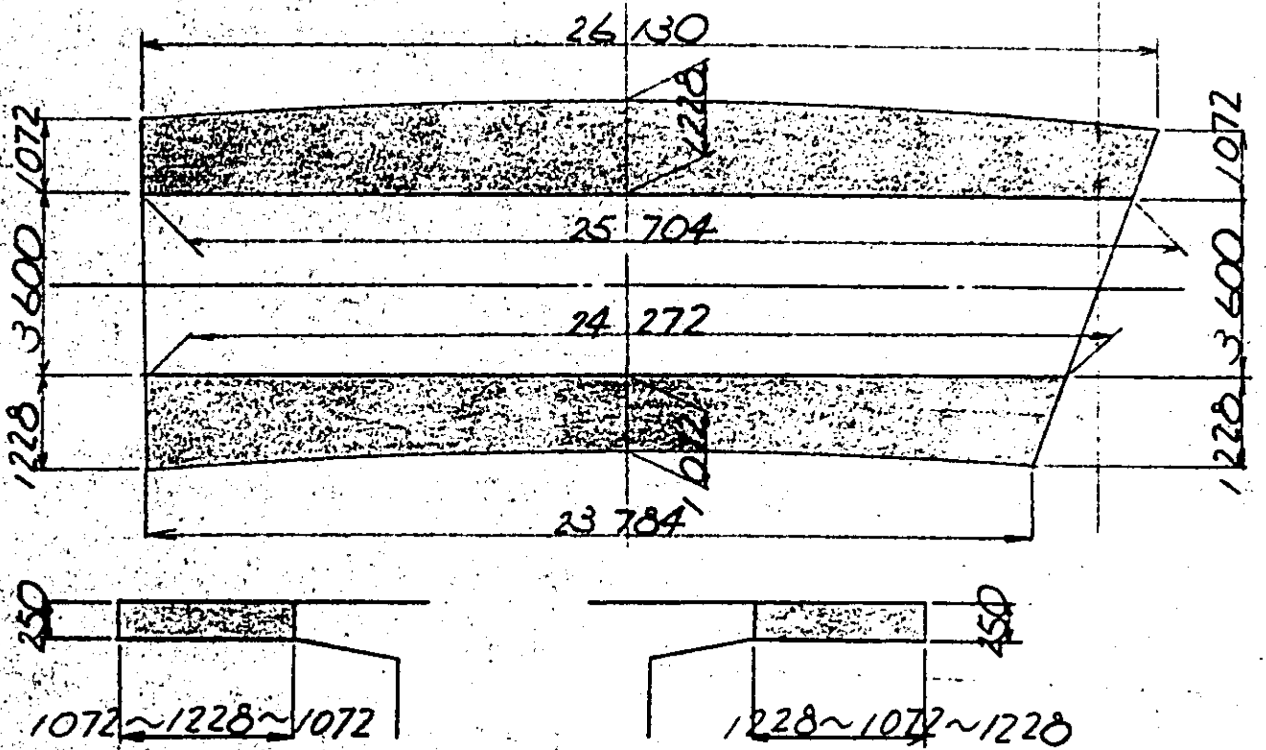
$$= 6.646$$

$$\Sigma \nabla = \nabla_F + \nabla_D$$

$$= 2.499 + 6.646$$

$$= 9.145\ m^3$$

5) SIDEWALK CONCRETE



① $\frac{1}{4} \times (1.072 + 1.228 \times 2 + 1.072) \times 0.250 = 0.2875\ m^2$

② $\frac{1}{4} \times (1.228 + 1.072 \times 2 + 1.228) \times 0.250 = 0.2875$ "

$A_s = 0.5750\ m^2$

$$V_s = A_s \times L_G$$
$$= 0.5750^{m^2} \times (26.130 + 25.704 + 24.272 + 23.784) \times \frac{1}{4}$$
$$= 14.359\ m^3$$

2. FOR CONCRETE FORM AREA

1) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{0.1000^{m^2} \times (1.000313 \overset{\text{CALC''D}}{} + 1.067140)$$

$$+ 0.400 \times (24.988 - 0.800 - 0.854 - 0.250 \times 3)\} \times 1.0$$

$$= 9.240^{m^2}$$

$$A_2 = \{2.8955^{m^2} \times (1.000313 + 1.067140) \times 2 + 1.400 \times (0.800 + 0.854)$$

$$+ 2.4755^{m^2} \times (1.000313 \times 2 + 1.000) \times 2 + 1.400 \times 0.250 \times 3\} \times 1$$

$$= 30.194^{m^2}$$

$$\Sigma A = A_1 + A_2$$

$$= 9.240 + 30.194$$

$$= 39.434^{m^2}$$

2) SIDEWALK

$$A_1 = (1.\overset{*}{1}50 + 0.250) \times (26.130 + 25.704) \times 1/2$$

$$+ (1.\overset{*}{1}50 + 0.250) \times (24.272 + 23.784) \times 1/2$$

$$= 69.923^{m^2}$$

$$A_2 = 0.5750^{m^2} \times (1.000313 + 1.067140)$$

$$= 1.189^{m^2}$$

$$\Sigma A = A_1 + A_2$$

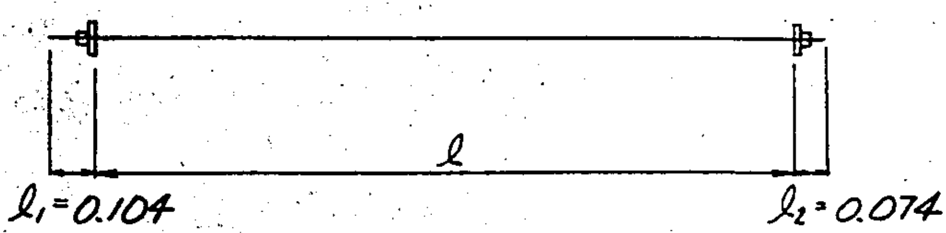
$$= 69.923 + 1.189$$

$$= 71.112^{m^2}$$

3. POST - TENSIONING BARS

I) P.C. BAR

$\phi\ 23^{mm}$ (SPECIAL GRADE)



$$l_1 + l_2 = 0.104 + 0.074 = 0.178^{m}$$

$$l_p = l + l_1 + l_2$$

	l (m)	l_1+l_2(m)	l_p (m)	N_p	$L_p = N_p \cdot l_p$
SLAB Ⓐ	3.600	0.178	3.778	46	173.788
〃 Ⓑ	3.762	0.178	3.940	5	19.700
CROSS BEAM Ⓒ	2.420	0.178	2.598	7	18.186
〃 Ⓓ	2.595	0.178	2.773	4	11.092
TOTAL	$\Sigma L_p = 222.766^{m}$				

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 222.766 = 726.22^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$L_S = \Sigma L_P - (l_1 + l_2) \times N_P$

$= 222.766 - 0.178 \times 62$

$= 211.730^{m}$

3) GROUT

$\phi 35^{mm}$

$L_G = L_S = 211.730$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$N_C = N_P \times 2$

$= 62 \times 2$

$= 124$

4. REINFORCING BAR (SD 30)

	W (kg)
D16	868.8
D13	1937.1
D10	83.5
TOTAL	2889.4

5. ELASTOMERIC BEARING PADS

1) FIXED SUPPORT

FOR $R = 170^{ton}$

$N = 2$, $450 \times 500 \times 14$

(3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 170^{ton}$

$N = 2$, $450 \times 500 \times 14$

(3 PLIES)

6. ANCHORING BAR (SS 41)

1) FIXED SIDE

FOR $\phi 85^{mm}$, $N = 2$

$l = 1090^{mm}$, $W = 97.01^{kg}$

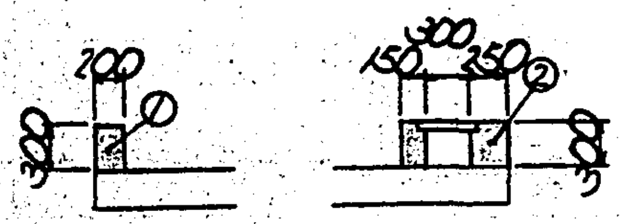
2) MOVABLE SIDE

FOR $\phi 75^{mm}$ $N = 2$

$l = 970^{mm}$, $W = 67.32^{kg}$

§ 3 BRIDGE FACE WORK

1. BRIDGE RAILING AND DUCT



① $0.300 \times 0.200 = 0.0600\ m^2$

② 0.700×0.300

$- 0.300 \times 0.250 = 0.1350\ m^2$

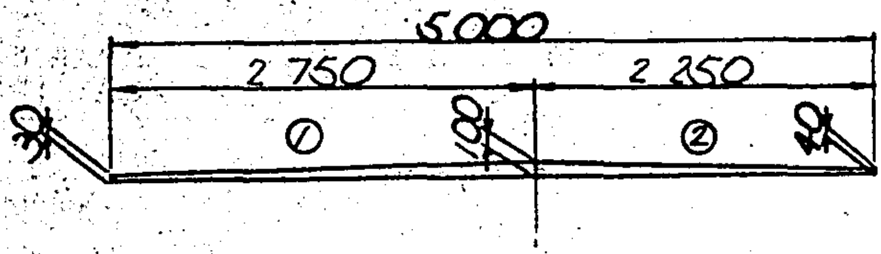
$$V = 0.0600 \times 26.130 + 0.1350 \times 23.784 = 4.779\ m^3$$

$$A = 0.300 \times 2 \times 26.130 + 0.0600 \times (1.000313 + 1.067140)$$

$$+ 0.300 \times 4 \times 23.784 + 0.1350 \times (1.000313 + 1.067140)$$

$$= 44.622\ m^2$$

2. MORTAR WITH SLOPE-PROTECTIVE MORTAR



① $\frac{1}{2} \times (0.030 + 0.100) \times 2.750 \qquad = 0.1788\ m^2$

② $\frac{1}{2} \times (0.100 + 0.040) \times 2.250 \qquad = 0.1575$ "

$A_w = 0.3363\ m^2$

$$V = A_w \times \overset{※}{L_G}$$

$$= 0.3363\ m^2 \times (26.051 + 24.063) \times \frac{1}{2}$$

$$= 8.427\ m^3$$

L = 30 M , H = 2.15 M Curve Left 72° 43′ 08″

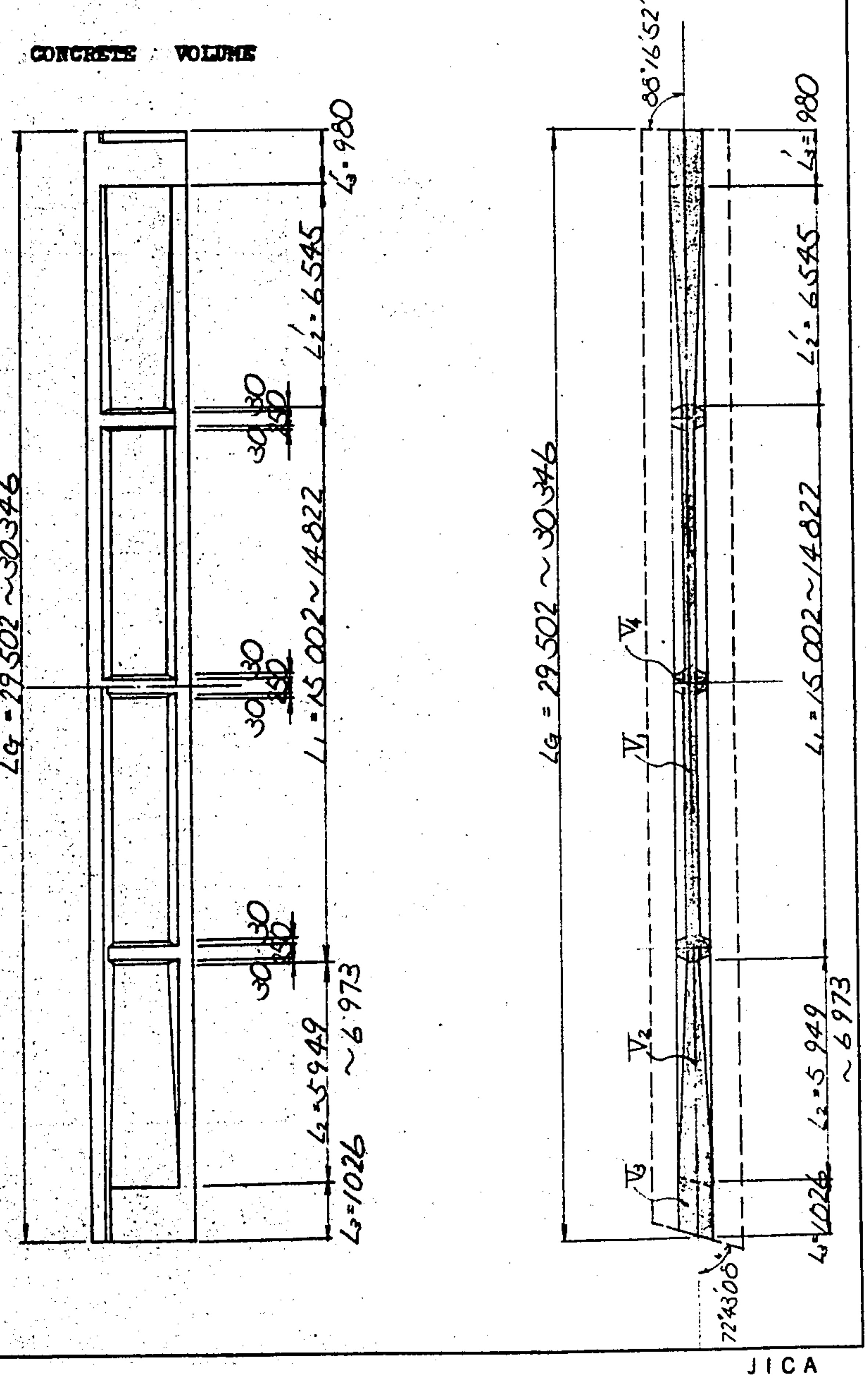
SUPERSTRUCTURE MATERIAL SCHEDULE

B 12 – PC34

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A (f_c'=400 kg/cm^2)	m^3	119.7
	P.C STRAND	12T12.7 (f_s'=190 kg/mm^2)	kg	5784.8
	SHEATH	ϕ65 and ϕ70	m	551.6 40.0
	FORMS		m^2	654.1
	ANCHORING DEVICE	FOR 12T12.7	EACH	40
	REINFORCING BAR	19	kg	—
		16	〃	1490.6
		13	〃	6755.4
		10	〃	68.0
		TOTAL	〃	8314.0
LATERAL JOINT	CONCRETE	CLASS B (f_c'=300 kg/cm^2)	m^3	9.6
	P.C BAR	ϕ23 (f_s'=110 kg/mm^2)	kg	560.2
	SHEATH	ϕ35	m	164.0
	FORMS		m^2	40.4
	ANCHOR PLATE, NUT	FOR ϕ23	EACH	88
	REINFORCING BAR	16	kg	994.1
		13	〃	1669.5
		10	〃	397.3
		TOTAL	〃	3060.9
SIDEWALK CONCRETE		CLASS C (f_c'=240 kg/cm^2)	m^3	15.7
BRIDGE RAILING AND DUCT		CONCRETE	m^3	5.9
		FORMS	m^2	54.8
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m^3	10.1
DRAINAGE			EACH	8
ELASTOMERIC BEARING PADS		FIX. FOR R = 120 ton	〃	4
		MOV. FOR R = 120 ton	〃	4

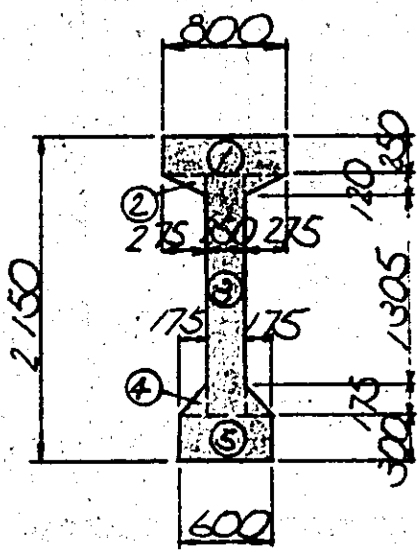
§ I MAIN BEAM

I. CONCRETE VOLUME



I) SECTION AREA

a) AT SPAN CENTER



① $0.800 \times 0.250 = 0.2000\ m^2$

② $\frac{1}{2} \times 0.275 \times 0.120 \times 2 = 0.0330$ "

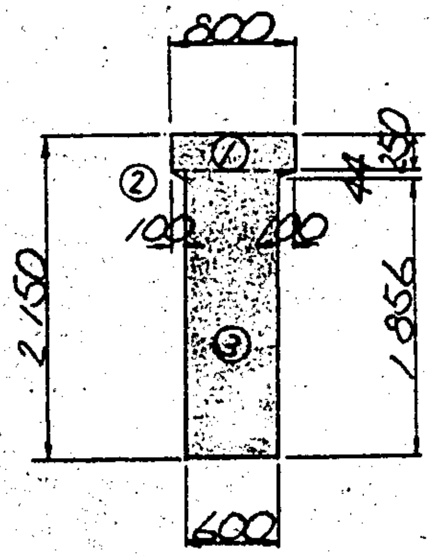
③ $0.250 \times 1.600 = 0.4000$ "

④ $\frac{1}{2} \times 0.175 \times 0.175 \times 2 = 0.0306$ "

⑤ $0.600 \times 0.300 = 0.1800$ "

$A_1 = 0.8436\ m^2$

b) AT SUPPORT POINT



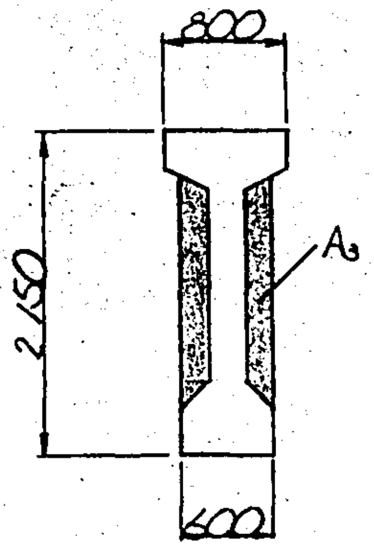
① $0.800 \times 0.250 = 0.2000\ m^2$

② $\frac{1}{2} \times 0.100 \times 0.044 \times 2 = 0.0044$ "

③ $0.600 \times 1.900 = 1.1400$ "

$A_2 = 1.3444\ m^2$

c) CENTRAL DIRPHRAGM



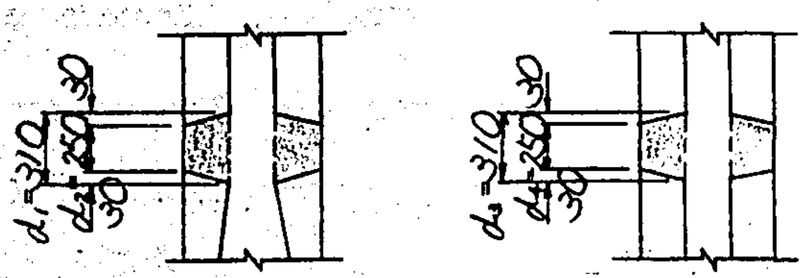
$$A_3 = A_2 - A_1$$
$$= 1.3444 - 0.8436$$
$$= 0.5008 \ m^2$$

2) QUANTITY CALCULATION FOR COCRETE VOLUME

$$V_1 = A_1 \times L_1$$
$$= 0.8436 \times \overset{*}{14.912} = 12.580 \ m^3$$
$$* L_1 = \tfrac{1}{2} \times (15.002 + 14.822) = 14.912 \ m$$

$$V_2 = \tfrac{1}{2} \times (A_1 + A_2) \times L_2 \times 2$$
$$= \tfrac{1}{2} \times (0.8436 + 1.3444) \times \overset{*}{6.503} \times 2$$
$$= 14.229 \ m^3$$
$$* L_2 = \tfrac{1}{4} \times (5.949 + 6.973 + 6.545 \times 2) = 6.503 \ m$$

$$V_3 = A_2 \times (L_3 + L_3')$$
$$= 1.3444 \times (1.026 + 0.980)$$
$$= 2.697 \ m^3$$



$$\nabla_4 = A_3 \times \left\{ \left(\frac{d_1+d_2}{2}\right) \times 2 + \left(\frac{d_3+d_4}{2}\right) \right\}$$

$$= 0.5008^{m^2} \times \left\{ \left(\frac{0.310+0.250}{2}\right) \times 2 + \left(\frac{0.310+0.250}{2}\right) \right\}$$

$$= 0.421 \ m^3$$

$$\Sigma \nabla = (\nabla_1 + \nabla_2 + \nabla_3 + \nabla_4) \times N_G$$

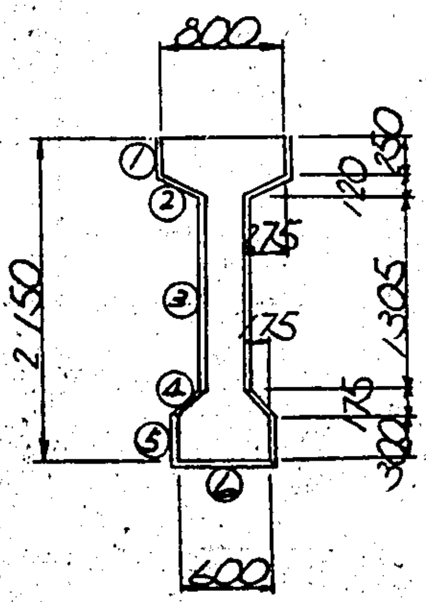
$$= (12.580 + 14.229 + 2.697 + 0.421) \times 4$$

$$= 119.708 \ m^3$$

2. FOR CONCRETE FORM AREA

I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



① $0.250 \times 2 = 0.500$ m

② $\sqrt{0.275^2 + 0.120^2} \times 2 = 0.600$ "

③ $1.305 \times 2 = 2.610$ "

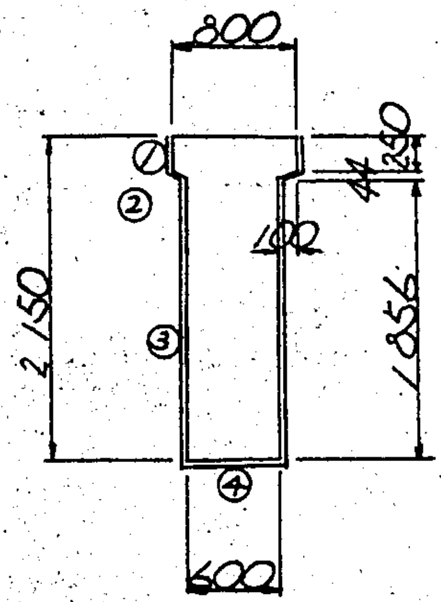
④ $\sqrt{0.175^2 + 0.175^2} \times 2 = 0.495$ "

⑤ $0.300 \times 2 = 0.600$ "

⑥ $= 0.600$ "

$L_1 = 5.405$ m

b) AT SUPPORT POINT



① $0.250 \times 2 = 0.500$ m

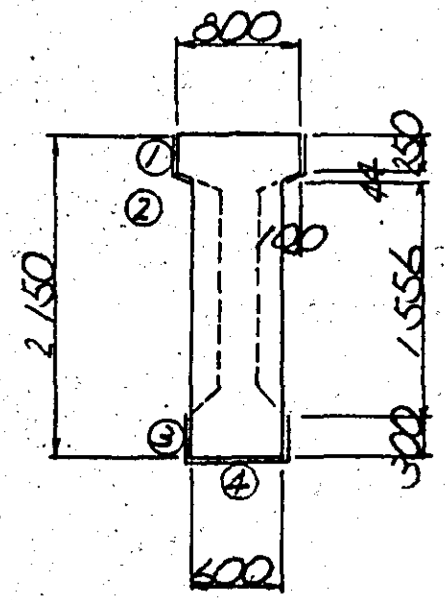
② $\sqrt{0.100^2 + 0.044^2} \times 2 = 0.219$ "

③ $1.856 \times 2 = 3.712$ "

④ $= 0.600$ "

$L_2 = 5.031$ m

c) CENTRAL DIAPHRAGM



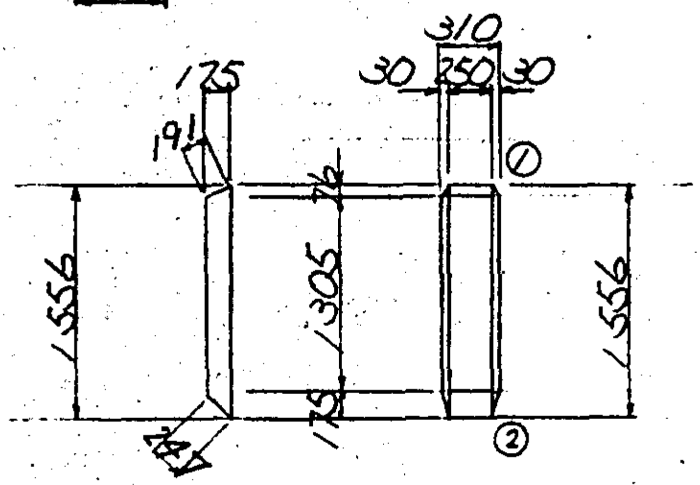
① $0.250 \times 2 = 0.500$ m

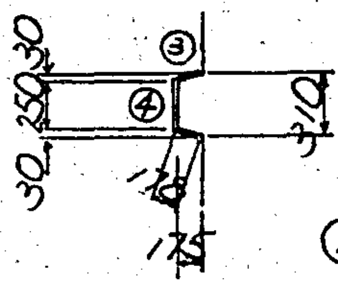
② $\sqrt{0.100^2 + 0.044^2} \times 2 = 0.219$ 〃

③ $0.300 \times 2 = 0.600$ 〃

④ $= 0.600$ 〃

$L_3 = 1.919$ m





① $0.030 \times 0.191 \times \frac{1}{2} \times 2 = 0.0057$ m²

② $0.030 \times 0.247 \times \frac{1}{2} \times 2 = 0.0074$ 〃

③ $(1.305 + 1.556) \times \frac{1}{2} \times 0.178 \times 2 = 0.5093$ 〃

④ $0.250 \times 1.556 = 0.3890$ 〃

$a_1 = 0.9114$ m²

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$A_1 = L_1 \times \overset{※}{6.991} \times 2$

$= 5.405 \times 6.991 \times 2 = 75.573 \ m^2$

※ $l = 7.301 - 0.250 - 0.060 = 6.991$

$A_2 = (L_1 + L_2) \times \frac{1}{2} \times \overset{※}{6.503} \times 2$

$= (5.405 + 5.031) \times \frac{1}{2} \times 6.503 \times 2 - 67.865 \ m^2$

** FOR CONCRETE VOLUME --- A2 **

$A_3 = A_2 \times (COSEC\theta_1 + \theta_2) + L_2 \times (1.026 + 0.980)$

$= 1.3444 \times (1.000450 + 1.047275) + 5.031 \times (1.026 + 0.980)$

$= 12.845 \ m^2$

$COSEC 88°16'52'' = 1.000450$
$cosec\ 72°43'08'' = 1.047275$

$A_4 = L_3 \times 0.310 \times 3$

$= 1.919 \times 0.310 \times 3 = 1.785 \ m^2$

$A_5 = a_1 \times 2 \times 3$

$= 0.9114 \times 2 \times 3 = 5.468 \ m^2$

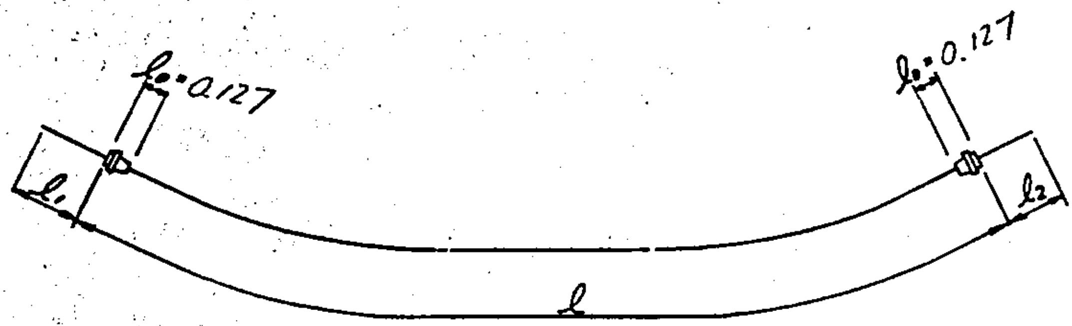
$\Sigma A = (A_1 + A_2 + A_3 + A_4 + A_5) \times N_G$

$= (75.573 + 67.865 + 12.845 + 1.785 + 5.468) \times 4$

$= \cancel{654}\ 144 \ m^2$

3. PRESTRESSING STEEL

I) MAIN CABLE



$$l_1 + l_2 = 1.300^{m} \qquad l_1 = l_2$$

$$l_p = l + l_1 + l_2$$

No	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_p	$L_p = N_p \times l_p$
C_1	29.996	1.300	31.296	4	125.184
C_2	29.894	〃	31.194	4	124.776
C_3	29.824	〃	31.124	4	124.496
C_4	29.754	〃	31.054	4	124.216
C_5	29.704	〃	31.004	4	124.016
TOTAL					$\Sigma L_p = 622.688^{m}$

$$\Sigma W_p = \gamma_p \times \Sigma L_p$$

$$= 9.29^{kg/m} \times 622.688$$

$$= 5\,784.77^{kg}$$

2) SHETH

$\phi 70^{mm}$,

$L_{s_1} = 2.000 \times 5 \times 4 = 40.000^{m}$

$\phi 65^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.554) \times 5 \times 4 = 551.608^{m}$

3) GROUT

$\phi 65^{mm}$, $\phi 70^{mm}$

$L_G = \Sigma L_p - (l_1 + l_2) \times N_p \times N_G$

$= 622.688 - 1.300 \times 5 \times 4 = 596.688^{m}$

4) ANCHORING DEVICE

FOR $12T12.^{7}$ ^{mm}

$N_c = N_p \times N_G \times 2$

$= 5 \times 4 \times 2$

$= 40$

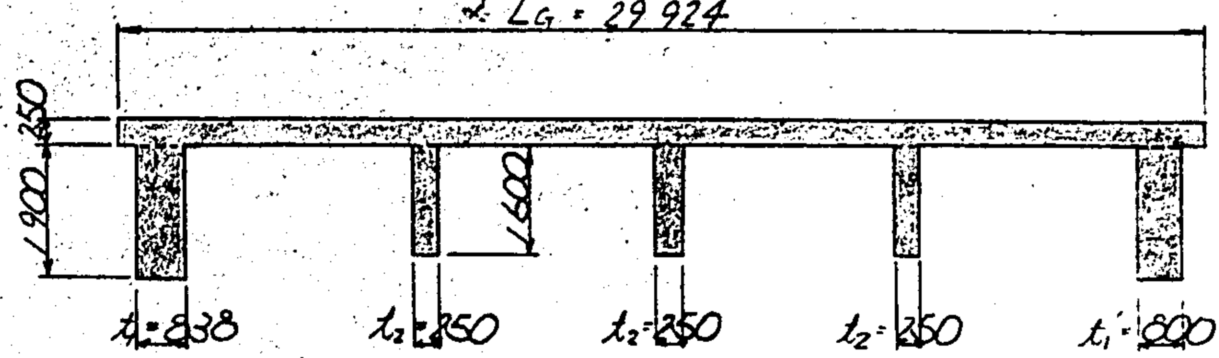
4. REINFORCING BAR (SD 30)

	W (Kg)
D16	1490.6
D13	6755.4
D10	68.0
TOTAL	8314.0

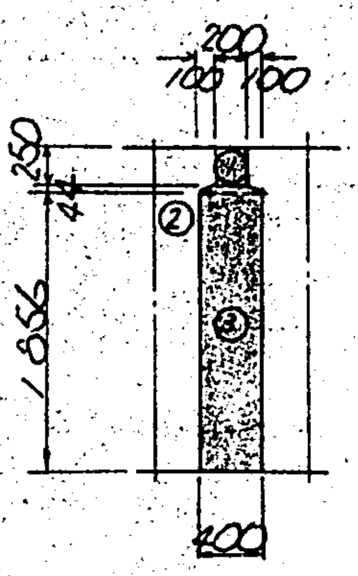
§ 2 LATERAL JOINT

I. CONCRETE VOLUME

I) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



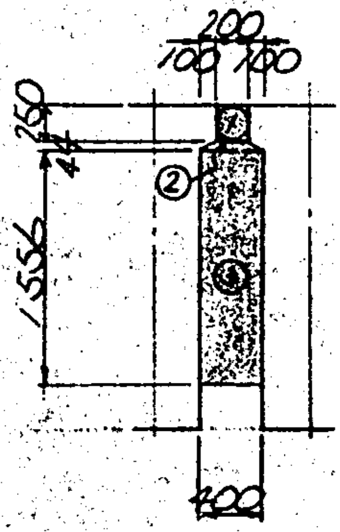
$$① = A_F = 0.200 \times 0.250 = 0.0500 \ m^2$$

$$② \ \tfrac{1}{2} \times (0.200 + 0.400) \times 0.044 = 0.0132 \ m^2$$

$$③ \ 1.856 \times 0.400 = 0.7424 \ "$$

$$② + ③ = A_{D1} = 0.7556 \ m^2$$

b) CENTRAL CROSS BEAM



$$② \ \tfrac{1}{2} \times (0.200 + 0.400) \times 0.044 = 0.0132 \ m^2$$

$$③ \ 1.556 \times 0.400 = 0.6224 \ "$$

$$② + ③ = A_{D2} = 0.6356 \ m^2$$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_F = A_F \times L_G \times N_F$$

$$= 0.0500^{m^2} \times 29.924 \times 3 = 4.489^{m^3}$$

$$V_D = \{A_{D1} \times (t_1 + t_1') + A_{D2} \times t_2 \times 3\} \times N_F$$

$$= \{0.7556 \times (0.838 + 0.800) + 0.6356 \times 0.25 \times 3\} \times 3$$

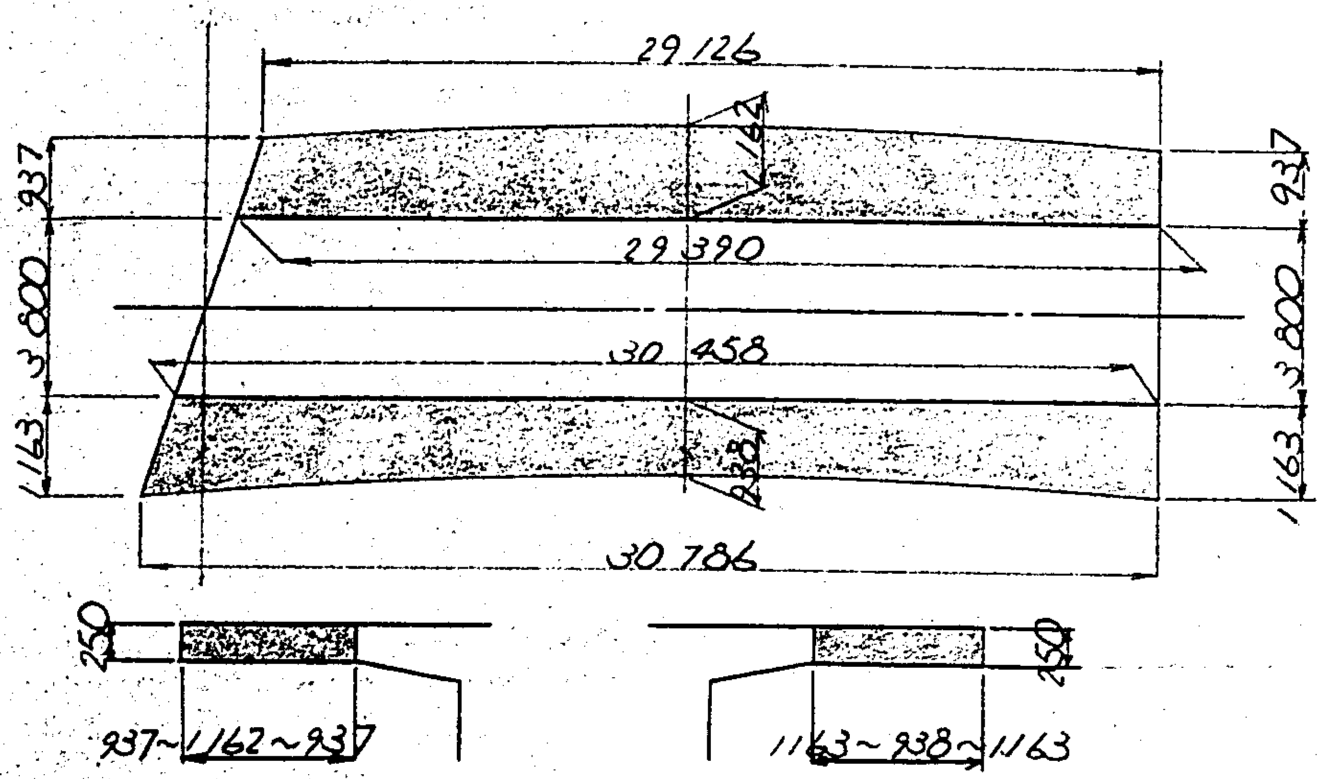
$$= 5.143^{m^3}$$

$$\Sigma V = V_F + V_D$$

$$= 4.489 + 5.143$$

$$= 9.632^{m^3}$$

5) SIDEWALK CONCRETE



$$① \ \frac{1}{4} \times (0.937 + 1.162 \times 2 + 0.937) \times 0.250 = 0.2624 \ m^2$$

$$② \ \frac{1}{4} \times (1.163 + 0.938 \times 2 + 1.163) \times 0.250 = 0.2626 \ ''$$

$$A_s = 0.5250 \ m^2$$

$$V_s = A_s \times L_G$$

$$= 0.5250 \ m^2 \times (29.126 + 29.390 + 30.458 + 30.786) \times \frac{1}{4}$$

$$= 15.719 \ m^3$$

2. FOR CONCRETE FORM AREA

1) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{0.0500^{m^2} \times (1.000450 + 1.047275) + 0.200 \times (29.924 - 0.838 - 0.800 - 0.250 \times 3)\} \times 3.0 = 16.829^{m^2}$$

$$A_2 = \{0.7556^{m^2} \times (1.000450 + 1.047275) \times 2 + 0.400 \times (0.838 + 0.80) + 0.6356^{m^2} \times (1.000450 \times 2 + 1.000) \times 2 + 0.400 \times 0.250 \times 3\} \times 3 = 23.593^{m^2}$$

$$\Sigma A = A_1 + A_2 = 16.829 + 23.593 = 40.422^{m^2}$$

2) SIDEWALK

$$A_1 = (\overset{※}{1.050} + 0.250) \times (29.126 + 29.390) \times 1/2 + (\overset{※}{1.050} + 0.250) \times (30.458 + 30.786) \times 1/2 = 77.844^{m^2}$$

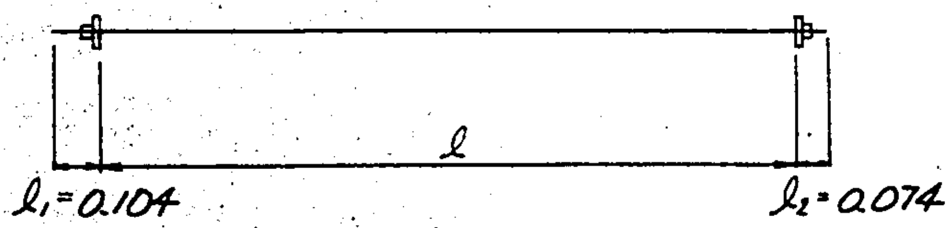
$$A_2 = 0.5250^{m^2} \times (1.000450 + 1.047275) = 1.075^{m^2}$$

$$\Sigma A = A_1 + A_2 = 77.844 + 1.075 = 78.919^{m^2}$$

3. POST - TENSIONING BARS

I) P.C. BAR

$\phi\ 23^{mm}$ (SPECIAL GRADE)



$$l_1 + l_2 = 0.104 + 0.074 = 0.178^{m}$$

$$l_p = l + l_1 + l_2$$

	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_p	$L_p = N_p \cdot l_p$
SLAB (A)	3.800	0.178	3.978	30	119.340
" (B)	3.900	0.178	4.078	3	12.234
CROSS BEAM (C)	3.420	0.178	3.598	7	25.186
" (D)	3.590	0.178	3.768	4	15.072
TOTAL	$\Sigma L_p = 171.832^{m}$				

