

Ultimate limit state (During an earthquake)
 Bottom slab (A Room) -- Perpendicular to levee normal An upper steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	γ_i · Md/Mud
I 5	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
4	54.622	53.0	3.01	D13	20.0	6.34	114.401	0.48
3	140.484	53.0	7.81	D13, D13	10.0	12.67	225.597	0.62
2	76.654	53.0	4.23	D13	20.0	6.34	114.401	0.67
1	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
II 5	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
4	32.610	53.0	1.79	D13	20.0	6.34	114.401	0.29
3	79.108	53.0	4.37	D13	20.0	6.34	114.401	0.69
2	48.201	53.0	2.65	D13	20.0	6.34	114.401	0.42
1	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
III 5	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
4	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
3	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
2	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
1	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00

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CALCULATION		
Detailed Design		
on Port Reactivation Project		
in La Union Province		
CALC FILE No.:		
CALC INDEX No.:	PAGE 409	
	INITIAL	DATE
PREPARED BY	V. Ando	26/07/02
CHECKED BY	R. NISHIMURA	09/08/2002

Serviceability limit state

Bottom slab (A Room) — Perpendicular to levee normal An upper steel reinforcement
B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	0.000	53.0	D13	20.0	6.34	0.0000	0.0040 × 6.0 = 0.0240
	4	24.281	53.0	D13	20.0	6.34	0.0140	
	3	56.215	53.0	D13, D13	10.0	12.67	0.0134	
	2	28.174	53.0	D13	20.0	6.34	0.0163	
	1	0.000	53.0	D13	20.0	6.34	0.0000	
II	5	0.000	53.0	D13	20.0	6.34	0.0000	0.0040 × 6.0 = 0.0240
	4	14.753	53.0	D13	20.0	6.34	0.0085	
	3	31.655	53.0	D13	20.0	6.34	0.0183	
	2	17.508	53.0	D13	20.0	6.34	0.0101	
	1	0.000	53.0	D13	20.0	6.34	0.0000	
III	5	0.000	53.0	D13	20.0	6.34	0.0000	0.0040 × 6.0 = 0.0240
	4	0.000	53.0	D13	20.0	6.34	0.0000	
	3	0.000	53.0	D13	20.0	6.34	0.0000	
	2	0.000	53.0	D13	20.0	6.34	0.0000	
	1	0.000	53.0	D13	20.0	6.34	0.0000	

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CALCULATION		
Detailed Design		
on Port Reactivation Project in La Union Province		
CALC FILE No.		
CALC INDEX No.	PAGE 405	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	P. NISHIHADA	09/05/2002

Ultimate limit state (Under ordinary conditions)
 Bottom slab (A Room) — Perpendicular to levee normal A lower steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md / Mud$	
I	5	224.519	57.6	14.70	D13, D22	10.0	25.69	422.204	0.58 ※
	4	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	1	234.729	57.6	15.39	D13, D22	10.0	25.69	422.204	0.61
II	5	141.007	57.6	9.14	D13, D16	10.0	16.27	272.448	0.57
	4	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	1	149.044	57.6	9.67	D13, D16	10.0	16.27	272.448	0.60
III	5	0.000	57.6	0.00	D13	20.0	6.34	108.233	0.00
	4	23.578	57.6	1.51	D13	20.0	6.34	108.233	0.24
	3	38.494	57.6	2.46	D13	20.0	6.34	108.233	0.39
	2	24.697	57.6	1.58	D13	20.0	6.34	108.233	0.25
	1	0.000	57.6	0.00	D13	20.0	6.34	108.233	0.00

※ It determines from serviceability limit state.

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CALCULATION		
Detailed Design:		
on Port Reactivation Project		
in La Union Province		
CALC FILE No.:		
CALC INDEX No.:	PAGE 400	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	E. NISHIHARA	09/08/2002

Ultimate limit state (During an earthquake)
 Bottom slab (A Room) - Perpendicular to levee normal A lower steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md / Mud$	
I	5	323.578	57.6	16.82	D13, D22	10.0	25.69	485.535	0.67 ※
	4	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	1	376.115	57.6	19.66	D13, D22	10.0	25.69	485.535	0.77
II	5	200.280	57.6	10.28	D13, D16	10.0	16.27	313.316	0.64
	4	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	1	241.632	57.6	12.45	D13, D16	10.0	16.27	313.316	0.77
III	5	0.000	57.6	0.00	D13	20.0	6.34	124.468	0.00
	4	33.776	57.6	1.71	D13	20.0	6.34	124.468	0.27
	3	58.649	57.6	2.97	D13	20.0	6.34	124.468	0.47
	2	39.538	57.6	2.00	D13	20.0	6.34	124.468	0.32
	1	0.000	57.6	0.00	D13	20.0	6.34	124.468	0.00

※ It determines from serviceability limit state.

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CALCULATION		
Detailed Design		
on Port Reactivation Project		
in La Union Province		
CALC FILE No.:		
CALC INDEX No	PAGE 407	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	E. NISHIMURA	07/08/2002

Serviceability limit state

Bottom slab (A Room) — Perpendicular to levee normal A lower steel reinforcement
B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	135.351	57.6	D13, D22	10.0	25.69	99.201	0.0189
	4	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	1	144.633	57.6	D13, D22	10.0	25.69	106.004	0.0202
II	5	84.763	57.6	D13, D16	10.0	16.27	96.599	0.0184
	4	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	1	92.070	57.6	D13, D16	10.0	16.27	104.926	0.0200
III	5	0.000	57.6	D13	20.0	6.34	0.000	0.0000
	4	14.197	57.6	D13	20.0	6.34	40.555	0.0091
	3	23.469	57.6	D13	20.0	6.34	67.041	0.0151
	2	15.215	57.6	D13	20.0	6.34	43.463	0.0098
	1	0.000	57.6	D13	20.0	6.34	0.000	0.0000

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CALCULATION		
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on Port Reactivation Project		
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CALC FILE No.:		
CALC INDEX No.	PAGE 408	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	R. NISHIMURA	09/08/2002

Ultimate limit state (Under ordinary conditions)

Bottom slab (A Room) - Parallel to centerline An upper steel reinforcement

B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md / Mud$	
I	5	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	4	51.198	51.0	3.71	D13	20.0	6.34	95.683	0.59
	3	92.207	51.0	6.73	D13, D13	10.0	12.67	188.577	0.54
	2	52.647	51.0	3.82	D13	20.0	6.34	95.683	0.61
	1	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
II	5	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	4	25.717	51.0	1.86	D13	20.0	6.34	95.683	0.30
	3	42.970	51.0	3.11	D13	20.0	6.34	95.683	0.49
	2	27.166	51.0	1.96	D13	20.0	6.34	95.683	0.31
	1	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
III	5	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	4	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	1	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00

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CALC INDEX No.	PAGE 409	
	INITIAL	DATE
PREPARED BY	Y. A. nelo	20/07/02
CHECKED BY	P. MISA/MBQA	07/08/2002

Ultimate limit state (During an earthquake)

Bottom slab (A Room) — Parallel to centerline An upper steel reinforcement

B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	4	75.380	51.0	4.32	D13	20.0	6.34	110.035	0.69
	3	140.484	51.0	8.13	D13, D13	10.0	12.67	216.864	0.65
	2	82.836	51.0	4.76	D13	20.0	6.34	110.035	0.75
	1	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
II	5	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	4	36.677	51.0	2.09	D13	20.0	6.34	110.035	0.33
	3	65.468	51.0	3.75	D13	20.0	6.34	110.035	0.59
	2	44.134	51.0	2.52	D13	20.0	6.34	110.035	0.40
	1	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
III	5	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	4	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	1	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00

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CALCULATION		
Detailed Design		
on Port Reactivation Project		
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CALC FILE No.:		
CALC INDEX No.:	PAGE 410	
	INITIAL	DATE
PREPARED BY	Y. Ando	21/07/12
CHECKED BY	E. NISHIMURA	09/08/2012

