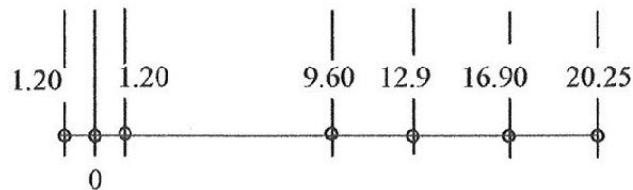
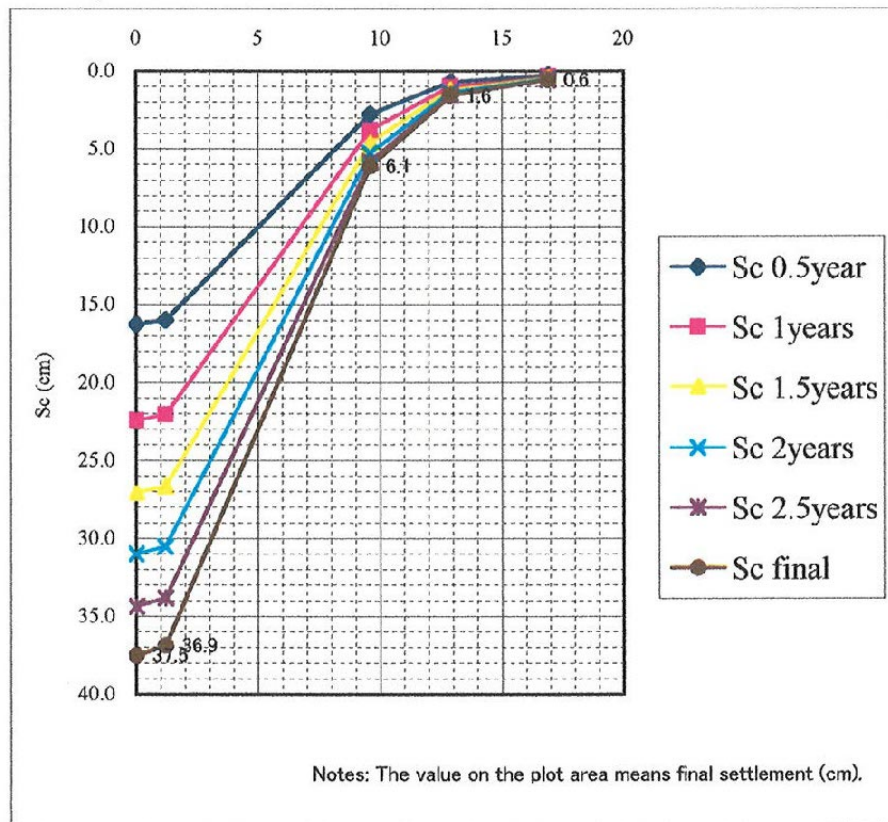
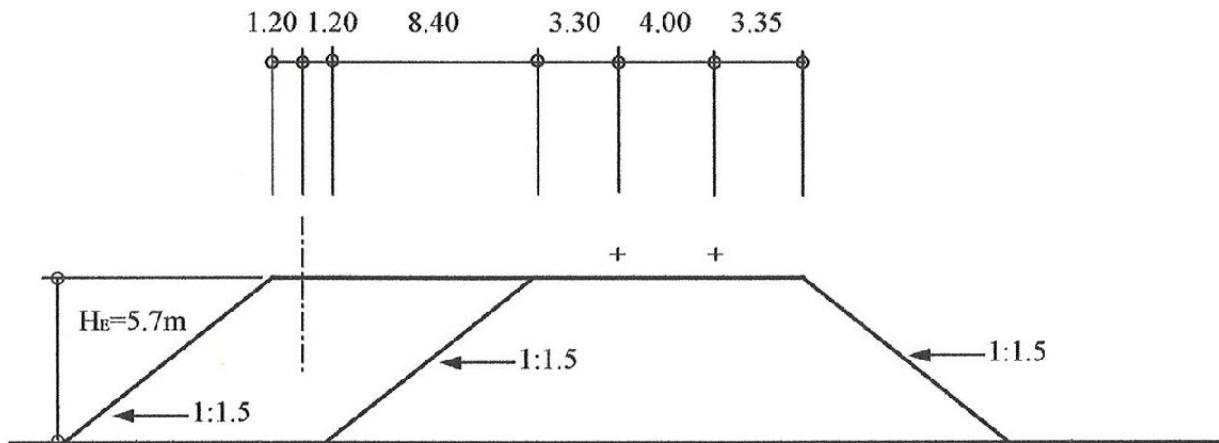