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 171.832 = 560.17^{kg}$$

2) **SHEATH**

$\phi 35^{mm}$

$$L_S = \Sigma L_P - (l_1 + l_2) \times N_P$$

$$= 171.832 - 0.178 \times 44$$

$$= 164.000^{m}$$

3) **GROUT**

$\phi 35^{mm}$

$$L_G = L_S = 164.000^{m}$$

4) **ANCHOR PLATE AND NUT**

FOR $\phi 23^{mm}$

$$N_c = N_P \times 2$$

$$= 44 \times 2$$

$$= 88$$

4. **REINFORCING BAR** (SD30)

	W (kg)
D16	994.1
D13	1669.5
D10	397.3
TOTAL	3060.9

5. ELASTOMERIC BEARING PADS

1) FIXED SUPPORT

FOR $R =$ ton

$N = 4$, $300 \times 500 \times 14$
(3 PLIES)

2) MOVABLE SUPPORT

FOR $R =$ ton

$N = 4$, $300 \times 500 \times 14$
(3 PLIES)

6. ANCHORING BAR (SS 41)

1) FIXED SIDE

FOR $\phi 80^{mm}$, $N = 3$

$l = 1030^{mm}$, $W = 122.06^{kg}$

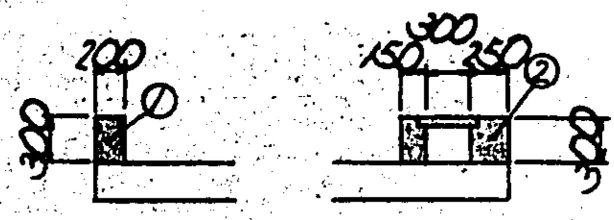
2) MOVABLE SIDE

FOR $\phi 75^{mm}$ $N = 3$

$l = 970^{mm}$, $W = 100.98^{kg}$

§ 3 BRIDGE FACE WORK

1. BRIDGE RAILING AND DUCT



$① \; 0.300 \times 0.200 = 0.0600 \; m^2$

$② \; 0.700 \times 0.300$

$- 0.300 \times 0.250 = 0.1350 \; m^2$

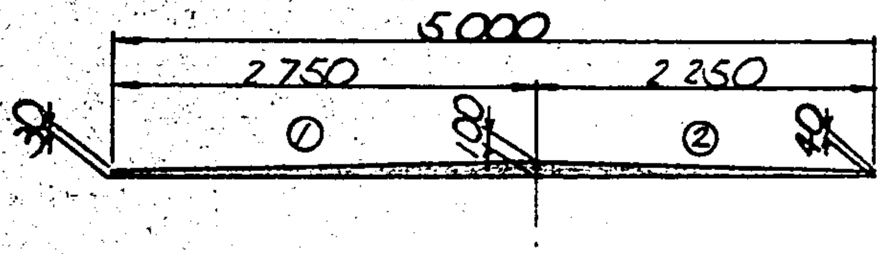
$$V = 0.0600 \, m^2 \times 29.126 + 0.1350 \times 30.786 = 5.904 \; m^3$$

$$A = 0.300 \times 29.126 \times 2 + 0.0600 \, m^2 \times (1.000450 + 1.047275)$$

$$+ 0.300 \times 4 \times 30.786 + 0.1350 \times (\qquad " \qquad) -$$

$$= 54.818 \; m^2$$

2. MORTAR WITH SLOPE-PROTECTIVE MORTAR



$① \; \frac{1}{2} \times (0.030 + 0.100) \times 2.750 \qquad = 0.1788 \; m^2$

$② \; \frac{1}{2} \times (0.100 + 0.040) \times 2.250 \qquad = 0.1575 \; "$

$A_w = 0.3363 \; m^2$

$$V = A_w \times \overset{*}{L}_G$$

$$= 0.3363 \times (29.182 + 30.588) \times \frac{1}{2}$$

$$= 10.050 \; m^3$$

L = 28 M , H = 2.15 M Curve Right 60°53'44"

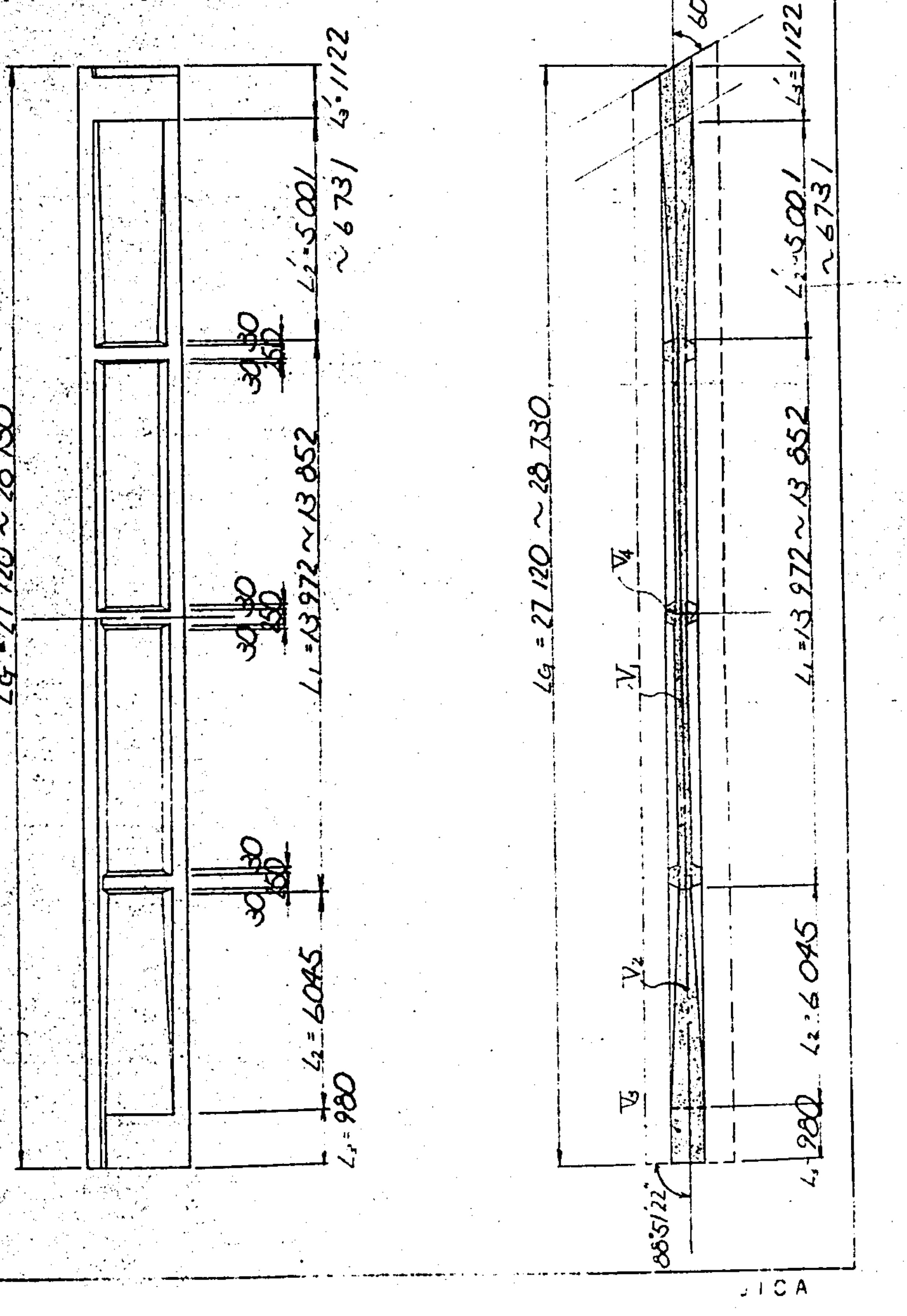
SUPERSTRUCTURE MATERIAL SCHEDULE

B 14 - PC39

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A ($fc' = 400\ kg/cm^2$)	m^3	112.1
	P.C STRAND	12T12.7 ($fs' = 190\ kg/mm^2$)	kg	5413.2
	SHEATH	ϕ65 and ϕ70	m	511.6 40.0
	FORMS		m^2	612.1
	ANCHORING DEVICE	FOR 12T12.7	EACH	40
	REINFORCING BAR	19	kg	—
		16	〃	1390.8
		13	〃	6353.9
		10	〃	68.0
		TOTAL	〃	7812.7
LATERAL JOINT	CONCRETE	CLASS B ($fc' = 300\ kg/cm^2$)	m^3	9.3
	P.C BAR	ϕ23 ($fs' = 110\ kg/mm^2$)	kg	490.5
	SHEATH	ϕ35	m	143.7
	FORMS		m^2	39.7
	ANCHOR PLATE, NUT	FOR ϕ23	EACH	76
	REINFORCING BAR	16	kg	961.1
		13	〃	1602.4
		10	〃	370.7
		TOTAL	〃	2934.2
SIDEWALK CONCRETE		CLASS C ($fc' = 240\ kg/cm^2$)	m^3	14.7
BRIDGE RAILING AND DUCT		CONCRETE	m^3	5.6
		FORMS	m^2	51.7
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m^3	9.4
DRAINAGE			EACH	8
ELASTOMERIC BEARING PADS		FIX. FOR R = 120 ton	〃	4
		MOV. FOR R = 120 ton	〃	4

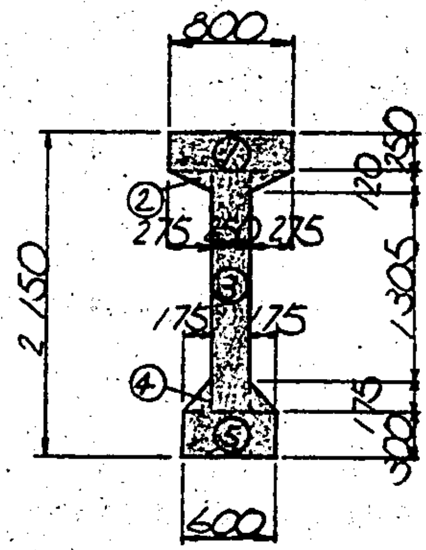
§ I MAIN BEAM

I, CONCRETE VOLUME



I) SECTION AREA

a) AT SPAN CENTER



① $0.800 \times 0.250 = 0.2000\ m^2$

② $\frac{1}{2} \times 0.275 \times 0.120 \times 2 = 0.0330$ "

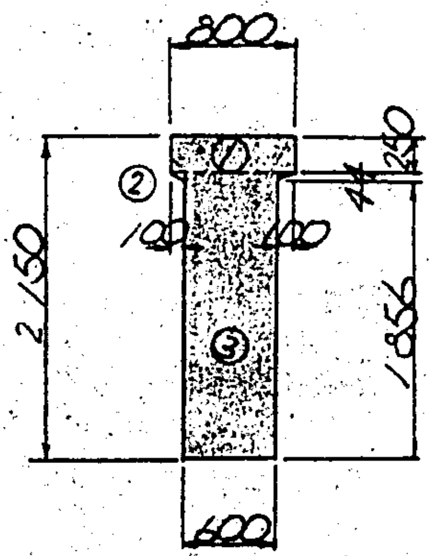
③ $0.250 \times 1.600 = 0.4000$ "

④ $\frac{1}{2} \times 0.175 \times 0.175 \times 2 = 0.0306$ "

⑤ $0.600 \times 0.300 = 0.1800$ "

$A_1 = 0.8436\ m^2$

b) AT SUPPORT POINT



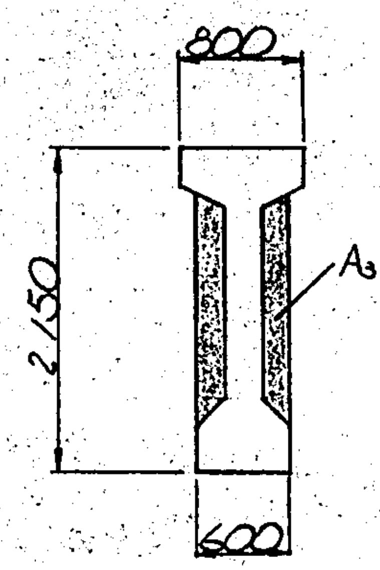
① $0.800 \times 0.250 = 0.2000\ m^2$

② $\frac{1}{2} \times 0.100 \times 0.044 \times 2 = 0.0044$ "

③ $0.600 \times 1.900 = 1.1400$ "

$A_2 = 1.3444\ m^2$

c) CENTRAL DIRPHRAGM



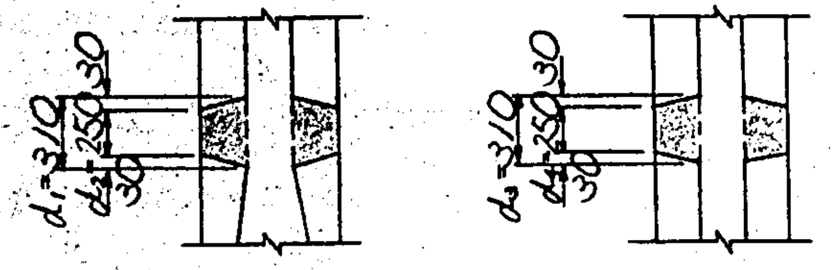
$$A_3 = A_2 - A_1$$
$$= 1.3444 - 0.8436$$
$$= 0.5008 \ m^2$$

2) QUANTITY CALCULATION FOR COCRETE VOLUME

$$V_1 = A_1 \times L_1$$
$$= 0.8436 \times 13.912 = 11.736 \ m^3$$
$$※ L_1 = 1/2 \times (13.972 + 13.852) = 13.912 \ m$$

$$V_2 = 1/2 \times (A_1 + A_2) \times L_2 \times 2$$
$$= 1/2 \times (0.8436 + 1.3444) \times 5.956^{※} \times 2$$
$$= 13.032 \ m^3 \quad ※ L_2 = 1/4 \times (6.045 \times 2 + 5.001 + 6.731)$$
$$= 5.956 \ m$$

$$V_3 = A_2 \times (L_3 + L_3')$$
$$= 1.3444 \times (0.980 + 1.122)$$
$$= 2.826 \ m^3$$



$$\nabla_4 = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2}\right) \times 2 + \left(\frac{d_3 + d_4}{2}\right) \right\}$$

$$= 0.5008^{m^2} \times \left\{ \left(\frac{0.310 + 0.250}{2}\right) \times 2 + \left(\frac{0.310 + 0.250}{2}\right) \right\}$$

$$= 0.421 \ m^3$$

$$\Sigma \nabla = (\nabla_1 + \nabla_2 + \nabla_3 + \nabla_4) \times N_G$$

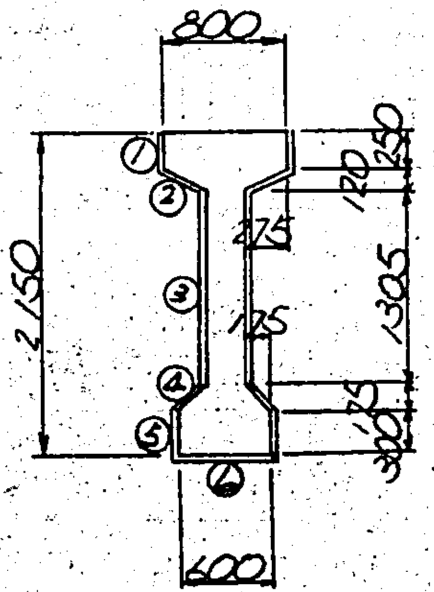
$$= (11.736 + 13.032 + 2.826 + 0.421) \times 4$$

$$= 112.060^{m^3}$$

2. FOR CONCRETE FORM AREA

I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



① $0.250 \times 2 = 0.500$ m

② $\sqrt{0.275^2 + 0.120^2} \times 2 = 0.600$ "

③ $1.305 \times 2 = 2.610$ "

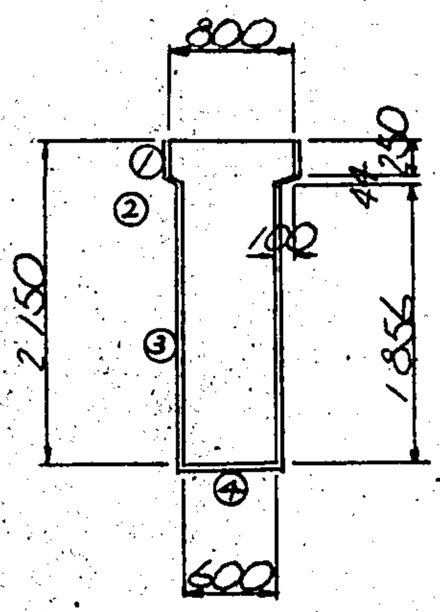
④ $\sqrt{0.175^2 + 0.175^2} \times 2 = 0.495$ "

⑤ $0.300 \times 2 = 0.600$ "

⑥ $= 0.600$ "

$L_1 = 5.405$ m

b) AT SUPPORT POINT



① $0.250 \times 2 = 0.500$ m

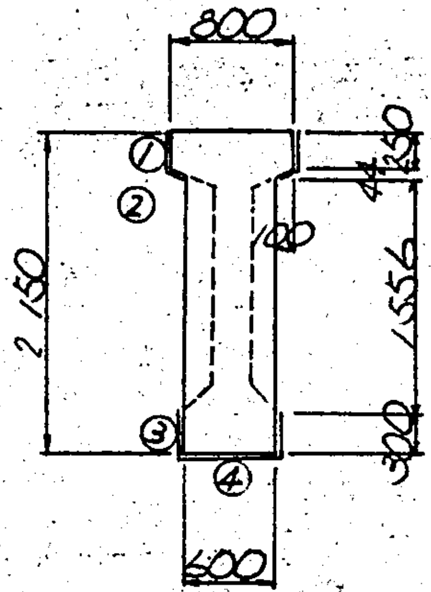
② $\sqrt{0.100^2 + 0.044^2} \times 2 = 0.219$ "

③ $1.856 \times 2 = 3.712$ "

④ $= 0.600$ "

$L_2 = 5.031$ m

c) CENTRAL DIAPHRAGM



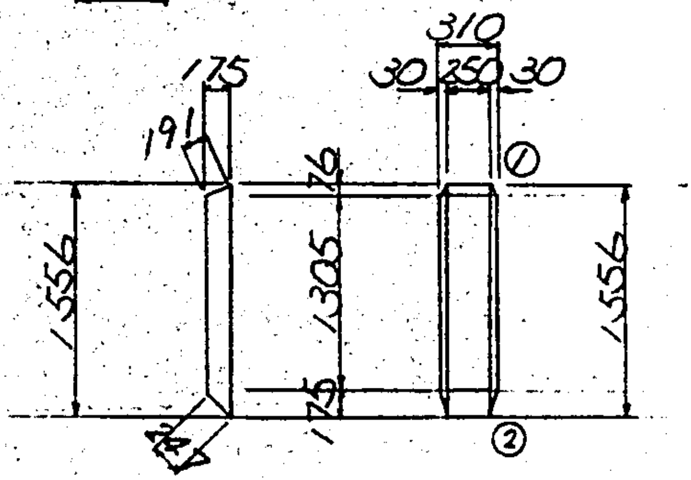
① 0.250×2 = 0.500 m

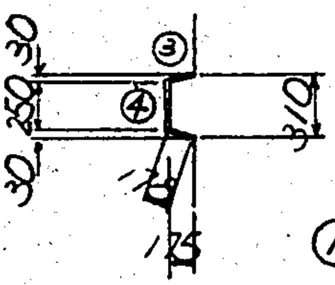
② $\sqrt{0.100^2 + 0.044^2} \times 2$ = 0.219 "

③ 0.300×2 = 0.600 "

④ = 0.600 "

L_3 = 1.919 m





① $0.030 \times 0.191 \times \frac{1}{2} \times 2$ = 0.0057 m^2

② $0.030 \times 0.247 \times \frac{1}{2} \times 2$ = 0.0074 "

③ $(1.305 + 1.556) \times \frac{1}{2} \times 0.178 \times 2$ = 0.5093 "

④ 0.250×1.556 = 0.3890 "

a_1 = 0.9114 m^2

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$A_1 = L_1 \times 6.49\overset{*}{}1 \times 2$

$= 5.405 \times 6.491 \times 2 = 70.168\ m^2$

※ $l = 6.801 - 0.250 - 0.060 = 6.491^m$

$A_2 = (L_1 + L_2) \times 1/2 \times 5.956 \times 2$

$= (5.405 + 5.031) \times 1/2 \times 5.9\overset{*}{}56 \times 2 = 62.157\ m^2$

** FOR CONCRETE VOLUME --- A2 **

$A_3 = A_2 \times (\mathrm{COSEC}\,\theta_1 + \theta_2) + L_2 \times (0.980 + 1.122)$

$= 1.3444 \times (1.000199 + 1.144512) + 5.031 \times (0.980 + 1.122)$

$= 13.458\ m^2$

$\mathrm{COSEC}\,88°51'22'' = 1.000199$
$\mathrm{COSEC}\,60°53'44'' = 1.144512$

$A_4 = L_3 \times 0.310 \times 3$

$= 1.919 \times 0.310 \times 3 = 1.785\ m^2$

$A_5 = a_1 \times 2 \times 3$

$= 0.9114 \times 2 \times 3 = 5.468\ m^2$

$\Sigma A = (A_1 + A_2 + A_3 + A_4 + A_5) \times N_G$

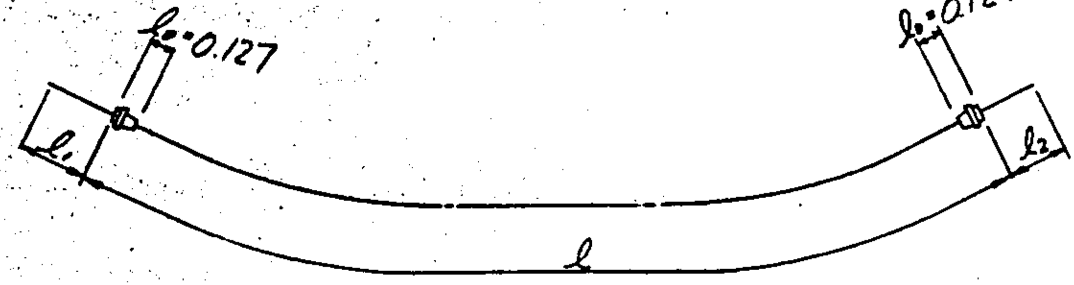
$= (70.168 + 62.157 + 13.458 + 1.785 + 5.468) \times 4$

$= 612.144\ m^2$

3. PRESTRESSING STEEL

I) MAIN CABLE

FOR 12T12.7



$$l_1 + l_2 = 1.300 \ ^{m} \qquad l_1 = l_2$$

$$l_p = l + l_1 + l_2$$

No	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_p	$L_p = N_p \times l_p$
C_1	27.996	1.300	29.296	4	117.184
C_2	27.894	〃	29.194	4	116.776
C_3	27.824	〃	29.124	4	116.496
C_4	29.754	〃	29.054	4	116.216
C_5	29.704	〃	29.004	4	116.016
TOTAL	$\Sigma L_p = 582.688^{m}$				

$$\Sigma W_p = \gamma_p \times \Sigma L_p$$

$$= 9.29^{kg/m} \times 582.688$$

$$= 5413.17^{kg}$$

2) SHETH

$\phi 70^{mm}$,

$L_{s_1} = 2.000 \times 5 \times 4 = 40.000^m$

$\phi 65^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.554) \times 5 \times 4 = 511.608^m$

3) GROUT

$\phi 65^{mm}$, $\phi 70^{mm}$

$L_G = \Sigma L_p - (l_1 + l_2) \times N_p \times N_G$

$= 582.688 - 1.300 \times 5 \times 4 = 556.688^m$

4) ANCHORING DEVICE

FOR $12T12.7^{mm}$

$N_c = N_p \times N_G \times 2$

$= 5 \times 4 \times 2$

$= 40$

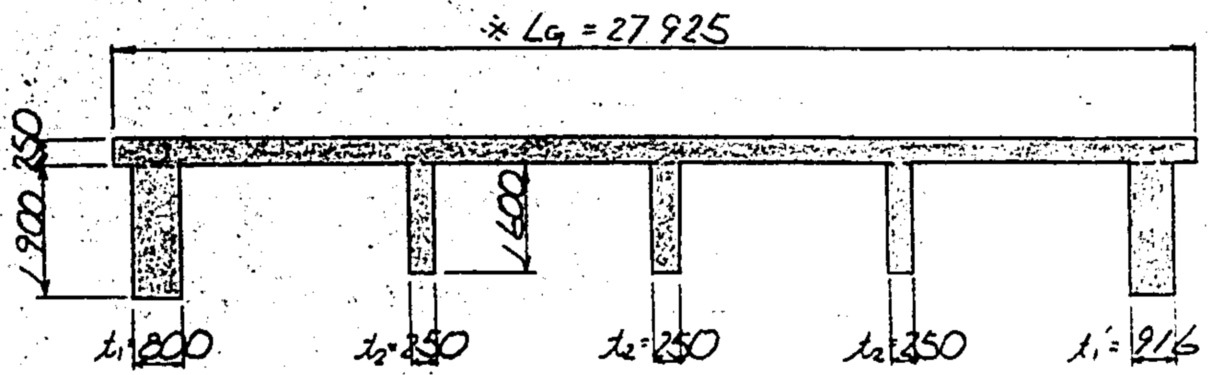
4. REINFORCING BAR (SD30)

	W (Kg)
D16	1390.8
D13	6353.9
D10	68.0
TOTAL	7812.7

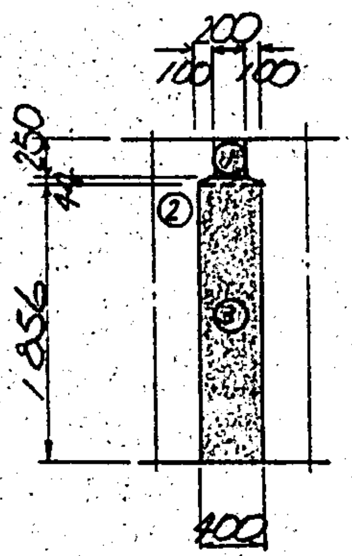
§ 2 LATERAL JOINT

I. CONCRETE VOLUME

1) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



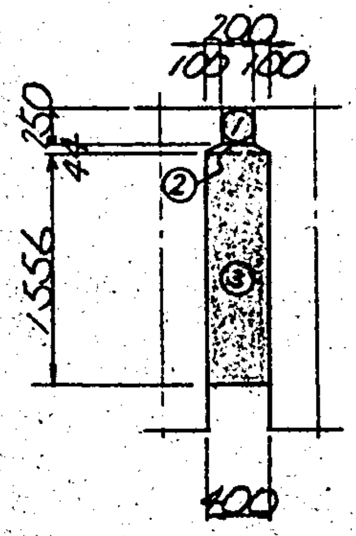
① $= A_F = 0.200 \times 0.250 = 0.0500$ m^2

② $\frac{1}{2} \times (0.200 + 0.400) \times 0.044 = 0.0132$ m^2

③ $1.856 \times 0.400 = 0.7424$

② + ③ $= A_{D_1} = 0.7556$ m^2

b) CENTRAL CROSS BEAM



② $\frac{1}{2} \times (0.200 + 0.400) \times 0.044 = 0.0132$ m^2

③ $1.556 \times 0.400 = 0.6224$

② + ③ $= A_{D_2} = 0.6356$ m^2

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_F = A_F \times L_G \times N_F$$

$$= 0.0500^{m^2} \times 27.925 \times 3 \quad = 4.189^{m^3}$$

$$V_D = \{A_{D1} \times (t_1 + t_1') + A_{D2} \times t_2 \times 3\} \times N_F$$

$$= \{0.7556 \times (0.800 + 0.816) + 0.6356 \times 0.250 \times 3\} \times 3$$

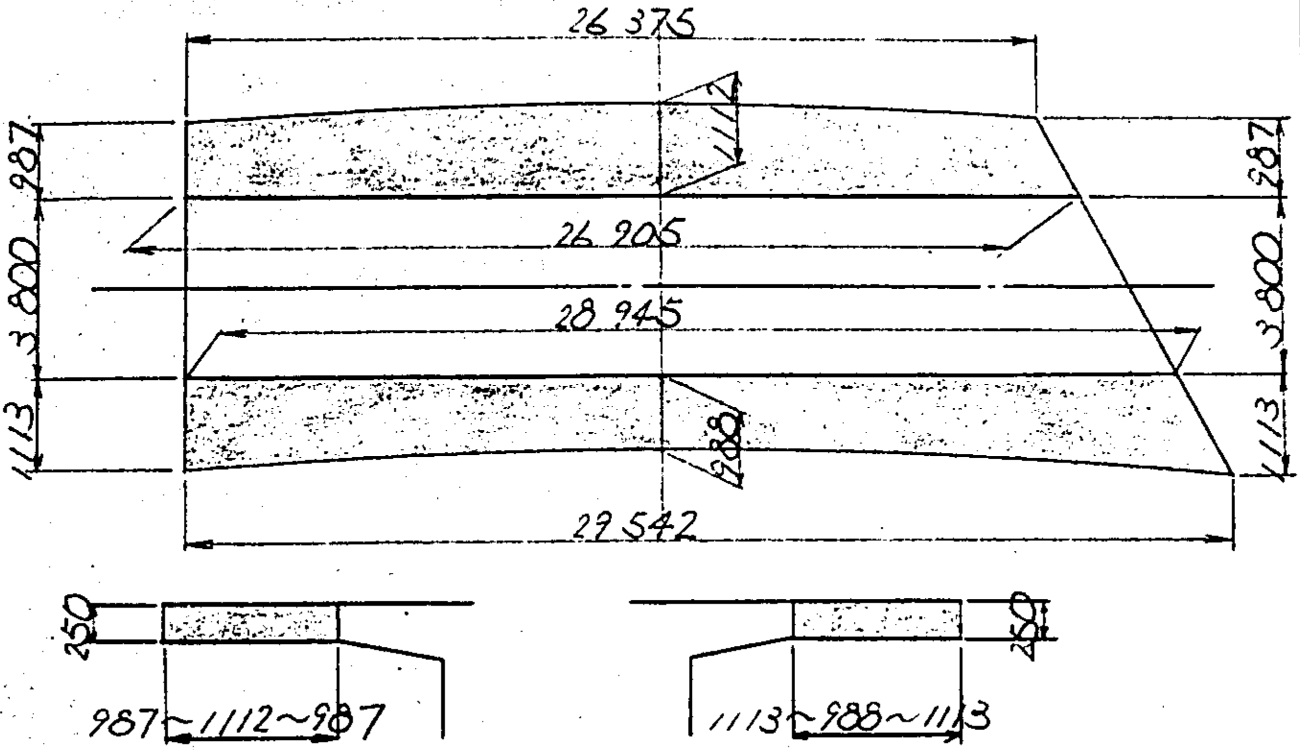
$$= 5.093^{m^3}$$

$$\Sigma V = V_F + V_D$$

$$= 4.189 + 5.093$$

$$= 9.282^{m^3}$$

3) SIDEWALK CONCRETE



$$① \ 1/4 \times (0.987 + 1.112 \times 2 + 0.987) \times 0.250 = 0.2624 \ m^2$$

$$② \ 1/4 \times (1.113 + 0.988 \times 2 + 1.113) \times 0.250 = 0.2626 \ ''$$

$$A_s = 0.5250 \ m^2$$

$$V_s = A_s \times L_G$$

$$= 0.5250 \times (26.375 + 26.905 + 28.945 + 29.542) \times 1/4$$

$$= 14.669 \ m^2$$

2. FOR CONCRETE FORM AREA

I) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{0.0500 \times (1.000199 + 1.144512) + 0.200 \times (27.925$$
$$-0.800 - 0.916 - 0.250 \times 3)\} \times 3 \quad = 15.597^{m^2}$$

$$A_2 = \{0.7556 \times (1.000199 + 1.144512) \times 2 + 0.400 \times (0.800 + 0.916)$$
$$+ 0.6356 \times (1.000199 \times 2 + 1.000) \times 2 + 0.400 \times 0.250 \times 3\} \times 3$$
$$= 24.125^{m^2}$$

$$\Sigma A = A_1 + A_2$$
$$= 15.597 + 24.125$$
$$= 39.722^{m^2}$$

2) SIDEWALK

$$A_1 = (1.\overset{*}{0}50 + 0.250) \times (26.375 + 26.905) \times 1/2$$
$$+ (1.\overset{*}{0}50 + 0.250) \times (28.945 + 29.542) \times 1/2$$
$$= 72.649^{m^2}$$

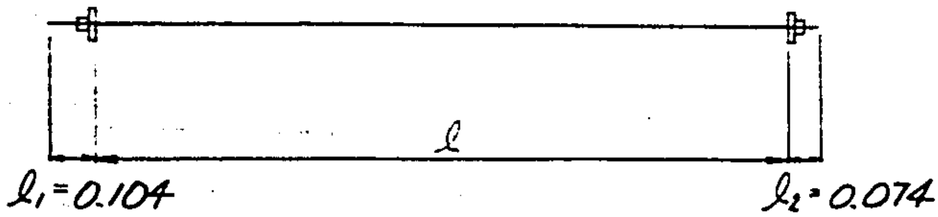
$$A_2 = 0.5250^{m^2} \times (1.000199 + 1.144512) = 1.126^{m^2}$$

$$\Sigma A = A_1 + A_2$$
$$= 72.649 + 1.126$$
$$= 73.775^{m^2}$$

3. POST - TENSIONING BARS

I) P.C. BAR

$\phi\ 23^{mm}$ (SPECIAL GRADE)



$$l_1 + l_2 = 0.104 + 0.074 = 0.178^{m}$$

$$l_p = l + l_1 + l_2$$

	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_p	$L_p = N_p \cdot l_p$
SLAB A	3.800	0.178	3.978	24	95.472
〃 B	4.269	0.178	4.447	3	13.341
CROSS BEAM C	3.420	0.178	3.598	7	25.186
〃 D	3.940	0.178	4.118	4	16.472
TOTAL	$\Sigma L_p = 150.471^{m}$				

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 150.471 = 490.54^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$$L_s = \Sigma L_p - (l_1 + l_2) \times N_p$$

$$= 150.471 - 0.178 \times 38$$

$$= 143.707^{m}$$

3) GROUT

$\phi 35^{mm}$

$$L_G = L_s = 143.707$$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$$N_c = N_p \times 2$$

$$= 38 \times 2$$

$$= 76$$

4. REINFORCING BAR (SD 30)

	W (kg)
D16	961.1
D13	1602.4
D10	370.7
TOTAL	2934.2

5. ELASTOMERIC BEARING PADS

I) FIXED SUPPORT

FOR $R = 120$ ton

$N = 4$, $300 \times 500 \times 14$

(3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 120$ ton

$N = 4$, $300 \times 500 \times 14$

(3 PLIES)

6. ANCHORING BAR (SS 41)

I) FIXED SIDE

FOR $\phi\ 80^{mm}$, $N = 3$

$l = 1030^{mm}$, $W = 122.06^{kg}$

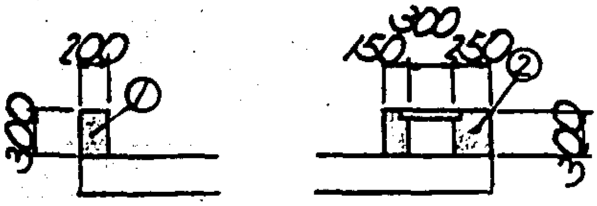
2) MOVABLE SIDE

FOR $\phi\ 75^{mm}$ $N = 3$

$l = 970^{mm}$ $W = 100.98^{kg}$

§ 3 BRIDGE FACE WORK

1. BRIDGE RAILING AND DUCT



① $0.300 \times 0.200 = 0.0600\ m^2$

② 0.700×0.300

$- 0.300 \times 0.250 = 0.1350\ m^2$

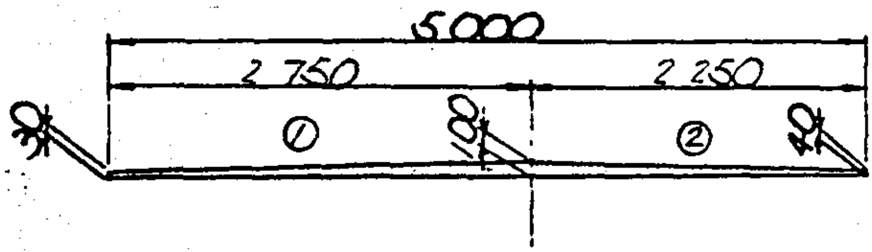
$$V = 0.0600 \times 26.375 + 0.1350 \times 29.542 = 5.571\ m^3$$

$$A = 0.300 \times 26.375 \times 2 + 0.0600 \times (1.000199 + 1.144512)$$

$$+ 0.300 \times 29.542 \times 4 + 0.1350 \times (\quad \text{"} \quad)$$

$$= 51.694\ m^3$$

2. MORTAR WITH SLOPE-PROTECTIVE MORTAR



① $\frac{1}{2} \times (0.030 + 0.100) \times 2.750 \qquad = 0.1788\ m^2$

② $\frac{1}{2} \times (0.100 + 0.040) \times 2.250 \qquad = 0.1575$ "

$A_w = 0.3363\ m^2$

$$V = A_w \times L_G$$

$$= 0.3363 \times (26.483 + 29.166) \times \frac{1}{2}$$

$$= 9.357\ m^3$$

L = 33 M , H = 2.15 M

Skew
Right 59°34′41″
70°08′11″

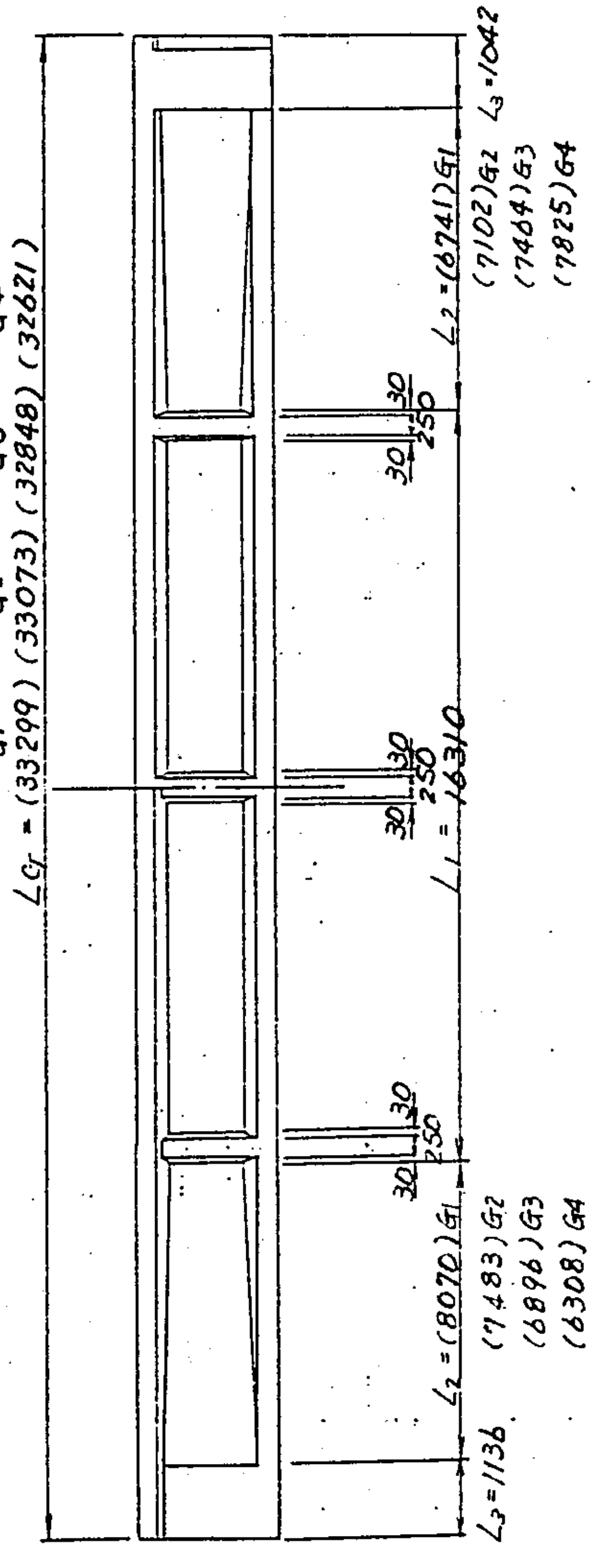
SUPERSTRUCTURE MATERIAL SCHEDULE

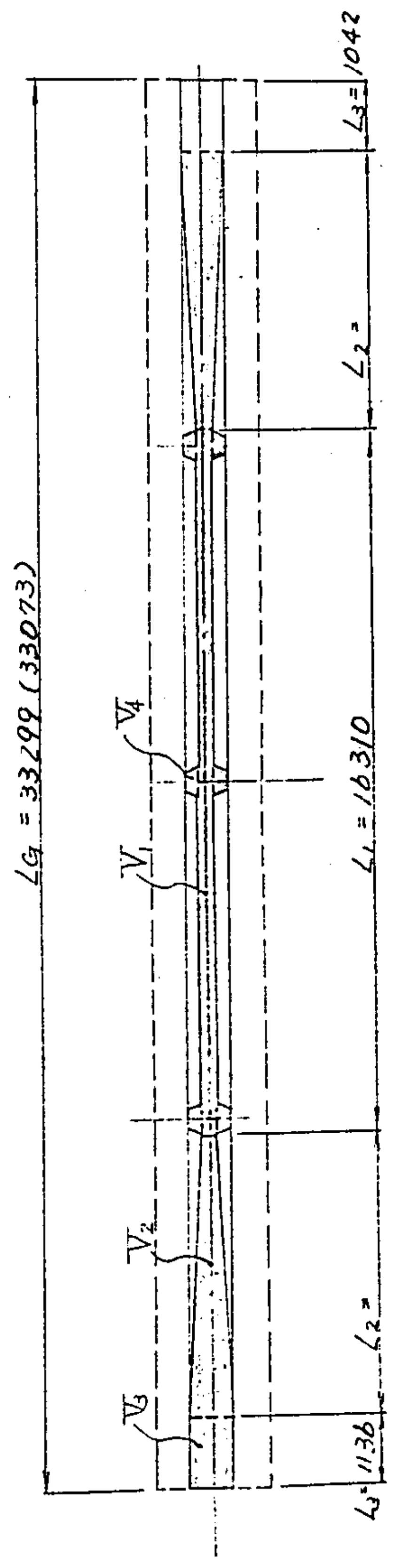
B14 - PC40

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A (f_c'=400 kg/cm²)	m³	131.8
	P.C STRAND	12T12.7 (f_s'=190 kg/mm²)	kg	7601.1
	SHEATH	φ65 and φ70	m	7329 48.0
	FORMS		m²	715.0
	ANCHORING DEVICE	FOR 12T12.7	EACH	48
	REINFORCING BAR	19	kg	2429.2
		16	〃	—
		13	〃	7454.6
		10	〃	74.2
		TOTAL	〃	9958.0
LATERAL JOINT	CONCRETE	CLASS B (f_c'=300 kg/cm²)	m³	10.5
	P.C BAR	φ23 (f_s'=110 kg/mm²)	kg	635.8
	SHEATH	φ35	m	186.5
	FORMS		m²	42.8
	ANCHOR PLATE, NUT	FOR φ23	EACH	96
	REINFORCING BAR	16	kg	1122.1
		13	〃	1775.6
		10	〃	437.7
		TOTAL	〃	3335.4
SIDEWALK CONCRETE		CLASS C (f_c'=240 kg/cm²)	m³	17.4
BRIDGE RAILING AND DUCT		CONCRETE	m³	6.4
		FORMS	m²	59.8
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m³	17.1
DRAINAGE			EACH	8
ELASTOMERIC BEARING PADS		FIX : FOR R = 190 ton	〃	4
		MOV. FOR R = 190 ton	〃	4