Serviceability limit state

Bottom slab (A Room) - Parallel to centerline An upper steel reinforcement

B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	0.000	51.0	D13	20.0	6.34	0.000	0.0040 × 8.0 = 0.0320
	4	30.996	51.0	D13	20.0	6.34	100.249	
	3	56.215	51.0	D13, D13	10.0	12.67	92.561	
	2	32.313	51.0	D13	20.0	6.34	104.508	
	1	0.000	51.0	D13	20.0	6.34	0.000	
II	5	0.000	51.0	D13	20.0	6.34	0.000	0.0040 × 8.0 = 0.0320
	4	15.472	51.0	D13	20.0	6.34	50.040	
	3	26.197	51.0	D13	20.0	6.34	84.728	
	2	16.789	51.0	D13	20.0	6.34	54.300	
	1	0.000	51.0	D13	20.0	6.34	0.000	
III	5	0.000	51.0	D13	20.0	6.34	0.000	0.0040 × 8.0 = 0.0320
	4	0.000	51.0	D13	20.0	6.34	0.000	
	3	0.000	51.0	D13	20.0	6.34	0.000	
	2	0.000	51.0	D13	20.0	6.34	0.000	
	1	0.000	51.0	D13	20.0	6.34	0.000	

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CALCULATION		
Detailed Design on Port Reactivation Project in La Union Province		
CALC FILE No.:		
CALC INDEX No.:	PAGE 4/11	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	E. NISHIMURA	07/08/2002

Ultimate limit state (Under ordinary conditions)
 Bottom slab (A Room) — Parallel to centerline A lower steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	37.638	55.6	2.49	D13	20.0	6.34	104.429	0.40
	4	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	3	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	2	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	1	39.351	55.6	2.61	D13	20.0	6.34	104.429	0.41
II	5	23.512	55.6	1.56	D13	20.0	6.34	104.429	0.25
	4	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	3	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	2	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	1	24.829	55.6	1.64	D13	20.0	6.34	104.429	0.26
III	5	0.000	55.6	0.00	D13	20.0	6.34	104.429	0.00
	4	141.996	55.6	9.54	D13, D16	10.0	16.27	262.661	0.59
	3	229.591	55.6	15.62	D13, D22	10.0	25.69	406.792	0.62 ※
	2	148.056	55.6	9.96	D13, D16	10.0	16.27	262.661	0.62
	1	0.000	55.6	0.00	D13	20.0	6.34	104.429	0.00

※ It determines from serviceability limit state.

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CALCULATION		
Detailed Design		
on Port Reactivation Project		
In La Union Province		
CALC FILE No.:		
CALC INDEX No.:	PAGE 4/12	
	INITIAL	DATE
PREPARED BY	Y. Ando 26/07/02	
CHECKED BY	P. NISHIHARA 09/08/2002	

Ultimate limit state (During an earthquake)

Bottom slab (A Room) -- Parallel to centerline A lower steel reinforcement

B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	54.243	55.6	2.84	D13	20.0	6.34	120.093	0.45
	4	0.000	49.0	0.00	D13	20.0	6.34	105.661	0.00
	3	0.000	49.0	0.00	D13	20.0	6.34	105.661	0.00
	2	0.000	49.0	0.00	D13	20.0	6.34	105.661	0.00
	1	63.056	55.6	3.31	D13	20.0	6.34	120.093	0.53
II	5	33.437	55.6	1.75	D13	20.0	6.34	120.093	0.28
	4	0.000	49.0	0.00	D13	20.0	6.34	105.661	0.00
	3	0.000	49.0	0.00	D13	20.0	6.34	105.661	0.00
	2	0.000	49.0	0.00	D13	20.0	6.34	105.661	0.00
	1	40.216	55.6	2.11	D13	20.0	6.34	120.093	0.33
III	5	0.000	55.6	0.00	D13	20.0	6.34	120.093	0.00
	4	205.365	55.6	10.94	D13, D16	10.0	16.27	302.060	0.68
	3	349.677	55.6	18.94	D13, D22	10.0	25.69	467.811	0.75 ※
	2	236.548	55.6	12.65	D13, D16	10.0	16.27	302.060	0.78
	1	0.000	55.6	0.00	D13	20.0	6.34	120.093	0.00

※ It determines from serviceability limit state.

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CALCULATION		
Detailed Design		
on Port Reactivation Project in La Union Province		
CALC FILE No.:		
CALC INDEX No.	PAGE 4/3	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	E. NISHIMURA	29/08/2002

Serviceability limit state

Bottom slab (A Room) — Parallel to centerline A lower steel reinforcement

B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	22.690	55.6	D13	20.0	6.34	67.196	0.0178
	4	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	1	24.247	55.6	D13	20.0	6.34	71.807	0.0191
II	5	14.137	55.6	D13	20.0	6.34	41.866	0.0111
	4	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	1	15.335	55.6	D13	20.0	6.34	45.414	0.0121
III	5	0.000	55.6	D13	20.0	6.34	0.000	0.0000
	4	85.662	55.6	D13, D16	10.0	16.27	101.254	0.0233
	3	139.962	55.6	D13, D22	10.0	25.69	106.409	0.0245
	2	91.171	55.6	D13, D16	10.0	16.27	107.766	0.0248
	1	0.000	55.6	D13	20.0	6.34	0.000	0.0000

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CALCULATION		
Detailed Design		
on Port Reactivation Project		
in La Union Province		
CALC FILE No.:		
CALC INDEX No.	PAGE 914	
	INITIAL	DATE
PREPARED BY	Y. Amde	26/07/02
CHECKED BY	P. NISHIMURA	07/08/2002

Ultimate limit state (Under ordinary conditions)

Bottom slab (B Room) — Perpendicular to levee normal. An upper steel reinforcement
B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	4	33.195	53.0	2.31	D13	20.0	6.34	99.479	0.37
	3	75.468	53.0	5.28	D13, D13	10.0	12.67	196.171	0.42 ※
	2	37.207	53.0	2.59	D13	20.0	6.34	99.479	0.41
	1	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
II	5	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	4	20.226	53.0	1.40	D13	20.0	6.34	99.479	0.22
	3	42.497	53.0	2.96	D13	20.0	6.34	99.479	0.47
	2	23.066	53.0	1.60	D13	20.0	6.34	99.479	0.26
	1	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
III	5	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	4	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	3	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	2	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	1	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00

※ It determines from serviceability limit state.

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CALCULATION		
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CALC FILE No.:		
CALC INDEX No.	PAGE 415	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	E. NISHINARA	29/08/2002

Ultimate limit state (During an earthquake)
 Bottom slab (B Room) -- Perpendicular to levee normal An upper steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md / Mud$	
I	5	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
	4	21.706	53.0	1.19	D13	20.0	6.34	114.401	0.19
	3	68.397	53.0	3.77	D13, D13	10.0	12.67	225.597	0.30 ※
	2	42.361	53.0	2.33	D13	20.0	6.34	114.401	0.37
	1	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
II	5	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
	4	12.439	53.0	0.68	D13	20.0	6.34	114.401	0.11
	3	38.515	53.0	2.12	D13	20.0	6.34	114.401	0.34
	2	27.057	53.0	1.48	D13	20.0	6.34	114.401	0.24
	1	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
III	5	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
	4	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
	3	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
	2	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
	1	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00

※ It determines from serviceability limit state.

