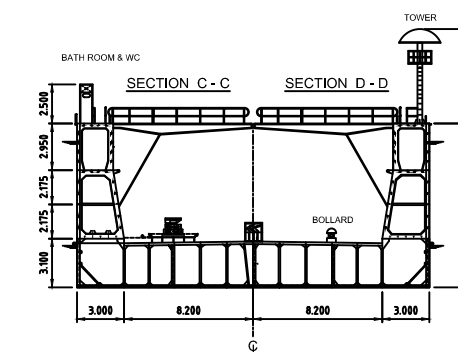
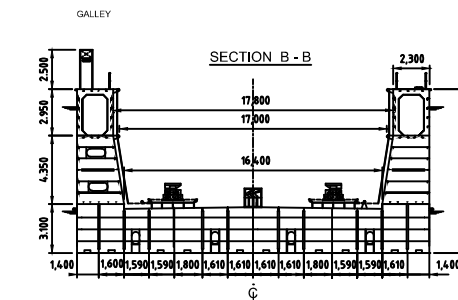
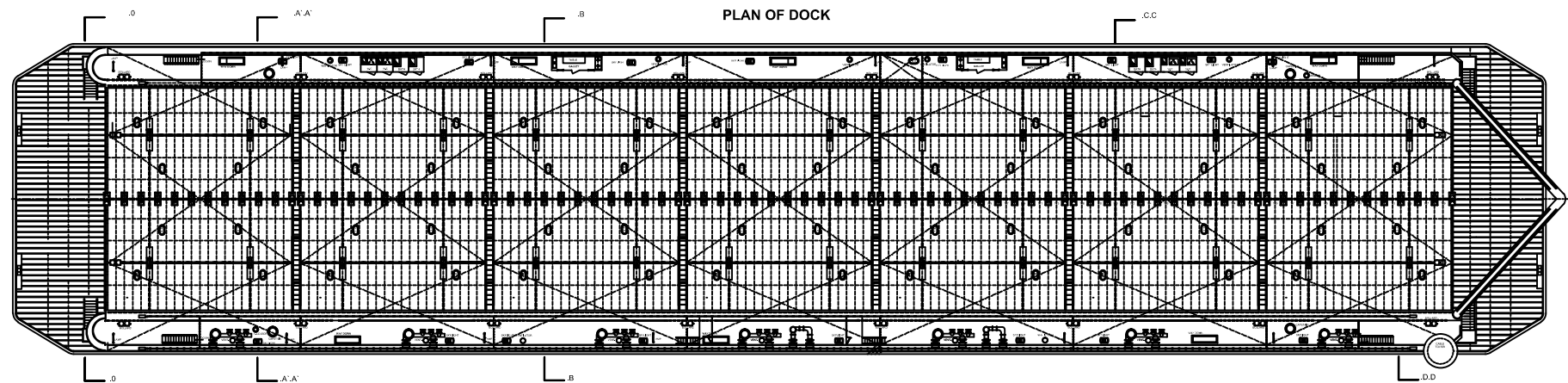
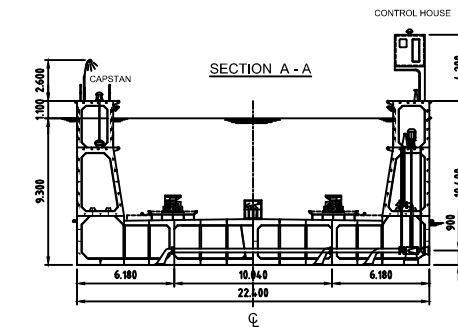
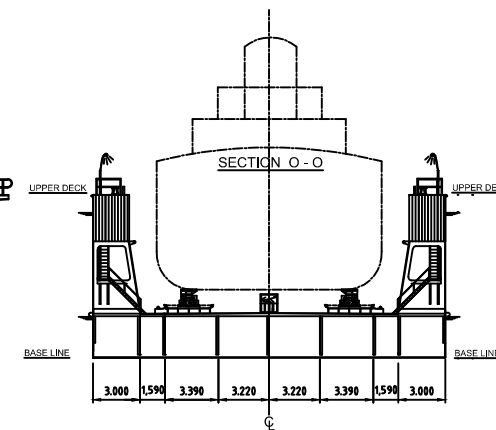
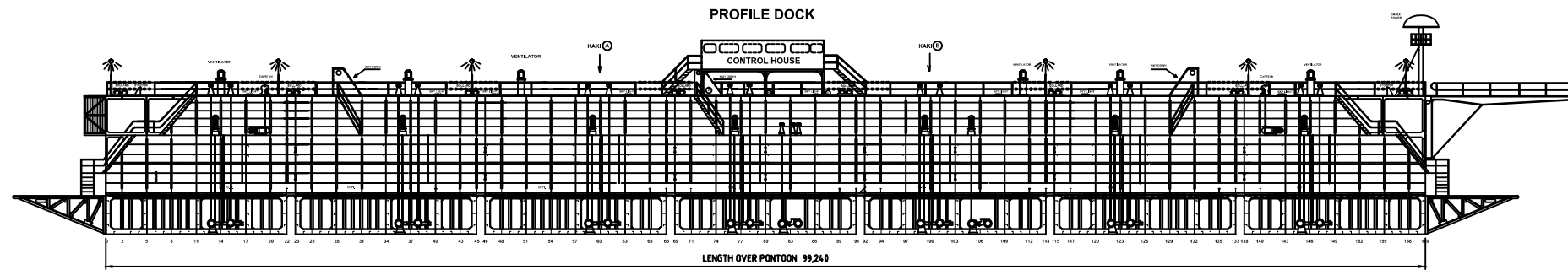