§ I MAIN BEAM

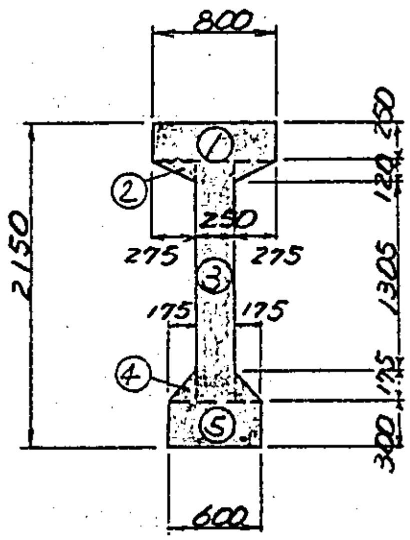
I. CONCRETE VOLUME





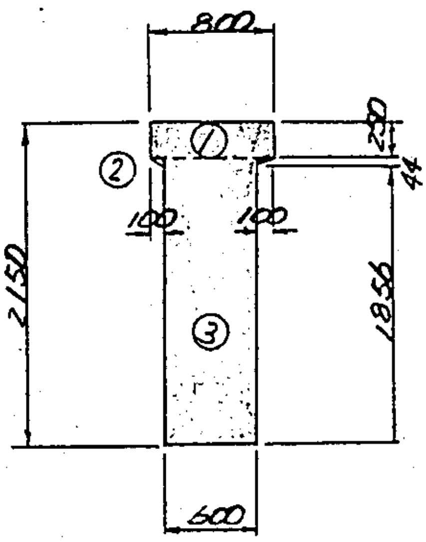
I) SECTION AREA

a) AT SPAN CENTER



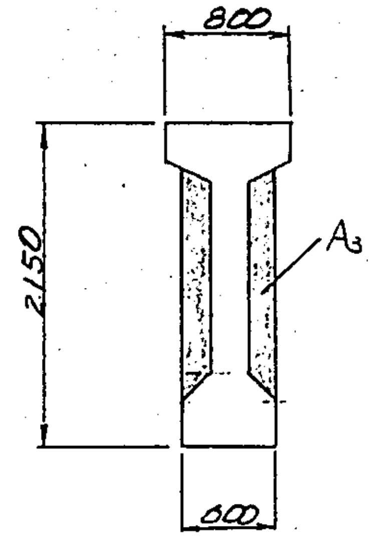
①	0.800×0.250	$= 0.2000 \ m^2$
②	$1/2 \times 0.275 \times 0.120 \times 2$	$= 0.0330$
③	0.250×1.600	$= 0.4000$
④	$0.175 \times 0.175 \times 1/2 \times 2$	$= 0.0306$
⑤	0.600×0.300	$= 0.1800$
	A_1	$= 0.8436 \ m^2$

b) AT SUPPORT POINT



①	0.800×0.250	$= 0.2000 \ m^2$
②	$1/2 \times 0.100 \times 0.044 \times 2$	$= 0.0044$
③	0.600×1.900	$= 1.1400$
	A_2	$= 1.3444 \ m^2$

c) CENTRAL DIRPHRAGM



$$A_3 = A_2 - A_1$$
$$= 1.3444 - 0.8436$$
$$= 0.5008 \quad m^2$$

2) QUANTITY CALCULATION FOR COCRETE VOLUME

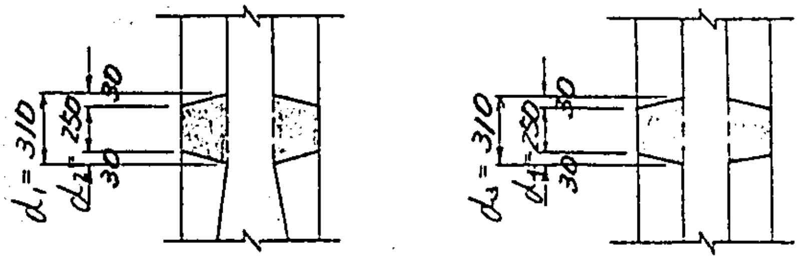
$$V_1 = A_1 \times L_1$$
$$= 0.8436 \times 16.310 = 13.759 \; m^3$$

$$V_2 = \frac{1}{2} \times (A_1 + A_2) \times (L_2 \times L_2')$$

$$= \frac{1}{2} \times (0.8436 + 1.3440) \times \begin{array}{l} (8.070 + 6.741)\,G1 \\ (7.483 + 7.102)\,G2 \\ (6.896 + 7.464)\,G3 \\ (6.308 + 7.825)\,G4 \end{array}$$

$$= \begin{array}{l} (16.200)\,G1 \\ (15.953)\,G2 \; m^3 \\ (15.707)\,G3 \\ (15.459)\,G4 \end{array}$$

$$V_3 = A_2 \times L_3 \times L_3'$$
$$= 1.3444 \times (1.136 + 1.042)$$
$$= 2.928 \quad m^3$$



$$\nabla_4 = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2} \right) \times 2 + \left(\frac{d_3 + d_4}{2} \right) \right\}$$

$$= 0.5008^{m^2} \times \left\{ \left(\frac{0.310 + 0.250}{2} \right) \times 2 + \left(\frac{0.310 + 0.250}{2} \right) \right\}$$

$$= 0.421 \quad m^3$$

$$\Sigma \nabla = (\nabla_1 + \nabla_3 + \nabla_4) \times N_G + (\nabla_{ZG1} + \nabla_{ZG2} + \nabla_{ZG3} + \nabla_{ZG4})$$

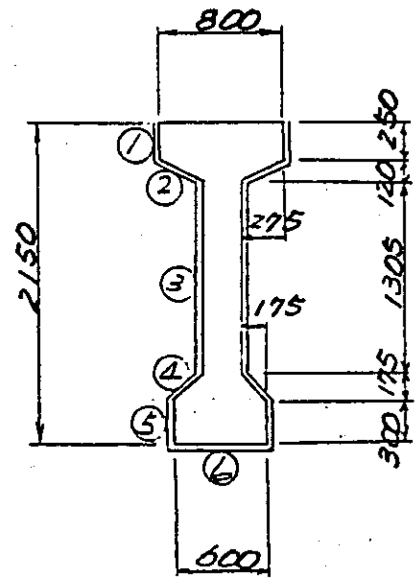
$$= (13.759 + 2.928 + 0.421) \times 4 + (16.200 + 15.953 + 15.707 + 15.459)$$

$$= 131.751 \quad m^3$$

2. FOR CONCRETE FORM AREA

I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



① $0.250 \times 2 = 0.500$ m

② $\sqrt{0.275^2 + 0.120^2} \times 2 = 0.600$ 〃

③ $1.305 \times 2 = 2.610$ 〃

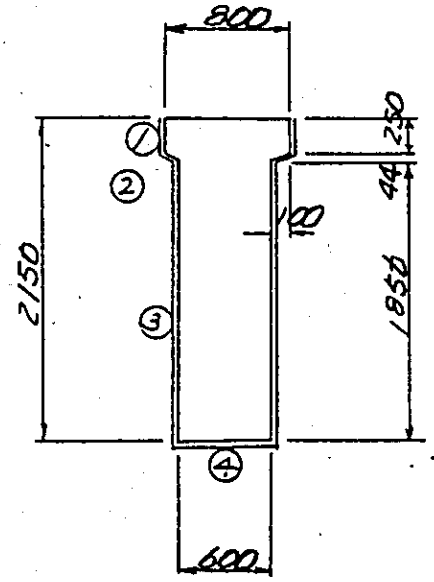
④ $\sqrt{0.175^2 + 0.175^2} \times 2 = 0.495$ 〃

⑤ $0.300 \times 2 = 0.600$ 〃

⑥ $= 0.600$ 〃

$L_1 = 5.405$ m

b) AT SUPPORT POINT



① $0.250 \times 2 = 0.500$ m

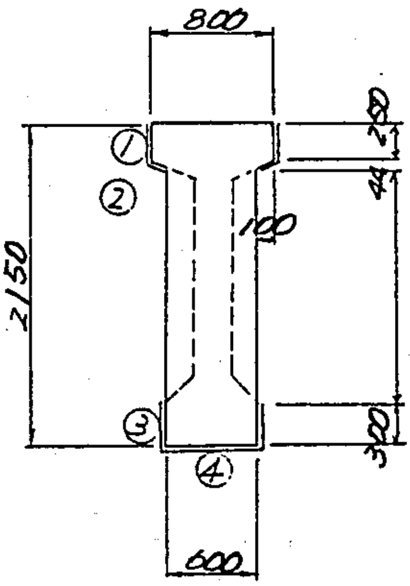
② $\sqrt{0.100^2 + 0.044^2} \times 2 = 0.219$ 〃

③ $1.856 \times 2 = 3.712$ 〃

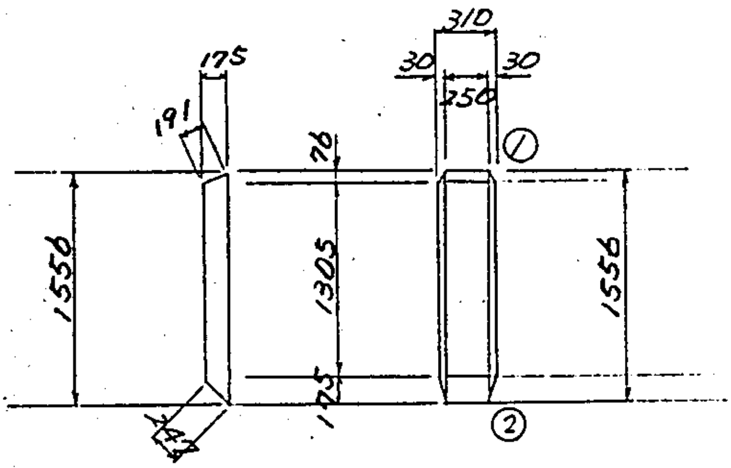
④ $= 0.600$ 〃

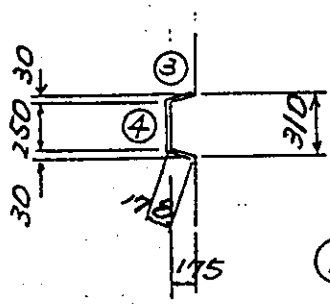
$L_2 = 5.031$ m

c) CENTRAL DIAPHRAGM



1	0.250×2	$= 0.500$	m
2	$\sqrt{0.100^2 + 0.044^2} \times 2$	$= 0.219$	"
3	0.300×2	$= 0.600$	"
4		$= 0.600$	"
	L_3	$= 1.919$	m





1	$0.03 \times 0.191 \times 1/2 \times 2$	$= 0.0057$	m^2
2	$0.03 \times 0.247 \times 1/2 \times 2$	$= 0.0074$	"
3	$(1.305 + 1.556) \times 1/2 \times 0.178 \times 2$	$= 0.5092$	"
4	0.250×1.556	$= 0.3890$	
	a_1	$= 0.9113$	m^2

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$A_1 = L_1 \times 7690 \times 2$

$= 5.405 \times 7.690 \times 2 = 83.129 \; m^2$

$A_2 = (L_1 + L_2) \times \frac{1}{2} \times \begin{matrix} (807 + 6.741) & G1 \\ (7.483 + 7.102) & G2 \\ (6.896 + 7.464) & G3 \\ (6.308 + 7.825) & G4 \end{matrix}$

$= (5.405 + 5.031) \times \frac{1}{2} \times \begin{matrix} 14.811 \\ 14.585 \\ 13.360 \\ 14.133 \end{matrix} = \begin{matrix} 77.284 \\ 76.105 \\ 74.930 \\ 73.746 \end{matrix} \; m^2$

** FOR CONCRETE VOLUME ---- A2 **

$A_3 = A_2 \times (COSEC\theta \times COSEEC\theta') + L_2 \times 0.980 \times 2$

$= 13444 \times (1.159663 + 1.063260) + 5.031 \times 0.980 \times 2$

$= 12.849 \; m^2$

$COSEC \begin{matrix} 59°34'41'' \\ 70°08'11' \end{matrix} = \begin{matrix} 1.159663 \\ 1.063260 \end{matrix}$

$A_4 = L_3 \times 0.310 \times 3$

$= 1.919 \times 0.310 \times 3 = 1.785 \; m^2$

$A_5 = a_1 \times 2 \times 3$

$= 0.9113 \, m^2 \times 2 \times 3 = 5.468 \; m^2$

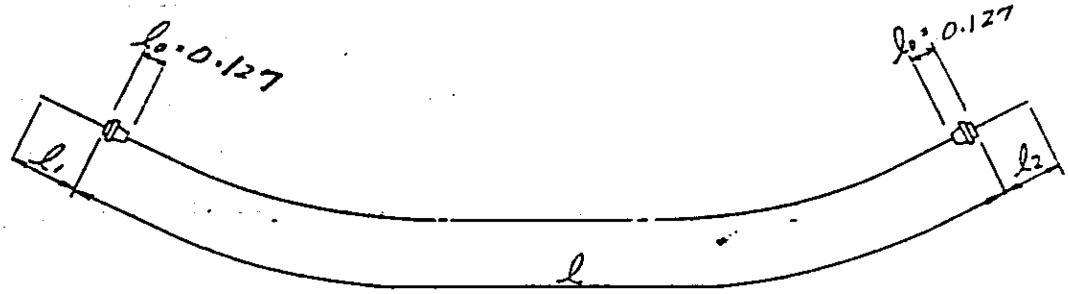
$\Sigma A = (A_1 + A_3 + A_4 + A_5) \times NG + A_2G_1 + A_2G_2 + A_2G_3 + A_2G_4$

$= (83.129 + 12.849 + 1.785 + 5.468) \times 77.284 + 76.105 + 74.930 + 73.746$

$= 714.989 \; m^2$

3, PRESTRESSING STEEL

I) MAIN CABLE FOR 12T12.7



$\ell_1 + \ell_2 = 1.300^{m}$ $\ell_1 = \ell_2$

$\ell_p = \ell + \ell_1 + \ell_2$

No	ℓ (m)	$\ell_1 + \ell_2$ (m)	ℓ_p (m)	N_p	$L_p = N_p \times \ell_p$
C_1	33.015	1.300	34.315	4	137.260
C_2	32.919	1.300	34.219	4	136.876
C_3	32.837	1.300	34.137	4	136.548
C_4	32.783	1.300	34.083	4	136.332
C_5	32.731	1.300	34.031	4	136.124
C_6	32.465	1.300	33.765	4	135.060
TOTAL					$\Sigma L_p = 818.200^{m}$

$\Sigma W_p = \gamma_p \times \Sigma L_p$

$= 9.29^{kg/m} \times 818.200$

$= 7601.08^{kg}$

2) SHETH

$\phi 70^{mm}$,

$L_{s_1} = 2.000 \times 6 \times 4 = 48.000^m$

$\phi 65^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.554) \times 6 \times 4 = 732.904^m$

3) GROUT

$\phi 65^{mm}, \phi 70$

$L_G = \Sigma L_p - (l_1 + l_2) \times N_p \times N_G$

$= 818.200 - 1.300 \times 6 \times 4 = 787.000^m$

4) ANCHORING DEVICE

FOR 12T 12.7 mm

$N_c = N_p \times N_G \times 2$

$= 6 \times 4 \times 2$

$= 48.$

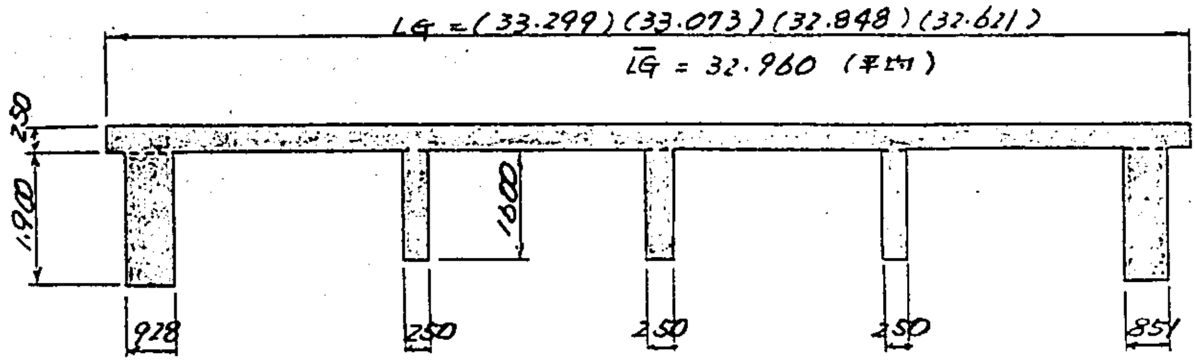
4. REINFORCING BAR (SD 30)

	W (Kg)
D 19	2429.2
D 13	7454.6
D 10	74.2
TOTAL	9958.0

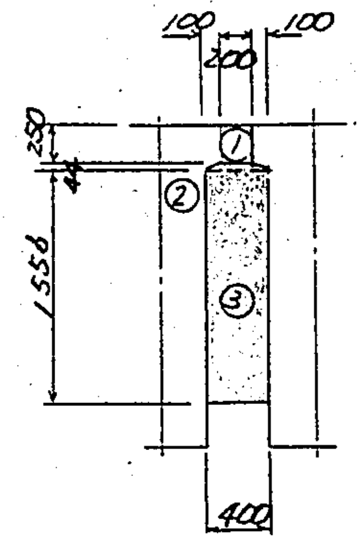
§ 2 LATERAL JOINT

I. CONCRETE VOLUME

I) SLAB AND CROSS BEAM



a) CENTRAL CROSS BEAM



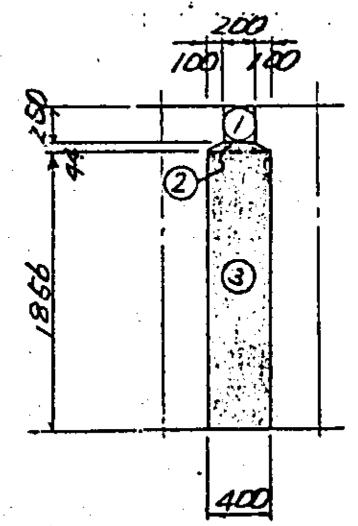
① $= A_F = 0.200 \times 0.250 = 0.0500$ m^2

② $1/2 \times (0.200 + 0.400) \times 0.044 = 0.0132$ m^2

③ $0.400 \times 1.556 = 0.6224$

② + ③ $= A_{D1} = 0.6856$ m^2

b) END OF CROSS BEAM



② $1/2 \times (0.200 + 0.400) \times 0.044 = 0.0132$ m^2

③ $0.400 \times 1.856 = 0.7424$

② + ③ $= A_{D2} = 0.7556$ m^2

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_F = A_F \times L_G \times N_F$$

$$= 0.0500 \times 32.960 \times 3 = 4.944\ m^3$$

$$V_D = (A_{D2} \times (t_1 \times t_1') \div A_{D1} \times t_2 \times 3) \times N_F$$

$$= (0.7556 \times (0.928 + 0.851) + 0.6856 \times 0.250 \times 3) \times 3$$

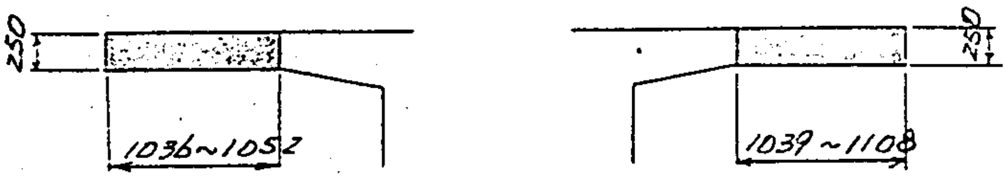
$$= 5.575\ m^3$$

$$\Sigma V = V_F + V_D$$

$$= 4.944 + 5.575$$

$$= 10.519\ m^3$$

3) SIDEWALK CONCRETE



① $0.25 \times (1.036 + 1.052)/2 = 0.2610\ m^2$

② $0.25 \times (1.039 + 1.108)/2 = 0.2684$ "

$A_s = 0.5294\ m^2$

$$\overline{V}_s = A_s \times \overline{L}_G$$

$$= 0.5294^{m^2} \times 32.960$$

$$= 17.449\ m^2$$

2. FOR CONCRETE FORM AREA

1) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{0.2 \times 0.25 \times (1.159663 + 1.063260) + 0.200 \times (32.960 - 0.800 \times 2 - 0.250 \times 3)\} \times 3$$
$$= 18.477\ m^2$$

$$A_2\ \{0.7556 \times (1.159663 + 1.063260) + 0.400 \times 0.800\} \times 2 \times 3 + (0.6356 \times 1.000 \times 2 + 0.400 \times 0.250) \times 3 \times 3$$
$$= 24.339\ m^2$$

$$\Sigma A = A_1 + A_2$$
$$= 18.477 + 24.339 = 42.816\ m^2$$

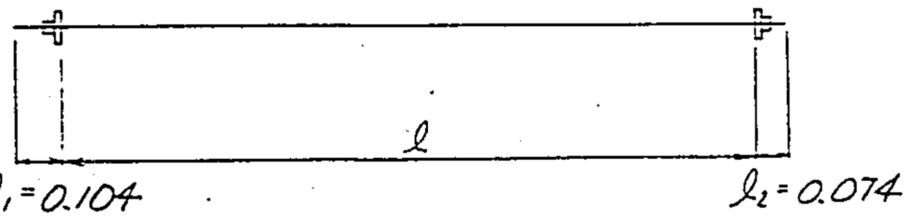
2) SIDEWALK

$$A = \{(1.036 + 1.052)/2 + (1.039 + 1.108)/2 + 0.25 \times 2\} \times 32.960 + \{(1.039 + 1.036) \times \frac{1.159663}{\mathrm{COSEC}\,\theta} + (1.052 + 1.108) \times \frac{1.063260}{\mathrm{COSEC}\,\theta}\} \times 0.25$$
$$= 87.449\ m^2$$

3. POST - TENSIONING BARS

I) P.C. BAR

ϕ 23 mm (SPECIAL GRADE)



$$l_1 + l_2 = 0.104 + 0.074 = 0.178^{m}$$

$$l_p = l + l_1 + l_2$$

	l (m)	l_1+l_2 (m)	l_p (m)	N_p	$L_p = N_p \cdot l_p$
SLAB (A)	3.800	0.178	3.978	30	119.340
〃 (B)	4.325	0.178	4.503	4	18.012
〃 (C)	3.990	0.178	4.168	3	12.504
CROSS BEAM (D)	3.620	0.178	3.798	3	11.394
〃 (E)	4.227	0.178	4.405	4	17.620
(F)	3.860	0.178	4.038	4	16.152
TOTAL				ΣL_p =	195.022 m

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 195.022 = 635.77^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$$L_S = \Sigma L_P - (l_1 + l_2) \times N_P$$

$$= 195.022 - 0.178 \times 48$$

$$= 186.478^{m}$$

3) GROUT

$\phi 35^{mm}$

$$L_G = L_S = 186.478\ m$$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$$N_C = N_P \times 2$$

$$= 48 \times 2$$

$$= 96$$

4. REINFORCING BAR (SD 30)

	W (kg)
D16	1122.1
D13	1775.6
D10	437.7
TOTAL	3.335.4

5. ELASTOMERIC BEARING PADS

1) FIXED SUPPORT

FOR $R = 190$ ton

$N = 4$, $450 \times 550 \times 14$

(3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 190$ ton

$N = 4$, $450 \times 550 \times 14$

(3 PLIES)

6. ANCHORING BAR (SS 41)

1) FIXED SIDE

FOR $\phi\ 80$ mm, $N = 3$

$l = 1.030$ mm, $W = 122.06$ kg

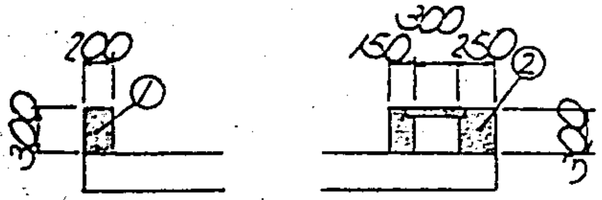
2) MOVABLE SIDE

FOR $\phi\ 75$ mm $N = 3$

$l = 970$ mm, $W = 100.98$ kg

§ 3 BRIDGE FACE WORK

1, BRIDGE RAILING AND DUCT



① $0.300 \times 0.200 = 0.0600\ m^2$

② 0.700×0.300

$-0.300 \times 0.250 = 0.1350\ m^2$

$\Sigma A = 0.1950\ m^2$

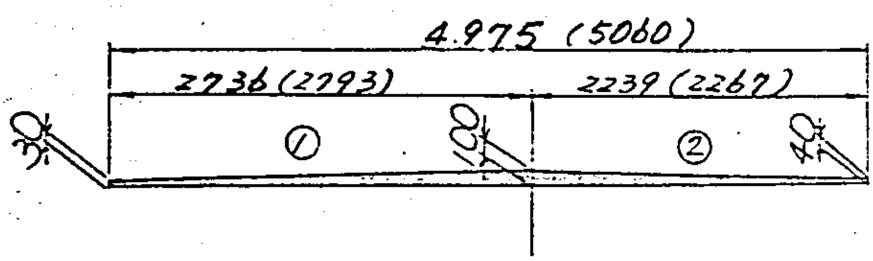
$\Sigma V = (0.0600 \times 33.617 + 0.1350 \times 32.321) = 6.380\ m^3$

cos θ

$\Sigma A = 0.300 \times 6 \times 32.960 + 0.1950 \times (1.159663 + 1.063260)$

$= 59.761\ m^2$

2, MORTAR WITH SLOPE-PROTECTIVE MORTAR



① $1/2 \times (0.030 + 0.100) \times (2.736 + 2.793)/2 = 0.1797\ m^2$

② $1/2 \times (0.100 + 0.040) \times (2.239 + 2.267)/2 = 0.1577$ 〃

$A_w = 0.3374\ m^2$

$V = A_w \times L_G$

$= 0.3374 \times 32.960$

$= 11.121\ m^3$

$L = 30^{M}$, $H = 2.15^{M}$

Skew
Right 70°00′00″

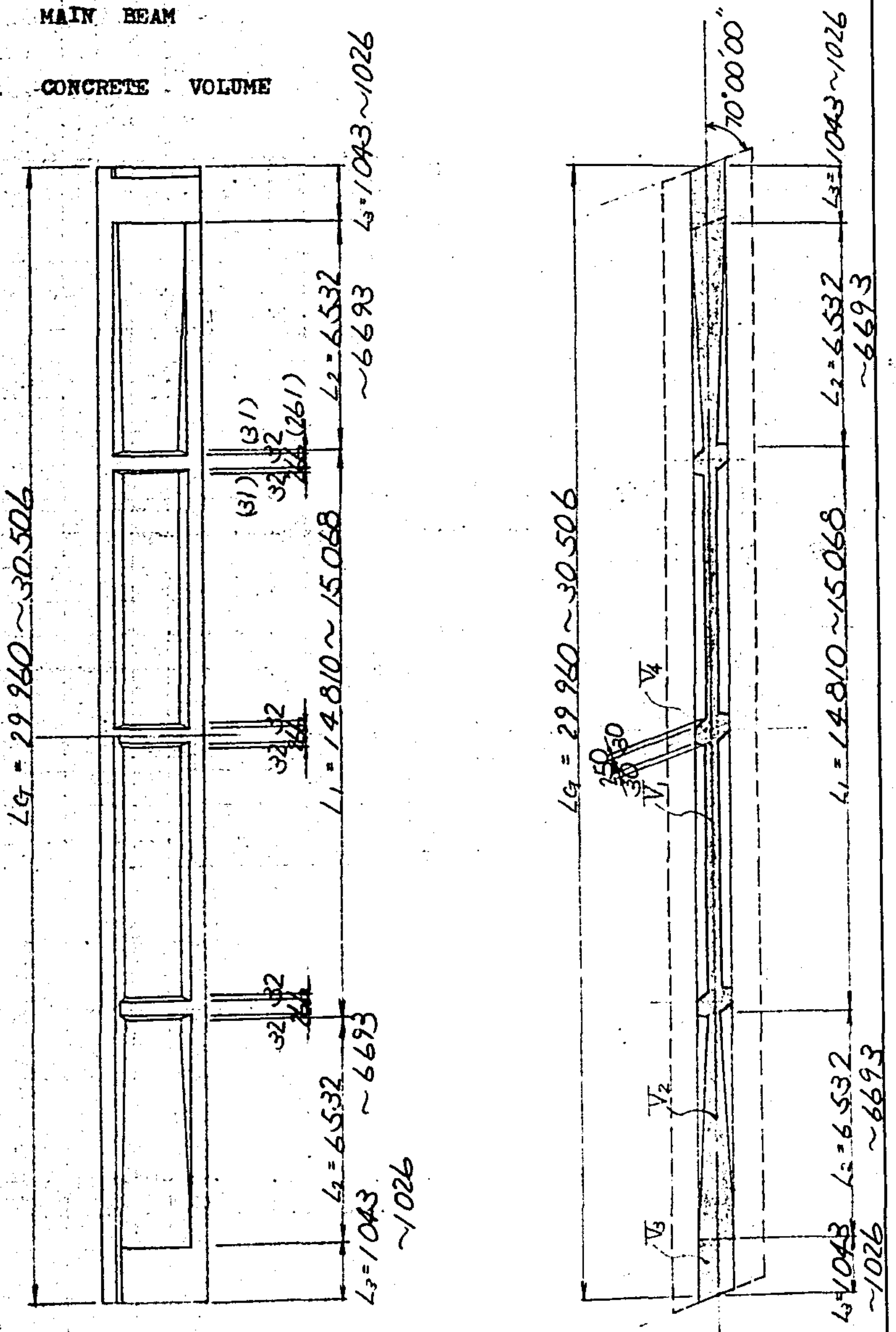
SUPERSTRUCTURE MATERIAL SCHEDULE

B14 – PC41

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A ($fc' = 400\ kg/cm^2$)	m^3	121.2
	P.C STRAND	12T12.7 ($fs' = 190\ kg/mm^2$)	kg	6 932.2
	SHEATH	ϕ65 and ϕ70	m	660.9 48.0
	FORMS		m^2	657.4
	ANCHORING DEVICE	FOR 12T12.7	EACH	48
	REINFORCING BAR	19	kg	2 240.2
		16	〃	—
		13	〃	7 166.6
		10	〃	74.2
		TOTAL	〃	9 481.0
LATERAL JOINT	CONCRETE	CLASS B ($fc' = 300\ kg/cm^2$)	m^3	19.0
	P.C BAR	ϕ23 ($fs' = 110\ kg/mm^2$)	kg	665.2
	SHEATH	ϕ35	m	196.6
	FORMS		m^2	78.2
	ANCHOR PLATE, NUT	FOR ϕ23	EACH	84
	REINFORCING BAR	16	kg	1 122.1
		13	〃	1 775.6
		10	〃	437.7
		TOTAL	〃	3 335.4
SIDEWALK CONCRETE		CLASS C ($fc' = 240\ kg/cm^2$)	m^3	16.9
BRIDGE RAILING AND DUCT		CONCRETE	m^3	6.0
		FORMS	m^2	55.4
MORTAR WITH SLOPE-PROTECTIVE MORTAR			m^3	12.3
DRAINAGE			EACH	8
ELASTOMERIC BEARING PADS		FIX. FOR R = 190 ton	〃	4
		MOV. FOR R = 190 ton	〃	4

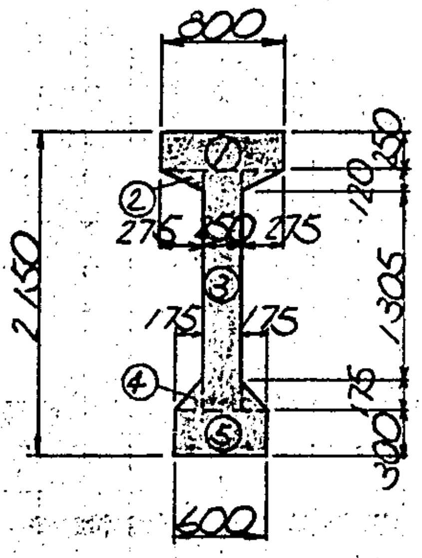
§ I MAIN BEAM

I. CONCRETE VOLUME



I) SECTION AREA

a) AT SPAN CENTER



① $0.800 \times 0.250 = 0.2000$ m²

② $\frac{1}{2} \times 0.275 \times 0.120 \times 2 = 0.0330$ "

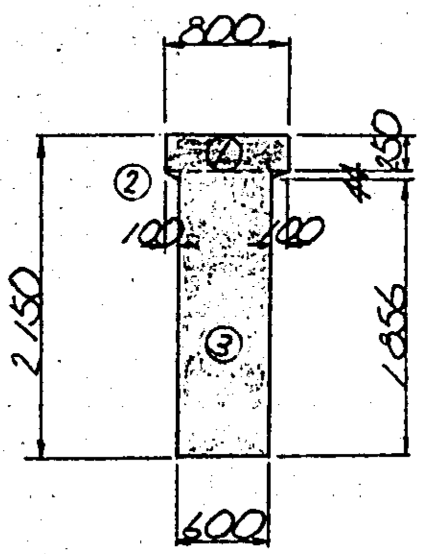
③ $0.250 \times 1.600 = 0.4000$ "

④ $\frac{1}{2} \times 0.175 \times 0.175 \times 2 = 0.0306$ "

⑤ $0.600 \times 0.300 = 0.1800$ "

$A_1 = 0.8436$ m²

b) AT SUPPORT POINT



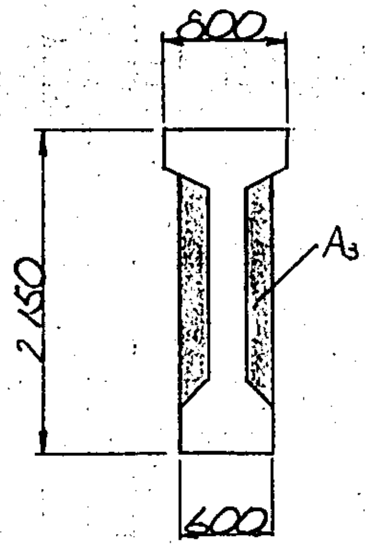
① $0.800 \times 0.250 = 0.2000$ m²

② $\frac{1}{2} \times 0.100 \times 0.044 \times 2 = 0.0044$ "

③ $0.600 \times 1.900 = 1.1400$ "

$A_2 = 1.3444$ m²

c) CENTRAL DIRPHRAGM



$A_3 = A_2 - A_1$

$= 1.3444 - 0.8436$

$= 0.5008 \ m^2$

2) QUANTITY CALCULATION FOR COCRETE VOLUME

$V_1 = A_1 \times L_1$

$= 0.8436 \times 14.939 = 12.603 \ m^3$

※ $L_1 = \frac{1}{2} \times (14.810 + 15.068) = 14.939 \ m$

$V_2 = \frac{1}{2} \times (A_1 + A_2) \times L_2 \times 2$

$= \frac{1}{2} \times (0.8436 + 1.3444) \times 6.613 \times 2$

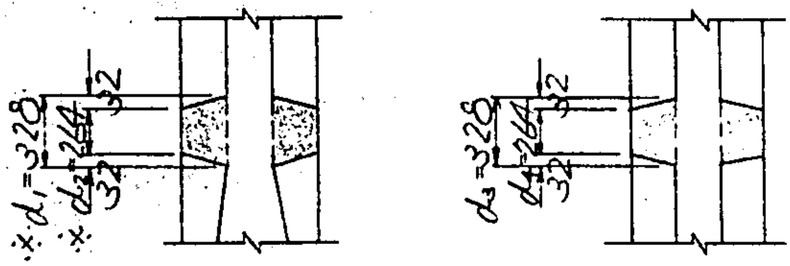
$= 14.469 \ m^3$ ※ $L_2 = \frac{1}{2} \times (6.532 + 6.693) = 6.613 \ m$

$V_3 = A_2 \times L_3 \times 2$

$= 1.3444 \times 1.035 \times 2$

$= 2.782 \ m^3$

※ $L_3 = \frac{1}{2} \times (1.043 + 1.026) = 1.035 \ m$



$$\nabla_4 = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2}\right) \times 2 + \left(\frac{d_3 + d_4}{2}\right) \right\}$$

$$= 0.5008^{m^2} \times \left\{ \left(\frac{0.328 + 0.264}{2}\right) \times 2 + \left(\frac{0.328 + 0.264}{2}\right) \right\}$$

$$= 0.445 \quad m^3$$

$$\sum \nabla = (\nabla_1 + \nabla_2 + \nabla_3 + \nabla_4) \times N_G$$

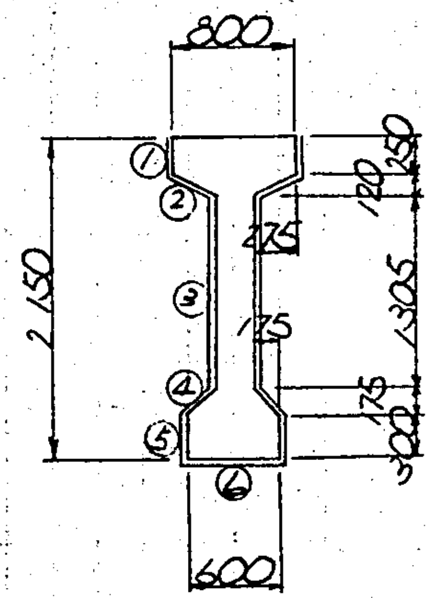
$$= (12.603 + 14.469 + 2.782 + 0.445) \times 4$$

$$= 121.196 \quad m^3$$

2. FOR CONCRETE FORM AREA

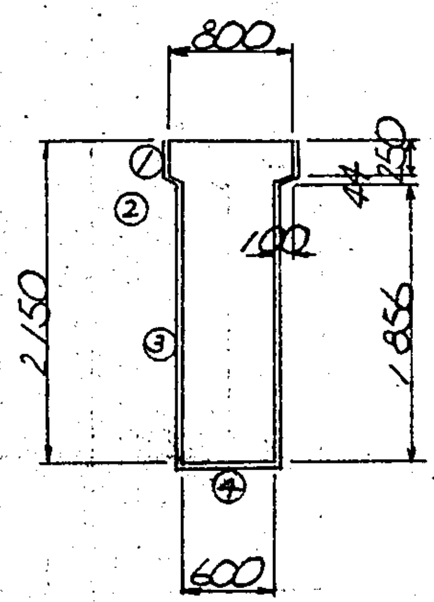
I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