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CALCULATION	
Detailed Design on Port Reactivation Project in La Union Province	
CALC FILE No.:	
CALC INDEX No.	PAGE 1/10
INITIAL DATE	
PREPARED BY	Y. Ando 26/07/02
CHECKED BY	E. NISHIMURA 03/08/2002

Serviceability limit state

Bottom slab (B Room) — Perpendicular to levee normal An upper steel reinforcement
B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	0.000	53.0	D13	20.0	6.34	0.0000	0.0040 × 6.0 = 0.0240
	4	17.852	53.0	D13	20.0	6.34	0.0103	
	3	42.160	53.0	D13, D13	10.0	12.67	0.0100	
	2	21.499	53.0	D13	20.0	6.34	0.0124	
	1	0.000	53.0	D13	20.0	6.34	0.0000	
II	5	0.000	53.0	D13	20.0	6.34	0.0000	0.0040 × 6.0 = 0.0240
	4	10.812	53.0	D13	20.0	6.34	0.0062	
	3	23.740	53.0	D13	20.0	6.34	0.0137	
	2	13.393	53.0	D13	20.0	6.34	0.0077	
	1	0.000	53.0	D13	20.0	6.34	0.0000	
III	5	0.000	53.0	D13	20.0	6.34	0.0000	0.0040 × 6.0 = 0.0240
	4	0.000	53.0	D13	20.0	6.34	0.0000	
	3	0.000	53.0	D13	20.0	6.34	0.0000	
	2	0.000	53.0	D13	20.0	6.34	0.0000	
	1	0.000	53.0	D13	20.0	6.34	0.0000	

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CALCULATION		
Detailed Design on Port Reactivation Project in La Union Province		
CALC FILE No.:		
CALC INDEX No.:	PAGE 417	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	E. NISHIHARA	09/08/2002

Ultimate limit state (Under ordinary conditions)
 Bottom slab (B Room) -- Perpendicular to levee normal A lower steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	183.156	57.6	11.93	D13, D16	10.0	16.27	272.448	0.74
	4	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	1	192.723	57.6	12.57	D13, D19	10.0	20.66	342.945	0.62 ※
II	5	114.934	57.6	7.42	D13, D13	10.0	12.67	213.654	0.59
	4	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	1	122.464	57.6	7.92	D13, D13	10.0	12.67	213.654	0.63 ※
III	5	0.000	57.6	0.00	D13	20.0	6.34	108.233	0.00
	4	19.228	57.6	1.23	D13	20.0	6.34	108.233	0.20
	3	31.507	57.6	2.01	D13	20.0	6.34	108.233	0.32
	2	20.277	57.6	1.29	D13	20.0	6.34	108.233	0.21
	1	0.000	57.6	0.00	D13	20.0	6.34	108.233	0.00

※ It determines from serviceability limit state.

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CALCULATION		
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CALC FILE No.:		
CALC INDEX No.:	PAGE 418	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	E. NISHIMURA	09/08/2002

Ultimate limit state (During an earthquake)
 Bottom slab (B Room) - Perpendicular to levee normal A lower steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	145.699	57.6	7.44	D13, D16	10.0	16.27	313.316	0.47
	4	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	1	194.955	57.6	10.00	D13, D19	10.0	20.66	394.387	0.49 ※
II	5	88.190	57.6	4.48	D13, D13	10.0	12.67	245.702	0.36
	4	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	1	126.959	57.6	6.47	D13, D13	10.0	12.67	245.702	0.52 ※
III	5	0.000	57.6	0.00	D13	20.0	6.34	124.468	0.00
	4	15.069	57.6	0.76	D13	20.0	6.34	124.468	0.12
	3	28.553	57.6	1.44	D13	20.0	6.34	124.468	0.23
	2	20.471	57.6	1.03	D13	20.0	6.34	124.468	0.16
	1	0.000	57.6	0.00	D13	20.0	6.34	124.468	0.00

※ It determines from serviceability limit state.

CALCULATION		
Detailed Design		
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CALC INDEX No.:	PAGE 419	
	INITIAL	DATE
PREPARED BY	Y. Ando	24/07/02
CHECKED BY	E. WISHINAGA	09/05/2002

Serviceability limit state

Bottom slab (B Room) — Perpendicular to levee normal A lower steel reinforcement
B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	100.641	57.6	D13, D16	10.0	16.27	114.694	0.0219
	4	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	1	109.339	57.6	D13, D19	10.0	20.66	98.891	0.0188
II	5	62.887	57.6	D13, D13	10.0	12.67	91.375	0.0174
	4	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	1	69.733	57.6	D13, D13	10.0	12.67	101.322	0.0193
III	5	0.000	57.6	D13	20.0	6.34	0.000	0.0000
	4	10.547	57.6	D13	20.0	6.34	30.128	0.0068
	3	17.601	57.6	D13	20.0	6.34	50.279	0.0113
	2	11.501	57.6	D13	20.0	6.34	32.854	0.0074
	1	0.000	57.6	D13	20.0	6.34	0.000	0.0000

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PREPARED BY	Y. Ando	26/07/02
CHECKED BY	E. NISHIMURA	09/08/2002

Ultimate limit state (Under ordinary conditions)

Bottom slab (B Room) — Parallel to centerline An upper steel reinforcement

B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	4	41.818	51.0	3.03	D13	20.0	6.34	95.683	0.48
	3	75.468	51.0	5.49	D13, D13	10.0	12.67	188.577	0.44
	2	43.176	51.0	3.13	D13	20.0	6.34	95.683	0.50
	1	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
II	5	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	4	20.967	51.0	1.51	D13	20.0	6.34	95.683	0.24
	3	35.170	51.0	2.54	D13	20.0	6.34	95.683	0.40
	2	22.325	51.0	1.61	D13	20.0	6.34	95.683	0.26
	1	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
III	5	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	4	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	1	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00

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CALCULATION		
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CALC INDEX No.:	PAGE 421	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/92
CHECKED BY	R. NISHIMURA	09/05/2002

Ultimate limit state (During an earthquake)

Bottom slab (B Room) — Parallel to centerline An upper steel reinforcement

B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md / Mud$	
I	5	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	4	35.019	51.0	2.00	D13	20.0	6.34	110.035	0.32
	3	68.397	51.0	3.92	D13, D13	10.0	12.67	216.864	0.32
	2	42.010	51.0	2.40	D13	20.0	6.34	110.035	0.38
	1	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
II	5	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	4	16.253	51.0	0.93	D13	20.0	6.34	110.035	0.15
	3	31.875	51.0	1.82	D13	20.0	6.34	110.035	0.29
	2	23.244	51.0	1.32	D13	20.0	6.34	110.035	0.21
	1	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
III	5	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	4	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	1	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00

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CALCULATION		
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	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	E. NISHIMURA	09/08/2002

Serviceability limit state

Bottom slab (B Room) -- Parallel to centerline An upper steel reinforcement

B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	0.000	51.0	D13	20.0	6.34	0.000	0.0040 × 8.0 = 0.0320
	4	23.123	51.0	D13	20.0	6.34	0.0169	
	3	42.160	51.0	D13, D13	10.0	12.67	0.0132	
	2	24.358	51.0	D13	20.0	6.34	0.0178	
	1	0.000	51.0	D13	20.0	6.34	0.0000	
II	5	0.000	51.0	D13	20.0	6.34	0.000	0.0040 × 8.0 = 0.0320
	4	11.485	51.0	D13	20.0	6.34	0.0084	
	3	19.647	51.0	D13	20.0	6.34	0.0143	
	2	12.720	51.0	D13	20.0	6.34	0.0093	
	1	0.000	51.0	D13	20.0	6.34	0.0000	
III	5	0.000	51.0	D13	20.0	6.34	0.000	0.0040 × 8.0 = 0.0320
	4	0.000	51.0	D13	20.0	6.34	0.000	
	3	0.000	51.0	D13	20.0	6.34	0.000	
	2	0.000	51.0	D13	20.0	6.34	0.000	
	1	0.000	51.0	D13	20.0	6.34	0.000	

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CALCULATION		
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CALC FILE No.:		
CALC INDEX No.	PAGE 423	
	INITIAL	DATE
PREPARED BY	Y. Ando	22/07/02
CHECKED BY	R. ALIUSTORA	09/08/2002

Ultimate limit state (Under ordinary conditions)

Bottom slab (B Room) — Parallel to centerline A lower steel reinforcement

B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	30.704	55.6	2.03	D13	20.0	6.34	104.429	0.32
	4	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	3	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	2	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	1	32.309	55.6	2.14	D13	20.0	6.34	104.429	0.34
II	5	19.166	55.6	1.27	D13	20.0	6.34	104.429	0.20
	4	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	3	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	2	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	1	20.401	55.6	1.35	D13	20.0	6.34	104.429	0.21
III	5	0.000	55.6	0.00	D13	20.0	6.34	104.429	0.00
	4	115.859	55.6	7.76	D13, D13	10.0	12.67	206.050	0.62
	3	187.909	55.6	12.71	D13, D19	10.0	20.66	330.546	0.63 ※
	2	121.538	55.6	8.15	D13, D13	10.0	12.67	206.050	0.65
	1	0.000	55.6	0.00	D13	20.0	6.34	104.429	0.00

※ It determines from serviceability limit state.