6. Analysis Data

Analysis Data for Consolidation Settlement and Stability

Km.23+100 HE=5.7M



Final settlement (cm)					
Distance (m)	0	1.20	9.60	12.90	16.90
Settlement (cm)	37.5	36.9	6.1	1.6	0.6

Fig. Settlement and Distance Km.23+100 H=5.7m

Scale : 1 / 657

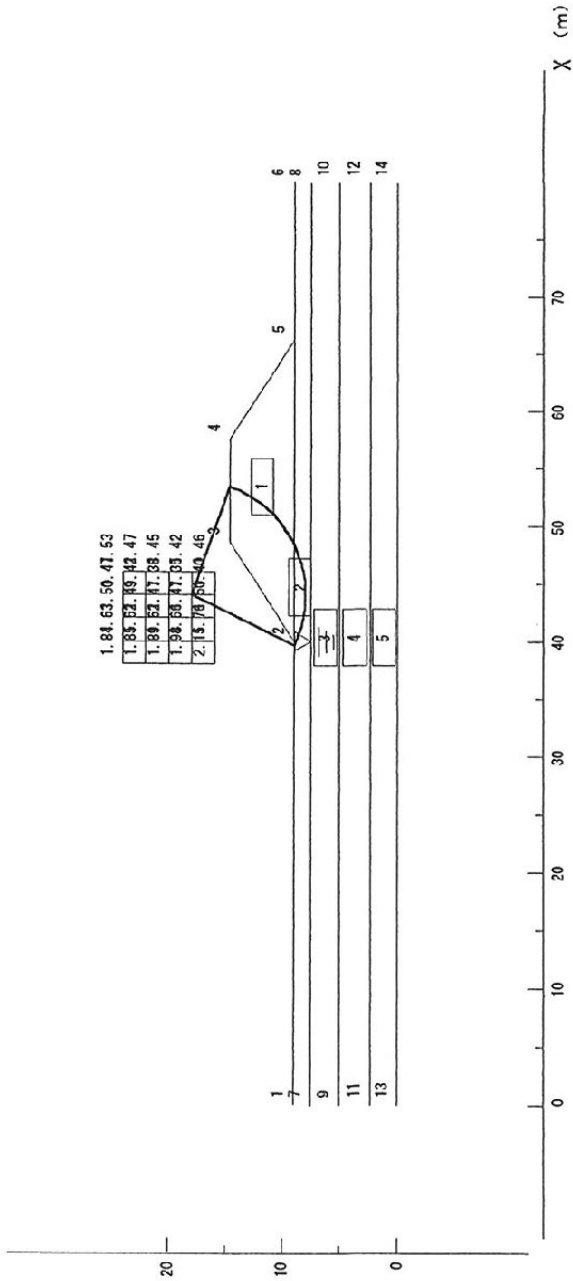
Safety Factor

Fs MIN = 1.365
X = 44.00 (m)
Y = 18.00 (m)
R = 10.00 (m)
Mr = 349.32 (tf - m)
Mo = 257.74 (tf - m)

Radius
Resistive Moment
Slipping Moment

Layer	Unit Weight (t/m^3)	Saturated gravity (t/m^3)	Internal friction angle	Cohesion (t/m^2)	1st Coeff. of Cohesion	Horizontal Seismic Coeff	Vertical seismic Coeff
1	1.800	1.700	10.00	2.20	0.00	0.000	0.000
2	1.760	1.660	0.00	1.50	0.00	0.000	0.000
3	1.760	1.660	0.00	2.50	0.00	0.000	0.000
4	1.760	1.660	0.00	3.00	0.00	0.000	0.000
5	1.900	1.800	0.00	30.00	0.00	0.000	0.000

Unit weight of water = $1,000 \text{ tf/m}^3$



Slope Stability Analysis

CALCULATION OF INITIAL PRESSURE

Km 23+100 HE=5.7m Center of Embankment

SOIL No.	SOIL	THICKNESS OF SOIL	WET UNIT WEIGHT	CALCULATION OF INITIAL PRESSURE	INITIAL PRESSURE
1	Ac1	1.500	1.660	$0.000 + 0.5(0.000 * 0.000 + 1.500 * 1.660)$	1.245
2	Ac2	2.500	0.660	$1.245 + 0.5(1.500 * 1.660 + 2.500 * 0.660)$	3.315
3	Ac3	2.600	0.660	$3.315 + 0.5(2.500 * 0.660 + 2.600 * 0.660)$	4.998