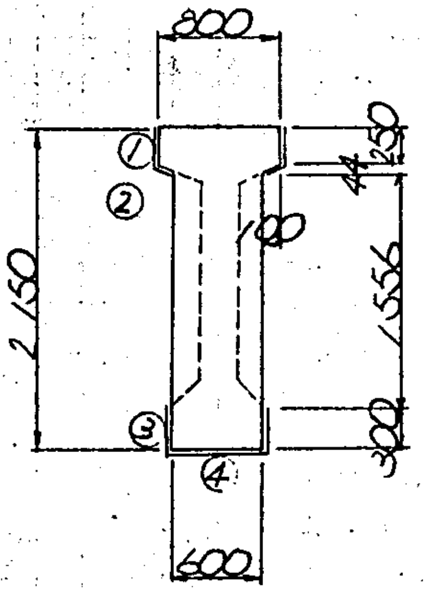
①	0.250×2	$= 0.500$ m
②	$\sqrt{0.275^2 + 0.120^2} \times 2$	$= 0.600$ 〃
③	1.305×2	$= 2.610$ 〃
④	$\sqrt{0.175^2 + 0.175^2} \times 2$	$= 0.495$ 〃
⑤	0.300×2	$= 0.600$ 〃
⑥		$= 0.600$ 〃
	L_1	$= 5.405$ m

b) AT SUPPORT POINT



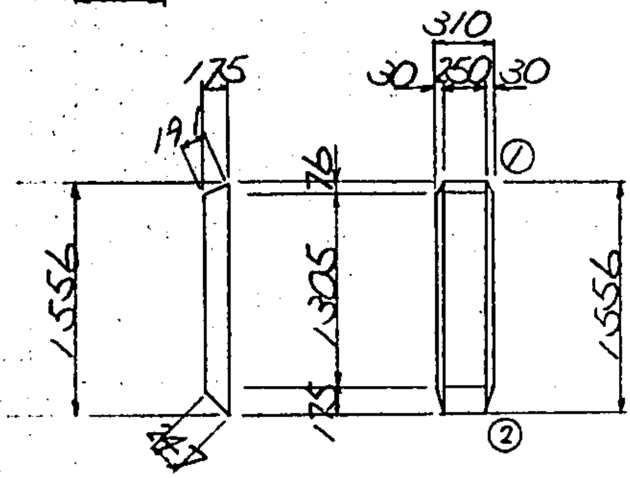
①	0.250×2	$= 0.500$ m
②	$\sqrt{0.100^2 + 0.044^2} \times 2$	$= 0.219$ 〃
③	1.856×2	$= 3.712$ 〃
④		$= 0.600$ 〃
	L_2	$= 5.031$ m

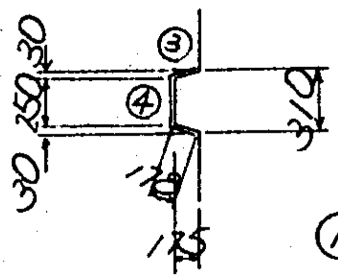
c) CENTRAL DIAPHRAGM



①	0.250×2	$= 0.500$ m
②	$\sqrt{0.100^2 + 0.044^2} \times 2$	$= 0.219$ 〃
③	0.300×2	$= 0.600$ 〃
④		$= 0.600$ 〃

$L_3 = 1.919$ m





①	$0.030 \times 0.191 \times \frac{1}{2} \times 2$	$= 0.0057$ m²
②	$0.030 \times 0.247 \times \frac{1}{2} \times 2$	$= 0.0074$ 〃
③	$(1.305 + 1.556) \times \frac{1}{2} \times 0.178 \times 2$	$= 0.5093$ 〃
④	0.250×1.556	$= 0.3890$ 〃

$a_1 = 0.9114$ m²

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$A_1 = L_1 \times \overset{*}{6.914} \times 2$

$= 5.405 \times 6.914 \times 2 = 74.740 \ m^2$

$* \ell = 7.306 - 0.328 - 0.064 = 6.914^m$

$A_2 = (L_1 + L_2) \times 1/2 \times 6.613 \times 2$

$= (5.405 + 5.031) \times 1/2 \times 6.\overset{*}{6}13 \times 2 = 69.013 \ m^2$

** FOR CONCRETE VOLUME --- A2 **

$A_3 = A_2 \times \overset{*}{COSEC}\theta \times 2 + L_2 \times \overset{*}{1.035} \times 2$

$= 1.3444 \times 1.055455 \times 2 + 5.031 \times 1.035 \times 2$

$= 13.252 \ m^2$

$COSEC(70°00'00'') = 1.064178$
$COSEC(72°48'54'') = 1.046731$ $\} \times 1/2 = 1.055455$

$A_4 = L_3 \times 0.328 \times 3$

$= 1.919 \times 0.328 \times 3 = 1.888 \ m^2$

$A_5 = a_1 \times 2 \times 3$

$= 0.9114 \times 2 \times 3 = 5.468 \ m^2$

$\Sigma A = (A_1 + A_2 + A_3 + A_4 + A_5) \times N_G$

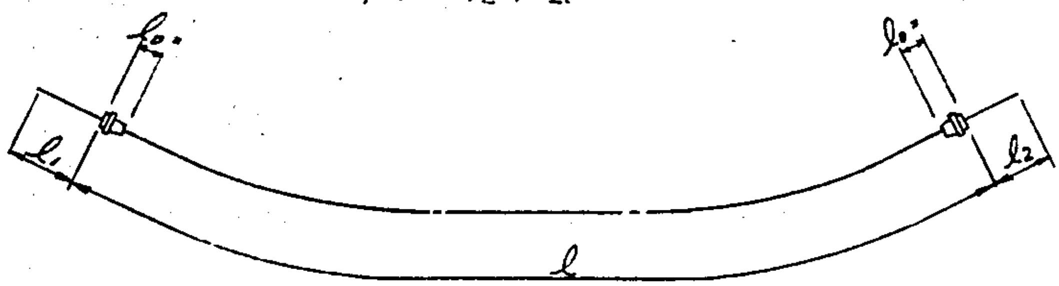
$= (74.740 + 69.013 + 13.252 + 1.888 + 5.468) \times 4$

$= 657.444 \ m^2$

3, PRESTRESSING STEEL

I) MAIN CABLE

FOR 12T12.7



$$l_1 + l_2 = 1.300 \ ^m \qquad l_1 = l_2$$

$$l_p = l + l_1 + l_2$$

No	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_p	$L_p = N_p \times l_p$
C_1	30.015	1.300	31.315	4	125.260
C_2	29.919	〃	31.219	4	124.876
C_3	29.837	〃	31.137	4	124.548
C_4	29.783	〃	31.083	4	124.332
C_5	29.731	〃	31.031	4	124.124
C_6	29.465	〃	30.765	4	123.060
TOTAL					$\Sigma L_p = 746.200^m$

$$\Sigma W_p = \gamma_p \times \Sigma L_p$$

$$= 9.29 \ ^{kg/m} \times 746.200$$

$$= 6\,932.20 \ ^{kg}$$

2) SHETH

$\phi 70^{mm}$,

$L_{s_1} = 2.000 \times 6 \times 4 = 48.000^{m}$

$\phi 65^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.554) \times 6 \times 4 = 660.904^{m}$

3) GROUT

$\phi 65^{mm}$, $\phi 70^{mm}$

$L_G = \Sigma L_p - (l_1 + l_2) \times N_P \times N_G$

$= 746.200 - 1.300 \times 6 \times 4 = 715.000^{m}$

4) ANCHORING DEVICE

FOR ^{mm}

$N_c = N_P \times N_G \times 2$

$= 6 \times 4 \times 2$

$= 48$

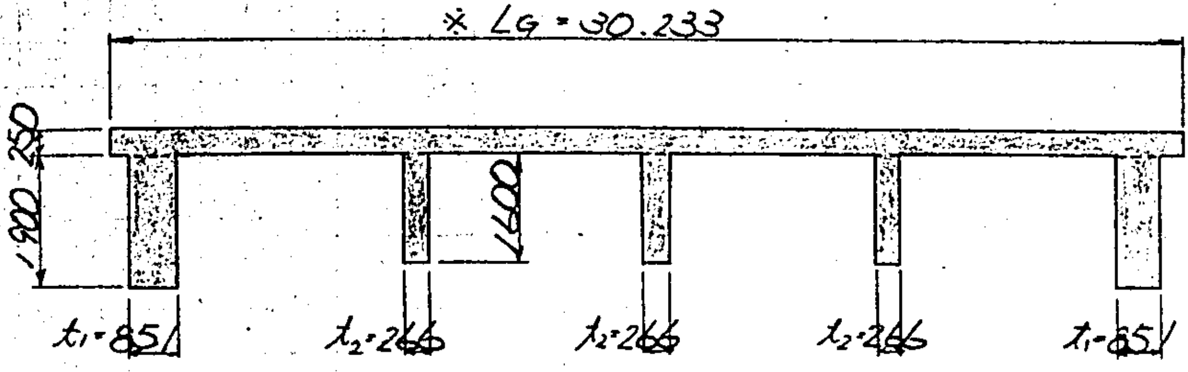
4, REINFORCING BAR (SD30)

	W (Kg)
D19	2 240.2
D13	7 166.6
D10	74.2
TOTAL	9 481.0

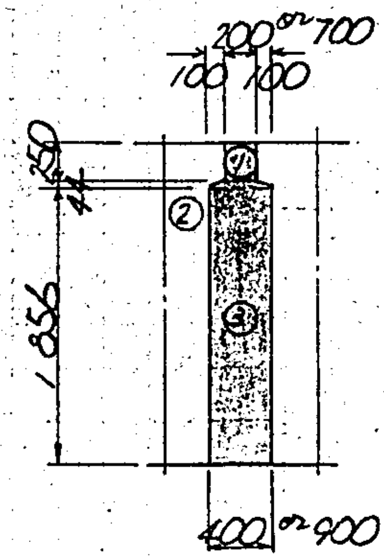
§ 2 LATERAL JOINT

I, CONCRETE VOLUME

I) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



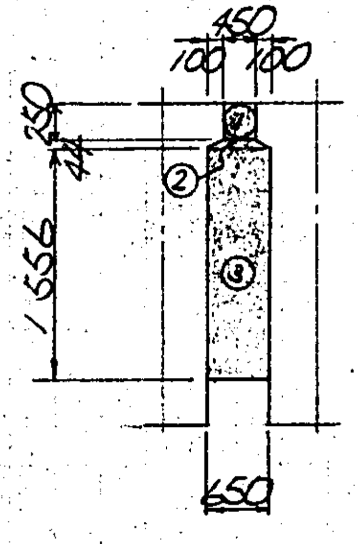
① = A_F = 0.450 × 0.250 = 0.1125 m²

② ½ × (0.450 + 0.650) × 0.044 = 0.0242 m²

③ 1.856 × 0.650 = 1.2064

② + ③ = A_{D1} = 1.2306 m²

b) CENTRAL CROSS BEAM



② ½ × (0.450 + 0.650) × 0.044 = 0.0242 m²

③ 1.556 × 0.650 = 1.0114 "

② + ③ = A_{D2} = 1.0356 m²

2) **QUANTITY CALCULATION FOR CONCRETE VOLUME**

$$V_F = A_F \times L_G \times N_F$$

$$= 0.1125 \times 30.233 \times 3 = 10.204\ m^3$$

$$V_D = \{A_{D1} \times t_1 \times 2 + A_{D2} \times t_2 \times 3\} \times N_F$$

$$= \{1.2306 \times 0.851 \times 2 + 1.0356 \times 0.266 \times 3\} \times 3$$

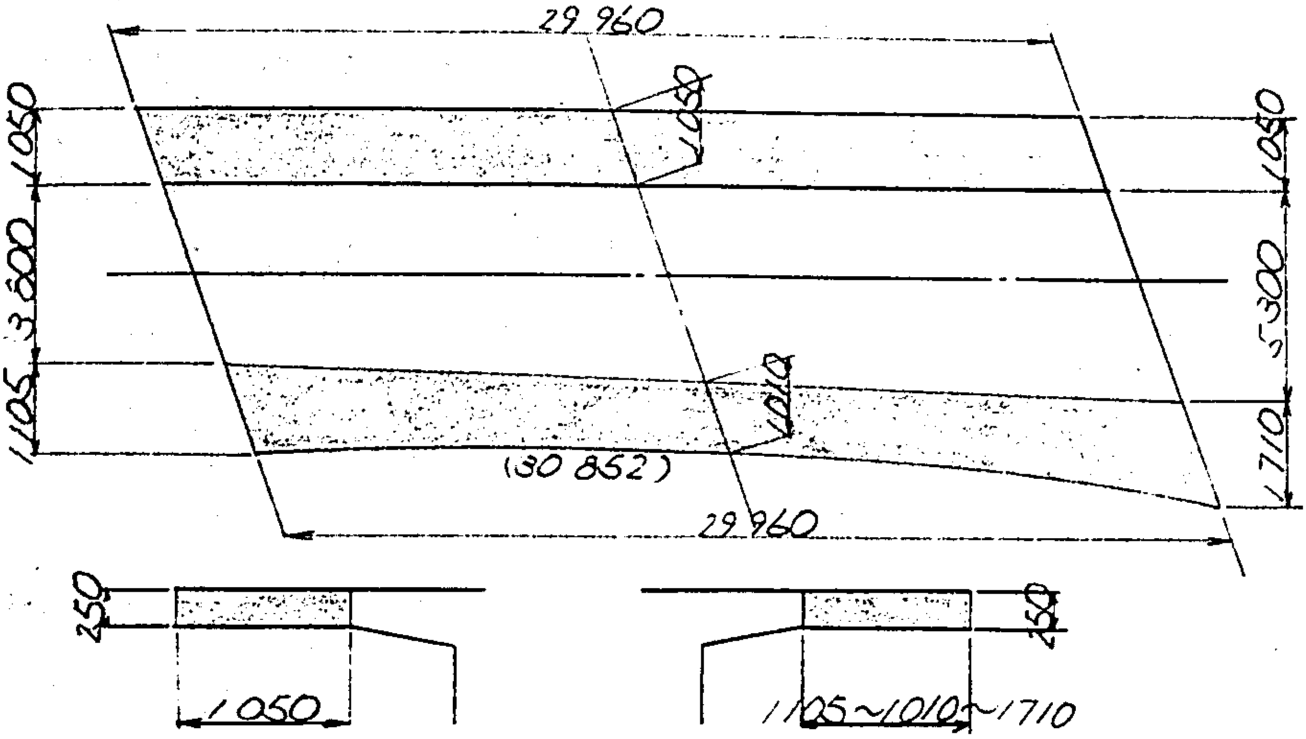
$$= 8.763\ m^3$$

$$\Sigma V = V_F + V_D$$

$$= 10.204 + 8.763$$

$$= 18.967\ m^3$$

3) SIDEWALK CONCRETE



① 1.050×0.250 $= 0.2625$ m^2

② $\frac{1}{4} \times (1.105 + 1.010 \times 2 + 1.710) \times 0.250$ $= 0.3022$ "

$A_s = 0.5647$ m^2

$V_s = A_s \times L_G$

$= 0.5647 \times 29.960$

$= 16.918$ m^3

2. FOR CONCRETE FORM AREA

1) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{ 0.1125 \times 1.064178 \times 2 + 0.450 \times (29.960 - 0.851 \times 2$$
$$- 0.266 \times 3 \} \times 3 \qquad = 37.789^{m^2}$$

$$A_2 = \{ 1.2306 \times 1.064178 \times 2 \times 2 + 0.650 \times 0.851 \times 2$$
$$+ 1.0356 \times 1.064178 \times 2 \times 3 + 0.650 \times 0.266 \times 3 \} \times 3$$
$$= 40.427^{m^2}$$

$$\Sigma A = A_1 + A_2$$
$$= 37.789 + 40.427$$
$$= 78.216^{m^2}$$

2) SIDEWALK

$$A_1 = (1.050 + 0.250) \times 29.960$$
$$+ (\overset{*}{1.209} + 0.250) \times 29.960 \qquad = 82.660^{m^2}$$

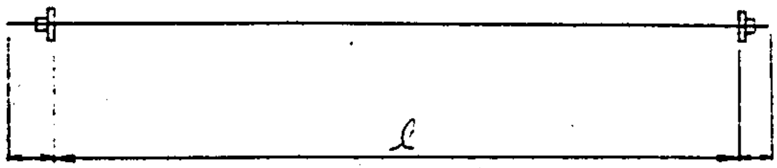
$$A_2 = 0.5647^{m^2} \times 1.064178 \times 2 \qquad = 1.202^{m^2}$$

$$\Sigma A = A_1 + A_2$$
$$= 82.660 + 1.202$$
$$= 83.862^{m^2}$$

3. POST - TENSIONING BARS

I) P.C. BAR

ϕ 23 mm (SPECIAL GRADE)



$$l_1 + l_2 = 0.104 + 0.074 = 0.178^m$$

$$l_p = l + l_1 + l_2$$

	l (m)	l_1+l_2 (m)	l_p (m)	N_p	$L_p = N_p \cdot l_p$
SLAB	※ 4.762	0.178	4.940	31	153.140
CROSS BEAM	※ 4.449	0.178	4.627	11	50.897
TOTAL	$\Sigma L_p = 204.037^m$				

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 204.037 = 665.16^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$$L_S = \Sigma L_P - (l_1 + l_2) \times N_P$$

$$= 204.037 - 0.178 \times 42$$

$$= 196.561^{m}$$

3) GROUT

$\phi 35^{mm}$

$$L_G = L_S = 196.561$$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$$N_C = N_P \times 2$$

$$= 42 \times 2$$

$$= 84$$

4. REINFORCING BAR (SD30)

	W (kg)
D16	1 122.1
D13	1 775.6
D10	437.7
TOTAL	3335.4

5. ELASTOMERIC BEARING PADS

1) FIXED SUPPORT

FOR $R = 190$ ton

$N = 4$, 450×550 14
(3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 190$ ton

$N = 4$, $450 \times 550 \times 14$
(3 PLIES)

6. ANCHORIMG BAR (SS 4I)

1) FIXED SIDE

FOR $\phi\ 80$ mm , $N = 3$

$l = 1030$ mm, $W = 122.06$ kg

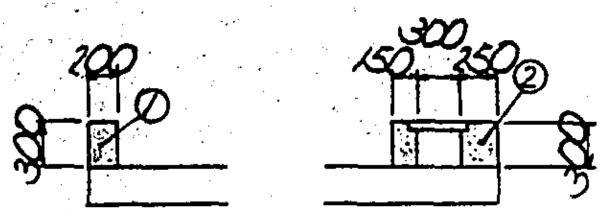
2) MOVABLE SIDE

FOR $\phi\ 75$ mm $N = 3$

$l = 970$ mm, $W = 100.98$ kg

§ 3 BRIDGE FACE WORK

1. BRIDGE RAILING AND DUCT



① $0.300 \times 0.200 = 0.0600 \; m^2$

② 0.700×0.300

$- 0.300 \times 0.250 = 0.1350 \; m^2$

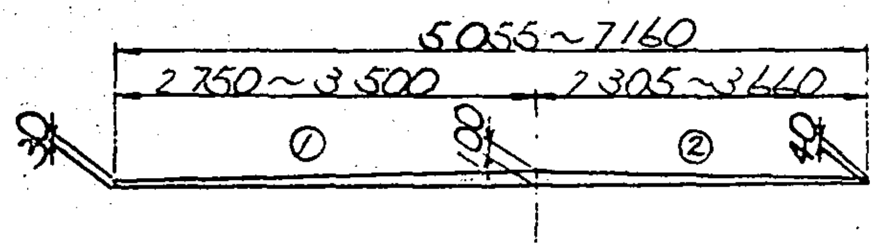
$$V = 0.0600 \times 29.960 + 0.1350 \times 30.852 = 5.963 \; m^3$$

$$A = 0.300 \times 29.960 \times 2 + 0.0600 \times 1.064178 \times 2$$

$$+ 0.300 \times 30.852 \times 4 + 0.1350 \times 1.064178 \times 2$$

$$= 55.413 \; m^2$$

2. MORTAR WITH SLOPE-PROTECTIVE MORTAR



① $\frac{1}{2} \times (0.030 + 0.100) \times 3.125 \qquad = 0.2031 \; m^2$

② $\frac{1}{2} \times (0.100 + 0.040) \times 2.983 \qquad = 0.2088 \; ''$

$$A_W = 0.4119 \; m^2$$

$$V = A_W \times L_G$$

$$= 0.4119 \times 29.960$$

$$= 12.341 \; m^3$$

$L = 26^{M}$, $H = 2.35^{M}$ Skew Right 70°00′00′

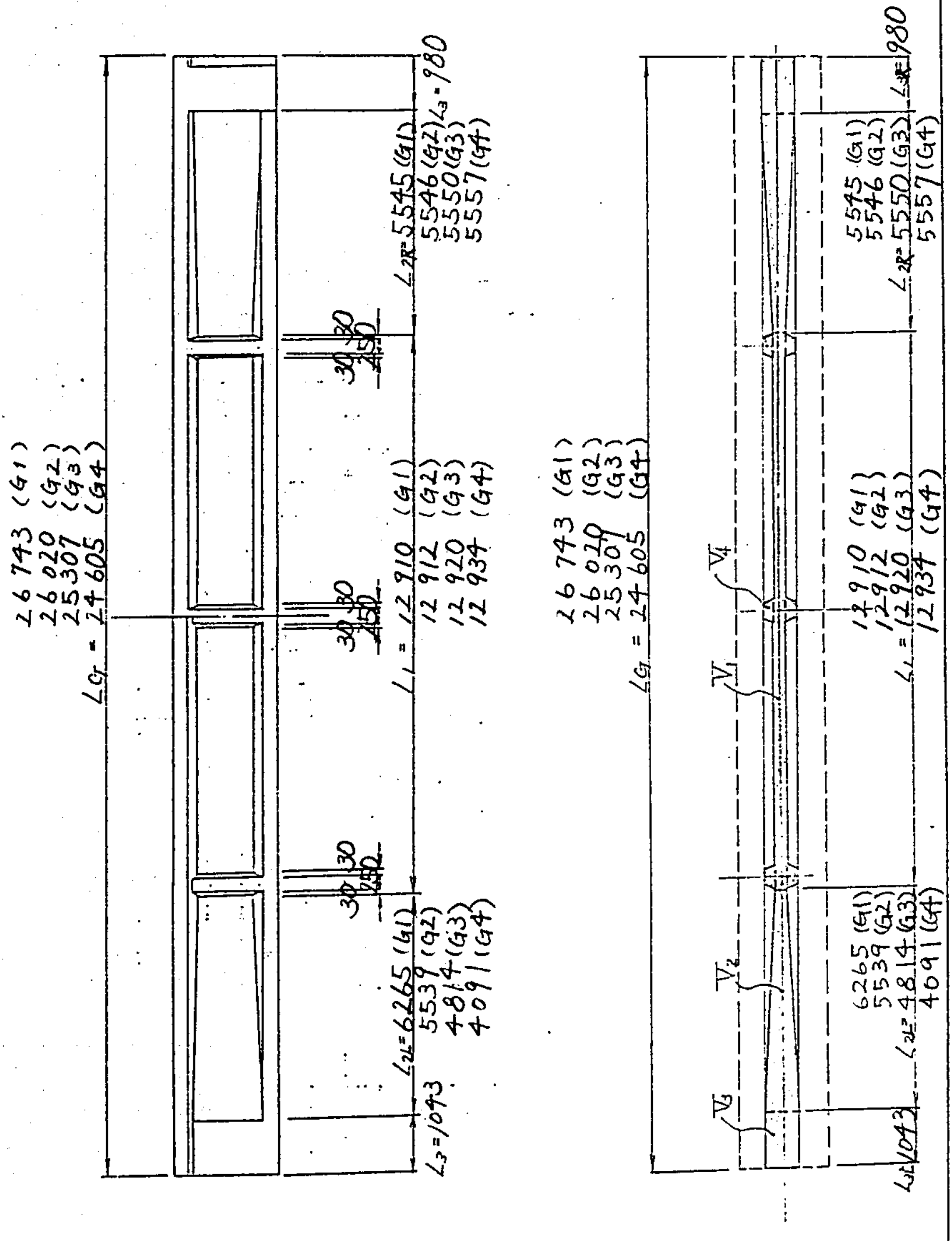
SUPERSTRUCTURE MATERIAL SCHEDULE

B14 – PC42

ITEM		TYPE	UNIT	QUANTITY
MAIN BEAM	CONCRETE	CLASS A ($f_c' = 400\ kg/cm^2$)	m^3	126.5
	P.C. WIRE	12 T 12.7 ($f_s' = 190\ kg/mm^2$)	kg	4991.6
	SHEATH	ϕ65 and ϕ70	m	466.2 ~~40.0~~
	FORMS		m^2	686.3
	ANCHORING DEVICE	FOR 12T 12.7	EACH	40
	REINFORCING BAR	19	kg	——
		16	〃	1332.1
		13	〃	7653.7
		10	〃	100.5
		TOTAL	〃	9086.3
LATERAL JOINT	CONCRETE	CLASS B ($f_c' = 300\ kg/cm^2$)	m^3	36.0
	P.C. BAR	ϕ23 ($f_s' = 110\ kg/mm^2$)	kg	1816.8
	SHEATH	ϕ35	m	545.7
	FORMS		m^2	153.3
	ANCHOR PLATE, NUT	FOR ϕ23	EACH	130
	REINFORCING BAR	16	kg	395.9
		13	〃	3515.3
		10	〃	345.7
		TOTAL	〃	4256.9
SIDEWALK CONCRETE		CLASS C ($f_c' = 240\ kg/cm^2$)	m^3	6.2
BRIDGE RAILING AND DUCT		CONCRETE	m^3	6.9
		FORMS	m^2	61.9
MORTAR WITH SLOPE-PROTECTIVE MORTAR		-	m^3	14.3
DRAINAGE			EACH	8
ELASTOMERIC BEARING PADS		FIX. FOR R = 190 ton	〃	4
		MOV. FOR R = 190 ton	〃	4

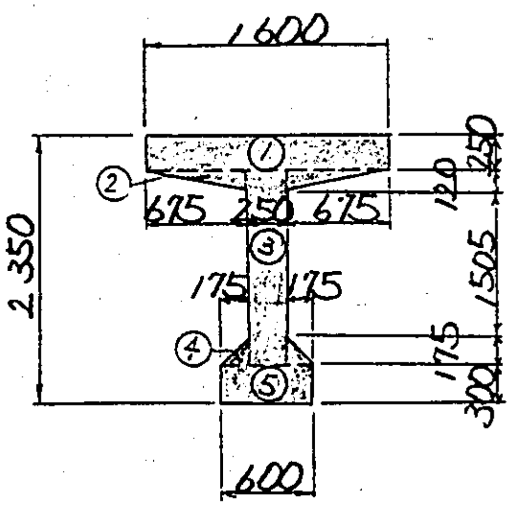
§ I MAIN BEAM

I. CONCRETE VOLUME



I) SECTION AREA

a) AT SPAN CENTER



① $1.600 \times 0.250 = 0.4000 \; m^2$

② $1/2 \times 0.675 \times 0.120 \times 2 = 0.0810$

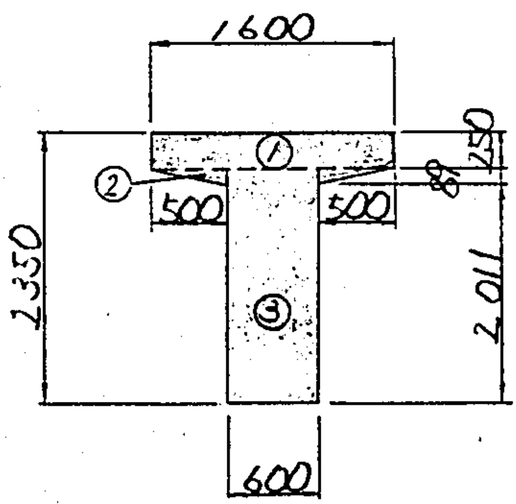
③ $0.250 \times 1.800 = 0.4500$

④ $1/2 \times 0.175 \times 0.175 \times 2 = 0.0306$

⑤ $0.600 \times 0.300 = 0.1800$

$A_1 = 1.1416 \; m^2$

b) AT SUPPORT POINT



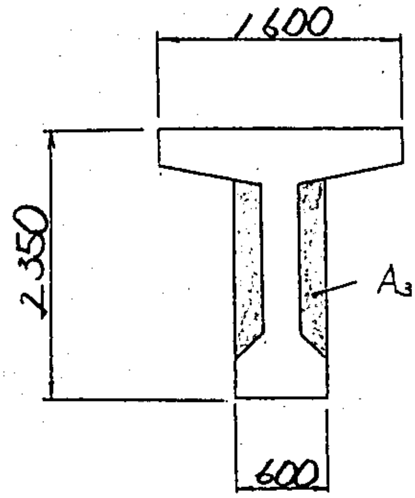
① $1.600 \times 0.250 = 0.4000 \; m^2$

② $1/2 \times 0.500 \times 0.089 \times 2 = 0.0445$

③ $0.600 \times 2.100 = 1.2600$

$A_2 = 1.7045 \; m^2$

c) CENTRAL DIAPHRAGM



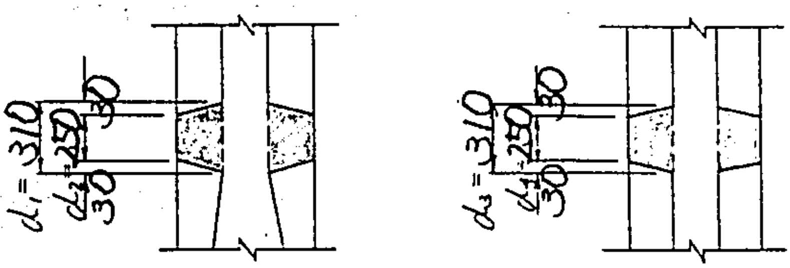
$$A_3 = A_2 - A_1$$
$$= 1.7045 - 1.1416$$
$$= 0.5629\ m^2$$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$V_1 = A_1 \times L_1$$
$$= 1.1416 \times \begin{matrix} 12.910 \\ 12.912 \\ 12.920 \\ 12.934 \end{matrix} = \begin{matrix} 14.738 \\ 14.740 \\ 14.749 \\ 14.765 \end{matrix}\ m^3 \quad \Sigma V_1 = 58.992\ m^3$$

$$V_2 = \tfrac{1}{2} \times (A_1 + A_2) \times (L_{2L} + L_{2R})$$
$$= \tfrac{1}{2} \times (1.1416 + 1.7045) \times \begin{pmatrix} 6.265 + 5.545 \\ 5.539 + 5.546 \\ 4.814 + 5.550 \\ 4.091 + 5.557 \end{pmatrix} = \begin{matrix} 16.806\ m^3 \\ 15.775 \\ 14.748 \\ 13.730 \end{matrix}$$
$$\Sigma V_2 = 61.059\ m^3$$

$$V_3 = A_2 \times (L_{3L} + L_{3R})$$
$$= 0.5629 \times (1.043 + 0.980) = 1.139\ m^3$$



$$\nabla_4 = A_3 \times \left\{ \left(\frac{d_1 + d_2}{2}\right) \times 2 + \left(\frac{d_3 + d_4}{2}\right) \right\}$$

$$= 0.5629 \times \left[\left(\frac{0.31 + 0.25}{2}\right) \times 2 + \left(\frac{0.31 + 0.25}{2}\right) \right]$$

$$= 0.473 \ m^3$$

$$\Sigma \nabla = \Sigma \nabla_1 + \Sigma \nabla_2 + (\nabla_3 + \nabla_4) \times N_G$$

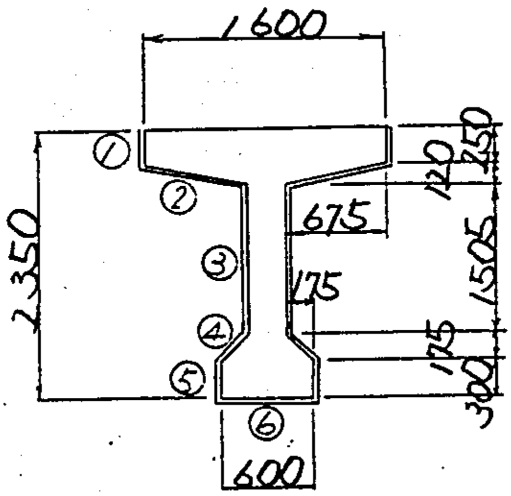
$$= 58.992 + 61.059 + (1.139 + 0.473) \times 4$$

$$= 126.499 \ m^3$$

2, FOR CONCRETE FORM AREA

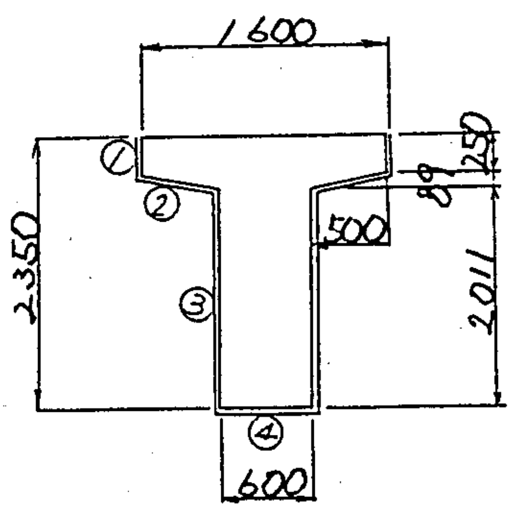
I) SECTION AREA AND LENGTH

a) AT SPAN CENTER



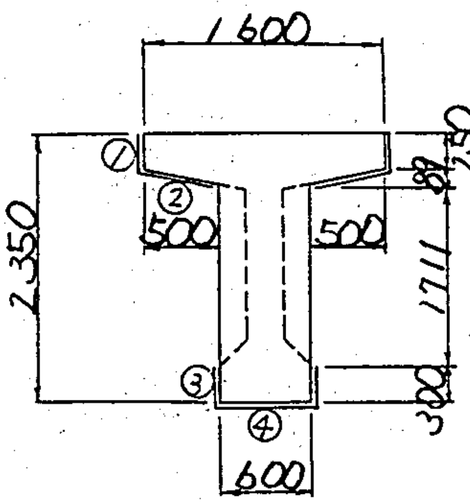
①	0.250×2	$= 0.500^m$
②	$\sqrt{0.675^2+0.120^2} \times 2$	$= 1.371$
③	1.505×2	$= 3.010$
④	$\sqrt{0.175^2+0.175^2} \times 2$	$= 0.495$
⑤	0.300×2	$= 0.600$
⑥		$= 0.600$
	L_1	$= 6.576^m$

b) AT SUPPORT POINT



①	0.250×2	$= 0.500^m$
②	$\sqrt{0.500^2+0.089^2} \times 2$	$= 1.016$
③	2.011×2	$= 4.022$
④		$= 0.600$
	L_2	$= 6.138^m$

c) CENTRAL DIAPHRAGM



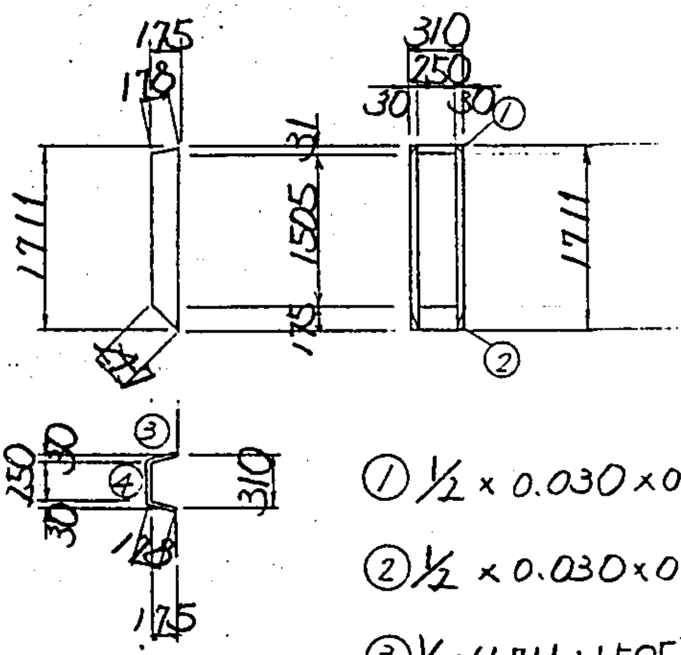
① $0.250 \times 2 = 0.500^{m}$

② $\sqrt{0.500^2 + 0.089^2} \times 2 = 1.016$

③ $0.300 \times 2 = 0.600$

④ $= 0.600$

$L_3 = 2.716^{m}$



① $\frac{1}{2} \times 0.030 \times 0.178 \times 2 = 0.0053 m^2$

② $\frac{1}{2} \times 0.030 \times 0.247 \times 2 = 0.0074$

③ $\frac{1}{2} \times (1.711 + 1.505) \times 0.178 \times 2 = 0.5724$

④ $0.250 \times 1.711 = 0.4278$

$a_1 = 1.0129 m^2$

2) QUANTITY CALCULATION
FOR CONCRETE FORM AREA

$$A_1 = L_1 \times \begin{matrix} 5.990 \\ 5.991 \\ 5.995 \\ 6.002 \end{matrix} \times 2$$

$$= 6.576 \times \ '' \ \times 2 = \begin{matrix} 78.780 \\ 78.794 \\ 78.846 \\ 78.938 \end{matrix} \ m^2$$

$$\Sigma A_1 = 315.358 \ m^2$$

$$A_2 = (L_1 + L_2) \times \tfrac{1}{2} \times (l_{2L} + l_{2R})$$

$$= (6.576 + 6.138) \times \tfrac{1}{2} \times \begin{pmatrix} 6.265 + 5.545 \\ 5.539 + 5.546 \\ 4.814 + 5.550 \\ 4.091 + 5.557 \end{pmatrix} = \begin{matrix} 75.076 \\ 70.467 \\ 65.884 \\ 61.332 \end{matrix} \ m^2$$

$$\Sigma A_2 = 272.759 \ m^2$$

** FOR CONCRETE VOLUME --- A2. **

$$A_3 = A_2 \times (\mathrm{COSEC}\,\theta_L + \mathrm{COSEC}\,\theta_R) + L_2 \times (1.043 + 0.980)$$

$$= 1.7045 \times (1.064 + 1.000) + 6.138 \times 2.023$$

$$= 15.935 \ m^2$$

$$\mathrm{COSEC}_L \ 70°00'00'' = 1.064$$
$$\mathrm{COSEC}_R \ 90°00'00'' = 1.000$$

$$A_4 = L_3 \times 0.310 \times 3$$

$$= 2.716 \times 0.310 \times 3 = 2.526 \ m^2$$

$$A_5 = a_1 \times 2 \times 3$$

$$= 1.0129 \times 2 \times 3 = 6.077 \ m^2$$

$$\Sigma A = \Sigma A_1 + \Sigma A_2 + (A_3 + A_4 + A_5) \times N_G$$

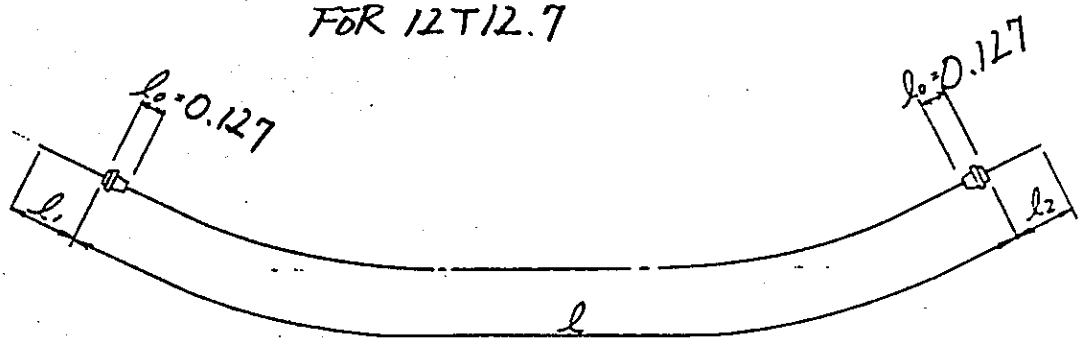
$$= 315.358 + 272.759 + (15.935 + 2.526 + 6.077) \times 4$$

$$= 686.269 \ m^2$$

3. PRESTRESSING STEEL

I) MAIN CABLE

FOR 12T12.7



$$l_1 + l_2 = 1.300^{m} \qquad l_1 = l_2$$

$$l_p = l + l_1 + l_2$$

No	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_G	$L_p = N_G \times l_p$
C_1	25.758	1.300	27.058	4	108.232
C_2	25.630	1.300	26.930	4	107.720
C_3	25.550	1.300	26.850	4	107.400
C_4	25.472	1.300	26.772	4	107.088
C_5	25.416	1.300	26.716	4	106.864
TOTAL	$\Sigma L_p = 537.304^{m}$				

$$\Sigma W_p = \gamma_p \times \Sigma L_p$$

$$= 9.29^{kg/m} \times 537.304$$

$$= 4991.55^{kg}$$

2) SHETH

$\phi\ 70^{mm}$

$L_{s_1} = 2.000 \times 5 \times 2 = 40.000^{m}$

$\phi\ 65^{mm}$

$L_{s_2} = \Sigma L_p - (2.000 + 1.554) \times 5 \times 4 = 466.224^{m}$

3) GROUT

$\phi\ 65^{mm}$

$L_G = \Sigma L_p - (l_1 + l_2) \times N_P \times N_G$

$= 537.304 - 1.300 \times 5 \times 4 = 511.304^{m}$

4) ANCHORING DEVICE

FOR 12T 12.7 mm

$N_c = N_P \times N_G \times 2$

$= 5 \times 4 \times 2$

$= 40$

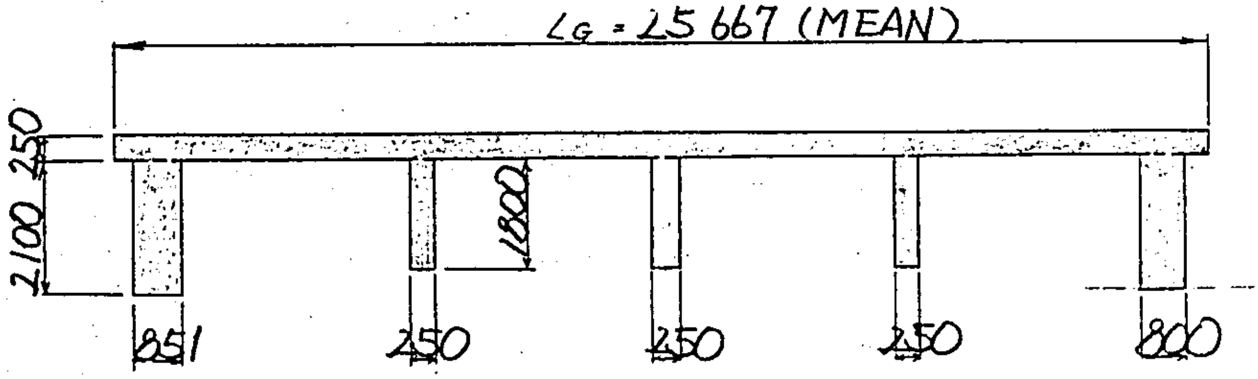
4.- REINFORCING BAR (SD 30)