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CALCULATION		
Detailed Design on Port Reactivation Project in La Union Province		
CALC FILE No.:		
CALC INDEX No.:	PAGE 429	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	R. NISHIHARA	07/08/2002

Ultimate limit state (During an earthquake)
 Bottom slab (B Room) -- Parallel to centerline A lower steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	24.422	55.6	1.28	D13	20.0	6.34	120.093	0.20
	4	0.000	49.0	0.00	D13	20.0	6.34	105.661	0.00
	3	0.000	49.0	0.00	D13	20.0	6.34	105.661	0.00
	2	0.000	49.0	0.00	D13	20.0	6.34	105.661	0.00
	1	32.685	55.6	1.71	D13	20.0	6.34	120.093	0.27
II	5	14.751	55.6	0.77	D13	20.0	6.34	120.093	0.12
	4	0.000	49.0	0.00	D13	20.0	6.34	105.661	0.00
	3	0.000	49.0	0.00	D13	20.0	6.34	105.661	0.00
	2	0.000	49.0	0.00	D13	20.0	6.34	105.661	0.00
	1	21.107	55.6	1.10	D13	20.0	6.34	120.093	0.18
III	5	0.000	55.6	0.00	D13	20.0	6.34	120.093	0.00
	4	92.957	55.6	4.89	D13, D13	10.0	12.67	236.957	0.39
	3	170.168	55.6	9.03	D13, D19	10.0	20.66	380.128	0.45 ※
	2	122.192	55.6	6.45	D13, D13	10.0	12.67	236.957	0.52
	1	0.000	55.6	0.00	D13	20.0	6.34	120.093	0.00

※ It determines from serviceability limit state.

CALCULATION		
Detailed Design on Port Reactivation Project in La Union Province		
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	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	R. ASTIHUON	07/08/2002

Serviceability limit state

Bottom slab (B Room) — Parallel to centerline A lower steel reinforcement

B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	16.871	55.6	D13	20.0	6.34	49.963	0.0133
	4	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	1	18.331	55.6	D13	20.0	6.34	54.287	0.0144
II	5	10.491	55.6	D13	20.0	6.34	31.069	0.0083
	4	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	1	11.613	55.6	D13	20.0	6.34	34.392	0.0091
III	5	0.000	55.6	D13	20.0	6.34	0.000	0.0000
	4	63.729	55.6	D13, D13	10.0	12.67	96.024	0.0221
	3	104.962	55.6	D13, D19	10.0	20.66	98.465	0.0227
	2	68.892	55.6	D13, D13	10.0	12.67	103.803	0.0239
	1	0.000	55.6	D13	20.0	6.34	0.000	0.0000

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CALCULATION		
Detailed Design on Port Reactivation Project in La Union Province		
CALC FILE No.:		
CALC INDEX No.:	PAGE 42/6	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	E. NISHIMURA	29/08/2002

Ultimate limit state (Under ordinary conditions)
 Bottom slab (C Room) — Perpendicular to levee normal An upper steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	4	27.266	53.0	1.89	D13	20.0	6.34	99.479	0.30
	3	62.749	53.0	4.38	D13	20.0	6.34	99.479	0.69
	2	31.281	53.0	2.17	D13	20.0	6.34	99.479	0.35
	1	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
II	5	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	4	16.582	53.0	1.15	D13	20.0	6.34	99.479	0.18
	3	35.335	53.0	2.46	D13	20.0	6.34	99.479	0.39
	2	19.423	53.0	1.35	D13	20.0	6.34	99.479	0.21
	1	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
III	5	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	4	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	3	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	2	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	1	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00

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CALCULATION		
Detailed Design		
on Port Reactivation Project		
in La Union Province		
CALC FILE No.:		
CALC INDEX No.:	PAGE 127	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	E. NISHIMURA	07/08/2002

Ultimate limit state (During an earthquake)

Bottom slab (C Room) — Perpendicular to levee normal An upper steel reinforcement
B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	48.313	53.0	2.66	D13	20.0	6.34	114.401	0.42
	4	2.771	53.0	0.15	D13	20.0	6.34	114.401	0.02
	3	17.832	53.0	0.98	D13	20.0	6.34	114.401	0.16
	2	14.024	53.0	0.77	D13	20.0	6.34	114.401	0.12
	1	25.892	53.0	1.42	D13	20.0	6.34	114.401	0.23
II	5	32.257	53.0	1.77	D13	20.0	6.34	114.401	0.28
	4	1.212	53.0	0.07	D13	20.0	6.34	114.401	0.01
	3	10.041	53.0	0.55	D13	20.0	6.34	114.401	0.09
	2	9.176	53.0	0.50	D13	20.0	6.34	114.401	0.08
	1	14.610	53.0	0.80	D13	20.0	6.34	114.401	0.13
III	5	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
	4	5.207	53.0	0.28	D13	20.0	6.34	114.401	0.05
	3	6.220	53.0	0.34	D13	20.0	6.34	114.401	0.05
	2	2.748	53.0	0.15	D13	20.0	6.34	114.401	0.02
	1	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00

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CALCULATION		
Detailed Design		
on Port Reactivation Project		
in La Union Province		
CALC FILE No.:		
CALC INDEX No.:		PAGE 428
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	P. NISHIMURA	09/08/2002

Serviceability limit state

Bottom slab (C Room) — Perpendicular to levee normal An upper steel reinforcement
B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	0.000	53.0	D13	20.0	6.34	0.0000	0.0040 × 6.0 = 0.0240
	4	12.463	53.0	D13	20.0	6.34	0.0072	
	3	30.598	53.0	D13	20.0	6.34	0.0177	
	2	16.112	53.0	D13	20.0	6.34	0.0093	
	1	0.000	53.0	D13	20.0	6.34	0.0000	
II	5	0.000	53.0	D13	20.0	6.34	0.0000	0.0040 × 6.0 = 0.0240
	4	7.500	53.0	D13	20.0	6.34	0.0043	
	3	17.230	53.0	D13	20.0	6.34	0.0099	
	2	10.082	53.0	D13	20.0	6.34	0.0058	
	1	0.000	53.0	D13	20.0	6.34	0.0000	
III	5	0.000	53.0	D13	20.0	6.34	0.0000	0.0040 × 6.0 = 0.0240
	4	0.000	53.0	D13	20.0	6.34	0.0000	
	3	0.000	53.0	D13	20.0	6.34	0.0000	
	2	0.000	53.0	D13	20.0	6.34	0.0000	
	1	0.000	53.0	D13	20.0	6.34	0.0000	

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CALCULATION		
Detailed Design		
on Port Reactivation Project in La Union Province		
CALC FILE No.:		
CALC INDEX No.:	PAGE 429	
	INITIAL	DATE
PREPARED BY	Y. Ando	24/07/02
CHECKED BY	Z. NISHIMURA	09/08/2002

Ultimate limit state (Under ordinary conditions)
 Bottom slab (C Room) — Perpendicular to levee normal A lower steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md / Mud$	
I	5	151.477	57.6	9.83	D13, D13	10.0	12.67	213.654	0.78 ※
	4	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	1	161.051	57.6	10.46	D13, D16	10.0	16.27	272.448	0.65
II	5	94.925	57.6	6.11	D13, D13	10.0	12.67	213.654	0.49 ※
	4	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	1	102.461	57.6	6.61	D13, D13	10.0	12.67	213.654	0.53
III	5	0.000	57.6	0.00	D13	20.0	6.34	108.233	0.00
	4	15.893	57.6	1.01	D13	20.0	6.34	108.233	0.16
	3	26.196	57.6	1.67	D13	20.0	6.34	108.233	0.27
	2	16.943	57.6	1.08	D13	20.0	6.34	108.233	0.17
	1	0.000	57.6	0.00	D13	20.0	6.34	108.233	0.00

※ It determines from serviceability limit state.