INTENSITY OF DISTRIBUTED LOAD $q=H*rt= 5.70 * 1.800 10.26$

SOIL No.	SOIL	DEPTH FROM CENTRAL	a/Z a= 8.550	b/Z b= 1.200	i	DP	Po	Po+DP
SOIL STRUTA								
1	Ac1	0.750	11.400	1.600	0.497	10.200	1.245	11.445
2	Ac2	2.750	3.109	0.436	0.452	9.275	3.315	12.590
3	Ac3	5.300	1.613	0.225	0.379	7.787	4.998	12.785

SUBSIDED VALUE FOR CONSOLIDATION AND COEFFICIENT OF CONSOLIDATION

SOIL No.	SOIL	THICKNESS OF SOIL	Po	DP	Po+DP	co	ci	Sc	DP/2	Po+DP/2	Cv
1	Ac1	1.5000	1.2450	10.2003	11.4453	1.6500	1.4600	0.1075	5.1001	6.3451	395
2	Ac2	2.5000	3.3150	9.2752	12.5902	1.6000	1.4470	0.1471	4.6376	7.9526	380
3	Ac3	2.6000	4.9980	7.7872	12.7852	1.5630	1.4440	0.1207	3.8936	8.8916	380

TYPICAL COEFFICIENT OF CONSOLIDATION AND DISTANCE OF DRAINAGE

SOIL No.	SOIL	THICKNESS OF SOIL	Cv	Cv'	H'	CONDITION OF DRAINAGE	DISTANCE OF DRAINAGE
1	Ac1	150.00	395.00	380.00	657.12	1Side	657.12
2	Ac2	250.00	380.00				
3	Ac3	260.00	380.00				

SUBSIDED TIME FOR CONSOLIDATION BY MOMENTARY EMBANKMENT

U (%)	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	95.00	100.00
Tv	0.008	0.031	0.071	0.126	0.196	0.287	0.403	0.567	0.848	1.130	infinite

EXPRESSION $t=Tv.d^2/C'v=Tv. 657.12^2 / 380.00=1136.35$

t (days) 9.09 35.23 80.68 143.18 222.72 326.13 457.95 644.31 963.62 1284.07

Sc.U (cm) 3.75 7.51 11.26 15.02 18.77 22.52 26.28 30.03 33.78 35.66 37.54

*APPENDIX

CALCULATION OF CONVERTIBLE SOIL THICKNESS

$$150.00 * \text{SQR}(380.00 / 395.00) + 250.00 * \text{SQR}(380.00 / 380.00) + 260.00 * \text{SQR}(380.00 / 380.00)$$

CALCULATION OF INITIAL PRESSURE

Km 23+100 HE=5.7m Top of Slope of Embankment

SOIL No.	SOIL	THICKNESS OF SOIL	WET UNIT WEIGHT	CALCULATION OF INITIAL PRESSURE	INITIAL PRESSURE
1	Ac1	1.500	1.660	$0.000+0.5(0.000 * 0.000 + 1.500 * 1.660)$	1.245
2	Ac2	2.500	0.660	$1.245+0.5(1.500 * 1.660 + 2.500 * 0.660)$	3.315
3	Ac3	2.600	0.660	$3.315+0.5(2.500 * 0.660 + 2.600 * 0.660)$	4.998

INTENSITY OF DISTRIBUTED LOAD $q=H*rt= 5.70* 1.800 10.26$

SOIL No.	SOIL	DEPTH FROM CENTRAL	a/Z	b1/Z	b2/Z	I1	I2	DP	Po	Po+DP
			a= 8.550	b1= 0.000	b2= 2.400					
		SOIL STRUTA								
1	Ac1	0.750	11.400	0.000	3.200	0.472	0.499	9.966	1.245	11.211
2	Ac2	2.750	3.109	0.000	0.873	0.401	0.476	8.997	3.315	12.312
3	Ac3	5.300	1.613	0.000	0.453	0.323	0.419	7.613	4.998	12.611

SUBSIDED VALUE FOR CONSOLIDATION AND COEFFICIENT OF CONSOLIDATTION

SOIL No.	SOIL	THICKNESS OF SOIL	Po	DP	Po+DP	eo	ei	Sc	DP/2	Po+DP/2	Cv
1	Ac1	1.5000	1.2450	9.9659	11.2109	1.6500	1.4650	0.1047	4.9829	6.2279	395
2	Ac2	2.5000	3.3150	8.9968	12.3118	1.6000	1.4500	0.1442	4.4984	7.8134	385
3	Ac3	2.6000	4.9980	7.6125	12.6105	1.5630	1.4450	0.1197	3.8063	8.8043	380