	W (Kg)
D 16	1332.1
D 13	7653.7
D 10	100.5
TOTAL	9086.3

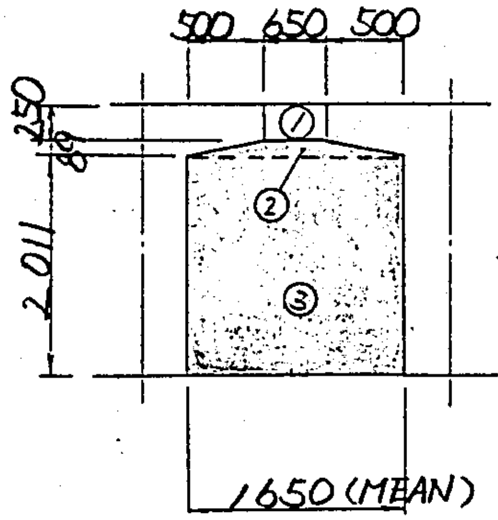
§2 LATERAL JOINT

I. CONCRETE VOLUME

I) SLAB AND CROSS BEAM



a) END OF CROSS BEAM



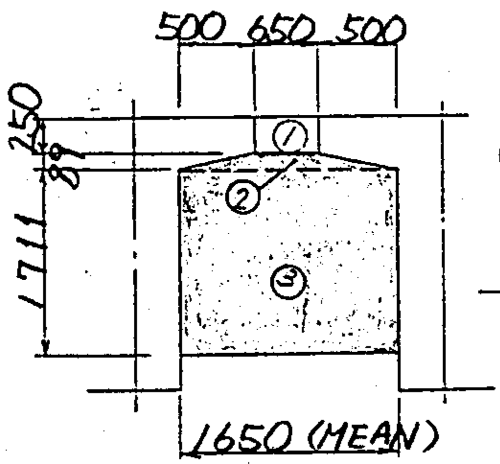
① $= A_F = 0.650 \times 0.250 = 0.1625\ m^2$

② $\frac{1}{2} \times (0.650 + 1.650) \times 0.089 = 0.1024$

③ $1.650 \times 2.011 = 3.3182$

② + ③ $= A_{D_1} = 3.4206\ m^2$

b) CENTRAL CROSS BEAM



② $\frac{1}{2} \times (0.650 + 1.650) \times 0.089 = 0.1024\ m^2$

③ $1.650 \times 1.711 = 2.8232$

② + ③ $= A_{D_2} = 2.9256\ m^2$

2) QUANTITY CALCULATION FOR CONCRETE VOLUME

$$\overline{V}_F = A_F \times L_G \times N_F$$

$$= 0.1625 \times 25.667 \times 3 = 12.513\ m^3$$

$$\overline{V}_D = (A_{D1} \times (t_{1L} + t_{1R}) + A_{D2} \times t_2 \times 3) \times N_F$$

$$= \{3.4206 \times (0.851 + 0.800) + 2.9256 \times 0.25 \times 3\} \times 3$$

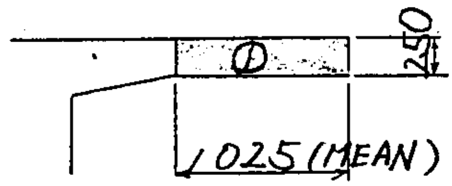
$$= 23.525\ m^3$$

$$\Sigma \overline{V} = \overline{V}_F + \overline{V}_D$$

$$= 12.513 + 23.525$$

$$= 36.038\ m^3$$

3) SIDEWALK CONCRETE



① $1.025 \times 0.250 \quad = 0.2563^{m^2}$

$A_s = 0.2563^{m^2}$

$V_s = A_s \times L_G$

$= 0.2563 \times 24.100$

$= 6.177^{m^3}$

2. FOR CONCRETE FORM AREA

I) SLAB AND CROSS BEAM

** FOR CONCRETE VOLUME **

$$A_1 = \{0.1625 \times (1.064 + 1.000) + 0.650 \times (25.667 - 0.851 - 0.800 - 0.250 \times 3)\} \times 3$$
$$= 46.375\ m^2$$

$$A_2 = \{3.4206 \times (1.064 + 1.000) \times 2 + 1.650 \times (0.851 + 0.800) + (2.9256 \times 1.000 \times 2 + 1.650 \times 0.250) \times 3\} \times 3$$
$$= (14.120 + 2.724 + 18.791) \times 3$$
$$= 106.905\ m^2$$

$$\Sigma A = A_1 + A_2$$
$$= 46.375 + 106.905 = 153.280\ m^2$$

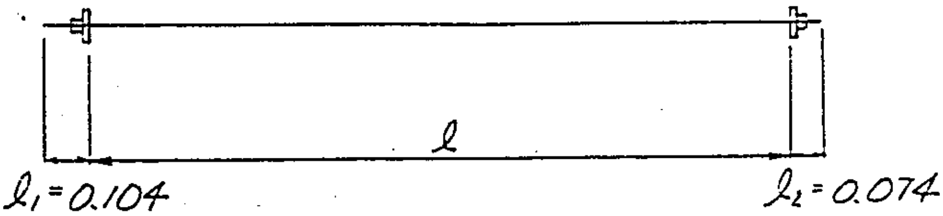
2) SIDEWALK

$$A = (1.025 + 0.250) \times 24.100 + 0.2563 \times (1.064 + 1.000)$$
$$= 31.257\ m^2$$

3. POST - TENSIONING BARS

I) P.C. BAR

ϕ 23 mm (SPECIAL GRADE)



$$l_1 + l_2 = 0.104 + 0.074 = 0.178^{m}$$

$$l_p = l + l_1 + l_2$$

	l (m)	$l_1 + l_2$ (m)	l_p (m)	N_p	$L_p = N_p \cdot l_p$
SLAB A	8.539	0.178	8.717	49	427.133
SLAB B	7.668	0.178	7.846	5	39.230
CROSS BEAM C	8.432	0.178	8.610	7	60.270
CROSS BEAM D	7.491	0.178	7.669	4	30.676
TOTAL	$\Sigma L_p = 557.309^{m}$				

$$\Sigma W_p = \gamma_p \times \Sigma L_p = 3.26^{kg/m} \times 557.309$$
$$= 1816.83^{kg}$$

2) SHEATH

$\phi 35^{mm}$

$$L_S = \Sigma L_P - (l_1 + l_2) \times N_P$$
$$= 557.309 - 0.178 \times 65$$
$$= 545.739^m$$

3) GROUT

$\phi 35^{mm}$

$$L_G = L_S = 545.739^m$$

4) ANCHOR PLATE AND NUT

FOR $\phi 23^{mm}$

$$N_C = N_P \times 2$$
$$= 65 \times 2$$
$$= 130$$

5. REINFORCING BAR (SD 30)

	W (kg)
D 16	395.9
D 13	3515.3
D 10	345.7
TOTAL	4256.9

5. ELASTOMERIC BEARING PADS

1) FIXED SUPPORT

FOR $R \fallingdotseq 190^{ton}$

$N = 4$, $450 \times 550 \times 14$
(3 PLIES)

2) MOVABLE SUPPORT

FOR $R = 190^{ton}$

$N = 4$, $450 \times 550 \times 14$
(3 PLIES)

6. ANCHORIMG BAR (SS 41)

1) FIXED SIDE

FOR $\phi\ 80^{mm}$, $N = 3$

$l = 1{,}030^{mm}$, $W = 122.^{06}\ ^{kg}$

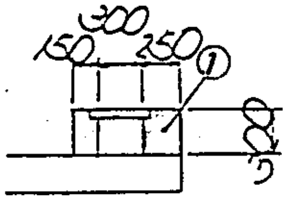
2) MOVABLE SIDE

FOR $\phi\ 75^{mm}$ $N = 3$

$l = 970^{mm}$, $W = 100.^{98}\ ^{kg}$

§ 3 BRIDGE FACE WORK

1. BRIDGE RAILING AND DUCT



① 0.700×0.300

LEFT = RIGHT

$-0.300 \times 0.250 = 0.1350^{m^2}$

$\Sigma A = 0.2700^{m^2}$

$L = \frac{1}{2} \times (27.034 + 24.100) = 25.567^{m}$

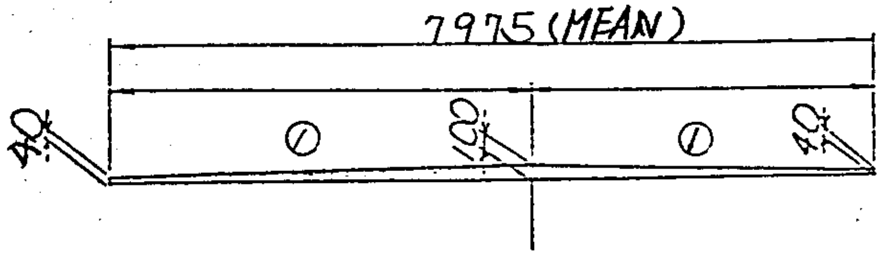
$\Sigma V = 0.2700^{m^2} \times 25.567 = 6.903^{m^3}$

case

$\Sigma A = 0.300 \times 8 \times 25.567 + 0.2700 \times (1.064 + 1.000)$

$= 61.918^{m^2}$

2. MORTAR WITH SLOPE-PROTECTIVE MORTAR



① $\frac{1}{2} \times (0.040 + 0.100) \times 7.975 = 0.5583^{m^2}$

$A_w = 0.5583^{m^2}$

$V = A_w \times L_G$

$= 0.5583 \times 25.567$

$= 14.274^{m^3}$

§ 21. R.C. GIRDER

R.C. GIRDER

REMARKS / UNIT / NO.	CONCRETE VOLUME	FORM AREA	REINFORCING BAR	ANCHOR BAR	WEIGTH	BEARING PAD		DECK PAD	
	CLASS C		SD 30						
NO.	m^3	m^2	kg	$\phi^{mm} \times L^{mm} \times N$	kg	A × B × t (mm)	NUM-BER	A × B × t (mm)	NUM-BER
RC 01	31.8	108.4	5197.3	46 × 700 × 4	36.4	200 × 500 × 12	4	200 × 200 × 17	4
02	31.8	108.4	5197.3	"	"	"	4	"	4
03	28.7	98.1	4717.1	"	"	"	4	"	4
04	28.7	98.1	4717.1	"	"	"	4	"	4
05	31.8	108.4	5197.3	"	"	"	4	"	4
06	31.8	108.4	5197.3	"	"	"	4	"	4
07	28.7	98.1	4717.1	"	"	"	4	"	4
08	28.7	98.1	4717.1	"	"	"	4	"	4
09	25.8	88.2	4266.9	"	"	"	4	"	4
10	28.7	98.1	4717.1	"	"	"	4	"	4
11	31.8	108.4	5197.3	"	"	"	4	"	4
12	31.8	108.4	5197.3	"	"	"	4	"	4
13	31.8	108.4	5197.3	"	"	"	4	"	4
14	31.8	108.4	5197.3	"	"	"	4	"	4
15	22.7	77.2	3809.1	"	"	"	4	"	4
16	73.9	203.2	10972.6	60 × 850 × 6	113.2	300 × 600 × 12	6	"	6
17	61.3	178.6	8382.2	60 × 850 × 4	75.5	"	4	"	4
18	61.3	178.6	8382.2	"	75.5	"	4	"	4
19	61.3	178.6	8382.2	"	75.5	"	4	"	4
20	61.3	178.6	8382.2	"	75.5	"	4	"	4
21	61.3	178.6	8382.2	"	75.5	"	4	"	4
22	61.3	178.6	8382.2	"	75.5	"	4	"	4
23	61.3	178.6	8382.2	"	75.5	"	4	"	4
24	74.3	204.3	11067.7	60 × 850 × 6	113.2	"	6	"	6

R.C. GIRDER

REMARKS / UNIT / NO.	CONCRETE VOLUME	FORM AREA	REINFORCING BAR	ANCHOR BAR	WEIGTH	BEARING PAD		DECK PAD	
	CLASS C		SD 30	SS 41					
	m^3	m^2	kg	$\phi^{mm} \times L^{mm} \times N$	kg	A x B x t (mm)	NUM-BER	A x B x t (mm)	NUM-BER
25	96.2	267.0	13 399.7	60 × 850 × 6	113.2	300 × 600 × 12	6	200 × 200 × 14	6
26	77.8	217.1	11 304.5	"	113.2	"	6	"	6
27	31.8	108.4	5 197.3	46 × 700 × 4	36.4	200 × 500 × 12	4	"	4
28	31.8	108.4	5 197.3	"	"	"	4	"	4
29	31.8	108.4	5 197.3	"	"	"	4	"	4
30	31.8	108.4	5 197.3	"	"	"	4	"	4
31	28.7	98.1	4 717.1	"	"	"	4	"	4
32	28.7	98.1	4 717.1	"	"	"	4	"	4
RCP 1	38.6	210.8	5 341.6	32 × 500 × 4 32 × 500 × 4	25.2	200 × 150 × 8	4 4	150 × 150 × 10	4 4
2	38.6	210.8	5 341.6	" "	25.2	200 × 150 × 8	4 4	150 × 150 × 10	4 4

R.C.GIRDER

NO.	CONCRETE VOLUME	FORM AREA	REINFORCING BAR	ANCHOR BAR	WEIGTH	BEARING PAD		DECK PAD	
REMARKS	CLASS C		SD 30	SS 41					
UNIT	m^3	m^2	kg	$\phi^{mm} \times L^{mm} \times N$	kg	A x B x t (mm)	NUM-BER	A x B x t (mm)	NUM-BER
				60 × 850 × 2	37.7				
RC 101	66.7	217.9	9 956.0	55 × 850 × 2	31.8	200 × 600 × 12	4	200 × 200 × 14	4
				〃	〃				
102	66.7	217.9	9 956.0	〃	〃	〃	〃	〃	〃
				〃	〃				
103	66.7	217.9	9 956.0	〃	〃	〃	〃	〃	〃
				〃	〃				
104	66.7	217.9	9 956.0	〃	〃	〃	〃	〃	〃
				〃	〃				
105	66.7	217.9	9 956.0	〃	〃	〃	〃	〃	〃
				〃	〃				
106	62.7	205.3	9 459.1	〃	〃	〃	〃	〃	〃
				〃	〃				
107	62.7	205.3	9 459.1	〃	〃	〃	〃	〃	〃
				〃	〃				
108	62.7	205.3	9 459.1	〃	〃	〃	〃	〃	〃
				〃	〃				
109	62.7	205.3	9 459.1	〃	〃	〃	〃	〃	〃
				〃	〃				
110	66.7	217.9	9 956.0	〃	〃	〃	〃	〃	〃
				〃	〃				
111	66.7	217.9	9 956.0	〃	〃	〃	〃	〃	〃
				〃	〃				
112	66.7	217.9	9 956.0	〃	〃	〃	〃	〃	〃

R.C.GIRDER

NO. (REMARKS / UNIT)	CONCRETE VOLUME	FORM AREA	REINFORCING BAR	ANCHOR BAR	WEIGTH	BEARING PAD		DECK PAD	
	CLASS C		SD 30						
	m^3	m^2	kg	$\phi^{mm} \times L^{mm} \times N$	kg	A × B × t (mm)	NUM-BER	A × B × t (mm)	NUM-BER
113	66.7	217.9	9956.0	60 × 850 × 2 55 × 850 × 2	37.7 31.8	200 × 600 × 12	4	200 × 200 × 14	4
114	62.7	205.3	9459.1	〃 〃	〃 〃	〃	〃	〃	〃
115	66.7	217.9	9956.0	〃 〃	〃 〃	〃	〃	〃	〃
116	58.9	192.6	8915.7	〃 〃	〃 〃	〃	〃	〃	〃
117	66.7	217.9	9956.0	〃 〃	〃 〃	〃	〃	〃	〃
118	62.7	205.3	9459.1	〃 〃	〃 〃	〃	〃	〃	〃
119	62.7	205.3	9459.1	〃 〃	〃 〃	〃	〃	〃	〃
120	66.7	217.9	9956.0	〃 〃	〃 〃	〃	〃	〃	〃
121	31.8	108.4	5197.3	46 × 700 × 4	36.4	200 × 500 × 12	4	200 × 200 × 14	4

R.C. GIRDER

REMARKS / UNIT / NO.	CONCRETE VOLUME	FORM AREA	REINFORCING BAR	ANCHORBAR	WEIGTH	BEARING PAD		DECK PAD	
	CLASS C		SD 30	SS 41					
	m^3	m^2	kg	$\phi^{mm} \times L^{mm} \times N$	kg	A × B × t (mm)	NUM-BER	A × B × t (mm)	NUM-BER
TOTAL									
RC 01~32	2 789.5	9 069.2	419 365.1	60 × 850 × 92	1 735.3	600 × 300 × 12	52	200 × 200 × 14	220
				55 × 850 × 40	636.0	600 × 200 × 12	80	200 × 150 × 14	16
RC101~121				46 × 700 × 88	800.8	500 × 200 × 12	88	150 × 150 × 14	16
				32 × 500 × 16	50.7				
RCP 1 ~ 2					3222.5 kg				

1. RC GIRDER

RC01

(L = 10"000)

R.C. GIRDER L= 10 000

RC 01

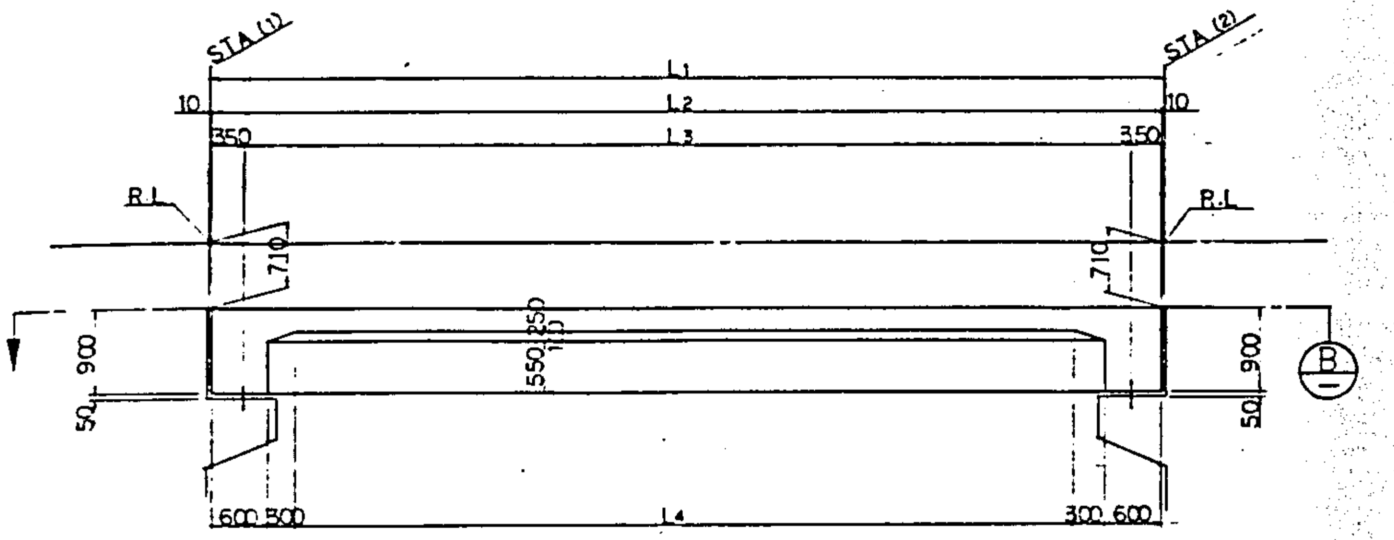
	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	15.6	47.9	1 228.3	78.7
BEAM	11.0	42.2	3 771.7	342.9
CURB	1.7	18.3	197.3	116.1
GRADING CONCRETE	3.5	—	—	—
TOTAL	31.8	108.4	5197.3	163.4

	UNIT	QUANTITY	REMARKS
ANCHOR BAR		4	Φ46 × 700 (STRAIGHT)
		4	Φ 55 × 850 (CURVE)
BEARING PAT		4	200 × 200 × 14
		4	500 × 200 × 14

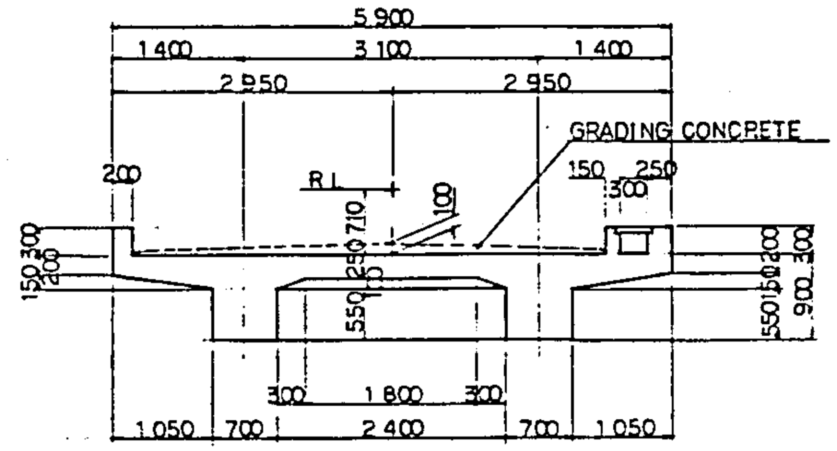
RC GIRDER L = 10 000

UNIT ; Kg

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—	—	—	—	—	—	1228.3	—	1228.3
BEAM	1965.2	—	496.2	—	—	311.6	998.7	—	3771.7
CURB	—	—	—	—	—	—	—	197.3	197.3
TOTAL	1965.2	—	496.2	—	—	311.6	2227.0	197.3	5197.3
SUPPORT BEARING							92.4	24.0	116.4



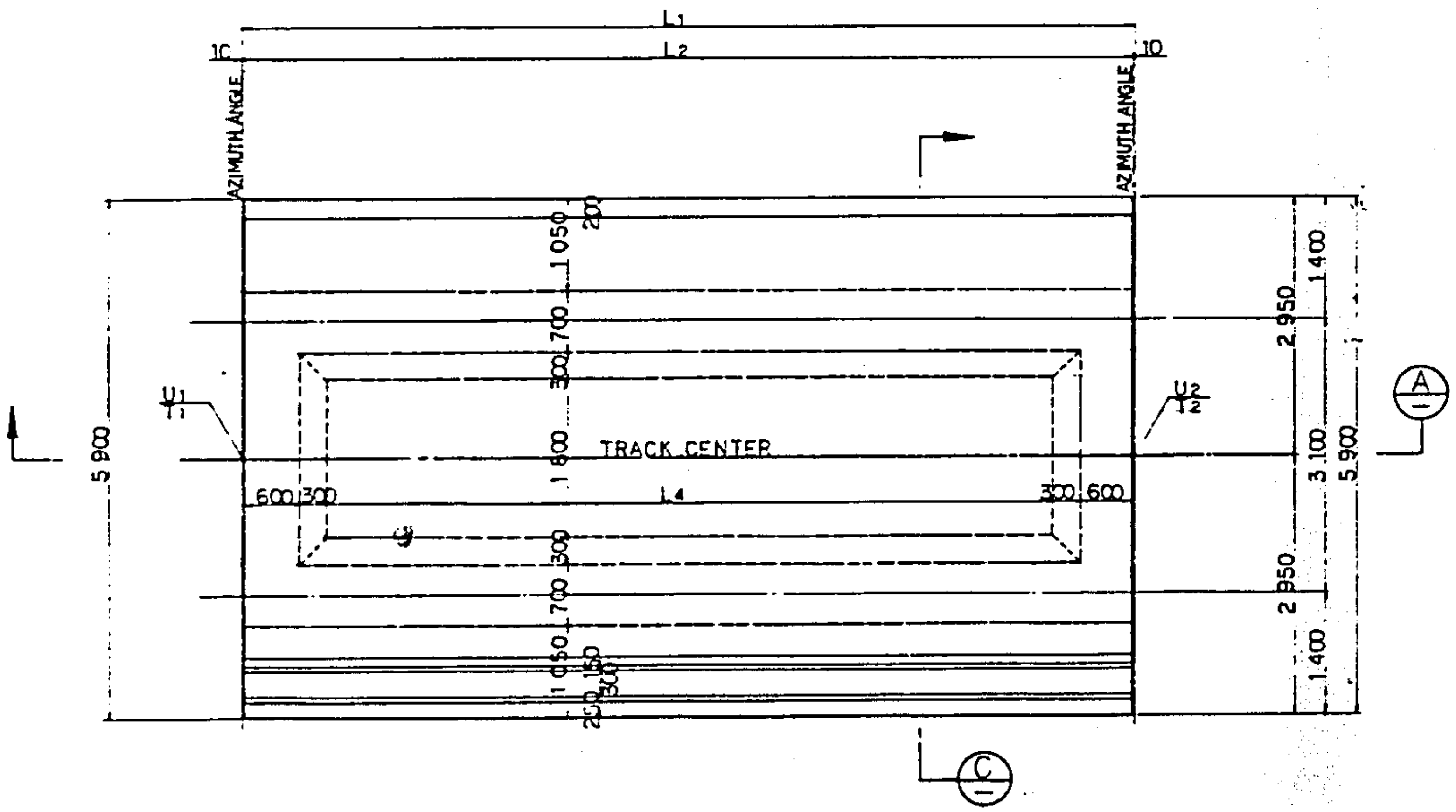
SECTION (A)



SECTION (C)

NOTES ;

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. REFERENCE DRAWING FOR BAR ARRANGEMENT : CS-187~189
3. GRADING CONCRETE SHALL BE SIMULTANEOUSLY PLACED WITH SLAB CONCRETE



SECTION (B)

DIMENSION SCHEDULE NO1

	RC001	RC002	RC003	RC004	RC008	RC009	RC010	RC011	RC012	RC013	RC015		RC027	RC028
STA (1)	13K399M000	13K645M000	13K680M000	13K765M000	14K202M000	14K416M000	14K766M000	14K843M000	15K569M000	15K639M000	17K041M000		17K625M000	17K749M000
STA (2)	13K409M000	13K655M000	13K689M000	13K774M000	14K211M000	14K424M000	14K775M000	14K853M000	15K579M000	15K649M000	17K048M000		17K635M000	17K759M000
R.L (1)														
R.L (2)														
AZIMUTH ANGLE (θ1)	350° 39′ 55″58	350° 39′ 55″58	350° 39′ 55″58	350° 39′ 55″58	2° 29′ 30″68	2° 29′ 30″68	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
DC (θ2)	〃	〃	〃	〃	〃	2° 43′ 34″56	344° 43′ 08″64	〃	〃	〃	〃		〃	〃
U 1	12K035M540	12K075M441	12K081M118	12K094M904	12K119M106	12K109M802	12K063M088	12K050M089	12K000M168	11K998M823	12K064M127		12K210M225	12K241M245
T 1	−2K768M578	−2K525M836	−2K491M299	−2K407M425	−1K972M658	−1K758M861	−1K412M375	−1K336M481	−613M716	−545M729	848M914		1K414M345	1K534M402
U 2	12K037M162	12K077M063	12K082M577	12K094M364	12K118M715	12K109M454	12K061M569	12K048M401	11K999M976	11K998M631	12K065M878		12K212M726	12K245M747
T 2	−2K755M711	−2K515M968	−2K482M419	−2K398M544	−1K963M667	−1K750M868	−1K403M505	−1K326M624	−603M718	−533M731	855M692		1K424M027	1K544M084
L 1	10000	10000	9000	9000	9000	8000	9000	10000	10000	10000	7000		10000	10000
L 2	9980	9980	8980	8980	8980	7980	8980	9980	9980	9980	6980		9980	9980
L 3	9280	9280	8280	8280	8280	7280	8280	9280	9280	9280	6280		9280	9280
L 4	8180	8180	7180	7180	7180	6180	7180	8180	8180	8180	5180		8180	8180
θ 1	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00		90° 00′ 00″00	90° 00′ 00″00
θ 2	〃	〃	〃	〃	〃	85° 46′ 04″58	115° 00′ 00″00	〃	〃	〃	〃		〃	〃

DIMENSION SCHEDULE NO2

	RC029	RC033	RC034	RC 121
STA (1)	17K784M000	19K117M000	19K232M000	19K428M254
STA (2)	17K794M000	19K126M000	19K242M000	19K438M254
R L (1)				
R L (2)				
AZIMUTH ANGLE (θ1)	345° 30′ 45″40	75° 05′ 10″71	75° 05′ 10″71	75° 05′ 10″71
DC (θ2)	〃	〃	〃	〃
U 1	12K250M001	11K647M999	11K536M872	11K346M008
T 1	1K565M289	2K606M935	2K636M532	2K681M467
U 2	12K252M503	11K639M302	11K527M209	11K336M345
T 2	1K577M971	2K609M251	2K639M105	2K684M041
L 1	10000	9000	10000	10000
L 2	9980	8980	9980	9980
L 3	9280	8280	9280	9280
L 4	8180	7180	8180	8180
θ 1	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00
θ 2	〃	〃	〃	〃

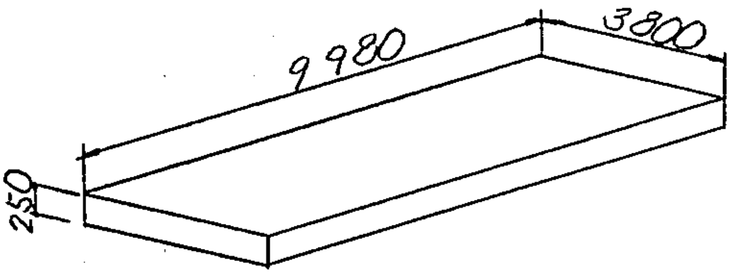
NOTES:

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. REFERENCE DRAWING FOR GENERAL VIEW : CS-185

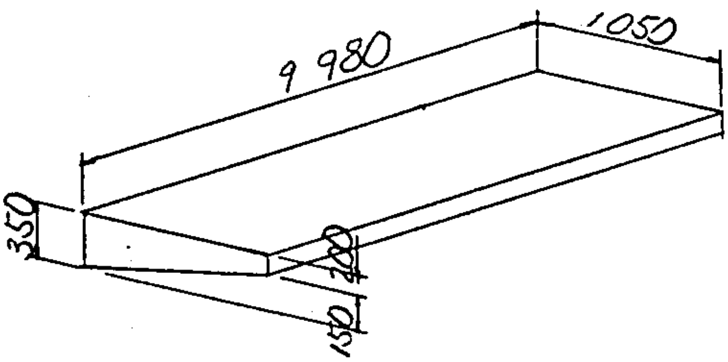
RC01 $L = 10^m.000$

CONCRETE. VOLUME

(1) SLAB.