CALCULATION		
Detailed Design		
on Port Reactivation Project in La Union Province		
CALC FILE No.:		
CALC INDEX No.:	PAGE 430	
	INITIAL	DATE
PREPARED BY	Y. Ando	28/07/12
CHECKED BY	R. NISHIMURA	07/08/2012

Ultimate limit state (During an earthquake)
 Bottom slab (C Room) — Perpendicular to levee normal A lower steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$		
I	5	30.990	57.6	1.56	D13, D13	10.0	12.67	245.702	0.13	※
	4	11.572	51.0	0.66	D13	20.0	6.34	110.035	0.11	
	3	14.899	51.0	0.85	D13	20.0	6.34	110.035	0.14	
	2	2.170	51.0	0.12	D13	20.0	6.34	110.035	0.02	
	1	57.826	57.6	2.93	D13, D16	10.0	16.27	313.316	0.18	
II	5	17.486	57.6	0.88	D13, D13	10.0	12.67	245.702	0.07	※
	4	7.522	51.0	0.43	D13	20.0	6.34	110.035	0.07	
	3	8.390	51.0	0.48	D13	20.0	6.34	110.035	0.08	
	2	0.868	51.0	0.05	D13	20.0	6.34	110.035	0.01	
	1	38.608	57.6	1.95	D13, D13	10.0	12.67	245.702	0.16	
III	5	0.000	57.6	0.00	D13	20.0	6.34	124.468	0.00	
	4	3.116	57.6	0.16	D13	20.0	6.34	124.468	0.03	
	3	7.444	57.6	0.37	D13	20.0	6.34	124.468	0.06	
	2	6.060	57.6	0.31	D13	20.0	6.34	124.468	0.05	
	1	0.000	57.6	0.00	D13	20.0	6.34	124.468	0.00	

※ It determines from serviceability limit state.

CALCULATION	
Detailed Design on Port Reactivation Project in La Union Province	
CALC FILE No.:	
CALC INDEX No.:	PAGE 43/
	INITIAL DATE
PREPARED BY	Y. Ando 28/07/02
CHECKED BY	R. NISHIMURA 09/08/2002

Serviceability limit state

Bottom slab (C Room) -- Perpendicular to levee normal A lower steel reinforcement
B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	71.847	57.6	D13, D13	10.0	12.67	104.394	0.0199
	4	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	1	80.548	57.6	D13, D16	10.0	16.27	91.795	0.0175
								0.0035 × 8.0 = 0.0280
II	5	44.700	57.6	D13, D13	10.0	12.67	64.949	0.0124
	4	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	1	51.549	57.6	D13, D13	10.0	12.67	74.901	0.0143
								0.0035 × 8.0 = 0.0280
III	5	0.000	57.6	D13	20.0	6.34	0.000	0.0000
	4	7.515	57.6	D13	20.0	6.34	21.467	0.0048
	3	12.774	57.6	D13	20.0	6.34	36.490	0.0082
	2	8.469	57.6	D13	20.0	6.34	24.192	0.0055
	1	0.000	57.6	D13	20.0	6.34	0.000	0.0000
								0.0035 × 8.0 = 0.0280

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CALCULATION		
Detailed Design		
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in La Union Province		
CALC FILE No.:		
CALC INDEX No.:	PAGE 432	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/6/02
CHECKED BY	R. NISHIMURA	07/08/2002

Ultimate limit state (Under ordinary conditions)

Bottom slab (C Room) - Parallel to centerline An upper steel reinforcement

B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	4	34.655	51.0	2.51	D13	20.0	6.34	95.683	0.40
	3	62.749	51.0	4.56	D13	20.0	6.34	95.683	0.72
	2	36.014	51.0	2.60	D13	20.0	6.34	95.683	0.41
	1	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
II	5	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	4	17.323	51.0	1.25	D13	20.0	6.34	95.683	0.20
	3	29.242	51.0	2.11	D13	20.0	6.34	95.683	0.34
	2	18.682	51.0	1.35	D13	20.0	6.34	95.683	0.21
	1	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
III	5	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	4	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	1	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00

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CALCULATION		
Detailed Design		
on Port Reactivation Project		
in La Union Province		
CALC FILE No.:		
CALC INDEX No.:	PAGE 433	
	INITIAL	DATE
PREPARED BY	<i>E. Ando</i>	26/07/02
CHECKED BY	<i>E. NISHIMURA</i>	09/08/2002

Ultimate limit state (During an earthquake)

Bottom slab(C Room) —Parallel to centerline An upper steel reinforcement

B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	8.100	51.0	0.46	D13	20.0	6.34	110.035	0.07
	4	8.137	51.0	0.46	D13	20.0	6.34	110.035	0.07
	3	17.832	51.0	1.02	D13	20.0	6.34	110.035	0.16
	2	11.946	51.0	0.68	D13	20.0	6.34	110.035	0.11
	1	4.339	51.0	0.25	D13	20.0	6.34	110.035	0.04
II	5	5.352	51.0	0.30	D13	20.0	6.34	110.035	0.05
	4	3.290	51.0	0.19	D13	20.0	6.34	110.035	0.03
	3	8.311	51.0	0.47	D13	20.0	6.34	110.035	0.08
	2	7.099	51.0	0.40	D13	20.0	6.34	110.035	0.06
	1	2.459	51.0	0.14	D13	20.0	6.34	110.035	0.02
III	5	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	4	30.087	51.0	1.72	D13	20.0	6.34	110.035	0.27
	3	37.175	51.0	2.12	D13	20.0	6.34	110.035	0.34
	2	16.779	51.0	0.96	D13	20.0	6.34	110.035	0.15
	1	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00

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CALCULATION		
Detailed Design		
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CALC FILE No.		
CALC INDEX No.	PAGE 434	
	INITIAL	DATE
PREPARED BY	K. Ando	26/07/02
CHECKED BY	P. NISHITURA	09/08/2002

Serviceability limit state

Bottom slab (C Room) -- Parallel to centerline An upper steel reinforcement

B = 100cm

NO	Ms (kN-m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	0.000	51.0	D13	20.0	6.34	0.0000	0.0040 × 8.0 = 0.0320
	4	16.613	51.0	D13	20.0	6.34	0.0121	
	3	30.598	51.0	D13	20.0	6.34	0.0223	
	2	17.848	51.0	D13	20.0	6.34	0.0130	
	1	0.000	51.0	D13	20.0	6.34	0.0000	
II	5	0.000	51.0	D13	20.0	6.34	0.0000	0.0040 × 8.0 = 0.0320
	4	8.173	51.0	D13	20.0	6.34	0.0060	
	3	14.259	51.0	D13	20.0	6.34	0.0104	
	2	9.409	51.0	D13	20.0	6.34	0.0069	
	1	0.000	51.0	D13	20.0	6.34	0.0000	
III	5	0.000	51.0	D13	20.0	6.34	0.0000	0.0040 × 8.0 = 0.0320
	4	0.000	51.0	D13	20.0	6.34	0.0000	
	3	0.000	51.0	D13	20.0	6.34	0.0000	
	2	0.000	51.0	D13	20.0	6.34	0.0000	
	1	0.000	51.0	D13	20.0	6.34	0.0000	

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CALCULATION	
Detailed Design	
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CALC FILE No.:	
CALC INDEX No.	PAGE 435
INITIAL	DATE
PREPARED BY	Y. Ando 26/07/02
CHECKED BY	E. NISHIMURA 09/08/2002

Ultimate limit state (Under ordinary conditions)
 Bottom slab (C Room) — Parallel to centerline A lower steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	25.393	55.6	1.68	D13	20.0	6.34	104.429	0.27
	4	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	3	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	2	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	1	26.999	55.6	1.79	D13	20.0	6.34	104.429	0.28
II	5	15.832	55.6	1.05	D13	20.0	6.34	104.429	0.17
	4	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	3	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	2	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	1	17.067	55.6	1.13	D13	20.0	6.34	104.429	0.18
III	5	0.000	55.6	0.00	D13	20.0	6.34	104.429	0.00
	4	95.852	55.6	6.40	D13, D13	10.0	12.67	206.050	0.51
	3	156.233	55.6	10.52	D13, D16	10.0	16.27	262.661	0.65
	2	101.534	55.6	6.79	D13, D13	10.0	12.67	206.050	0.54
	1	0.000	55.6	0.00	D13	20.0	6.34	104.429	0.00

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CALCULATION	
Detailed Design on Port Reactivation Project in La Union Province	
CALC FILE No.:	
CALC INDEX No.:	PAGE 136
PREPARED BY	Y. Ando 26/07/02
CHECKED BY	E. NISHIMURA 03/08/2002