TYPICAL COEFFICIENT OF CONSOLIDATION AND DISTANCE OF DRAINAGE

SOIL No	SOIL	THICKNESS OF SOIL	Cv	Cv'	H'	CONDITION OF DRAINAGE	DISTANCE OF DRAINAGE
1	Ac1	150.00	395.00	380.00	655.50	1Side	655.50
2	Ac2	250.00	385.00				
3	Ac3	260.00	380.00				

SUBSIDED TIME FOR CONSOLIDATION BY MOMENTARY EMBANKMENT

U (%)	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	95.00	100.00
Tv	0.008	0.031	0.071	0.126	0.196	0.287	0.403	0.567	0.848	1.130	infinite

EXPRESSION $t=Tv.d^2/C'v=Tv. 655.50^2/ 380.00=1130.72$

t (days) 9.05 35.05 80.28 142.47 221.52 324.52 455.68 641.12 958.85 1277.72

Sc. U (cm) 3.69 7.37 11.06 14.75 18.43 22.12 25.81 29.49 33.18 35.02 36.87

*APPENDIX

CALCULATION OF CONVERTIBLE SOIL THICKNESS

$$150.00 * \text{SQR}(380.00 / 395.00) + 250.00 * \text{SQR}(380.00 / 385.00) + 260.00 * \text{SQR}(380.00 / 380.00)$$

CALCULATION OF INITIAL PRESSURE

Km 23+100 HE=5.7m Toe of Slope of Embankment

SOIL No.	SOIL	THICKNESS OF SOIL	WET UNIT WEIGHT	CALCULATION OF INITIAL PRESSURE	INITIAL PRESSURE
1	Ac1	1.500	1.660	$0.000 + 0.5(0.000 * 0.000 + 1.500 * 1.660)$	1.245
2	Ac2	2.500	0.660	$1.245 + 0.5(1.500 * 1.660 + 2.500 * 0.660)$	3.315
3	Ac3	2.600	0.660	$3.315 + 0.5(2.500 * 0.660 + 2.600 * 0.660)$	4.998

INTENSITY OF DISTRIBUTED LOAD

SOIL No.	SOIL	DEPTH FROM CENTRAL	$a1+a2/Z$	$a1+b/Z$	$a1/Z$	$a2/Z$	b/Z	I1	I2	I3	DP	Po	Po+DP
			a1= 8.550	a2= 0.000	b= 2.400								
		SOIL STRUTA											
1	Ac1	0.750	11.400	14.600	11.400	0.000	0.000	0.500	0.470	0.000	0.308	1.245	1.553
2	Ac2	2.750	3.109	3.982	3.109	0.000	0.000	0.496	0.400	0.000	0.985	3.315	4.300
3	Ac3	5.300	1.613	2.066	1.613	0.000	0.000	0.490	0.310	0.000	1.847	4.998	6.845

SUBSIDED VALUE FOR CONSOLIDATION AND COEFFICIENT OF CONSOLIDATION

SOIL No.	SOIL	THICKNESS OF SOIL	Po	DP	Po+DP	eo	e1	Sc	DP/2	Po+DP/2	Cv
1	Ac1	1.5000	1.2450	0.3078	1.5528	1.6500	1.5420	0.0045	0.1539	1.3989	460
2	Ac2	2.5000	3.3150	0.9850	4.3000	1.6000	1.5760	0.0231	0.4925	3.8075	420
3	Ac3	2.6000	4.9980	1.8468	6.8448	1.5630	1.5300	0.0335	0.9234	5.9214	400

TYPICAL COEFFICIENT OF CONSOLIDATION AND DISTANCE OF DRAINAGE

SOIL No.	SOIL	THICKNESS OF SOIL	Cv	Cv'	H'	CONDITION OF DRAINAGE	DISTANCE OF DRAINAGE
1	Ac1	150.00	460.00	400.00	643.85	1Side	643.85
2	Ac2	250.00	420.00				
3	Ac3	260.00	400.00				

SUBSIDED TIME FOR CONSOLIDATION BY MOMENTARY EMBANKMENT

U (%)	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	95.00	100.00
Tv	0.008	0.031	0.071	0.126	0.196	0.287	0.403	0.567	0.848	1.130	infinite