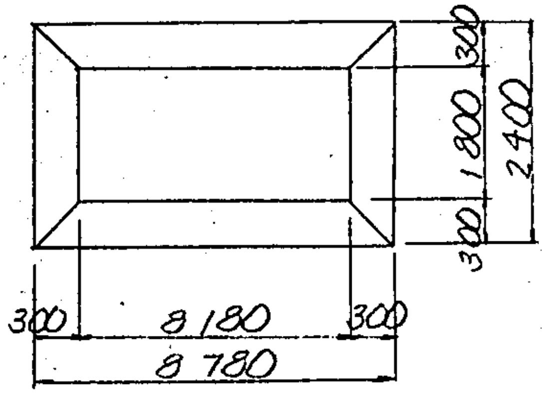


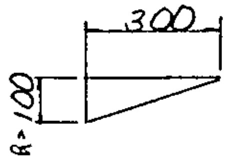
$$V_a = 3.800 \times 0.250 \times 9.980 = 9.481\ m^3$$



$$V_b' = \tfrac{1}{2} \times (0.350 + 0.200) \times 1.050 \times 9.980 = 2.882$$

$$V_b = 2.882 \times 2 = 5.764\ m^3$$



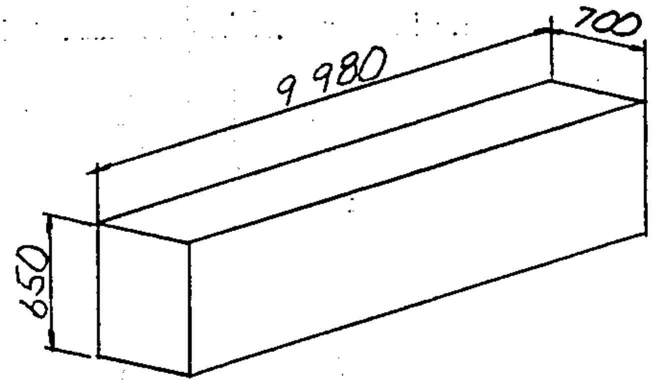


$$Va = \left[8.780 \times 2.400 - \left\{8.780 \times 2.400 + (8.780 + 8.180) \times (2.400 + 1.800) + 8.180 \times 1.800\right\} \times 1/6\right] \times 0.100 = 0.323 \, m^3$$

SLAB TOTAL	15.568 m^3

(2) BEAM

1) LONGITUDINAL BEAM

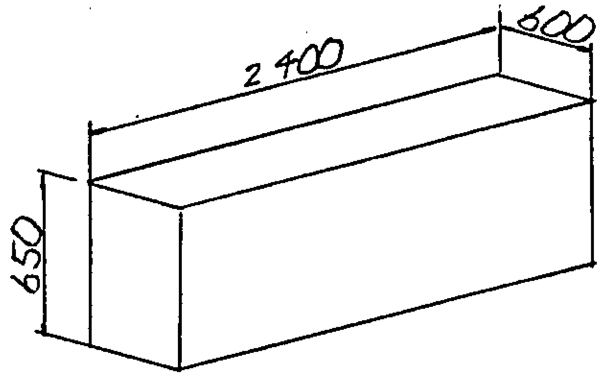


$Va = 0.700 \times 0.650 \times 9.980 \times 2$ = 9.082 m³

9.082

2) TRANSVERSE BEAM

AT END

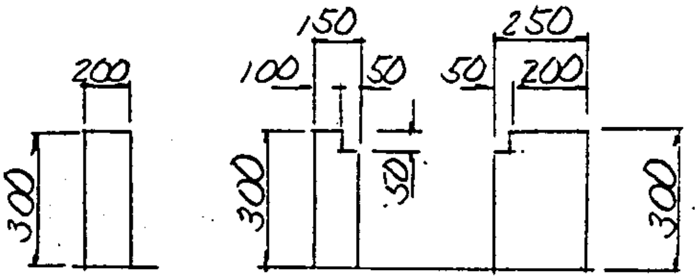


$Va = 0.600 \times 0.650 \times 2.400 \times 2$ = 1.872 m³

1.872 m³

BEAM TOTAL 10.954 m³

(3) CURB



$\ell = 9.980^{m}$

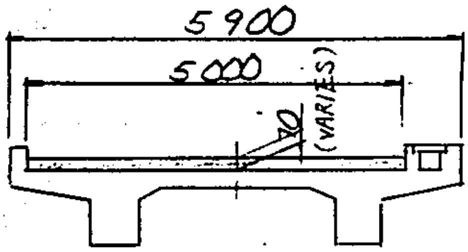
$Va = 0.200 \times 0.30 \times 9.980 = 0.599\ m^3$

$Vb = (0.150 \times 0.300 - 0.050 \times 0.050) \times 9.980 = 0.424$ "

$Vc = (0.250 \times 0.300 - 0.050 \times 0.050) \times 9.980 = 0.724$ "

CURB TOTAL 1.747 m^3

(4) GRADING CONCRETE



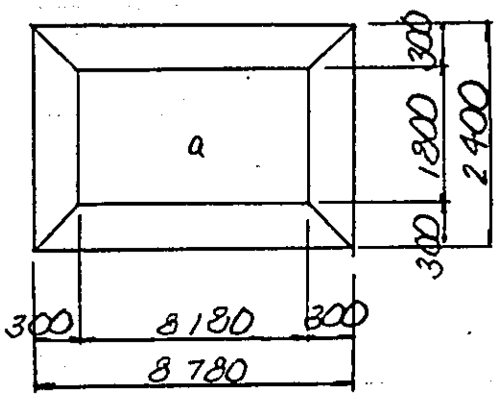
$l = 9.980$

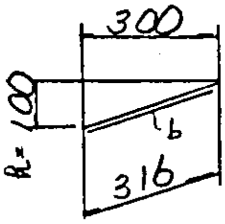
$V = 0.070 \times 5.000 \times 9.980 = 3.493\ m^3$

TOTAL $3.493\ m^3$

FORM AREA

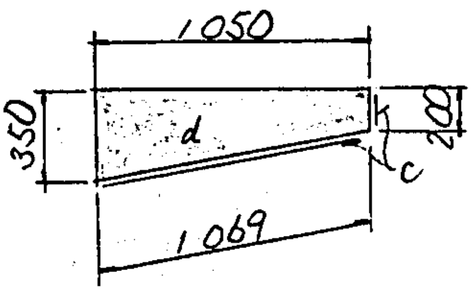
(1) SLAB





$A_a = 1.800 \times 8.180 = 14.724$ m²

$A_b = 0.316 \times \{(8.780 + 8.180) + (2.400 + 1.800)\} \times 1/2 \times 2 = 6.687$ "



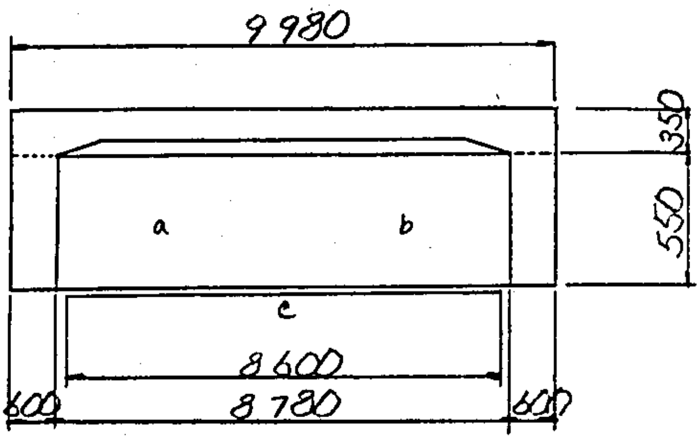
$A_c = (1.069 + 0.200) \times 9.980 \times 2 = 25.329$

$A_d = 1/2 \times (0.350 + 0.200) \times 1.050 \times 4 = 1.156$ m²

SLAB TOTAL 47.896 m²

(2) BEAM

(1) LONGITUDINAL BEAM



$Aa = 9.980 \times 0.550 \times 2$ = $10.978\ m^2$

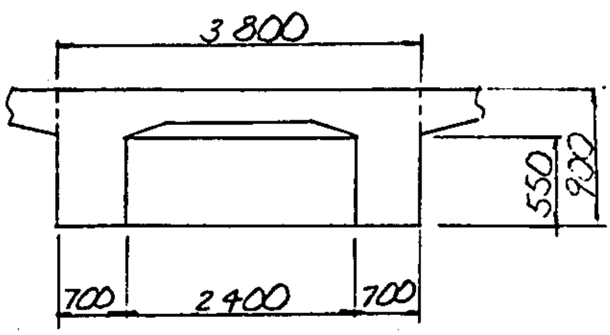
$Ab = 8.780 \times 0.550 \times 2$ = 9.658 "

$Ac = 8.600 \times 0.700 \times 2$ = 12.040 "

$32.676\ m^2$

2) TRANSVERSE BEAM

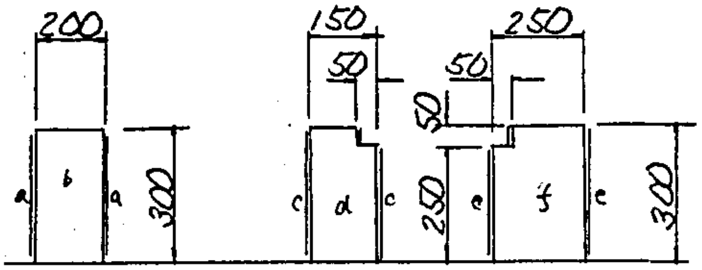
AT END



$Aa = (3.800 \times 0.900 + 2.400 \times 0.550) \times 2$ = $9.480\ m^2$

BEAM TOTAL $42.156\ m^2$

(3) CURB



$l = 9.980^{m}$

$A_a = 0.300 \times 2 \times 9.980$	=	5.988^{m^2}
$A_b = 0.200 \times 0.300 \times 2$	=	0.120 "
$A_c = (0.300 + 0.250 + 0.05) \times 9.980$	=	5.988 "
$A_d = (0.150 \times 0.300 - 0.050 \times 0.050) \times 2$	=	0.085 "
$A_e = (0.250 + 0.050 + 0.300) \times 9.980$	=	5.988 "
$A_f = (0.250 \times 0.300 - 0.050 \times 0.050) \times 2$	=	0.145 "
CURB TOTAL		18.314^{m^2}

REINFORCING BAR

No. 14

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	RC. GIRDER					
	L = 10 000					
	SLAB					
S 1	D13	0.995	6 920	36	247.9	
2	〃	〃	5 480	2	10.9	
3	〃	〃	5 630	33	184.9	
4	〃	〃	3 600	36	129.0	
5	〃	〃	2 690	12	32.1	
6	〃	〃	1 970	8	15.7	
7	〃	〃	2 700	72	193.5	
8	〃	〃	1 500	12	17.9	
S 21	D13	0.995	9 880	34	334.3	
22	〃	〃	10 020	2	19.9	
23	〃	〃	10 020	2	19.9	〃
24	〃	〃	1 400	16	22.3	(VARIES)
				D 13	1 228.3 kg	
				TOTAL	1 228.3 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	BEAM					
B 1	D32	6.23	7 010	4	174.7	
2	〃	〃	8 610	4	214.6	〃
3	〃	〃	9 810	4	244.5	〃
4	〃	〃	11 430	4	284.8	
5	〃	〃	10 500	16	1 046.6	
6	D25	3.98	10 390	12	496.2	
7	D16	1.56	10 210	8	127.4	〃
B° 1	D13	0.995	1 550	118	182.0	
2	〃	〃	2 610	118	306.4	
3	〃	〃	1 220	118	143.3	
4	〃	〃	2 280	118	267.7	
B 21	D16	1.56	3 690	32	184.2	
B° 21	D13	0.995	1 450	26	37.5	
22	〃	〃	2 390	26	61.8	
				D32	1 965.2 kg	
				D25	496.2 〃	
				D16	311.6 〃	
				D13	998.7	
				TOTAL	3 771.7 kg	
	(SUPPORT BEARING)					
H 1	D13	0.995	400	24	9.6	
2	〃	〃	920	40	36.6	
3	D10	0.56	5 370	4	12.0	
				D13	46.2 kg	× 2 = 92.4 kg
				D10	12.0 kg	× 2 = 24.0
				TOTAL	58.2 kg	× 2 = 116.4 kg

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	CURB					
W 1	D10	0.56	890	67	33.4	
2	"	"	720	67	27.0	
3	"	"	610	67	22.9	
4	"	"	1,270	67	47.6	
5	"	"	9,880	12	66.4	
				D10	197.3 kg	
				TOTAL	197.3 kg	

2.RC GIRDER

RC 03

(L = 9ᵐ000)

R.C. GIRDER L = 9 000

RC 03

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	14.0	43.0	1102.3	78.7
BEAM	10.0	38.6	3429.0	342.9
CURB	1.6	16.5	185.8	116.1
GRADING CONCRETE	3.1	—	—	—
TOTAL	28.7	98.1	4717.1	164.4

	UNIT	QUANTITY	REMARKS
ANCHOR BAR		4	φ46 × 700 (STRAIGHT)
		4	φ55 × 850 (CURVE)
BEARING PAT		4	200 × 200 × 14
		4	500 × 200 × 14

Rc03 $L_1 = 9\,000$

CONCRETE VOLUME

(1) SLAB

$Va = 0.950^{m^2} \times 8.980^{L_2}$	=	8.531^{m^3}
$Vb = 0.578 \times 8.980$	=	5.190
$Va = \{7.78 \times 2.40 - \{7.78 \times 2.40 + (7.78 + 7.18)$		
$\times (2.40 + 1.80) + 7.18 \times 1.80\} \times 1/6\} \times 0.10$	=	0.263
SLAB TOTAL		13.984^{m^3}

(2) BEAM

1) LONGITUDINAL BEAM

$Va = 0.910^{m^2} \times 8.980^{L_2}$	=	8.172^{m^3}
		8.172^{m^3}

2) TRANSVERSE BEAM AT END

$Va = 1.872$	=	1.872^{m^3}
		1.872^{m^3}
BEAM TOTAL		10.044^{m^3}

(3) CURB

$V = 1.747^{m^3} \times 1/9.980 \times \overset{L_2}{8.980}$ =	1.572^{m^3}
CURB TOTAL	1.572^{m^3}

(4) GRADING CONCRETE

$V = 0.350^{m^2} \times \overset{L_2}{8.980}$ =	3.143^{m^3}
TOTAL	3.143^{m^3}

FORM AREA

(1) SLAB

$A_a = 1.800 \times \overset{L_4}{7.180}$ =	12.924^{m^2}
$A_b = 0.316 \times (2.100 + \overset{VARIES}{7.480}) \times 2$ =	6.055 "
$A_c = 1.269 \times 2 \times \overset{L_2}{8.980}$ =	22.791 "
$A_d = 1.155^{m^2} \times 1$ =	1.155 "
SLAB TOTAL	42.925^{m^2}

(2) BEAM

1) LONGITUDINAL BEAM

$Aa = 1.100 \times \overset{L_2}{8.980} = 9.878\ m^2$

$Ab = 1.100 \times (\overset{L_4}{7.180} + 0.600) = 8.558$ "

$Ac = 1.400 \times (\overset{L_1}{9.000} - 1.400) = 10.640$ "

$29.076\ m^2$

2) TRANSVERSE BEAM

AT END

$Aa = 9.480\ m^2 \times 1 = 9.480\ m^2$

$9.480\ m^2$

BEAM TOTAL $38.556\ m^2$

(3) CURB

$A = 18.314\ m^2 \times 1/9.980 \times \overset{L_2}{8.980} = 16.479\ m^2$

TOTAL $16.479\ m^2$

RAINFORCING BAR

REFERENCE NO. OF R.C.GIRDER : RC01

3. RC GIRDER

RC09

(L = 8.000)

R.C. GIRDER $L = 8000$

RC 09

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	12.5	38.0	984.2	78.7
BEAM	9.1	35.6	3 120.2	342.9
CURB	1.4	14.6	162.5	116.1
GRADING CONCRETE	2.8	——	——	——
TOTAL	25.8	88.2	4 266.9	165.4

	UNIT	QUANTITY	REMARKS
ANCHOR BAR		2	ϕ46 × 700
		2	〃
BEARING PAT		4	200 × 200 × 14
		4	500 × 200 × 14

Rc 09 $L_1 = 8.000$

CONCRETE VOLUME

(1) SLAB

$Va = 0.950^{m^2} \times \overset{L_2}{7.980}$	=	7.581^{m^3}
$Vb = 0.578'' \times 7.980''$	=	$4.612''$
$Va = [6.78 \times 2.40 - \{6.78 \times 2.40 + (6.78 + 6.18)$		
$\times (2.40 + 1.80) + 6.18 \times 1.80\} \times 1/6] \times 0.10$	=	$0.263''$
SLAB TOTAL		12.456^{m^3}

(2) BEAM

1) LONGITUDINAL BEAM

$Va = 0.910^{m^2} \times \overset{L_2}{7.980}$	=	7.262^{m^3}
		7.262^{m^3}

2) TRANSVERSE BEAM AT END

$Va = 1.872$	=	1.872^{m^3}
		1.872^{m^3}
BEAM TOTAL		9.134^{m^3}

(3) CURB

$V = 1.747^{m^3} \times 1/9.980 \times \overset{L_2}{7.980}$ = 1.397^{m^3}

CURB TOTAL 1.397^{m^3}

(4) GRADING CONCRETE

$V = 0.350^{m^2} \times \overset{L_2}{7.980}$ = 2.793^{m^3}

TOTAL 2.793^{m^3}

FORM AREA

(1) SLAB

$Aa = 1.800 \times \overset{L_4}{6.180}$ = 11.124^{m^2}

$Ab = 0.316 \times (2.100 + \overset{\text{VARIES}}{6.480}) \times 2$ = 5.423 "

$Ac = 1.269 \times 2 \times \overset{L_2}{7.980}$ = 20.253 "

$Ad = 1.155^{m^2} \times 1$ = 1.155 "

SLAB TOTAL 37.955^{m^2}

(2) BEAM

1) LONGITUDINAL BEAM

$Aa = 1.100 \times \overset{L2}{7.980}$	=	8.778^{m^2}
$Ab = 1.100 \times (\overset{L4}{6.780} + 0.600)$	=	8.118 "
$Ac = 1.400 \times (\overset{L1}{8.000} - 1.400)$	=	9.240 "
		26.136^{m^2}

2) TRANSVERSE BEAM AT END

$Aa = 9.480^{m^2} \times 1$	=	9.480^{m^2}
		9.480^{m^2}
	BEAM TOTAL	35.616^{m^2}

(3) CURB

$A = 18.314^{m^2} \times 1/9.980 \times \overset{L2}{7.980}$	=	14.644^{m^2}
	TOTAL	14.644^{m^2}

RAINFORCING BAR

REFERENCE NO. OF R.C. GIRDER : RC01

29

4. RC GIRDER
RC 15
(L = 7.000)

R.C. GIRDER $l = 7000$

RC 15

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	10.9	33.0	858.2	78.7
BEAM	8.2	31.4	2811.6	342.9
CURB	1.2	12.8	139.3	116.1
GRADING CONCRETE	2.4	—	—	—
TOTAL	22.7	77.2	3809.1	167.8

	UNIT	QUANTITY	REMARKS
ANCHOR BAR		2	φ 46 × 700
		2	〃
BEARING PAT		4	200 × 200 × 14
		4	500 × 200 × 14

RC 15 $L_1 = 7.000^m$

CONCRETE VOLUME

(1) SLAB

$V_a = 0.950^{m^2} \times \overset{L_2}{6.980}$ =	6.631^{m^3}
$V_b = 0.578 \times 6.980$ =	4.034 "
$V_a = \{5.78 \times 2.40 - \{5.78 \times 2.40 + (5.78 + 5.18) \times (2.40 + 1.80) + 5.18 \times 1.80\} \times 1/6\} \times 0.10$ =	0.233 "
SLAB TOTAL	10.898^{m^3}

(2) BEAM

1) LONGITUDINAL BEAM

$V_a = 0.910^{m^2} \times \overset{L_2}{6.980}$ =	6.352^{m^3}
	6.352^{m^3}

2) TRANSVERSE BEAM

AT END

$V_a = 1.872^{m^3}$ =	1.872^{m^3}
	1.872^{m^3}
BEAM TOTAL	8.224^{m^3}

(3) CURB	
$V = 1.747^{m^3} \times 1/9.980 \times \overset{L_2}{6.980}$ =	1.222^{m^3}
CURB TOTAL	1.222^{m^3}
(4) GRADING CONCRETE	
$V = 0.350^{m^2} \times \overset{L_2}{6.980}$ =	2.443^{m^3}
TOTAL	2.443^{m^3}
FORM AREA	
(1) SLAB	
$Aa = 1.800 \times \overset{L_4}{5.180}$ =	9.324^{m^2}
$Ab = 0.316 \times (2.100 + \overset{VARIES}{5.480}) \times 2$ =	4.791 "
$Ac = 1.269 \times 2 \times \overset{L_2}{6.980}$ =	17.715 "
$Ad = 1.155^{m^2} \times 1$ =	1.155 "
SLAB TOTAL	32.985^{m^2}

(2) BEAM

1) LONGITUDINAL BEAM

$Aa = 1.100 \times \overset{L_2}{6.980}$ =	$7.678 \; m^2$
$Ab = 1.100 \times (\overset{L_4}{5.180} + 0.600)$ =	6.358 "
$Ac = 1.400 \times (\overset{L_1}{7.000} - 1.400)$ =	7.840 "
	$21.876 \; m^2$

2) TRANSVERSE BEAM

AT END

$Aa = 9.480 \, m^2 \times 1$ =	$9.480 \; m^2$
	$9.480 \; m^2$
BEAM TOTAL	$31.356 \; m^2$

(3) CURB

$A = 18.314 \, m^2 \times 1/9.980 \times \overset{L_2}{6.980}$ =	$12.809 \; m^2$
TOTAL	$12.809 \; m^2$

RAINFORCING BAR

REFERENCE NO. OF R.C.GIRDER : RC01

5. RC GIRDER
RC103
(L = 16.000)

R.C. GIRDER L=16.000
RC 103

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	25.0	76.3	1945.4	77.8
BEAM	33.0	112.5	7694.8	233.2
CURB	2.8	29.1	315.8	112.8
GRADING CONCRETE	5.6	——	——	——
TOTAL	66.7	217.9	9956.0	149.3

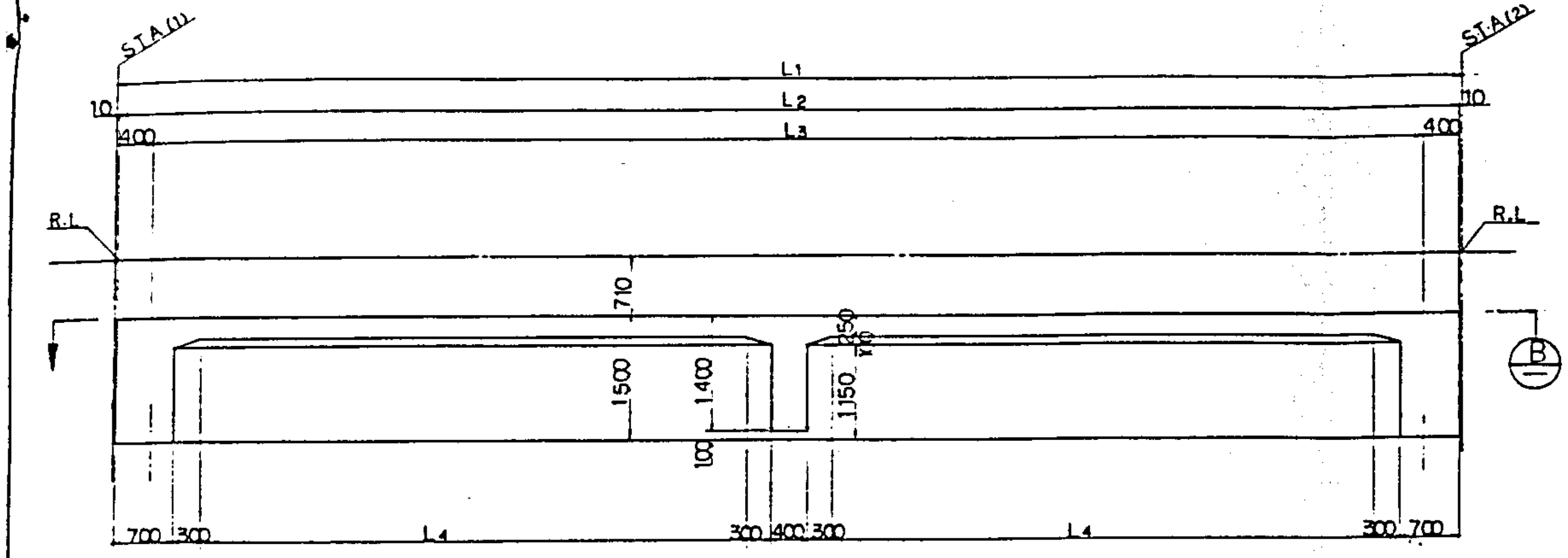
	UNIT	QUANTITY	REMARKS
ANCHOR BAR	number	2 2	FIX φ60 × 850 MOV φ55 × 850
BEARING PAT		4 4	200 × 200 × 14 600 × 200 × 14

5

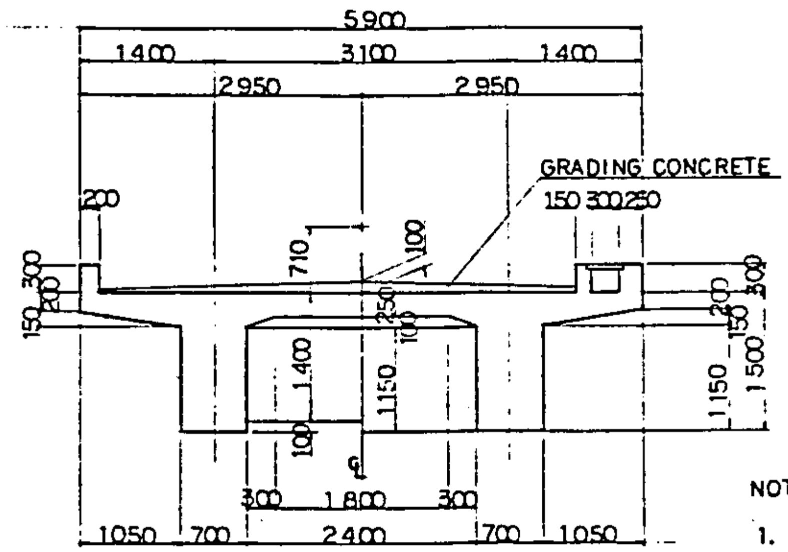
RC GIRDER L=16000

UNIT: Kg.

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—	—	—	—	—	—	1945.4	—	1945.4
BEAM	4270.6	—	—	793.3	292.9	241.8	2096.2	—	7694.8
CURB	—	—	—	—	—	—	—	315.8	315.8
TOTAL	4270.6	—	—	793.3	292.9	241.8	4041.6	315.8	9956.0
SUPPORT BEARING	—	—	—	—	—	—	92.4	24.0	116.4



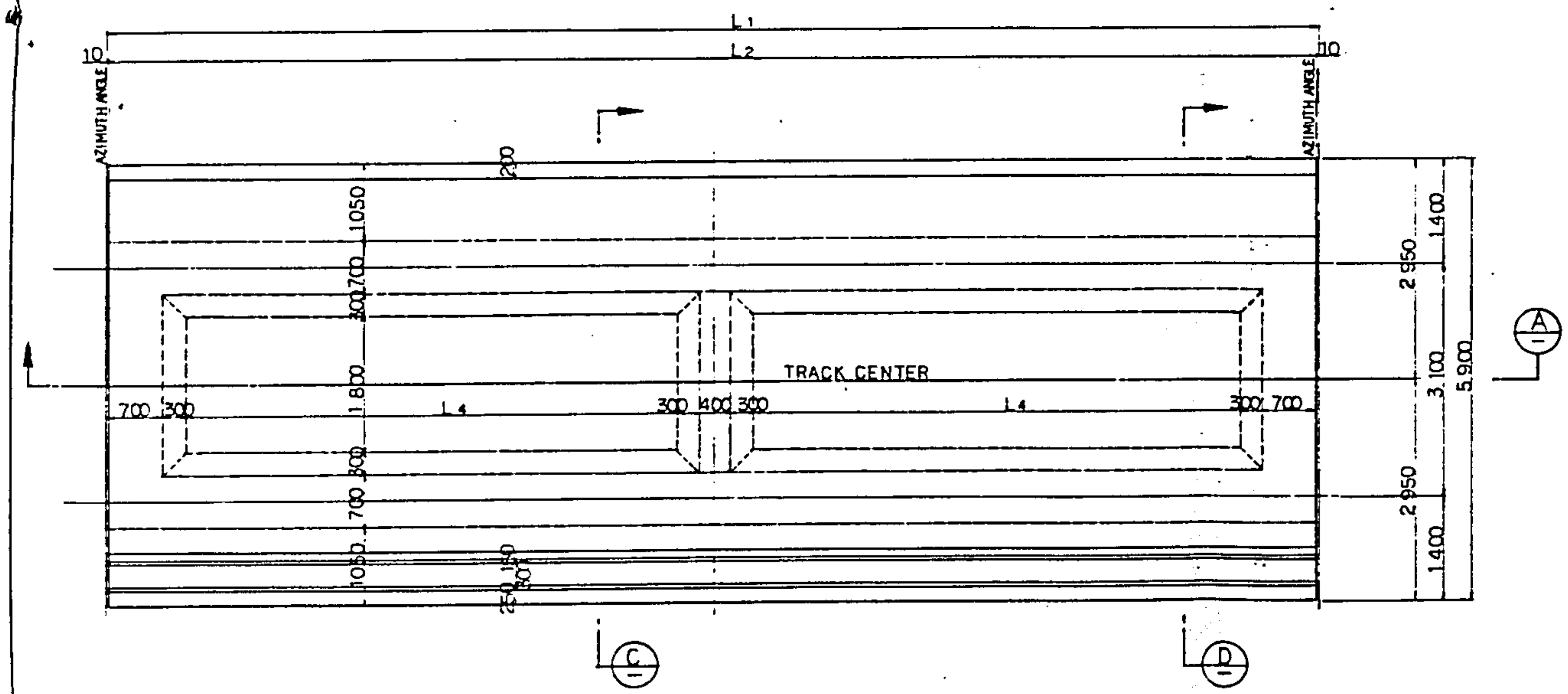
SECTION A



SECTION C SECTION D

NOTES;

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. REFERENCE DRAWING FOR BAR ARRANGEMENT: CS-278~280
3. GRADING CONCRETE SHALL BE SIMULTANEOUSLY PLACED WITH SLAB CONCRETE



SECTION B

DIMENSTON SCHEDULE NO 1

	RC103	RC104	RC105	RC106	RC107	RC108	RC109
STA (1)	19K149M254	19K165M254	19K181M254	19K197M254	19K212M254	19K227M254	19K242M254
STA (2)	19K165M254	19K181M254	19K197M254	19K212M254	19K227M254	19K242M254	19K257M254
AZIMUTH ANGLE (θ1)	75° 05′ 10″71	75° 05′ 10″71	75° 05′ 10″71	75° 05′ 10″71	75° 05′ 10″71	75° 05′ 10″71	75° 05′ 10″71
DO (θ2)	〃	〃	〃	〃	〃	〃	〃
U 1	11K615M610	11K600M148	11K584M687	11K569M227	11K554M732	11K540M237	11K525M742
T 1	2K609M662	2K613M780	2K617M898	2K622M016	2K625M876	2K629M737	2K633M597
U 2	11K600M148	11K584M687	11K569M226	11K554M732	11K540M237	11K525M742	11K511M248
T 2	2K613M780	2K617M898	2K622M016	2K625M876	2K629M737	2K633M597	2K637M458
L 1	16000	16000	16000	15000	15000	15000	15000
L 2	15980	15980	15980	14980	14980	14980	14980
L 3	15180	15180	15180	14180	14180	14180	14180
L 4	6490	6490	6490	5990	5990	5990	5990
θ 1	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00
θ 2	〃	〃	〃	〃	〃	〃	〃

	RC110	RC111	RC112	RC113	RC114	RC115	RC116
STA (1)	19K257M254	19K273M254	19K289M254	19K305M254	19K321M254	19K336M254	19K352M254
STA (2)	19K273M254	19K289M254	19K305M254	19K321M254	19K336M254	19K352M254	19K366M254
AZIMUTH ANGLE (θ1)	75° 05′ 10″71	75° 05′ 10″71	75° 05′ 10″71	75° 05′ 10″71	75° 05′ 10″71	75° 05′ 10″71	75° 05′ 10″71
DO (θ2)	〃	〃	〃	〃	〃	〃	〃
U 1	11K511M248	11K495M787	11K480M325	11K464M864	11K449M403	11K434M909	11K419M448
T 1	2K637M458	2K641M576	2K645M693	2K649M811	2K653M929	2K657M789	2K661M907
U 2	11K495M787	11K480M325	11K464M864	11K449M403	11K434M909	11K419M448	11K405M919
T 2	2K641M576	2K645M693	2K649M811	2K653M929	2K657M789	2K661M907	2K665M510
L 1	16000	16000	16000	16000	15000	16000	14000
L 2	15980	15980	15980	15980	14980	15980	13980
L 3	15180	15180	15180	15180	14180	15180	13180
L 4	6490	6490	6490	6490	5990	6490	5490
θ 1	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00
θ 2	〃	〃	〃	〃	〃	〃	〃

DIMENSION SCHEDULE NO 2

	RC117	RC118	RC119	RC120
STA (1)	19K366M254	19K382M254	19K397M254	19K412M254
STA (2)	19K382M254	19K397M254	19K412M254	19K426M254
AZIMUTH ANGLE (θ1)	75° 05′ 10″71	75° 05′ 10″71	75° 05′ 10″71	75° 05′ 10″71
DO (θ2)	〃	〃	〃	〃
U 1	11K405M919	11K390M458	11K375M964	11K361M469
T 1	2K665M510	2K669M628	2K673M489	2K677M349
U 2	11K390M458	11K375M964	11K361M469	11K346M008
T 2	2K669M628	2K673M489	2K677M349	2K681M467
L 1	16000	15000	15000	16000
L 2	15980	14980	14980	15980
L 3	15180	14180	14180	15180
L 4	6490	5990	5990	6490
θ 1	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00	90° 00′ 00″00
θ 2	〃	〃	〃	〃

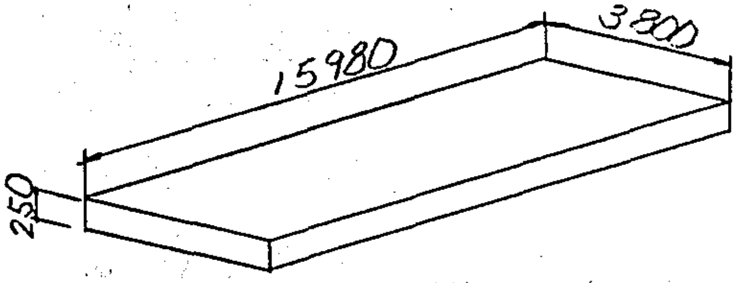
NOTES;

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. REFERENCE DRAWING FOR GENERAL VIEW: CS-276

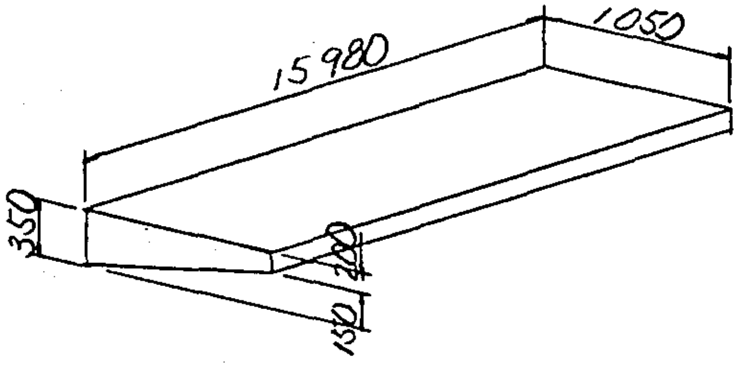
RC103 $L = 16^m.000$

CONCRETE. VOLUME

(1) SLAB.

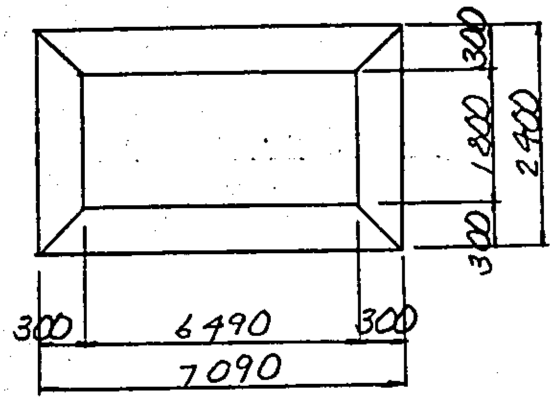


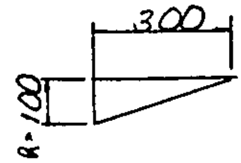
$Va = 3.800 \times 0.250 \times 15.980$ = 15.181^{m^3}



$Vb' = 1/2 \times (0.350 + 0.200) \times 1.050 \times 15.980 = 4.614$

$Vb = 4.614 \times 2$ = 9.228^{m^3}





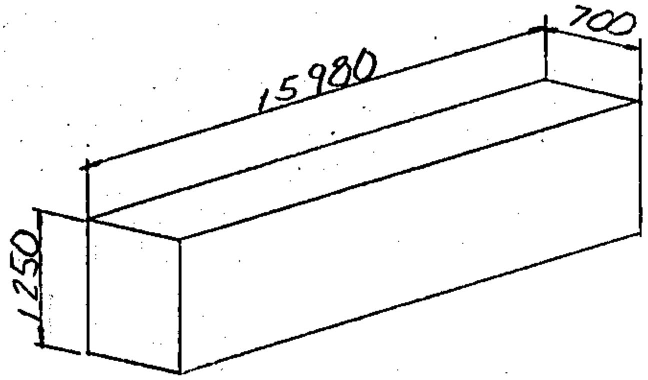
$V_a = [7.090 \times 2.400 - \{7.090 \times 2.400 + (7.090 + 6.490)$

$\times (2.400 + 1.800) + 6.490 \times 1.800\} \times 1/6] \times 0.100 \times 2 = 0.575 \; m^2$

SLAB TOTAL $24.954 \; m^3$

(2) BEAM

1) LONGITUDINAL BEAM

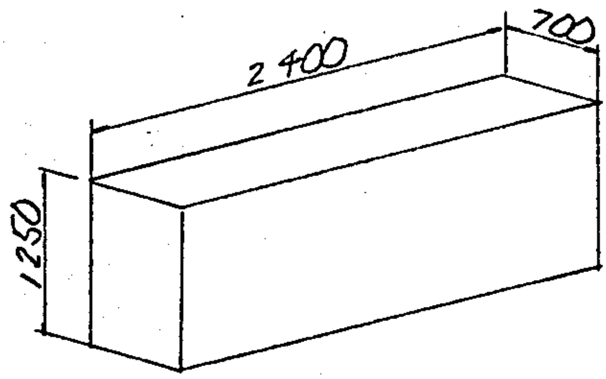


$Va = 0.700 \times 15.980 \times 1.250 \times 2 \quad = 27.965\ m^3$

$27.965\ m^3$

2) TRANSVEASE BEAM

AT END

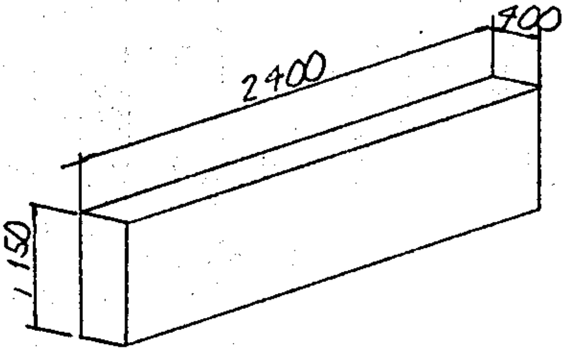


$Va = 0.700 \times 1.250 \times 2.400 \times 2 \quad = 4.200\ m^3$

$4.200\ m^3$

(3) TRANSVERSE BEAM

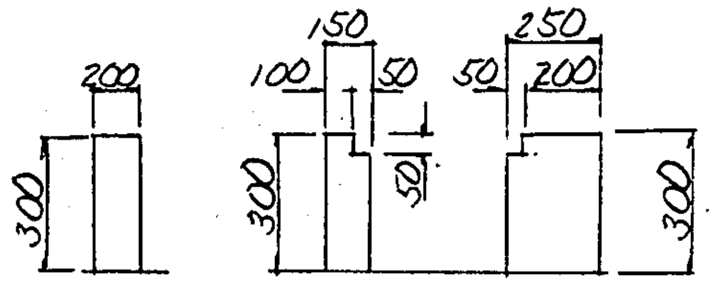
AT INTER MEDIATE



$Va = 0.400 \times 1.150 \times 2.400$	=	$1.104\ m^3$
		$1.104\ m^3$
BEAM TOTAL		$33.269\ m^3$

10

(4) CURB



$l = 15980$

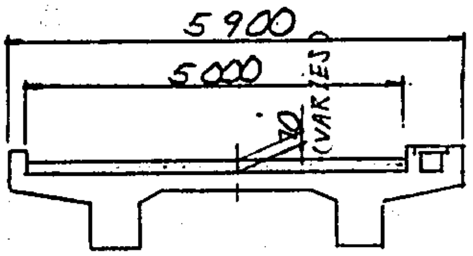
$V_a = 0.200 \times 0.30 \times 15.980 = 0.959\ m^3$

$V_b = (0.150 \times 0.300 - 0.050 \times 0.050) \times 15.980 = 0.679$ "

$V_c = (0.250 \times 0.300 - 0.050 \times 0.050) \times 15.980 = 1.159$ "

CURB TOTAL $2.797\ m^3$

(5) GRADING CONCRETE



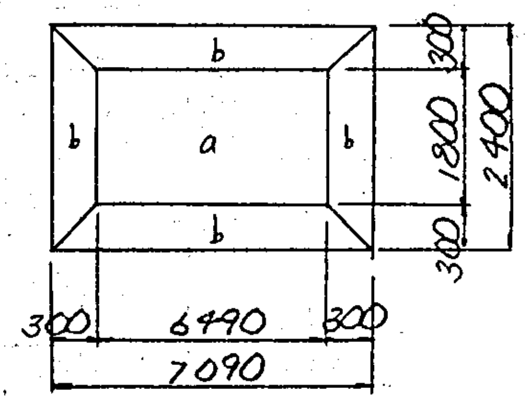
$l = 15.980$ m

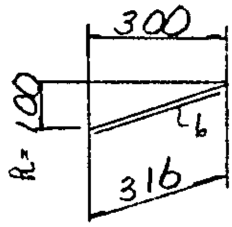
$V = 0.070 \times 5.000 \times 15.980 = 5.593$ m³

GRADING CONCRETE TOTAL 5.593 m³

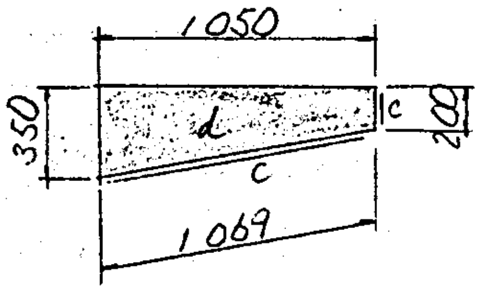
FORM AREA

(1) SLAB





$A_a = 1.800 \times 6.490 \times 2$	=	23.364 m^2
$A_b = 0.316 \times \{(7.090 + 6.490) + (2.400 + 1.800)\} \times 1/2 \times 2 \times 2$	=	11.236 ″



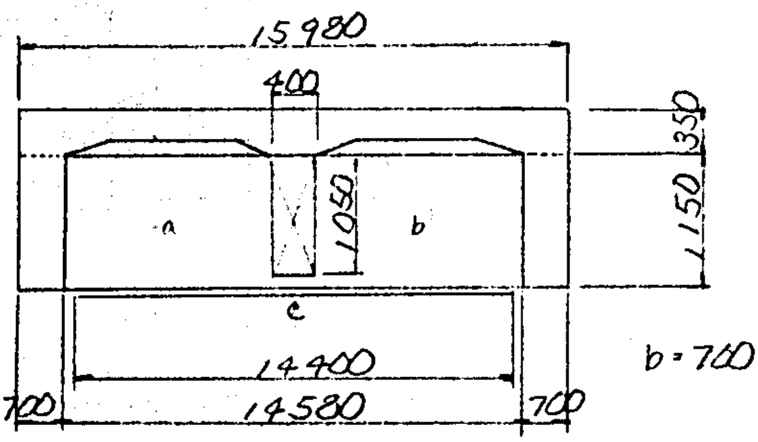
$l = 15.980$

$A_c = (1.069 + 0.200) \times 15.980 \times 2$		40.557
$A_d = 1/2 \times (0.350 + 0.200) \times 1.050 \times 4$	=	1.155 m^2
SLAB TOTAL		76.312 m^2

13

(2) BEAM

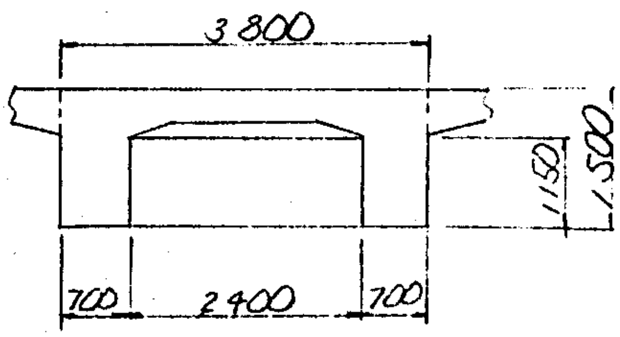
(1) LONGITUDINAL BEAM



$Aa = 15.980 \times 1.150 \times 2$	= $36.754\ m^2$
$Ab = (14.580 \times 1.150 - 0.400 \times 1.050) \times 2$	= 32.694 "
$Ac = 14.400 \times 0.700 \times 2$	= 20.160 "
	$89.608\ m^2$