Ultimate limit state (During an earthquake)

Bottom slab (C Room) — Parallel to centerline A lower steel reinforcement

B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	5.194	55.6	0.27	D13	20.0	6.34	120.093	0.04
	4	9.981	49.0	0.59	D13	20.0	6.34	105.661	0.09
	3	14.899	49.0	0.88	D13	20.0	6.34	105.661	0.14
	2	6.799	49.0	0.40	D13	20.0	6.34	105.661	0.06
	1	9.695	55.6	0.51	D13	20.0	6.34	120.093	0.08
II	5	2.943	55.6	0.15	D13	20.0	6.34	120.093	0.02
	4	5.786	49.0	0.34	D13	20.0	6.34	105.661	0.05
	3	6.943	49.0	0.41	D13	20.0	6.34	105.661	0.07
	2	2.604	49.0	0.15	D13	20.0	6.34	105.661	0.02
	1	6.406	55.6	0.33	D13	20.0	6.34	120.093	0.05
III	5	0.000	55.6	0.00	D13	20.0	6.34	120.093	0.00
	4	20.083	55.6	1.05	D13, D13	10.0	12.67	236.957	0.08
	3	44.321	55.6	2.32	D13, D16	10.0	16.27	302.060	0.15
	2	36.011	55.6	1.88	D13, D13	10.0	12.67	236.957	0.15
	1	0.000	55.6	0.00	D13	20.0	6.34	120.093	0.00

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CALCULATION		
Detailed Design		
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in La Union Province		
CALC FILE NO.		
CALC INDEX	PAGE 437	
	INITIAL	DATE
PREPARED BY	V. Ando	26/07/01
CHECKED BY	P. NISHIMOTO	07/08/2002

Serviceability limit state

Bottom slab (C Room) -- Parallel to centerline A lower steel reinforcement

B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	12.044	55.6	D13	20.0	6.34	35.668	0.0095
	4	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	1	13.504	55.6	D13	20.0	6.34	39.992	0.0106
II	5	7.459	55.6	D13	20.0	6.34	22.090	0.0059
	4	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	1	8.582	55.6	D13	20.0	6.34	25.415	0.0067
III	5	0.000	55.6	D13	20.0	6.34	0.000	0.0000
	4	45.542	55.6	D13, D13	10.0	12.67	68.621	0.0158
	3	76.170	55.6	D13, D16	10.0	16.27	90.034	0.0208
	2	50.707	55.6	D13, D13	10.0	12.67	76.403	0.0176
	1	0.000	55.6	D13	20.0	6.34	0.000	0.0000

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CALCULATION		
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CALC FILE No.:		
CALC INDEX No.:	PAGE 438	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	E. NISHIMURA	09/08/2002

Ultimate limit state (Under ordinary conditions)
 Bottom slab (D Room) — Perpendicular to levee normal An upper steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	0.000	53.0	0.00	D13, D13	10.0	12.67	196.171	0.00
	4	22.163	53.0	1.54	D13	20.0	6.34	99.479	0.25
	3	52.081	53.0	3.63	D13	20.0	6.34	99.479	0.58
	2	26.445	53.0	1.84	D13	20.0	6.34	99.479	0.29
	1	0.000	53.0	0.00	D13, D13	10.0	12.67	196.171	0.00
II	5	0.000	53.0	0.00	D13, D13	10.0	12.67	196.171	0.00
	4	13.435	53.0	0.93	D13	20.0	6.34	99.479	0.15
	3	29.327	53.0	2.04	D13	20.0	6.34	99.479	0.32
	2	16.465	53.0	1.14	D13	20.0	6.34	99.479	0.18
	1	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
III	5	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	4	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	3	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	2	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00
	1	0.000	53.0	0.00	D13	20.0	6.34	99.479	0.00

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CALCULATION		
Detailed Design		
on Port Reactivation Project		
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CALC FILE No:		
CALC INDEX	PAGE 439	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	E. NISHIMURA	01/08/2002

Ultimate limit state (During an earthquake)

Bottom slab (D Room) — Perpendicular to levee normal An upper steel reinforcement
B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$
I 5	170.023	53.0	9.48	D13, D13	10.0	12.67	225.597	0.75
4	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
3	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
2	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
1	143.810	53.0	8.00	D13, D13	10.0	12.67	225.597	0.64
II 5	109.422	53.0	6.06	D13, D13	10.0	12.67	225.597	0.49
4	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
3	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
2	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
1	88.789	53.0	4.91	D13	20.0	6.34	114.401	0.78
III 5	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00
4	18.039	53.0	0.99	D13	20.0	6.34	114.401	0.16
3	26.305	53.0	1.44	D13	20.0	6.34	114.401	0.23
2	15.164	53.0	0.83	D13	20.0	6.34	114.401	0.13
1	0.000	53.0	0.00	D13	20.0	6.34	114.401	0.00

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CALCULATION	
Detailed Design	
on Port Reactivation Project	
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CALC FILE No.:	
CALC INDEX No.:	PAGE 440
	INITIAL DATE
PREPARED BY:	Y. Ando 26/17/02
CHECKED BY:	R. NISHIMURA 09/08/2003

Serviceability limit state

Bottom slab (D Room) — Perpendicular to levee normal An upper steel reinforcement
B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	0.000	53.0	D13, D13	10.0	12.67	0.0000	0.0040 × 6.0 = 0.0240
	4	7.282	53.0	D13	20.0	6.34	22.647	
	3	19.738	53.0	D13	20.0	6.34	61.386	
	2	11.175	53.0	D13	20.0	6.34	34.755	
	1	0.000	53.0	D13, D13	10.0	12.67	0.0000	
II	5	0.000	53.0	D13, D13	10.0	12.67	0.0000	0.0040 × 6.0 = 0.0240
	4	4.306	53.0	D13	20.0	6.34	13.392	
	3	11.115	53.0	D13	20.0	6.34	34.568	
	2	7.061	53.0	D13	20.0	6.34	21.960	
	1	0.000	53.0	D13	20.0	6.34	0.0000	
III	5	0.000	53.0	D13	20.0	6.34	0.0000	0.0040 × 6.0 = 0.0240
	4	0.000	53.0	D13	20.0	6.34	0.0000	
	3	0.000	53.0	D13	20.0	6.34	0.0000	
	2	0.000	53.0	D13	20.0	6.34	0.0000	
	1	0.000	53.0	D13	20.0	6.34	0.0000	

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CALCULATION		
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CALC FILE No.:		
CALC INDEX No.:	PAGE 441	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	R. NISHIMURA	09/08/2002

Ultimate limit state (Under ordinary conditions)

Bottom slab (D Room) — Perpendicular to levee normal A lower steel reinforcement
B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	124.592	57.6	8.05	D13, D13	10.0	12.67	213.654	0.64
	4	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	1	134.802	57.6	8.73	D13, D13	10.0	12.67	213.654	0.69
II	5	77.895	57.6	5.01	D13	20.0	6.34	108.233	0.79
	4	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	1	85.932	57.6	5.53	D13, D13	10.0	12.67	213.654	0.44
III	5	0.000	57.6	0.00	D13	20.0	6.34	108.233	0.00
	4	13.060	57.6	0.83	D13	20.0	6.34	108.233	0.13
	3	21.742	57.6	1.39	D13	20.0	6.34	108.233	0.22
	2	14.179	57.6	0.90	D13	20.0	6.34	108.233	0.14
	1	0.000	57.6	0.00	D13	20.0	6.34	108.233	0.00

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CALCULATION	
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CALC IN	PAGE 442
PREPARED BY	INITIAL DATE
Y. Ando	26/12/01
CHECKED BY	E. NISHIMURA
	07/08/2002