GENERAL ARRANGEMENT

DOK APUNG SURABAYA - I



HORIZONTAL LONGITUDINAL BULKHEAD UNDER SIDE WALL



DIMENSIONS

LENGTH OVER ALL (OVER PLATFORM)	113.24 MTR
LENGTH OVER PONTOON	99.24 MTR
LENGTH PER PONTOON	13.62 MTR
B. EXTERNAL	22.40 MTR
B. BETWEEN SIDE WALL AT TOP	17.80 MTR
B. BETWEEN SIDE WALL AT BOTTOM	16.40 MTR
B. OF SIDE WALL AT TOP	
B. OF SIDE WALL AT BOTTOM	
CAMBER OF PONTOON DECK	
RISE OF FLOOR OF PONTOON	
DEPTH MOULDED	
DEPTH OF PONTOON AT CENTER	
HEIGHT OF SIDE WALL FROM DECK OF PONTOON	
MAX DRAFT OF VESSEL TO BE DOCKED	
DRAFT EMPY (WITHOUT DRAINING)	
DRAFT FULL LOADS INCLUDING DRAINING	2.60 MTR
MAX. DRAFT (ON SIDE WALL)	9.30 MTR
FREEBOARD WHEN MAX DRAFT UP TO SIDE WALL	1.10 MTR
MAX. WATER HEIGHT ABOVE KEEL BLOCK	5.20 MTR
HEIGHT OF KEEL BLOCK	1.20 MTR
HEIGHT OF BILGE BLOCK	1.20 MTR
WEIGHT OF DOCK INCLUDING DRAINING	
WEIGHT WITHOUT DRAINING	
FREEBOARD OF PONTOON DECK AT CENTER	0.30 MTR
DISTANCE BETWEEN PONTOON	0.65 MTR
NUMBER OF PONTOON	7

LAMPIRAN

Perhitungan Konstruksi Dok Apung

Perhitungan Konstruksi Dok Apung								
Jenis	Spesifikasi	Luasan (m ²)	Expanded Plate (mm)	Tebal (mm)	Panjang (mm)	Jumlah	Berat (ton)	Total
Pontoon Construction								
Pontoon Deck								
Deck Plate	13,620 x 16,400 x 11	223		11		1	19,29	
Long Deck Girder	T 300x12 / 200x9							
Web			300	12	13,620	14	5,39	
Face Bar			200	9	13,620	14	2,69	
Deck Ordinary Frame	L 120x120x10		240	10	16,400	14	4,33	
Deck Transv. Girder	T 300x12 / 200x9							
Web			300	12	16,400	4	1,85	
Face Bar			200	9	16,400	4	0,93	
								34,477
Side Shell								
Outer Side Shell	13,620 x 3,100 x 11	42		11		2	7,29	
Hor. Stringer	T 300x12 / 200x9							
Web			300	12	13,620	2	0,77	
Face Bar			200	9	13,620	2	0,38	
Side Transv. Girder	T 300x12 / 200x9							
Web			300	12	3,100	8	0,70	
Face Bar			200	9	3,100	8	0,35	
Side Ord. Frame	L 120x120x10		240	10	3,100	28	1,64	
								11,133
LONG. WTD BHD (9820 OFF CL)								
Steel Plate	2,636 x 13,620 x 9	36		9		2	5,07	
Hor. Stringer	T 300x12 / 200x9							
Web			300	12	13,620	2	0,77	
Face Bar			200	9	13,620	2	0,38	
Side Transv. Girder	T 300x12 / 200x9							
Web			300	12	2,636	8	0,60	
Face Bar			200	9	2,636	8	0,30	
BHD Ord. Frame	L 120x120x10		240	10	2,636	28	1,39	
								8,512
LONG. Wash BHD (AT CL)								
Steel Plate	2,7 x 13,620 x 9	37		9		1	2,60	
Hor. Stringer	T 300x12 / 200x9							
Web			300	12	13,620	1	0,38	
Face Bar			200	9	13,620	1	0,19	
Side Transv. Girder	T 300x12 / 200x9							
Web			300	12	2,700	4	0,31	
Face Bar			200	9	2,700	4	0,15	
BHD Ord. Frame	L 120x120x10		240	10	2,700	14	0,71	
								4,345