2) TRANSVERSE BEAM

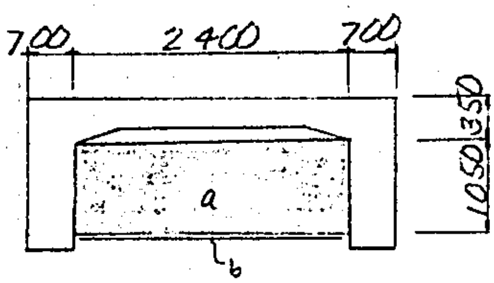
AT END



$Aa = (3.800 \times 1.500 + 2.400 \times 1.150) \times 2$	= $16.920\ m^2$
	$16.920\ m^2$

(3) TRANSVERSE BEAM

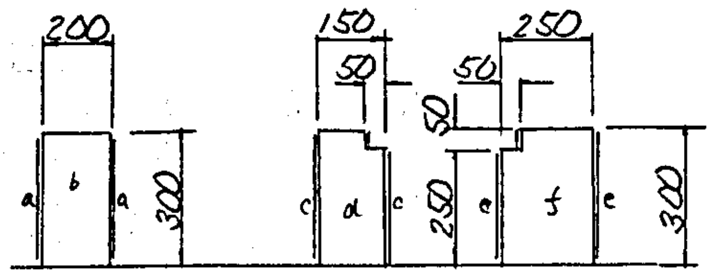
AT INTER MEDIATE



b = 400

$Aa = 2.400 \times 1.050 \times 2$ =	5.040 m^2
$Ab = 2.400 \times 0.400$ =	0.960 "
	6.000 m^2
BEAM TOTAL	112.528 m^2

(4) CURB



$l = 15.980^m$

$Aa = 0.300 \times 2 \times 15.980$	=	9.588^{m^2}
$Ab = 0.200 \times 0.300 \times 2$	=	0.120 "
$Ac = (0.300 + 0.250 + 0.05) \times 15.980$	=	9.588 "
$Ad = (0.150 \times 0.300 - 0.050 \times 0.050) \times 2$	=	0.085 "
$Ae = (0.250 + 0.050 + 0.300) \times 15.980$	=	9.588 "
$Af = (0.250 \times 0.300 - 0.050 \times 0.050) \times 2$	=	0.145 "
CURB TOTAL		29.114^{m^2}

RAINFORCING BAR

No. 47

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	RC GIRDER					
	L= 16 000					
	SLAB					
S 1	D13	0.995	6 920	58	399.3	
2	〃	〃	5 480	4	21.8	
3	〃	〃	5 630	52	291.3	
4	〃	〃	3 600	58	207.8	
5	〃	〃	2 690	14	37.5	
6	〃	〃	1 970	16	31.4	
7	〃	〃	2 700	116	311.7	
8	〃	〃	1 500	14	20.9	
S 21	D13	0.995	15 880	34	537.2	
22	〃	〃	16 150	2	32.1	
23	〃	〃	16 150	2	32.1	〃
24	〃	〃	1 400	16	22.3	(VARIES)
				D13	1 945.4 kg	
				TOTAL	1 945.4 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	BEAM					
B 1	D32	6.23	10 720	4	267.1	
2	〃	〃	13 120	4	327.0	〃
3	〃	〃	15 120	4	376.8	〃
4	〃	〃	16 910	4	421.4	〃
5	〃	〃	16 500	28	2 878.3	
6	D22	3.04	16 310	16	793.3	
7	D19	2.25	16 270	8	292.9	〃
B° 1	D13	0.995	1 550	190	293.0	
2	〃	〃	3 810	190	720.3	
3	〃	〃	1 220	190	230.7	
4	〃	〃	3 480	190	658.0	
B 21	D16	1.56	3 690	28	161.2	
B° 21	D13	0.995	1 550	26	40.1	
22	〃	〃	3 690	26	95.5	
B 31	D16	1.56	3 690	14	80.6	
B° 31	D13	0.995	1 250	13	16.2	
32	〃	〃	3 280	13	42.4	
				D32	4 270.6 kg	
				D22	793.3 〃	
				D19	292.9 〃	
				D16	241.8 〃	
				D13	2 096.2	
				TOTAL	7 694.8 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
(SUPPORT BEARING)						
H 1	D13	0.995	400	24	9.6	
2	"	"	920	40	36.6	
3	D10	0.560	5370	4	12.0	
				D13	46.2 kg	×2 = 92.4 kg
				D10	12.0 "	×2 = 24.0 "
				TOTAL	58.2 kg	×2 = 116.4 kg
CURB						
W 1	D10	0.56	890	107	53.3	
2	"	"	720	107	43.1	
3	"	"	610	107	36.6	
4	"	"	1270	107	76.1	
5	"	"	15880	12	106.7	
				D10	315.8 kg	
				TOTAL	315.8 kg	

6. RC GIRDER

RC 107

(L = 15.000)

R.C. GIRDER L=15.00
RC 107

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	23.4	71.3	1820.9	77.8
BEAM	31.5	106.7	7345.0	233.2
CURB	2.6	27.3	293.2	112.8
GRADING CONCRETE	5.2	—	—	—
TOTAL	62.7	205.3	9459.1	150.9

	UNIT	QUANTITY	REMARKS
ANCHOR BAR		2	FIX φ 60 × 850
		2	MOV φ 55 × 850
BEARING PAT		4	200 × 200 × 14
		4	600 × 200 × 14

Rc107

$L_1 = 15.000$

CONCRETE VOLUME

(1) SLAB

$Va = 0.950^{m^2} \times 14.980^{L2}$ =	14.231^{m^3}
$Vb = 0.578^{m^2} \times 14.980^{L2}$ =	8.658 "
$Vc = [6.59 \times 2.40 - \{6.59 \times 2.40 + (6.59 + 5.99) \times (2.40 + 1.80) + 5.99 \times 1.80\} \times 1/6] \times 0.10 \times 2$ =	0.515 "
SLAB TOTAL	23.404^{m^3}

(2) BEAM

1) LONGITUDINAL BEAM

$V = 1.750^{m^2} \times 14.980^{L2}$ =	26.215^{m^3}
	26.215^{m^3}

2) TRANSVERSE BEAM AT END

$V = 4.200^{m^3} \times 1$ =	4.200^{m^3}
	4.200^{m^3}

72

3) TRANSVERSE BEAM AT INTER MEDIATE

$V = 1.104^{m^3} \times 1 = 1.104^{m^3}$

1.104^{m^3}

BEAM TOTAL 31.519^{m^3}

(3) CURB

$V = 2.797^{m^3} \times 1/15.980 \times \overset{L_2}{14.980} = 2.622^{m^3}$

TOTAL 2.622^{m^3}

(4) GRADING CONCRETE

$V = 0.350^{m^2} \times \overset{L_2}{14.980} = 5.243^{m^3}$

TOTAL 5.243^{m^3}

23
2

FORM AREA

(1) SLAB

$Aa = 1.800 \times \overset{L4}{5.990} \times 2$	= $21.564\ m^2$
$Ab = 0.316 \times (\overset{VARIES}{6.290} + \overset{VARIES}{2.100}) \times 2 \times 2$	= 10.605 "
$Ac = 1.269 \times 2 \times \overset{L2}{14.980}$	= 38.019 "
$Ad = 1.155\ m^2 \times 1$	= 1.155 "
SLAB. TOTAL	$71.343\ m^2$

(2) BEAM

1) LONGILTUDINAL BEAM

$Aa = 1.150 \times \overset{L2}{14.980} \times 2$	= $34.454\ m^2$
$Ab = \{(\overset{L2}{14.980} - 1.400) \times 1.150 - 0.460\ m^2\} \times 2$	= 30.314 "
$Ac = 0.700 \times (\overset{L1}{15.000} - 1.400) \times 2$	= 19.040 "
	$83.808\ m^2$

2) TRASVERSE BEAM

AT. END

$A = 16.920\ m^2 \times 1$	= $16.920\ m^2$
	$16.920\ m^2$

3) TRANSVERSE BEAM AT INTER. MEDIATE.

$A = Aa + Ab = 6.000^{m^2}$ =	6.000^{m^2}
BEAM TOTAL	106.728^{m^2}

(3) CURB

$A = 29.114^{m^2} \times 1/15.980 \times \overset{L_2}{14.980}$ =	27.292^{m^2}
CURB TOTAL	27.292^{m^2}

RAINFORCING BAR

REFERENCE NO. OF RC. GIRDER : RC103

7. RC GIRDER
RC 116
(L = 14.000)

R.C. GIRDER L= 14 000

RC 116

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	21.8	66.4	1 696.4	77.8
BEAM	29.8	100.7	6 948.6	233.2
CURB	2.4	25.5	270.7	112.8
GRADING CONCRETE	4.9	———	———	———
TOTAL	58.9	192.6	8 915.7	151.4

	UNIT	QUANTITY	REMARKS
ANCHOR BAR		2	FIX φ60 × 850
		2	MOV φ55 × 850
BEARING PAT		4	200 × 200 × 14
		4	600 × 200 × 14

Rc116 $L_1 = 14.000^{m}$

CONCRETE VOLUME

(1) SLAB

$Va = 0.950^{m^2} \times 13.980^{L2}$ =	13.281^{m^3}
$Vb = 0.578^{m^2} \times 13.980^{L2}$ =	8.080
$Vc = [6.09 \times 2.40 - \{6.09 \times 2.40 + (6.09 + 5.49) \times (2.40 + 1.80) + 5.49 \times 1.80\} \times 1/6] \times 0.10 \times 2$ =	0.485
SLAB TOTAL	21.846^{m^3}

(2) BEAM

1) LONGITUDINAL BEAM

$V = 1.750^{m^2} \times 13.980^{L2}$ =	24.465^{m^3}
	24.465^{m^3}

2) TRANSVERSE BEAM AT END

$V = 4.200^{m^3} \times 1$ =	4.200^{m^3}
	4.200^{m^3}

3) TRANSVERSE BEAM AT INTER MEDIATE

$V = 1.104^{m^3} \times 1$ = 1.104^{m^3}

1.104^{m^3}

BEAM TOTAL 29.769^{m^3}

(3) CURB

$V = 2.797^{m^3} \times 1/15.980 \times \overset{L_2}{13.980}$ = 2.446^{m^3}

TOTAL 2.446^{m^3}

(4) GRADING CONCRETE

$V = 0.350^{m^2} \times \overset{L_2}{13.980}$ = 4.893^{m^3}

TOTAL 4.893^{m^3}

FORM AREA

(1) SLAB

$Aa = 1.800 \times \overset{L4}{5.49} \times 2$	= $19.764\ m^2$
$Ab = 0.316 \times (\overset{VARIES}{5.790} + \overset{VARIES}{2.100}) \times 2 \times 2$	= 9.973 "
$Ac = 1.269 \times 2 \times \overset{L2}{13.980}$	= 35.481 "
$Ad = 1.155^{m^2} \times 1$	= 1.155 "
SLAB. TOTAL	$66.373\ m^2$

(2). BEAM

1). LONGILTUDINAL BEAM

$Aa = 1.150 \times \overset{L2}{13.980} \times 2$	= $32.154\ m^2$
$Ab = \{(\overset{L2}{13.980} - \overset{12.58}{1.400}) \times 1.150 - 0.460^{m^2}\} \times 2$	= 28.014 "
$Ac = 0.700 \times (\overset{L1}{14.000} - 1.400) \times 2$	= 17.640 "
	$77.808\ m^2$

2) TRANSVERSE BEAM

AT END

$A = 16.920^{m^2} \times 1$	= $16.920\ m^2$
	$16.920\ m^2$

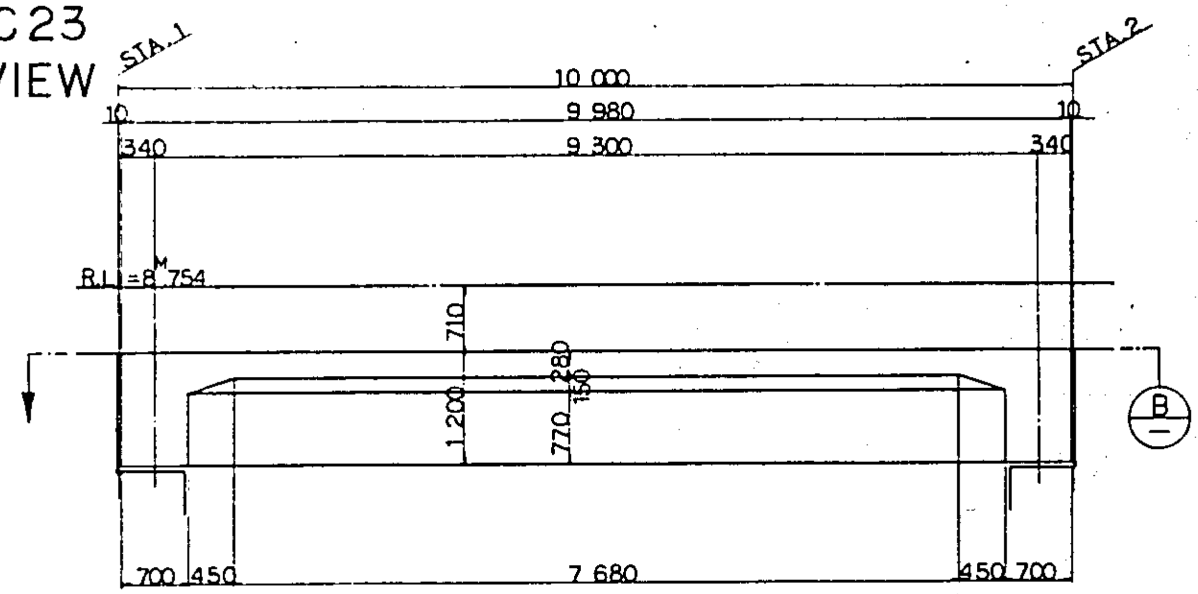
3) TRANSVERSE BEAM AT INTER MEDIATE	
$A = A_a + A_b = 6.000^{m^2}$ =	6.000^{m^2}
BEAM TOTAL	100.728^{m^2}
(3) CURB	
$A = 29.114^{m^2} \times 1/15.980 \times 13.980^{L2}$ =	25.470^{m^2}
CURB TOTAL	25.470^{m^2}

RAINFORCING BAR

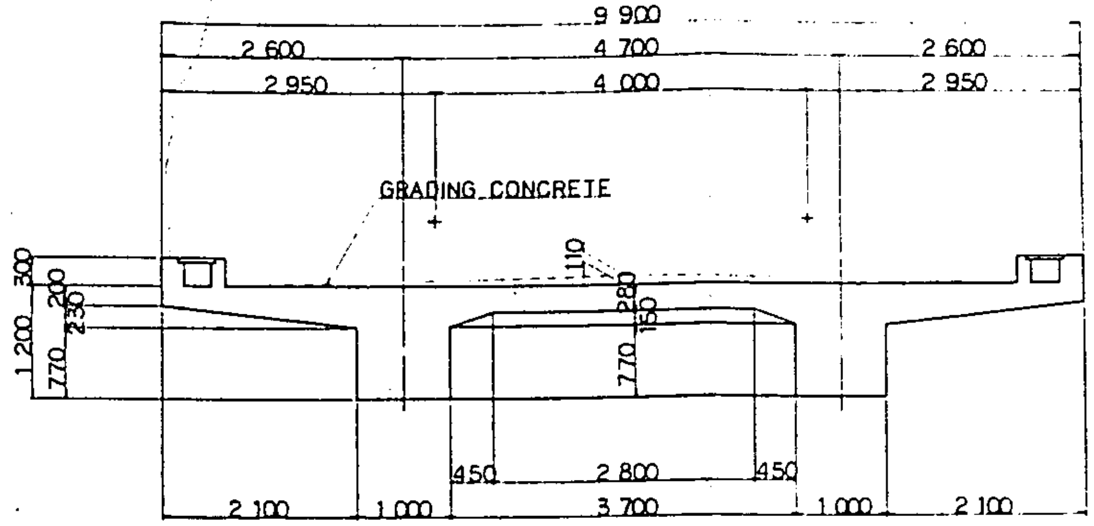
REFERENCE NO. OF R.C.GIRDER : RC103

31/4

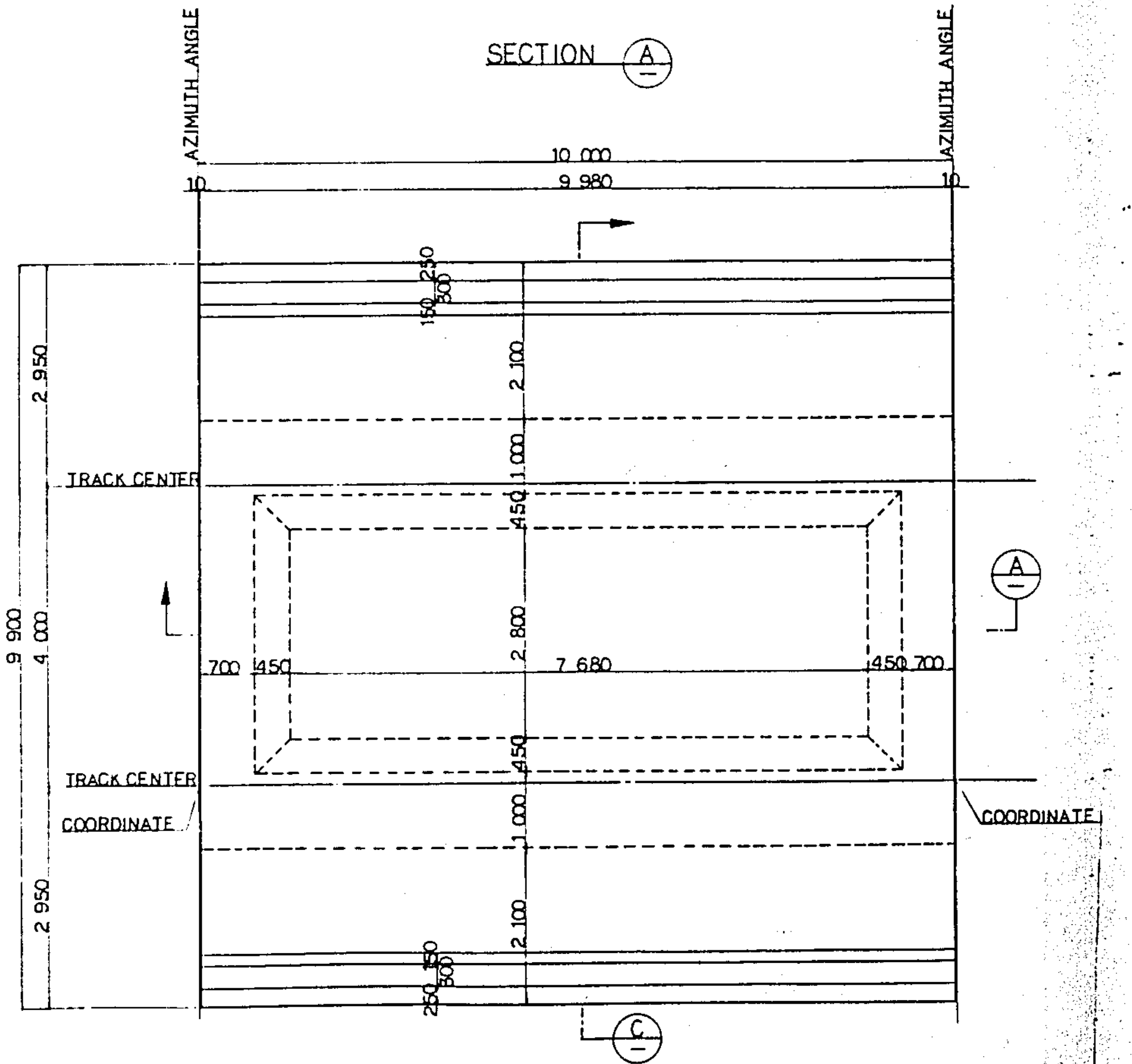
9. RC17~RC23 GENERAL VIEW



SECTION (A)



SECTION (C)



SECTION (B)

DIMENSION SCHEDULE

		STATION	R.L.	AZIMUTH ANGLE	CENGKAREN AIRPORT LINE COORDINATE
RC 17	STA.1	$17^K 212^M 000$	8.754^M	345° 30′ 45″	U. 12 106^M906 T. 1 014^M477
	STA.2	$17^K 222^M 000$	•	•	U. 12 109^M407 T. 1 024^M159
RC 18	STA.1	$17^K 260^M 000$	8.754^M	345° 30′ 45″	U. 12 118^M914 T. 1 060^M951
	STA.2	$17^K 270^M 000$	•	•	U. 12 121^M415 T. 1 070^M633
RC 19	STA.1	$17^K 300^M 000$	8.754^M	345° 30′ 45″	U. 12 128^M920 T. 1 099^M679
	STA.2	$17^K 310^M 000$	•	•	U. 12 131^M422 T. 1 109^M361
RC 20	STA.1	$17^K 340^M 000$	8.754^M	345° 30′ 45″	U. 12 138^M927 T. 1 138^M407
	STA.2	$17^K 350^M 000$	•	•	U. 12 141^M429 T. 1 148^M089
RC 21	STA.1	$17^K 380^M 000$	8.754^M	345° 30′ 45″	U. 12 148^M934 T. 1 177^M135
	STA.2	$17^K 390^M 000$	•	•	U. 12 151^M435 T. 1 186^M817
RC 22	STA.1	$17^K 420^M 000$	8.754^M	345° 30′ 45″	U. 12 158^M941 T. 1 215^M863
	STA.2	$17^K 430^M 000$	•	•	U. 12 161^M442 T. 1 225^M545
RC 23	STA.1	$17^K 460^M 000$	8.754^M	345° 30′ 45″	U. 12 168^M947 T. 1 254^M591
	STA.2	$17^K 470^M 000$	•	•	U. 12 171^M449 T. 1 264^M273

NOTES :

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. REFERENCE DRAWING FOR BAR ARRANGEMENT : CS-217~218

RC RC17 ~ RC23

	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	29.9	81.1	2 219.6	74.1
BEAM	23.1	73.1	5 915.7	256.1
CURB	2.3	24.4	251.9	109.5
GRADING CONCRETE	5.9	—	—	—
TOTAL	61.2	178.6	8 382.2	137.0

	UNIT	QUANTITY	REMARKS
ANCHOR BAR	kg	15.5	φ60 × 850
BEARING PAT	EACH	4	600 × 300 × 12
		4	200 × 200 × 14

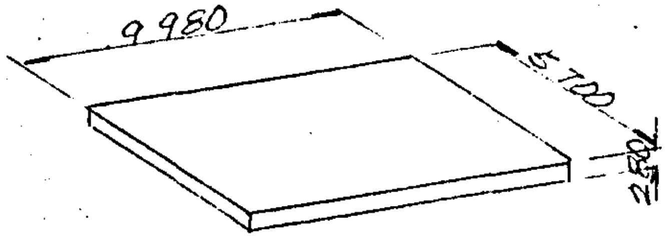
(RC17)~(RC23) WEIGHT OF BARS BY DIAMETER

	D32	D29	D25	D22	D19	D16	D13	D10	TOTAL
SLAB	—	—	—	—	—	895.2	1 319.4	—	2 214.6
BEAM	2 575.0	—	—	704.1	284.7	2 048.3	303.6	—	5 915.7
CURB	—	—	—	—	—	—	—	251.9	251.9
TOTAL	2 575.0	—	—	704.1	284.7	2 943.5	1 623.0	251.9	8 382.2

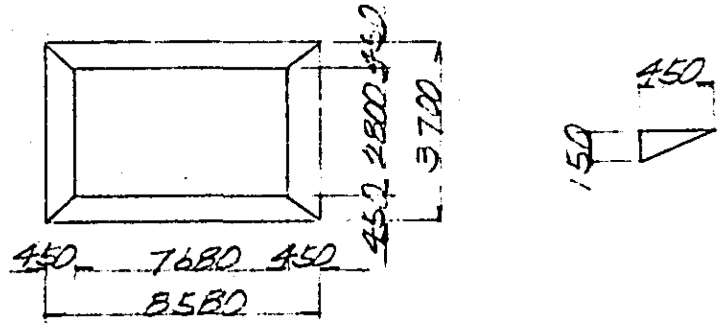
RC17 ~ RC23

CONCRETE VOLUME

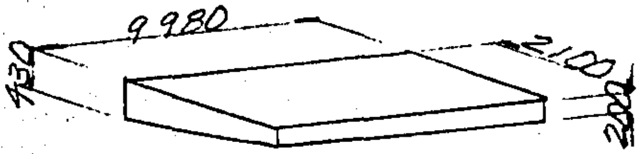
(1) SLAB



$$V_a = 9.980 \times 5.700 \times 0.280 = 15.928\ m^3$$



$$V_b = [\,8.580 \times 3.700 - \{8.580 \times 3.700 + (8.580 + 7.680) \times (3.700 + 2.800) + 7.680 \times 2.800\} \times 1/6\,] \times 0.150 = 0.788\ ''$$

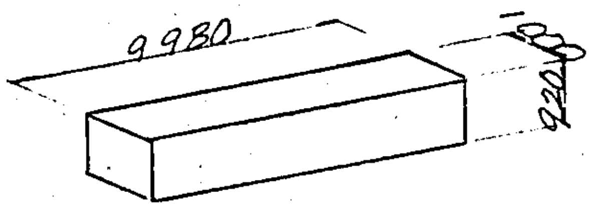


$$V_c' = \frac{1}{2} \times (0.430 + 0.200) \times 2.100 \times 9.980 \times 2 = 13.204\ m^3$$

SLAB TOTAL 29.920 m^3

(2) BEAM.

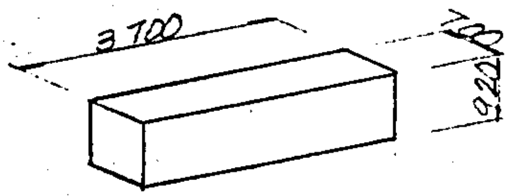
1) LONGITUDINAL BEAM



$V_a' = 0.920 \times 1.000 \times 9.980 \times 2 \quad = 18.363\ m^3$

$18.363\ m^3$

2) TRANSVERSE BEAM

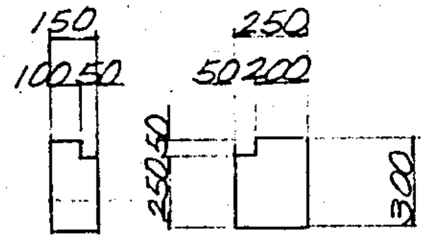


$V_a' = 0.920 \times 0.700 \times 3.700 \times 2 \quad = 4.766\ m^3$

$4.766\ m^3$

BEAM TOTAL $23.129\ m^3$

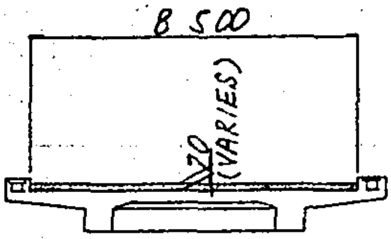
(3) CURB



$\ell = 9.980$

$V_a = (0.250 \times 0.150 + 0.100 \times 0.050) \times 9.980 \times 2 =$	$0.848\ m^3$
$V_b = (0.250 \times 0.250 + 0.200 \times 0.050) \times 9.980 \times 2 =$	1.447
CURB TOTAL	$2.295\ m^3$

(4) GRADING CONCRETE



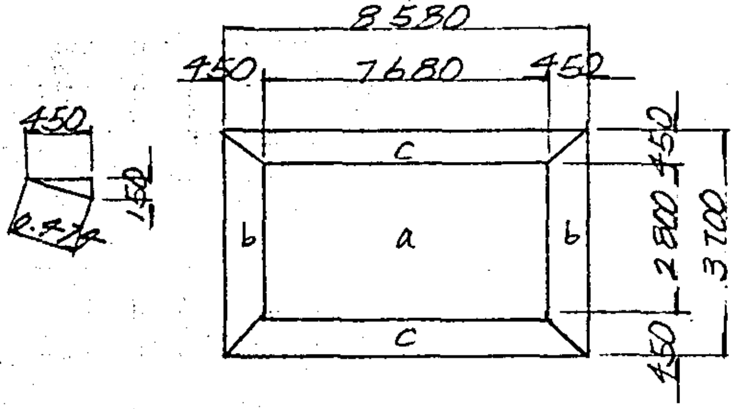
$\ell = 9.980^{m}$

$V = 0.07 \times 8.500 \times 9.980 = 5.938\ m^3$

GRADING CONCRETE TOTAL $5.938\ m^3$

FORM AREA

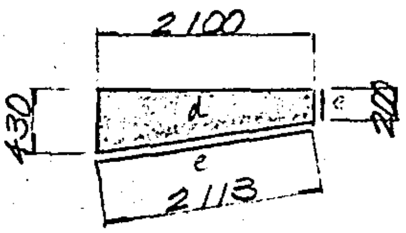
(1) SLAB



$A_a = 7.680 \times 2.800$ = 21.504 m²

$A_b = (3.700 + 2.800) \times 1/2 \times 0.474 \times 2$ = 3.081 "

$A_c = (8.580 + 7.680) \times 1/2 \times 0.474 \times 2$ = 7.707 "



$\ell = 9.980^m$

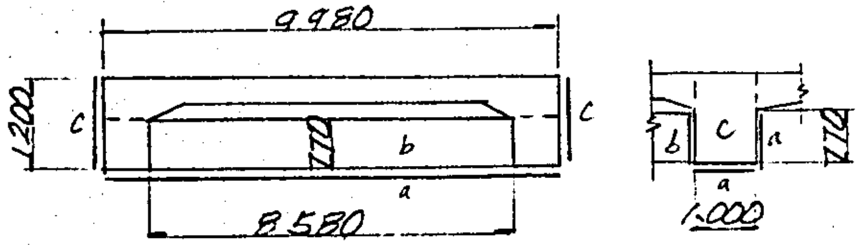
$A_d = (0.430 + 0.200) \times 1/2 \times 2.100 \times 2 \times 2$ = 2.646 "

$A_e = (0.200 + 2.113) \times 9.980 \times 2$ = 46.167

SLAB TOTAL 81.105 m²

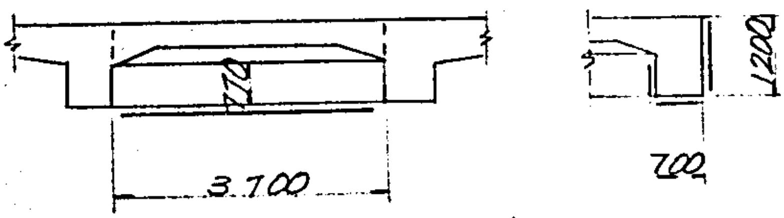
(2) BEAM

1) LONGITUPINAL BEAM



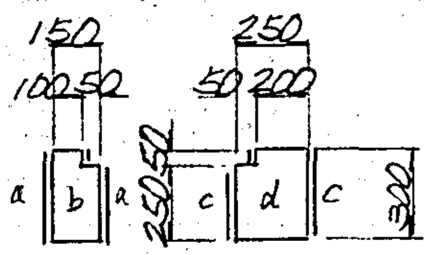
$A_a = (0.770 + 1.000) \times 9.980 \times 2$	=	$35.329\ m^2$
$A_b = 0.770 \times 8.580 \times 2$	=	13.213 "
$A_c = 1.200 \times 1.000 \times 4$	=	4.800 "
		$53.342\ m^2$

2) TRANSVERSE BEAM
AT END



$A_a = (0.770 + 0.700 + 1.200) \times 3.700 \times 2$	=	$19.758\ m^2$
		$19.758\ m^2$
BEAM TOTAL		$73.100\ m^2$

(3) CURB



$l = 9.980^m$

$A_a = 0.300 \times 2 \times 9.980 \times 2$	=	11.976^{m^2}
$A_b = (0.250 \times 0.150 + 0.050 \times 0.100) \times 2 \times 2$	=	0.170
$A_c = 0.300 \times 2 \times 9.980 \times 2$	=	11.976
$A_d = (0.250 \times 0.250 + 0.050 \times 0.200) \times 2 \times 2$	=	0.290
CURB TOTAL		24.412^{m^2}

No. 73

RAINFORCING BAR

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	RC 17 ~ RC 23					
	SLAB					
S 1	D 13	0.995	10 910	35	379.9	
2	D 16	1.56	8 060	4	50.3	
3	"	"	8 240	30	385.6	
4	"	"	5 500	35	300.3	
5	D 13	0.995	4 070	12	48.6	
6	D 16	1.56	2 860	6	26.8	
7	"	"	2 430	6	22.7	
8	D 13	0.995	4 400	70	306.5	
9	"	"	2 800	12	33.4	
S 21	D 13	0.995	9 880	52	511.2	
22	D 16	1.56	10 030	4	62.6	
23	"	"	10 030	3	46.9	
24	D 13	0.995	1 430	28	39.8	(VARIES)
				D 16	895.2 kg	
				D 13	1,319.4 "	
		SLAB	TOTAL WEIGHT		2 214.6 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	BEAM					
B 1	D32	6.23	8 440	4	210.3	
2	〃	〃	9 840	4	245.2	
3	〃	〃	11 620	4	289.6	
4	〃	〃	10 490	28	1 829.9	
5	D22	3.04	10 290	16	500.5	
6	D19	2.25	10 240	8	184.3	
B° 1	D16	1.56	2 030	130	411.7	
2	〃	〃	3 550	130	719.9	
3	〃	〃	1 500	130	304.2	
4	〃	〃	3 020	130	612.5	
B 21	D22	3.04	5 580	12	203.6	
22	D19	2.25	5 580	8	100.4	
23	D13	0.995	5 580	16	88.8	
B° 21	D13	0.995	3 080	38	116.5	
22	〃	〃	2 600	38	98.3	
				D32	2 575.0 kg	
				D22	704.1 〃	
				D19	284.7 〃	
				D16	2 048.3 〃	
				D13	303.6 〃	
		BEAM	TOTAL WEIGHT		5 915.7 kg	

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
	CURB					
W 1	D10	0.56	890	132	65.8	
2	〃	〃	710	132	52.5	
3	〃	〃	610	132	45.1	
4	〃	〃	9 880	16	88.5	
				D 10	251.9 kg	
			CURB TOTAL	WEIGHT	251.9 kg	

No. 76

REINF. NO.	DIA. (mm)	U. WEIGHT (kg/m)	LENGTH (mm)	NUMBER	WEIGHT (kg)	REMARKS
				D32	2 525.0 kg	
				D22	704.1 "	
				D19	284.7 "	
				D16	2 993.5 "	
				D13	1 623.0 "	
				D10	251.9 "	
			TOTAL WEIGHT		8 382.2 kg	

10. R C (RC16)

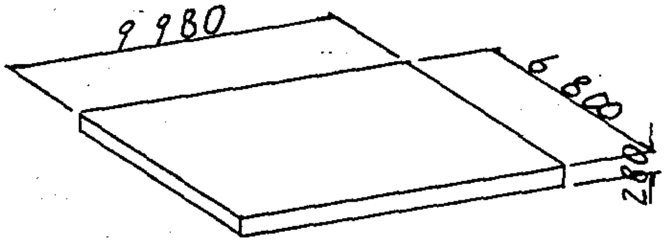
	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	32.7	79.6	2 423.1	74.1
BEAM	32.4	99.2	8 297.6	256.1
CURB	2.3	24.4	251.9	109.5
GRADING CONCRETE	6.5	——	——	——
TOTAL	73.9	203.2	10 972.6	148.5

	UNIT	QUANTITY	REMARKS
ANCHOR BAR	kg	113.2	φ60 × 850
BEARING PAT	EACH	6	600 × 300 × 12
		6	200 × 200 × 14

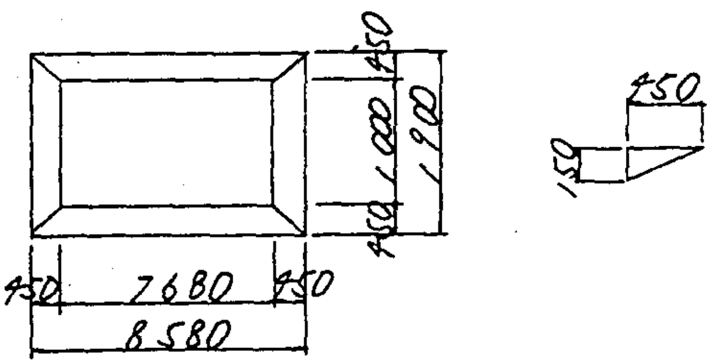
(RC16)

CONCRETE VOLUME

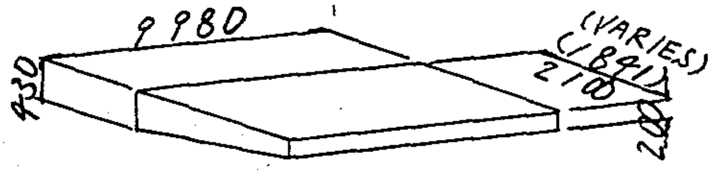
(1) SLAB



$V_a = 9.980 \times 6.800 \times 0.280 = 19.002\ m^3$



$V_b = [\ 8.580 \times 1.900 - \{ 8.580 \times 1.900 + (8.580 + 7.680)$
$\times (1.900 + 1.000) + 7.680 \times 1.000 \} \times 1/6\ ] \times 0.150 \times 2 = 1.334$ 〃



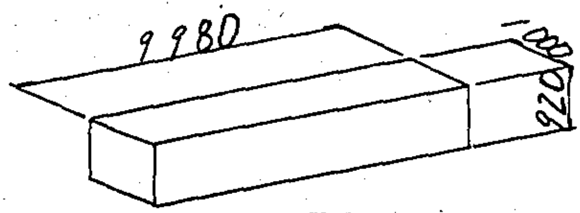
$V_c = \frac{1}{2} \times (0.430 + 0.200) \times 2.100 \times 9.980 = 6.602\ m^3$

$V_d = \frac{1}{2} \times (0.430 + 0.200) \times 1.841 \times 9.980 = 5.788\ "$

SLAB TOTAL 32.726 m^3

(2) BEAM

1) LONGITUDINAL BEAM

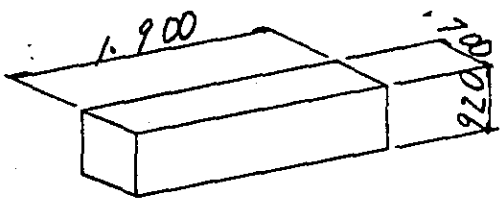


$V_a = 0.920 \times 1.000 \times 9.980 \times 3 = 27.545\ m^3$

27.545 m^3

2) TRANSVERSE BEAM

AT END

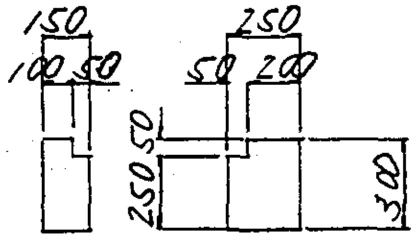


$V_a = 0.920 \times 0.700 \times 1.900 \times 4 = 4.894\ m^3$

4.894 m^3

BEAM TOTAL 32.439 m^3

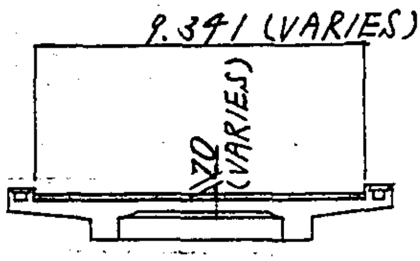
(3) CURB



$\ell = 9.981^{m}$
$\ell = 9.983$ "

$Va = (0.250 \times 0.150 + 0.100 \times 0.050) \times 9.981 =$	$0.424\ m^3$
$Vb = (0.250 \times 0.250 + 0.200 \times 0.050) \times 9.981 =$	0.724 "
$Vc = (0.250 \times 0.150 + 0.100 \times 0.050) \times 9.983 =$	0.424 "
$Vd = (0.250 \times 0.250 + 0.200 \times 0.050) \times 9.983 =$	0.724 "
CURB TOTAL	$2.296\ m^3$