EXPRESSION $t = Tv \cdot d^2 / C'v = Tv \cdot 643.85^2 / 400.00 = 1036.35$

t (days) 8.29 32.13 73.58 130.58 203.13 297.44 417.65 587.62 878.83 1171.09

Sc, U (cm) 0.61 1.22 1.83 2.44 3.05 3.66 4.28 4.89 5.50 5.80 6.11

*APPENDIX

CALCULATION OF CONVERTIBLE SOIL THICKNESS

$$150.00 * \text{SQR}(400.00 / 460.00) + 250.00 * \text{SQR}(400.00 / 420.00) + 260.00 * \text{SQR}(400.00 / 400.00)$$

CALCULATION OF INITIAL PRESSURE

Km 23+100 HE=5.7m 3.3m from Toe of Slope

SOIL No.	SOIL	THICKNESS OF SOIL	WET UNIT WEIGHT	CALCULATION OF INITIAL PRESSURE	INITIAL PRESSURE
1	Ac1	1.500	1.660	$0.000 + 0.5 (0.000 * 0.000 + 1.500 * 1.660)$	1.245
2	Ac2	2.500	0.660	$1.245 + 0.5 (1.500 * 1.660 + 2.500 * 0.660)$	3.315
3	Ac3	2.600	0.660	$3.315 + 0.5 (2.500 * 0.660 + 2.600 * 0.660)$	4.998

INTENSITY OF DISTRIBUTED LOAD $q=H*rt= 5.70 * 1.800 10.26$

SOIL No.	SOIL	DEPTH FROM CENTRAL	a1/Z	a1+a2+b/Z	a2/Z	I1	I2	DP	Po	Po+DP
			a1= 8.550	a2= 3.300	b= 1.200					
SOIL STRUTA										
1	Ac1	0.750	11.400	19.006	4.400	0.000	0.000	0.000	1.245	1.249
2	Ac2	2.750	3.109	5.182	1.200	0.014	0.000	0.149	3.315	3.464
3	Ac3	5.300	1.613	2.689	0.623	0.056	0.000	0.575	4.998	5.573

SUBSIDED VALUE FOR CONSOLIDATION AND COEFFICIENT OF CONSOLIDATTION

SOIL No.	SOIL	THICKNESS OF SOIL	Po	DP	Po+DP	e0	e1	Sc	DP/2	Po+DP/2	Cv
1	Ac1	1.5000	1.2450	0.0042	1.2492	1.6500	1.6500	0.0000	0.0021	1.2471	470
2	Ac2	2.5000	3.3150	0.1487	3.4637	1.6000	1.5950	0.0048	0.0744	3.3894	420
3	Ac3	2.6000	4.9980	0.5747	5.5727	1.5630	1.5520	0.0112	0.2873	5.2853	400

TYPICAL COEFFICIENT OF CONSOLIDATION AND DISTANCE OF DRAINAGE

SOIL No	SOIL	THICKNESS OF SOIL	Cv	Cv'	H'	CONDITION OF DRAINAGE	DISTANCE OF DRAINAGE
1	Ac1	150.00	470.00	400.00	642.36	1Side	642.36
2	Ac2	250.00	420.00				
3	Ac3	260.00	400.00				

SUBSIDED TIME FOR CONSOLIDATION BY MOMENTARY EMBANKMENT

U (%)	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	95.00	100.00
Tv	0.008	0.031	0.071	0.126	0.196	0.287	0.403	0.567	0.848	1.130	infinite

EXPRESSION $t=Tv \cdot d^2/C'v=Tv \cdot 642.36^2/ 400.00=1031.55$

t (days) 8.25 31.98 73.24 129.98 202.18 296.06 415.71 584.89 874.75 1165.65

Sc U (cm) 0.16 0.32 0.48 0.64 0.80 0.96 1.12 1.28 1.44 1.52 1.60

*APPENDIX

CALCULATION OF CONVERTIBLE SOIL THICKNESS

$150.00 *SQR(400.00 / 470.00) + 250.00 *SQR(400.00 / 420.00) + 260.00 *SQR(400.00 / 400.00)$

CALCULATION OF INITIAL PRESSURE

Km 23+100 HE=5.7m 7.3m from Toe of Slope

SOIL No.	SOIL	THICKNESS OF SOIL	WET UNIT WEIGHT	CALCULATION OF INITIAL PRESSURE	INITIAL PRESSURE
1	Ac1	1.500	1.660	$0.000+0.5(0.000 * 0.000 + 1.500 * 1.660)$	1.245
2	Ac2	2.500	0.660	$1.245+0.5(1.500 * 1.660 + 2.500 * 0.660)$	3.315
3	Ac3	2.600	0.660	$3.315+0.5(2.500 * 0.660 + 2.600 * 0.660)$	4.998