Ultimate limit state (During an earthquake)
 Bottom slab (D Room) — Perpendicular to levee normal A lower steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	0.000	57.6	0.00	D13, D13	10.0	12.67	245.702	0.00
	4	34.777	51.0	1.99	D13	20.0	6.34	110.035	0.32
	3	63.011	51.0	3.61	D13	20.0	6.34	110.035	0.57
	2	23.784	51.0	1.36	D13	20.0	6.34	110.035	0.22
	1	0.000	57.6	0.00	D13, D13	10.0	12.67	245.702	0.00
II	5	0.000	57.6	0.00	D13	20.0	6.34	124.468	0.00
	4	21.852	51.0	1.25	D13	20.0	6.34	110.035	0.20
	3	35.482	51.0	2.03	D13	20.0	6.34	110.035	0.32
	2	14.073	51.0	0.80	D13	20.0	6.34	110.035	0.13
	1	0.000	57.6	0.00	D13, D13	10.0	12.67	245.702	0.00
III	5	0.000	57.6	0.00	D13	20.0	6.34	124.468	0.00
	4	0.000	57.6	0.00	D13	20.0	6.34	124.468	0.00
	3	0.000	57.6	0.00	D13	20.0	6.34	124.468	0.00
	2	0.000	57.6	0.00	D13	20.0	6.34	124.468	0.00
	1	0.000	57.6	0.00	D13	20.0	6.34	124.468	0.00

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CALCULATION		
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CALC INDEX No :	PAGE 443	
	INITIAL	DATE
PREPARED BY	Y. Ando	28/07/02
CHECKED BY	E. NISHIMURA	09/08/2002

Serviceability limit state

Bottom slab (D Room) — Perpendicular to levee normal A lower steel reinforcement
B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	44.512	57.6	D13, D13	10.0	12.67	64.676	0.0123
	4	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	1	53.794	57.6	D13, D13	10.0	12.67	78.163	0.0149
II	5	27.391	57.6	D13	20.0	6.34	78.245	0.0176
	4	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	51.0	D13	20.0	6.34	0.000	0.0000
	1	34.698	57.6	D13, D13	10.0	12.67	50.416	0.0096
III	5	0.000	57.6	D13	20.0	6.34	0.000	0.0000
	4	4.635	57.6	D13	20.0	6.34	13.240	0.0030
	3	8.240	57.6	D13	20.0	6.34	23.538	0.0053
	2	5.653	57.6	D13	20.0	6.34	16.148	0.0036
	1	0.000	57.6	D13	20.0	6.34	0.000	0.0000

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CALCULATION		
Detailed Design on Port Reactivation Project in La Union Province		
CALC FILE No.:		
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	INITIAL	DATE
PREPARED BY	Y. Ando	25/07/02
CHECKED BY	E. NISHIMURA	09/08/2002

Ultimate limit state (Under ordinary conditions)
 Bottom slab(D Room) --Parallel to centerline An upper steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	4	28.603	51.0	2.07	D13	20.0	6.34	95.683	0.33
	3	52.081	51.0	3.78	D13	20.0	6.34	95.683	0.60
	2	30.052	51.0	2.17	D13	20.0	6.34	95.683	0.35
	1	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
II	5	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	4	14.225	51.0	1.02	D13	20.0	6.34	95.683	0.16
	3	24.271	51.0	1.75	D13	20.0	6.34	95.683	0.28
	2	15.674	51.0	1.13	D13	20.0	6.34	95.683	0.18
	1	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
III	5	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00
	4	0.000	51.0	0.00	D13, D13	10.0	12.67	188.577	0.00
	3	0.000	51.0	0.00	D13, D13	10.0	12.67	188.577	0.00
	2	0.000	51.0	0.00	D13, D13	10.0	12.67	188.577	0.00
	1	0.000	51.0	0.00	D13	20.0	6.34	95.683	0.00

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CALCULATION		
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CALC INDEX No.:		PAGE 445
	INITIAL	DATE
PREPARED BY	K. Ando	26/07/02
CHECKED BY	R. NISHIMURA	03/08/2002

Ultimate limit state (During an earthquake)

Bottom slab (D Room) — Parallel to centerline An upper steel reinforcement

B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	28.504	51.0	1.63	D13	20.0	6.34	110.035	0.26
	4	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	1	24.107	51.0	1.37	D13	20.0	6.34	110.035	0.22
II	5	18.208	51.0	1.04	D13	20.0	6.34	110.035	0.17
	4	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	3	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	2	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	1	14.826	51.0	0.84	D13	20.0	6.34	110.035	0.13
III	5	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00
	4	106.885	51.0	6.16	D13, D13	10.0	12.67	216.864	0.49
	3	157.001	51.0	9.10	D13, D13	10.0	12.67	216.864	0.72
	2	91.326	51.0	5.25	D13, D13	10.0	12.67	216.864	0.42
	1	0.000	51.0	0.00	D13	20.0	6.34	110.035	0.00

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CALCULATION		
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CALC FILE No.:		
CALC INDEX No.:		PAGE 446
	INITIAL	DATE
PREPARED BY	LA Ando	26/07/02
CHECKED BY	R. Nishimura	09/08/2002

Serviceability limit state

Bottom slab(D Room)--Parallel to centerline An upper steel reinforcement

B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W(cm)	Permission crack width W_{lim} (cm)
I	5	0.000	51.0	D13	20.0	6.34	0.0000	0.0040 × 8.0 = 0.0320
	4	10.456	51.0	D13	20.0	6.34	33.817	
	3	19.738	51.0	D13	20.0	6.34	63.838	
	2	11.773	51.0	D13	20.0	6.34	38.077	
	1	0.000	51.0	D13	20.0	6.34	0.0000	
II	5	0.000	51.0	D13	20.0	6.34	0.0000	0.0040 × 8.0 = 0.0320
	4	5.025	51.0	D13	20.0	6.34	16.252	
	3	9.198	51.0	D13	20.0	6.34	29.749	
	2	6.342	51.0	D13	20.0	6.34	20.512	
	1	0.000	51.0	D13	20.0	6.34	0.0000	
III	5	0.000	51.0	D13	20.0	6.34	0.0000	0.0040 × 8.0 = 0.0320
	4	0.000	51.0	D13, D13	10.0	12.67	0.0000	
	3	0.000	51.0	D13, D13	10.0	12.67	0.0000	
	2	0.000	51.0	D13, D13	10.0	12.67	0.0000	
	1	0.000	51.0	D13	20.0	6.34	0.0000	

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CALCULATION		
Detailed Design		
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in La Union Province		
CALC FILE No.:		
CALC INDEX No.:	PAGE 447	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	R. NISHIMURA	07/08/2002

Ultimate limit state (Under ordinary conditions)
 Bottom slab (D Room) — Parallel to centerline A lower steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	20.886	55.6	1.38	D13	20.0	6.34	104.429	0.22
	4	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	3	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	2	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	1	22.599	55.6	1.49	D13	20.0	6.34	104.429	0.24
II	5	12.994	55.6	0.86	D13	20.0	6.34	104.429	0.14
	4	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	3	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	2	0.000	49.0	0.00	D13	20.0	6.34	91.879	0.00
	1	14.311	55.6	0.95	D13	20.0	6.34	104.429	0.15
III	5	0.000	55.6	0.00	D13	20.0	6.34	104.429	0.00
	4	78.884	55.6	5.26	D13, D13	10.0	12.67	206.050	0.42
	3	129.664	55.6	8.70	D13, D13	10.0	12.67	206.050	0.69
	2	84.944	55.6	5.67	D13, D13	10.0	12.67	206.050	0.45
	1	0.000	55.6	0.00	D13	20.0	6.34	104.429	0.00

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CALCULATION		
Detailed Design on Port Reactivation Project in La Union Province		
CALC FILE No.:		
CALC INDEX No.:	PAGE 448	
	INITIAL	DATE
PREPARED BY	Y. Ando	26/07/02
CHECKED BY	E. NISHIMURA	09/08/2002