(4) GRADING CONCRETE



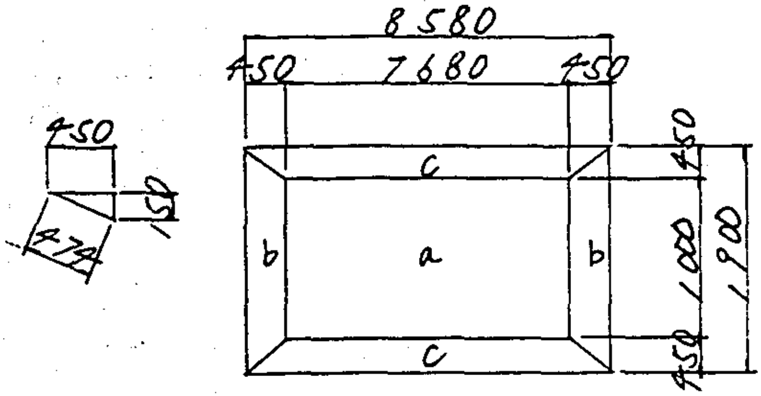
$\ell = 9.980^{m}$

$V = 0.07 \times 9.341 \times 9.980$ = $6.526\ m^3$

GRADING CONCRETE TOTAL $6.526\ m^3$

FORM AREA

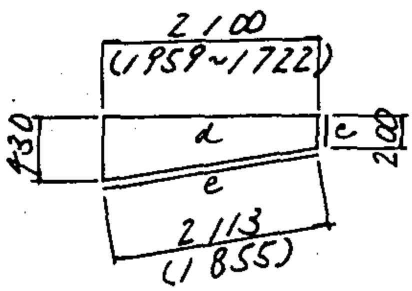
(1) SLAB



$$Aa = 7.680 \times 1.000 \times 2 = 15.360\ m^2$$

$$Ab = (1.900 + 1.000) \times 1/2 \times 0.474 \times 2 \times 2 = 2.749\ ''$$

$$Ac = (8.580 + 7.680) \times 1/2 \times 0.474 \times 2 \times 2 = 15.414\ ''$$



$\ell = 9.980^m$

$$Ad = (0.430 + 0.200) \times 1/2 \times 2.100 \times 2 = 1.323\ ''$$

$$Ae = (0.200 + 2.113) \times 9.980 = 23.084\ ''$$

$$Af = (0.430 + 0.200) \times 1/2 \times 1.959 = 0.617\ ''$$

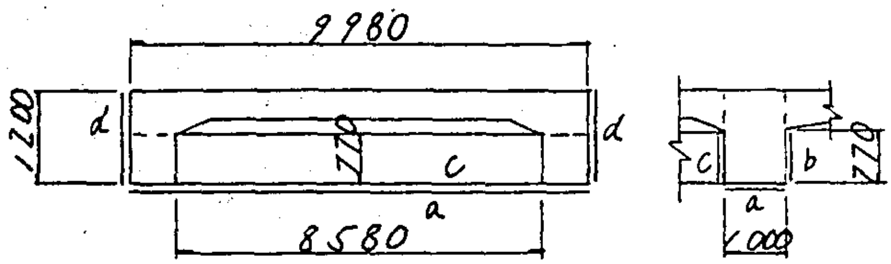
$$Ag = (0.430 + 0.200) \times 1/2 \times 1.722 = 0.542\ ''$$

$$Ah = (0.200 + 1.855) \times 9.980 = 20.509\ ''$$

SLAB TOTAL = $79.598\ m^2$

(2) BEAM

1) LONGITUDINAL BEAM



$Aa = 1.000 \times 9.980 \times 3$ = 29.940 m^2

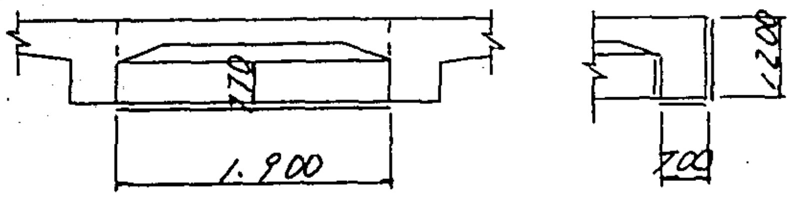
$Ab = 0.770 \times 9.980 \times 2$ = 15.369 "

$Ac = 0.770 \times 8.580 \times 4$ = 26.426 "

$Ad = 1.200 \times 1.000 \times 6$ = 7.200 "

78.935 m^2

2) TRANSVERSE BEAM
AT END

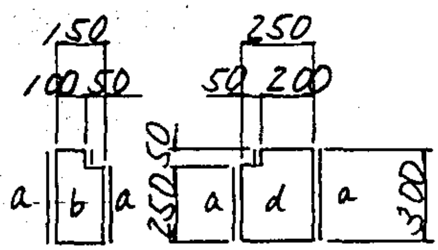


$Aa = (0.770 + 0.700 + 1.200) \times 1.900 \times 4$ = 20.292 m^2

20.292 m^2

BEAM TOTAL 99.227 m^2

(3) CURB



$\ell = 9.980^{m}$
$\ell = 9.983$ "

$Aa = 0.300 \times 4 \times 9.980$ =	11.976^{m^2}
$Ab = (0.250 \times 0.150 + 0.050 \times 0.100) \times 2 \times 2$ =	0.170 "
$Ac = 0.300 \times 4 \times 9.983$ =	11.980 "
$Ad = (0.250 \times 0.250 + 0.050 \times 0.200) \times 2 \times 2$ =	0.290 "
CURB TOTAL	24.416^{m^2}

RAINFORCING BAR

REFERENCE NO. OF RC.GIRDER : RC17

11. R C (RC24)

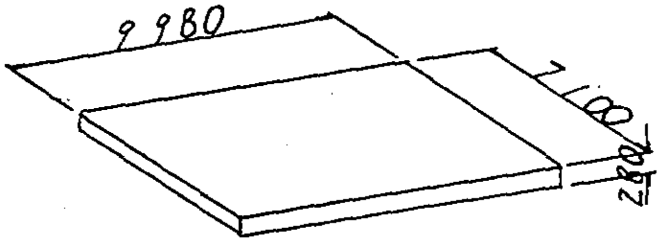
	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	32.6	79.0	2 415.7	74.1
BEAM	32.8	100.8	8 400.1	256.1
CURB	2.3	24.5	251.9	109.5
GRADING CONCRETE	6.5	—	—	—
TOTAL	74.2	204.3	11 067.7	149.2

	UNIT	QUANTITY	REMARKS
ANCHOR BAR	kg	113.2	960 × 850
BEARING PAT	EACH	6	600 × 300 × 12
		6	200 × 200 × 14

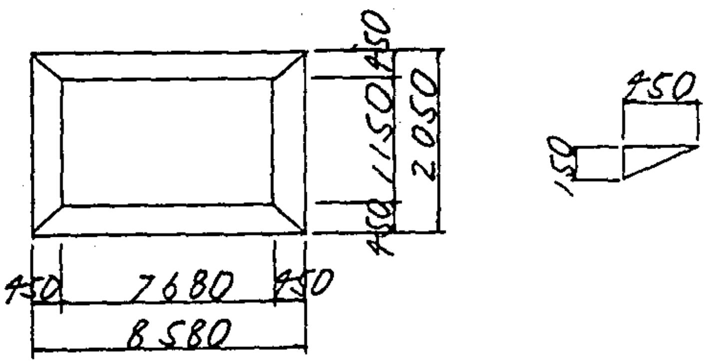
RC24

CONCRETE VOLUME

(1) SLAB

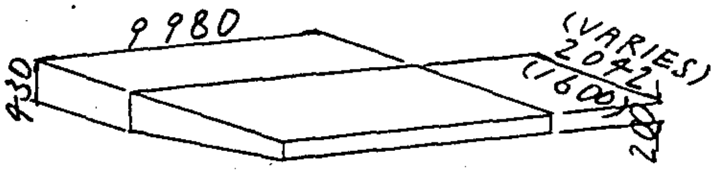


$V_a = 9.980 \times 7.100 \times 0.280 \qquad = 19.840\ m^3$



$V_b = [\,8.580 \times 2.050 - \{8.580 \times 2.050 + (8.580 + 7.680)$

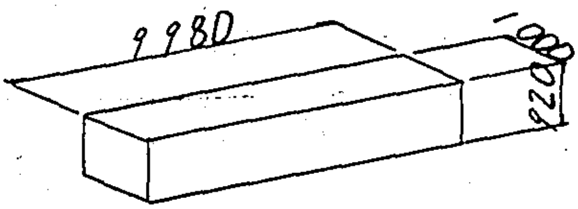
$\times (2.050 + 1.150) + 7.680 \times 1.150\} \times 1/6\,] \times 0.150 \times 2 = \qquad 1.354$ 〃



$Vc = 1/2 \times (0.430 + 0.200) \times 2.042 \times 9.980$ =	6.419 m^3
$Vd = 1/2 \times (0.430 + 0.200) \times 1.600 \times 9.980$ =	5.030 "
SLAB TOTAL	32.643 m^3

(2) BEAM

1) LONGITUDINAL BEAM

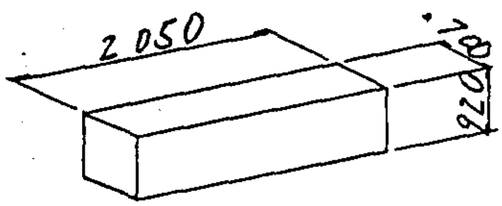


$Va = 0.920 \times 1.000 \times 9.980 \times 3 \quad = 27.545\ m^3$

$27.545\ m^3$

2) TRANSVERSE BEAM

AT END

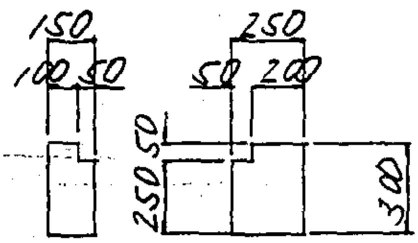


$Va = 0.920 \times 0.700 \times 2.050 \times 4 \quad = 5.281\ m^3$

$5.281\ m^3$

BEAM TOTAL $32.826\ m^3$

(3) CURB

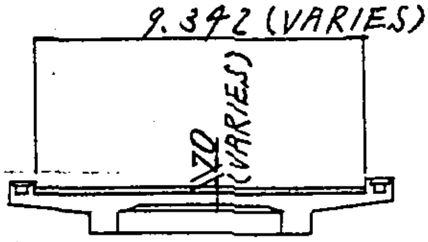


$\ell = 9.981^m$

$\ell = 10.030$ "

$Va = (0.250 \times 0.150 + 0.100 \times 0.050) \times 9.981$ =	$0.424 \, m^3$
$Vb = (0.250 \times 0.250 + 0.200 \times 0.050) \times 9.981$ =	0.724 "
$Vc = (0.250 \times 0.150 + 0.100 \times 0.050) \times 10.030$ =	0.426 "
$Vd = (0.250 \times 0.250 + 0.200 \times 0.050) \times 10.030$ =	0.727 "
CURB TOTAL	$2.301 \, m^3$

(4) GRADING CONCRETE

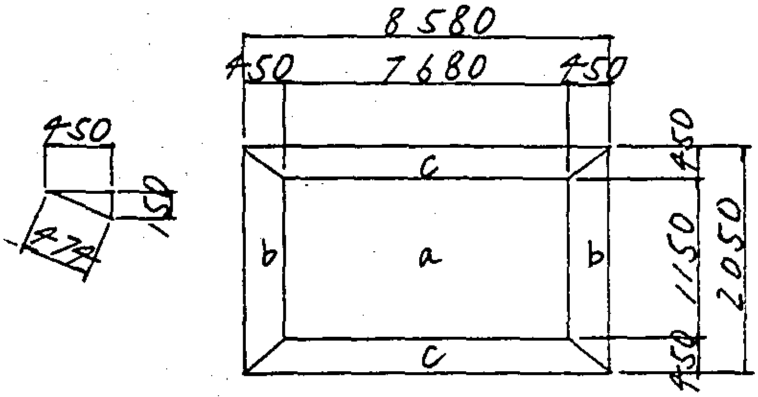


$\ell = 9.980^m$

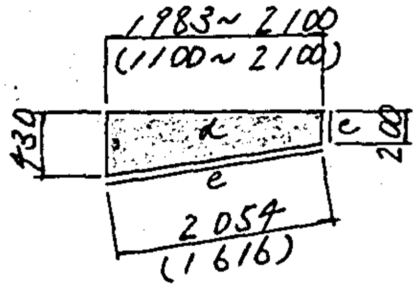
$V = 0.07 \times 9.342 \times 9.980$ =	$6.526\ m^3$
GRADING CONCRETE TOTAL	$6.526\ m^3$

FORM AREA

(1) SLAB



$A_a = 7.680 \times 1.150 \times 2$	$= 17.664\ m^2$
$A_b = (2.050 + 1.150) \times 1/2 \times 0.474 \times 2 \times 2$	$= 3.034$ "
$A_c = (8.580 + 7.680) \times 1/2 \times 0.474 \times 2 \times 2$	$= 15.414$ "

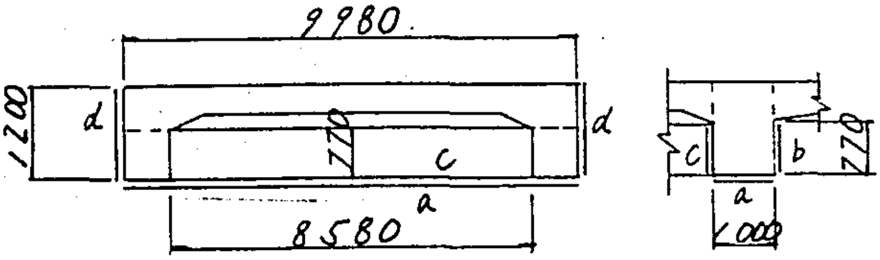


$\ell = 9.980^m$

$A_d = (0.430 + 0.200) \times 1/2 \times 1.983$	$= 0.625$ "
$A_e = (0.430 + 0.200) \times 1/2 \times 2.100 \times 2$	$= 1.323$ "
$A_f = (0.430 + 0.200) \times 1/2 \times 1.100$	$= 0.347$ "
$A_g = (0.200 + 0.054) \times 9.980$	$= 22.495$ "
$A_h = (0.200 + 1.616) \times 9.980$	$= 18.124$ "
SLAB TOTAL	$79.026\ m^2$

(2) BEAM

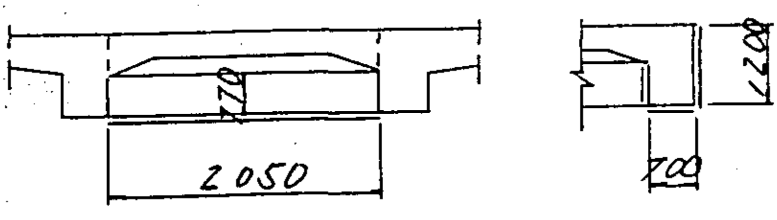
1) LONGITUDINAL BEAM



$Aa = 1.000 \times 9.980 \times 3$	$= 29.940\ m^2$
$Ab = 0.770 \times 9.980 \times 2$	$= 15.369$ "
$Ac = 0.770 \times 8.580 \times 4$	$= 26.426$ "
$Ad = 1.200 \times 1.000 \times 6$	$= 7.200$ "
	$78.935\ m^2$

2) TRANSVERSE BEAM

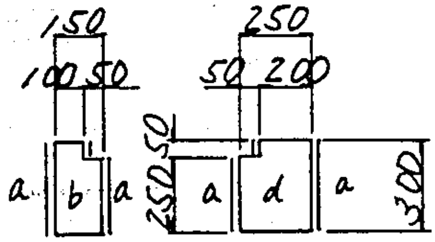
AT END



$Aa = (0.770 + 0.700 + 1.200) \times 2.050 \times 4$	$= 21.8$[illegible] m^2
	$21.894\ m^2$

BEAM TOTAL	$100.829\ m^2$

(3) CURB



$\ell = 9.981^{m}$

$\ell = 10.030$ "

$Aa = 0.300 \times 4 \times 9.981 = 11.977\ m^2$

$Ab = (0.250 \times 0.150 + 0.050 \times 0.100) \times 2 \times 2 = 0.170$ "

$Ac = 0.300 \times 4 \times 10.030 = 12.036$ "

$Ad = (0.250 \times 0.250 + 0.050 \times 0.200) \times 2 \times 2 = 0.290$ "

CURB TOTAL $24.473\ m^2$

RAINFORCING BAR

REFERENCE NO. OF R.C.GIRDER : RC1T

12.R C RC25

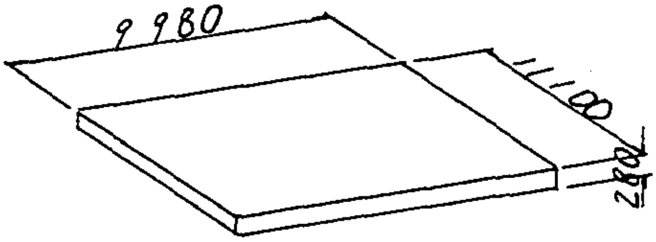
	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	46.1	120.4	3 416.0	74.1
BEAM	38.0	122.2	9 731.8	256.1
CURB	2.3	24.4	251.9	109.5
GRADING CONCRETE	9.8	——	——	——
TOTAL	96.2	267.0	13 399.7	139.3

	UNIT	QUANTITY	REMARKS
ANCHOR BAR	kg	113.2	960 × 850
BEARING PAT	EACH	6	600 × 300 × 12
		6	200 × 200 × 14

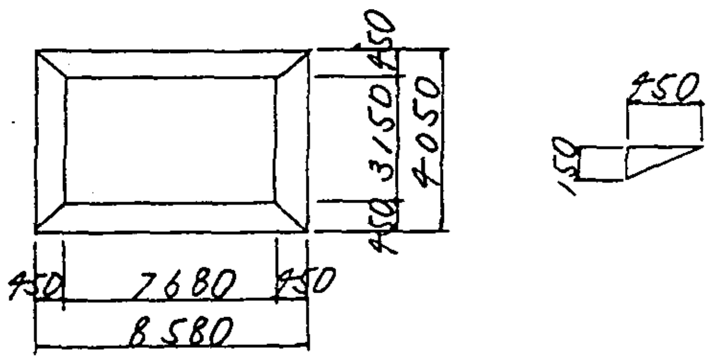
RC25

CONCRETE VOLUME

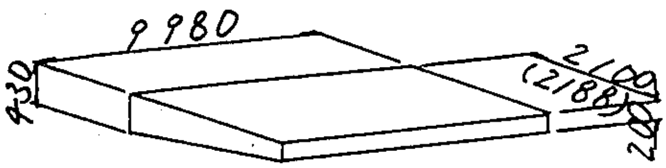
(1) SLAB



$V_a = 9.980 \times 11.100 \times 0.280 = 31.018\ m^3$



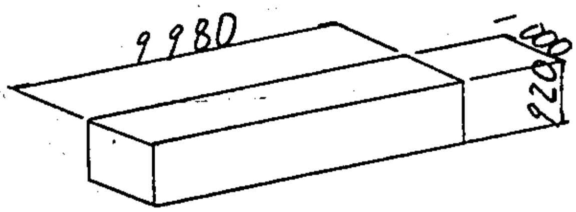
$V_b = [\,8.580 \times 4.050 - \{8.580 \times 4.050 + (8.580 + 7.680) \times (4.050 + 3.150) + 7.680 \times 3.150\} \times 1/6\,] \times 0.150 \times 2 = 1.624$ "



$Vc = 1/2 \times (0.430 + 0.200) \times 2.100 \times 9.980$ =	6.602 m³
$Vd = 1/2 \times (0.430 + 0.200) \times 2.188 \times 9.980$ =	6.878 ″
SLAB TOTAL	46.122 m³

(2) BEAM

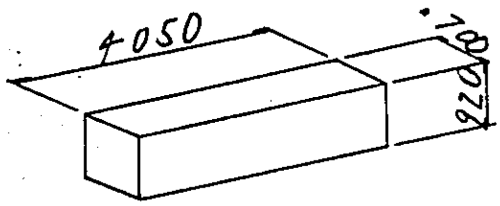
1) LONGITUDINAL BEAM



Va = 0.920 × 1.000 × 9.980 × 3 =	27.545 m^3
	27.545 m^3

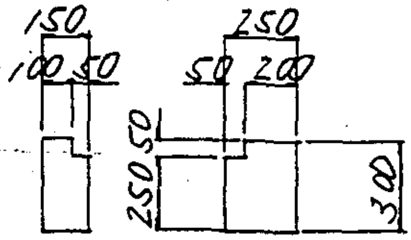
2) TRANSVERSE BEAM

AT END



Va = 0.920 × 0.700 × 4.050 × 4 =	10.433 m^3
	10.433 m^3
BEAM TOTAL	37.978 m^3

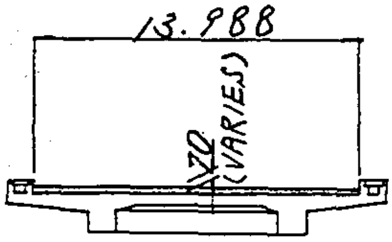
(3) CURB



$\ell = 9.980^{m}$

$V_a = (0.250 \times 0.150 + 0.100 \times 0.050) \times 9.980 \times 2 =$	$0.848\ m^3$
$V_b = (0.250 \times 0.250 + 0.200 \times 0.050) \times 9.980 \times 2 =$	1.447 "
CURB TOTAL	$2.295\ m^3$

(4) GRADING CONCRETE

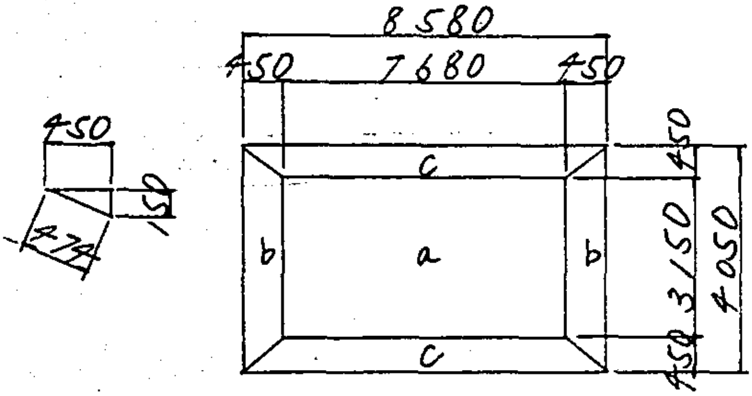


$\ell = 9.980^{m}$

$V = 0.07 \times 13.988 \times 9.980$	$= 9.772\ m^3$
GRADING CONCRETE TOTAL	$9.772\ m^3$

FORM AREA

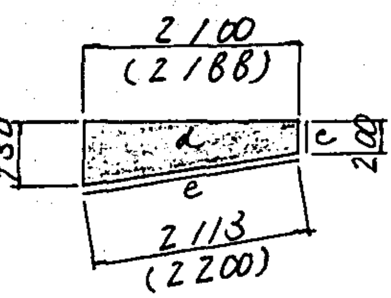
(1) SLAB



$$A_a = 7.680 \times 3.150 \times 2 = 48.384 \ m^2$$

$$A_b = (4.050 + 3.150) \times 1/2 \times 0.474 \times 2 \times 2 = 6.826 \ ''$$

$$A_c = (8.580 + 7.680) \times 1/2 \times 0.474 \times 2 \times 2 = 15.414 \ ''$$



$\ell = 9.980 \ m$

$$A_d = (0.430 + 0.200) \times 1/2 \times 2.100 \times 2 = 1.323 \ ''$$

$$A_e = (0.200 + 2.113) \times 9.980 = 23.084 \ ''$$

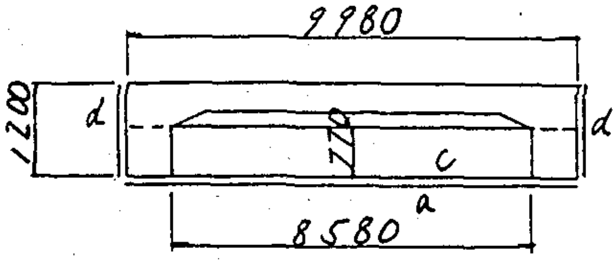
$$A_f = (0.430 + 0.200) \times 1/2 \times 2.188 \times 2 = 1.378 \ ''$$

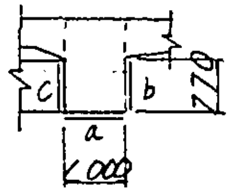
$$A_g = (0.200 + 2.200) \times 9.980 = 23.952 \ ''$$

SLAB TOTAL $120.361 \ m^2$

(2) BEAM

1) LONGITUDINAL BEAM





$Aa = 1.000 \times 9.980 \times 3 \qquad = 29.940\ m^2$

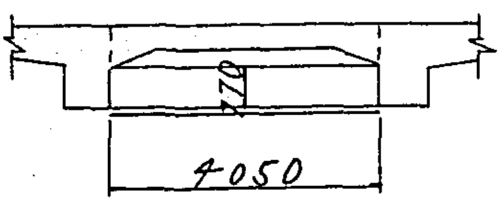
$Ab = 0.770 \times 9.980 \times 2 \qquad = 15.369\ "$

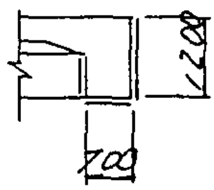
$Ac = 0.770 \times 8.580 \times 4 \qquad = 26.426\ "$

$Ad = 1.200 \times 1.000 \times 6 \qquad = 7.200\ "$

$78.935\ m^2$

2) TRANSVERSE BEAM
AT END



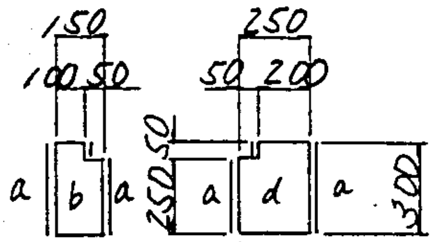


$Aa = (0.770 + 0.700 + 1.200) \times 4.050 \times 4 \qquad = 43.254\ m^2$

$43.254\ m^2$

BEAM TOTAL $122.189\ m^2$

(3) CURB



$\ell =$ m

$A_a = 0.300 \times 4 \times$ =	m²
$A_b = (0.250 \times 0.150 + 0.050 \times 0.100) \times 2 \times 2$ =	0.170 "
$A_c = 0.300 \times 4 \times$ =	"
$A_d = (0.250 \times 0.250 + 0.050 \times 0.200) \times 2 \times 2$ =	0.290 "
CURB TOTAL	m²

RAINFORCING BAR

REFERENCE NO. OF R.C. GIRDER : RC17

13. R C (RC26)

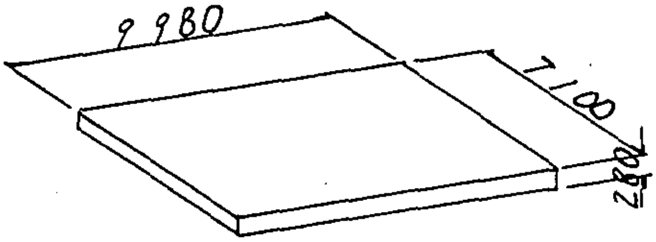
	CONCRETE VOLUME (m^3)	FORM AREA (m^2)	REINFORCING BAR (kg)	RATIO (kg/m^3)
SLAB	35.5	90.0	2 630.6	74.1
BEAM	32.8	100.8	8 400.1	256.1
CURB	2.5	26.3	273.8	109.5
GRADING CONCRETE	7.0	——	——	——
TOTAL	77.8	217.1	11 304.5	145.3

	UNIT	QUANTITY	REMARKS
ANCHOR BAR	kg	113.2	φ 60 × 850
BEARING PAT	EACH	6	600 × 300 × 12
		6	200 × 200 × 14

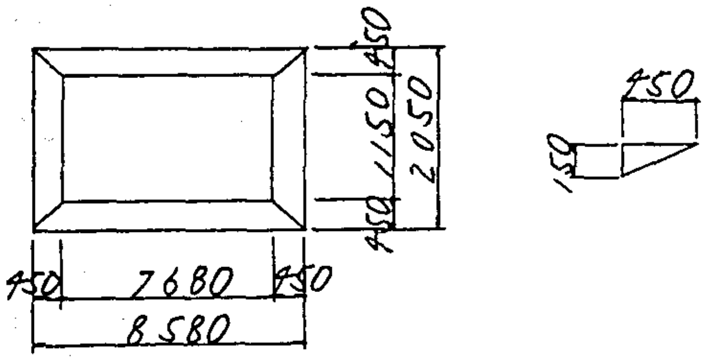
(RC26)

CONCRETE VOLUME

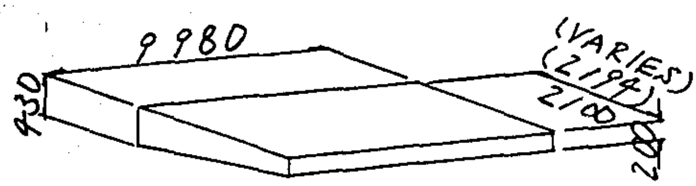
(1) SLAB



$$V_a = 9.980 \times 7.100 \times 0.280 = 19.840\ m^3$$

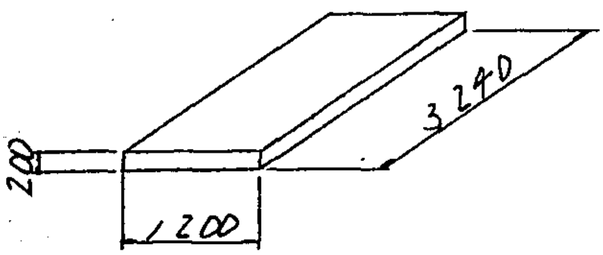


$$V_b = [\,8.580 \times 2.050 - \{8.580 \times 2.050 + (8.580 + 7.680) \times (2.050 + 1.150) + 7.680 \times 1.150\} \times 1/6\,] \times 0.150 \times 2 = 1.354\ ''$$



$$V_c = 1/2 \times (0.430 + 0.200) \times 2.100 \times 9.980 = 6.602\ m^3$$

$$V_d = 1/2 \times (0.430 + 0.200) \times 2.194 \times 9.980 = 6.897\ "$$

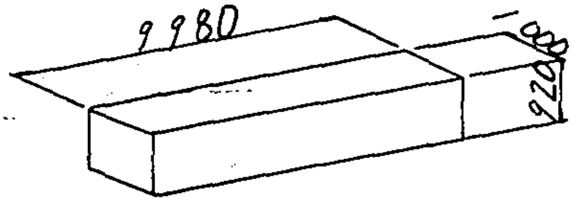


$$V_e = 1.200 \times 0.200 \times 3.240 = 0.778\ "$$

SLAB TOTAL 35.471 m^3

(2) BEAM

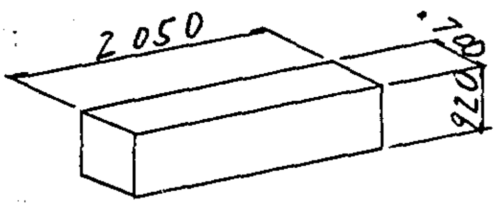
1) LONGITUDINAL BEAM



$Va = 0.920 \times 1.000 \times 9.980 \times 3$ =	$27.545 m^3$
	$27.545 m^3$

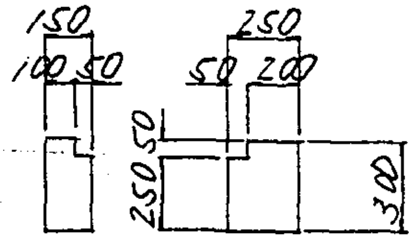
2) TRANSVERSE BEAM

AT END



$Va = 0.920 \times 0.700 \times 2.050 \times 4$ =	$5.281 m^3$
	$5.281 m^3$
BEAM TOTAL	$32.826 m^3$

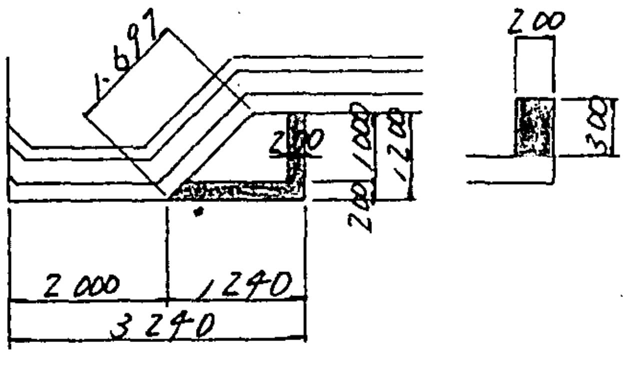
(3) CURB



$\ell = 9.980^{m}$

$V_a = (0.250 \times 0.150 + 0.100 \times 0.050) \times 9.980 \times 2 = 0.848\ m^3$

$V_b = (0.250 \times 0.250 + 0.200 \times 0.050) \times 9.980 \times 2 = 1.447$ "



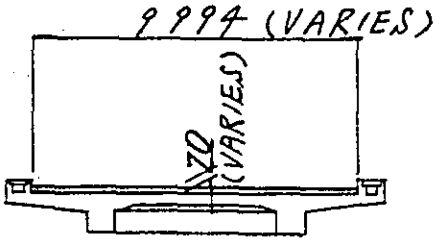
$V = (0.250 \times 0.150 + 0.100 \times 0.05) \times (1.697 - 1.200) = 0.021\ m^3$

$V = (0.250 \times 0.25 + 0.20 \times 0.05) \times (1.697 - 1.200) = 0.036$ "

$V = 0.20 \times 0.30 \times (1.24 + 1.000) = 0.134$ "

CURB TOTAL $2.486\ m^3$

(4) GRADING CONCRETE



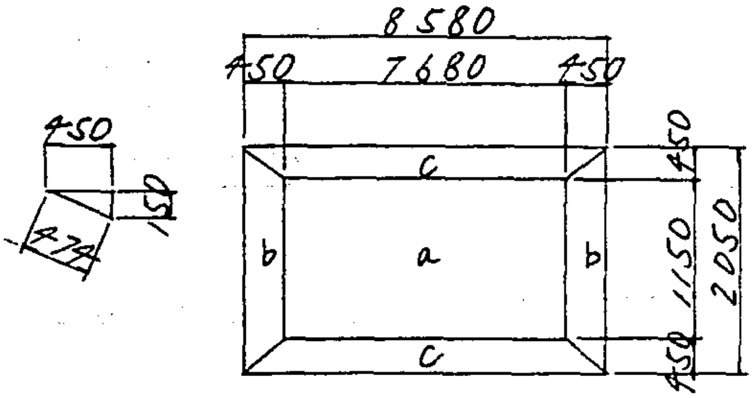
$\ell = 9.980^{m}$

$V = 0.07 \times 9.994 \times 9.980 = 6.982\ m^3$

GRADING CONCRETE TOTAL 6.982 m^3

FORM AREA

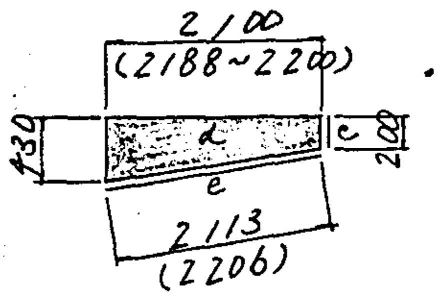
(1) SLAB



$A_a = 7.680 \times 1.150 \times 2 = 17.664 \text{ m}^2$

$A_b = (2.050 + 1.150) \times 1/2 \times 0.474 \times 2 \times 2 = 3.034$ "

$A_c = (8.580 + 7.680) \times 1/2 \times 0.474 \times 2 \times 2 = 15.414$ "



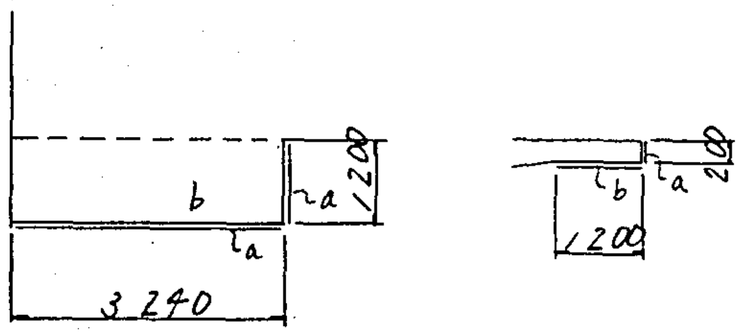
$\ell = 9.980 \text{ m}$

$A_d = (0.430 + 0.200) \times 1/2 \times 2.100 \times 2 = 1.323$ "

$A_e = (0.200 + 2.113) \times 9.980 = 23.084$ "

$A_f = (0.430 + 0.200) \times 1/2 \times 2.194 = 1.382$ "

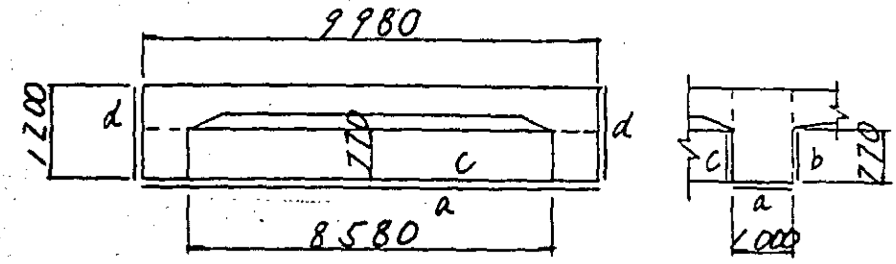
$A_g = (0.200 + 2.206) \times 9.980 = 24.012$ "



$-A = 3.240 \times 0.20$	$= -0.648\ m^2$
$Aa = (1.20 + 3.240) \times 0.20$	$= 0.888$ 〃
$Ab = 3.240 \times 1.200$	$= 3.888$ 〃
SLAB TOTAL	$90.041\ m^2$

(2) BEAM

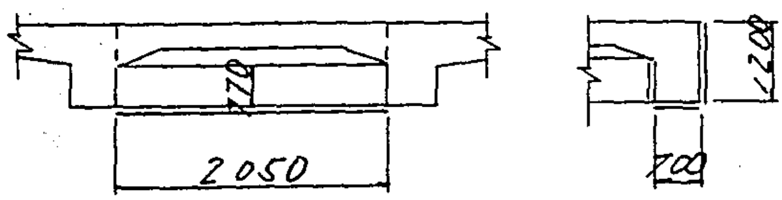
1) LONGITUDINAL BEAM



$Aa = 1.000 \times 9.980 \times 3$	=	$29.940\ m^2$
$Ab = 0.770 \times 9.980 \times 2$	=	15.369 "
$Ac = 0.770 \times 8.580 \times 4$	=	26.426 "
$Ad = 1.200 \times 1.000 \times 6$	=	7.200 "
		$78.935\ m^2$

2) TRANSVERSE BEAM

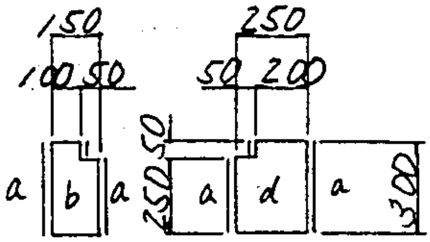
AT END



$Aa = (0.770 + 0.700 + 1.200) \times 2.050 \times 4$	=	$21.894\ m^2$
		$21.894\ m^2$

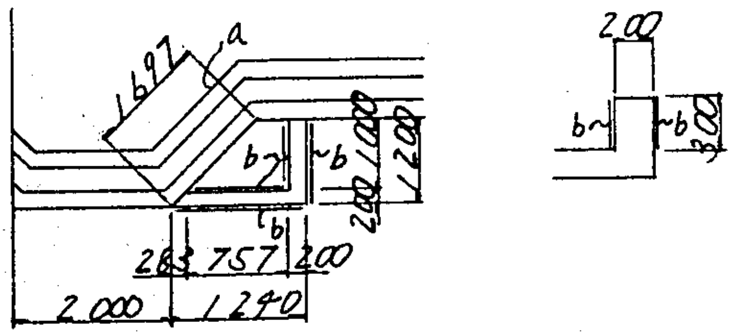
BEAM TOTAL	$100.829\ m^2$

(3) CURB



$\ell = 9.980^{m}$

$Aa = 0.300 \times 2 \times 9.980 \times 2$ =	$11.976\ m^2$
$Ab = (0.250 \times 0.150 + 0.050 \times 0.100) \times 2 \times 2$ =	0.170 "
$Ac = 0.300 \times 2 \times 9.980 \times 2$ =	11.976 "
$Ad = (0.250 \times 0.250 + 0.050 \times 0.200) \times 2 \times 2$ =	0.290 "



$A = 0.30 \times (1.697 - 1.20) \times 4$ =	$0.596\ m^2$
$A = 0.30 \times (1.240 + 0.757 + 1.20 + 1.000)$ =	1.259 "
CURB TOTAL	$26.267\ m^2$

RAINFORCING BAR

REFERENCE NO. OF R.C.GIRDER : RC17