INTENSITY OF DISTRIBUTED LOAD $q=H*ri= 5.70* 1.800 10.26$

SOIL No.	SOIL	DEPTH FROM CENTRAL	a1/Z	a1+a2+b/Z	a2/Z	l1	l2	DP	Po	Po+DP
			a1= 8.850	a2= 7.300		b= 1.200				
		SOIL STRUTA								
1	Ac1	0.750	11.400	24.333	9.732	0.000	0.000	0.000	1.245	1.246
2	Ac2	2.750	3.109	6.636	2.655	0.003	0.000	0.031	3.315	3.346
3	Ac3	5.300	1.613	3.443	1.377	0.017	0.000	0.174	4.998	5.172

SUBSIDED VALUE FOR CONSOLIDATION AND COEFFICIENT OF CONSOLIDATION

SOIL No.	SOIL	THICKNESS OF SOIL	Po	DP	Po+DP	e0	e1	Sc	DP/Z	Po+DP/2	Cv
1	Ac1	1.5000	1.2450	0.0007	1.2457	1.6500	1.6500	0.0000	0.0093	1.2454	470
2	Ac2	2.5000	3.3150	0.0313	3.3463	1.6000	1.5970	0.0029	0.0157	3.3307	420
3	Ac3	2.6000	4.9980	0.1742	5.1722	1.5630	1.5600	0.0030	0.0871	5.0851	400