Ultimate limit state (During an earthquake)
 Bottom slab (D Room) — Parallel to centerline A lower steel reinforcement
 B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$	
I	5	0.000	55.6	0.00	D13	20.0	6.34	120.093	0.00
	4	37.342	49.0	2.22	D13	20.0	6.34	105.661	0.35
	3	63.011	49.0	3.76	D13	20.0	6.34	105.661	0.60
	2	33.622	49.0	2.00	D13	20.0	6.34	105.661	0.32
	1	0.000	55.6	0.00	D13	20.0	6.34	120.093	0.00
II	5	0.000	55.6	0.00	D13	20.0	6.34	120.093	0.00
	4	19.823	49.0	1.18	D13	20.0	6.34	105.661	0.19
	3	29.365	49.0	1.74	D13	20.0	6.34	105.661	0.28
	2	16.102	49.0	0.95	D13	20.0	6.34	105.661	0.15
	1	0.000	55.6	0.00	D13	20.0	6.34	120.093	0.00
III	5	0.000	55.6	0.00	D13	20.0	6.34	120.093	0.00
	4	0.000	55.6	0.00	D13, D13	10.0	12.67	236.957	0.00
	3	0.000	55.6	0.00	D13, D13	10.0	12.67	236.957	0.00
	2	0.000	55.6	0.00	D13, D13	10.0	12.67	236.957	0.00
	1	0.000	55.6	0.00	D13	20.0	6.34	120.093	0.00

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	INITIAL	DATE
PREPARED BY	<i>Y. Arado</i>	<i>26/07/02</i>
CHECKED BY	<i>R. NISHIYAMA</i>	<i>09/08/2002</i>

Serviceability limit state

Bottom slab(D Room) — Parallel to centerline A lower steel reinforcement

B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
I	5	7.461	55.6	D13	20.0	6.34	22.095	0.0059
	4	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	1	9.018	55.6	D13	20.0	6.34	26.706	0.0071
								0.0035 × 10.0 = 0.0350
II	5	4.575	55.6	D13	20.0	6.34	13.549	0.0036
	4	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	3	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	2	0.000	49.0	D13	20.0	6.34	0.000	0.0000
	1	5.773	55.6	D13	20.0	6.34	17.097	0.0045
								0.0035 × 10.0 = 0.0350
III	5	0.000	55.6	D13	20.0	6.34	0.000	0.0000
	4	28.290	55.6	D13, D13	10.0	12.67	42.626	0.0098
	3	49.123	55.6	D13, D13	10.0	12.67	74.016	0.0171
	2	33.799	55.6	D13, D13	10.0	12.67	50.927	0.0117
	1	0.000	55.6	D13	20.0	6.34	0.000	0.0000
								0.0035 × 10.0 = 0.0350

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CHECKED BY	R. NISHIMURA	09/08/2002

Footing

i) Examination at the time of ultimate which receives bending
Under ordinary conditions

B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$
Seaside above	0.000	61.0	0.00	D13	20.0	6.34	114.698	0.00
below	171.815	61.0	10.53	D16, D19	10.0	24.26	424.575	0.45
Landside above	0.717	61.0	0.04	D16	20.0	9.93	178.470	0.00
below	0.582	61.0	0.03	D13	20.0	6.34	114.698	0.01

During an earthquake

B = 100cm

NO	Md (kN·m)	d (cm)	Asn (cm ²)	Diameter (mm)	Pitch (cm)	As (cm ²)	Mud (kN·m)	$\gamma_i \cdot Md/Mud$
Seaside above	0.000	61.0	0.00	D13	20.0	6.34	131.903	0.00
below	291.305	61.0	14.20	D16, D19	10.0	24.26	488.261	0.60
Landside above	119.445	61.0	5.73	D16	20.0	9.93	205.240	0.58
below	0.000	61.0	0.00	D13	20.0	6.34	131.903	0.00

ii) Under serviceability Examination to a crack

B = 100cm

NO	Ms (kN·m)	d (cm)	Diameter (mm)	Pitch (cm)	As (cm ²)	σ_{se} (N/mm ²)	Crack width W (cm)	Permission crack width W_{lim} (cm)
Seaside above	0.000	61.0	D13	20.0	6.34	0.000	0.0000	0.0035x8=0.0280
below	155.480	61.0	D16, D19	10.0	24.26	113.481	0.0215	0.0035x8=0.0280
Landside above	18.658	61.0	D16	20.0	9.93	32.412	0.0073	0.0035x8=0.0280
below	0.000	61.0	D13	20.0	6.34	0.000	0.0000	0.0035x8=0.0280

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CHECKED BY	R. NISHIHARA	07/08/2003

iii) Examination to shearing

Sea side footing

NO	Vd (kN/m)	d (cm)	γ_i	γ_b	β_d	β_p	β_n	f _{vcd} (N/mm ²)	Vcd (kN/m)	$\gamma_i \cdot Vd/Vcd$
Ultimate limit state (Under ordinary conditions)										
Sea side above	0.000	54.0	1.10	1.30	1.16655	0.48910	1	0.529	125.374	0.00
below	223.408	54.0	1.10	1.30	1.16655	0.76574	1	0.529	196.287	1.25
Ultimate limit state (During an earthquake)										
Sea side above	0.000	54.0	1.00	1.15	1.16655	0.48910	1	0.529	141.727	0.00
below	378.888	54.0	1.00	1.15	1.16655	0.76574	1	0.529	221.889	1.71
Serviceability limit state										
Sea side above	0.000	54.0	--	1.00	1.16655	0.48910	1	0.577	177.775	0.00
below	202.170	54.0	--	1.00	1.16655	0.76574	1	0.577	278.326	0.73
The steel reinforcement of D13 is arranged at intervals of 200mm.										
NO	A _w (mm ²)	f _{wyd} (N/mm ²)	α_s (°)	Z (mm)	γ_b	Vcd (kN/m)	Vsd (kN/m)	Vyd (kN/m)	$\gamma_i \cdot Vd/Vyd$	
Ultimate limit state (Under ordinary conditions)										
Sea side above	380.1	345.00	90	469.6	1.15	125.374	267.742	393.116	0.00	
below	380.1	345.00	90	469.6	1.15	196.287	267.742	464.029	0.53	
Ultimate limit state (During an earthquake)										
Sea side above	380.1	345.00	90	469.6	1.00	141.727	307.904	449.631	0.00	
below	380.1	345.00	90	469.6	1.00	221.889	307.904	529.793	0.72	
Serviceability limit state										
Sea side above	380.1	345.00	90	469.6	1.00	177.775	307.904	485.679	0.00	
below	380.1	345.00	90	469.6	1.00	278.326	307.904	586.230	0.35	

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CHECKED BY	R. NISHIJIMA	09/08/2002

Land side Footing

NO	Vd (kN/m)	d (cm)	γ_i	γ_b	β_d	β_p	β_n	f _{vd} (N/mm ²)	V _{cd} (kN/m)	$\gamma_i \cdot V_d/V_{cd}$
Ultimate limit state (Under ordinary conditions)										
Land side above	0.943	54.0	1.10	1.30	1.16655	0.56877	1	0.529	145.796	0.01
below	0.738	54.0	1.10	1.30	1.16655	0.48910	1	0.529	125.374	0.01
Ultimate limit state (During an earthquake)										
Land side above	155.275	54.0	1.00	1.15	1.16655	0.56877	1	0.529	164.813	0.94
below	0.000	54.0	1.00	1.15	1.16655	0.48910	1	0.529	141.727	0.00
Serviceability limit state										
Land side above	24.284	54.0	--	1.00	1.16655	0.56877	1	0.577	206.733	0.12
below	0.000	54.0	--	1.00	1.16655	0.48910	1	0.577	177.775	0.00
The steel reinforcement of D13 is arranged at intervals of 400mm.										
NO	A _w (mm ²)	f _{wyd} (N/mm ²)	α_s (°)	Z (mm)	γ_b	V _{cd} (kN/m)	V _{sd} (kN/m)	V _{yd} (kN/m)	$\gamma_i \cdot V_d/V_{yd}$	
Ultimate limit state (Under ordinary conditions)										
Land side above	126.7	345.00	90	469.6	1.15	145.796	44.624	190.420	0.01	
below	126.7	345.00	90	469.6	1.15	125.374	44.624	169.998	0.01	
Ultimate limit state (During an earthquake)										
Land side above	126.7	345.00	90	469.6	1.00	164.813	51.317	216.130	0.72	
below	126.7	345.00	90	469.6	1.00	141.727	51.317	193.044	0.00	
Serviceability limit state										
Land side above	126.7	345.00	90	469.6	1.00	206.733	51.317	258.050	0.09	
below	126.7	345.00	90	469.6	1.00	177.775	51.317	229.092	0.00	

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PREPARED BY	<i>Y. Ando</i>	24/07/01
CHECKED BY	<i>R. NISHIKAWA</i>	09/08/2000