TYPICAL COEFFICIENT OF CONSOLIDATION AND DISTANCE OF DRAINAGE

SOIL No.	SOIL	THICKNESS OF SOIL	Cv	Cv'	H'	CONDITION OF DRAINAGE	DISTANCE OF DRAINAGE
1	Ac1	150.00	470.00	400.00	642.36	ISide	642.36
2	Ac2	250.00	420.00				
3	Ac3	260.00	400.00				

SUBSIDED TIME FOR CONSOLIDATION BY MOMENTARY EMBANKMENT

U (%)	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	95.00	100.00
Tv	0.008	0.031	0.071	0.126	0.196	0.287	0.403	0.567	0.848	1.130	infinite

EXPRESSION $t=Tv.d^2/C'v=Tv. 642.36^2/ 400.00=1031.55$

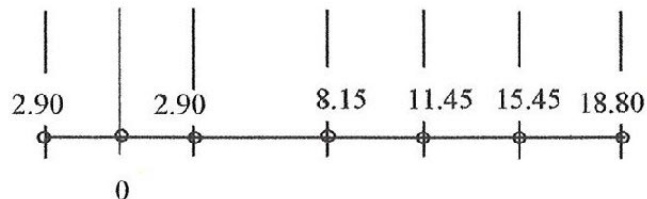
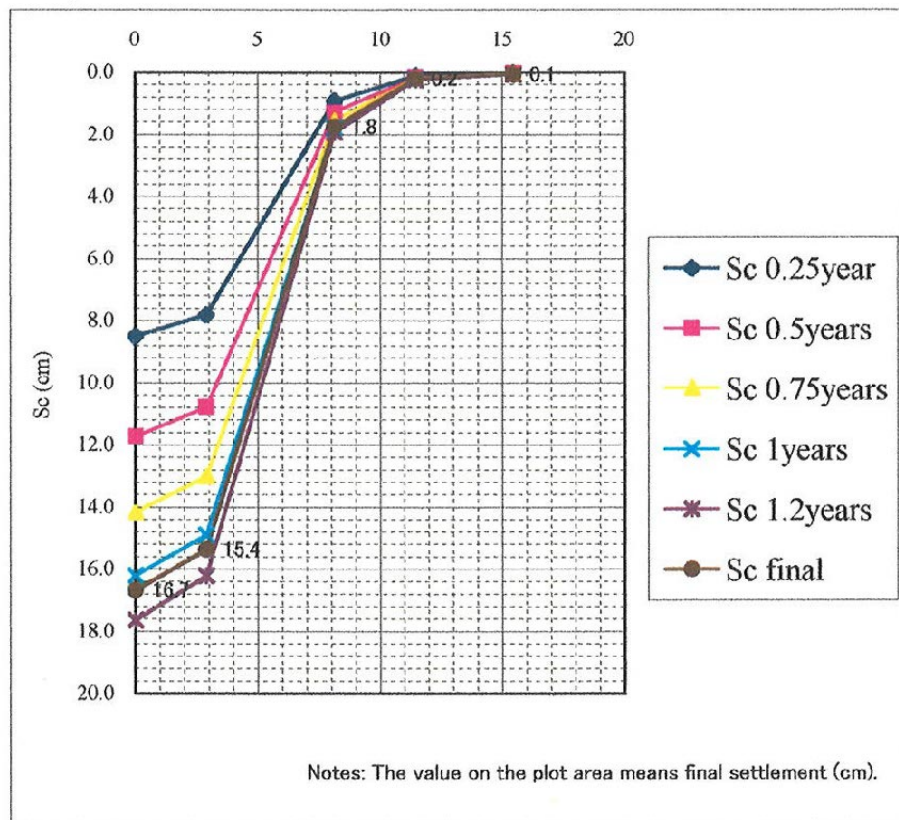
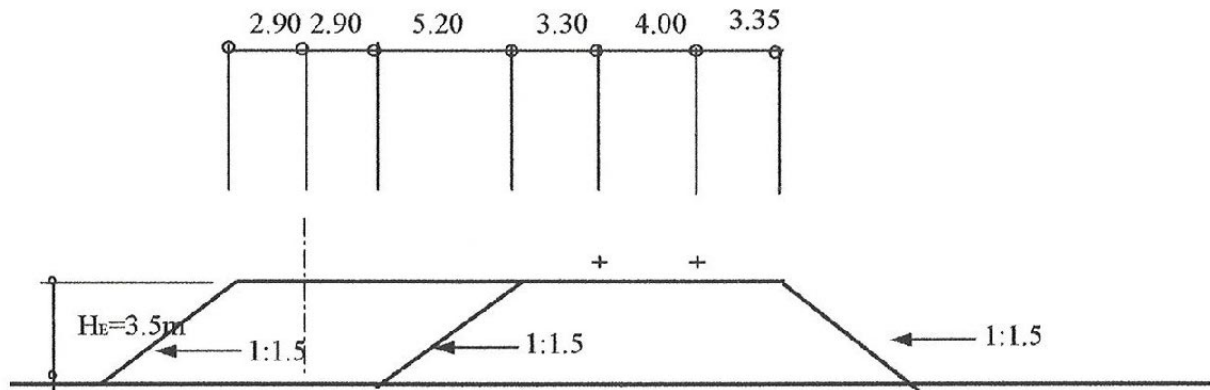
t (days)	8.25	31.98	73.24	129.98	202.13	296.06	415.71	584.89	874.75	1165.65	
Sc. U (cm)	0.06	0.12	0.18	0.24	0.30	0.36	0.41	0.47	0.53	0.56	0.59

*APPENDIX

CALCULATION OF CONVERTIBLE SOIL THICKNESS

$$150.00 * \text{SQR}(400.00 / 470.00) + 250.00 * \text{SQR}(400.00 / 420.00) + 260.00 * \text{SQR}(400.00 / 400.00)$$

Km.17+900 HE=3.5m



Final settlement (cm)					
Distance (m)	0	2.90	8.15	11.45	15.45
Settlement (cm)	16.7	15.4	1.8	0.2	0.1

Fig. Settlement and Distance Km.17+900 HE=3.5m

SOIL SECTION AND DESIGN SOIL VALUE

Km Age	17+900	HE=3.50m
Location	Buaran River	

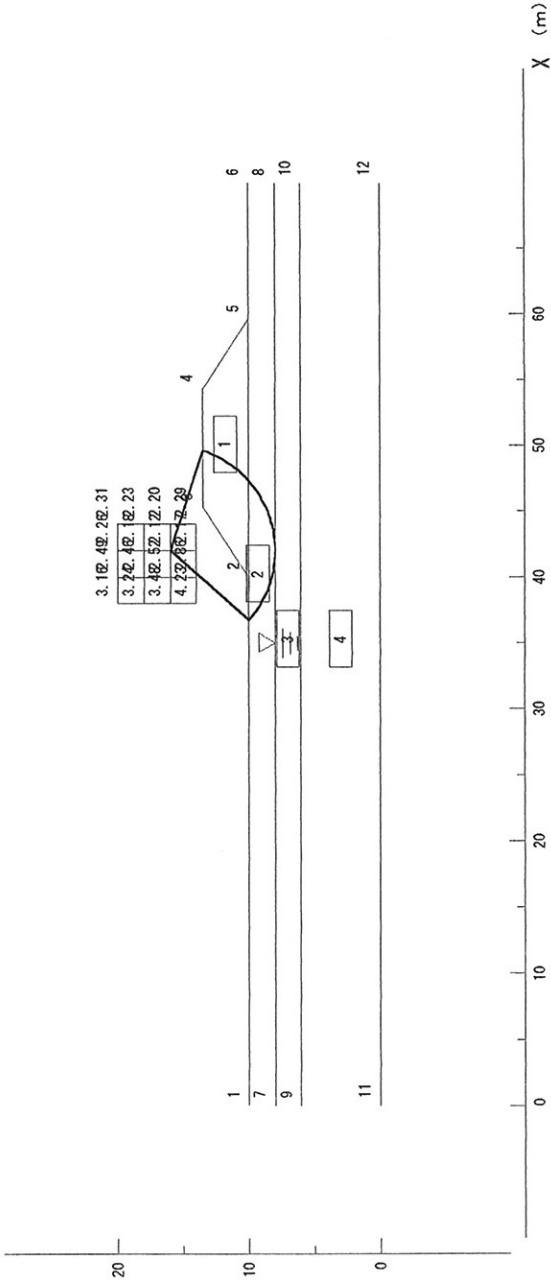
2.00 $\frac{\nabla}{\text{m}}$

縮尺 ; 1/ 575

最小安全率 F S MIN = 2.129
円弧の中心 X = 42.00 (m)
Y = 16.00 (m)
半径 R = 8.00 (m)
抵抗モーメント M R = 286.88 (t f · m)
起動モーメント M O = 125.36 (t f · m)

層番号	飽和重量 (t f /m ³)	湿潤重量 (t f /m ³)	内部摩擦角 (度)	粘着力 (t f /m ²)	粘着力の 一次係数	水平震度	鉛直震度
1	1.800	1.700	10.00	2.20	0.00	0.000	0.000
2	1.760	1.660	0.00	2.00	0.00	0.000	0.000
3	1.760	1.660	0.00	3.00	0.00	0.000	0.000
4	1.900	1.800	40.00	0.00	0.00	0.000	0.000

水の単位体積重量 = 1.000 (t f /m³)



安全率図 (常時)

CALCULATION OF INITIAL PRESSURE

Km 17+900 HE=3.5m Center of Embankment

SOIL No.	SOIL	THICKNESS OF SOIL	WET UNIT WEIGHT	CALCULATION OF INITIAL PRESSURE			INITIAL PRESSURE
1	Ac1	2.000	1.660	$0.000 + 0.5 (0.000 * 0.000 + 2.000 * 1.660)$			1.660
2	Ac2	2.000	0.660	$1.660 + 0.5 (2.000 * 1.660 + 2.000 * 0.660)$			3.980

INTENSITY OF DISTRIBUTED LOAD $q=H*rl= 3.50* 1.800 6.30$

SOIL No.	SOIL	DEPTH FROM CENTRAL SOIL STRUTA	a/Z a= 5.250	b/Z b= 2.900	I	DP	Po	Po+DP
1	Ac1	1.000	5.250	2.900	0.498	6.276	1.660	7.936
2	Ac2	3.000	1.750	0.967	0.467	5.882	3.980	9.862

SUBSIDED VALUE FOR CONSOLIDATION AND COEFFICIENT OF CONSOLIDATION

SOIL No.	SOIL	THICKNESS OF SOIL	Po	DP	Po+DP	e0	e1	Sc	DP/2	Po+DP/2	Cv
1	Ac1	2.0000	1.6600	6.2755	7.9355	1.6370	1.5180	0.0903	3.1378	4.7978	410
2	Ac2	2.0000	3.9800	5.8816	9.8616	1.5860	1.4870	0.0766	2.9408	6.9208	390

TYPICAL COEFFICIENT OF CONSOLIDATION AND DISTANCE OF DRAINAGE

SOIL No	SOIL	THICKNESS OF SOIL	Cv	Cv'	H'	CONDITION OF DRAINAGE	DISTANCE OF DRAINAGE
1	Ac1	200.00	410.00	390.00	395.06	1Side	395.06
2	Ac2	200.00	390.00				

SUBSIDED TIME FOR CONSOLIDATION BY MOMENTARY EMBANKMENT

U (%)	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	95.00	100.00
Tv	0.008	0.031	0.071	0.126	0.196	0.287	0.403	0.567	0.848	1.130	infinite

EXPRESSION $t=Tv \cdot d^2 / C'v = Tv \cdot 395.06^2 / 390.00 = 400.19$

t (days)	3.20	12.41	28.41	50.42	78.44	114.85	161.28	226.91	339.36	452.21	
Sc. U (cm)	1.67	3.34	5.00	6.67	8.34	10.01	11.68	13.35	15.01	15.85	16.68

*APPENDIX

CALCULATION OF CONVERTIBLE SOIL THICKNESS

$$200.00 * \text{SQR} (390.00 / 410.00) + 200.00 * \text{SQR} (390.00 / 390.00)$$