Bottom Pontoon								
Bottom Plate	13,620 x 32,000 x 11	436		11		1	37,63	
Long. Bot. Girder	T 300x12 / 200x9							
Web			300	12	13,620	16	6,16	
Face Bar			200	9	13,620	16	3,08	
Bottom Ord. Frame	L 120x120x10		240	10	22,400	14	5,91	
Trans. Bot. Girder	T 300x12 / 200x9							
Web			300	12	22,400	4	2,53	
Face Bar			200	9	22,400	4	1,27	
								56,579
End Wall								
Steel Plate	2700 x 32,000 x 11	70		11		2	12,12	
Hor. Stringer	T 300x12 / 200x9							
Web			300	12	22,400	2	1,27	
Face Bar			200	9	22,400	2	0,63	
End Long. Girder	T 300x12 / 200x9							
Web			300	12	2,700	32	2,44	
Face Bar			200	9	2,700	32	1,22	
End Wall Ord. Frame	L 120x120x10		240	10	22,400	4	1,69	
								19,373
Trans. Wash BHD								
Steel Plate	2700 x 32,000 x 11	70		9		3	14,88	
End Long. Girder	T 300x12 / 200x9							
Web			300	12	2,700	48	3,66	
Face Bar			200	9	2,700	48	1,83	
BHD Ord. Frame	L 120x120x10		240	10	22,400	9	3,80	
								24,171
Strut	I 160x12 / 100x12		360	12	2,700	140	12,82	12,819
Strut Frame	L 120x120x10		240	10	1,900	48	1,72	1,718
All Bracket (5%)								8,656
Welding (3%)								5,194
					<i>Weight @ Pontoon 7 Pontoon (T)</i>			186,98
								1.308,84
Jenis	Spesifikasi	Luasan (m ²)	Expanded Plate (mm)	Tebal (mm)	Panjang (mm)	Jumlah	Berat (ton)	Total
SIDE WALL								
Top Deck	Steel Plate		2,300	11	99,240	2	39,42	
Deck Longitudinal	L 120x120x10		240	10	99,240	8	14,96	
Deck Transv. Girder	T 300x12 / 100x10							
Web			300	12	2,300	244	15,86	
Face Bar			100	10	2,300	244	4,41	
								74,642
Safety Deck	Steel Plate		2,300	11	99,240	2	39,42	
Deck Longitudinal	L 120x120x10		240	10	99,240	8	14,96	
Deck Transv. Girder	T 300x12 / 100x10							
Web			300	12	2,300	240	15,60	
Face Bar			100	10	2,300	240	4,33	
								74,309

Out Shell (Accom.)	Steel Plate		2,950	10	99,240	2	45,96	
Long. Ord. Frame	L 120x120x10		240	10	99,240	8	14,96	
Transv. Girder	T 300x12 / 100x10							
Web			300	12	2,950	244	20,34	
Face Bar			100	10	2,950	244	5,65	
								86,912
Out Shell (Tank)	Steel Plate		4,350	10	99,240	2	67,78	
Long. Ord. Frame	L 120x120x10		240	10	99,240	8	14,96	
Transv. Girder	T 300x12 / 100x10							
Web			300	12	4,350	244	30,00	
Face Bar			100	10	4,350	244	8,33	
Long. Girder	T 300x12 / 100x10							
Web			300	12	99,240	2	5,61	
Face Bar			100	10	99,240	2	1,56	
								128,228
Inner Shell (Accom.)	Steel Plate		2,950	9	99,240	2	41,37	
Long. Ord. Frame	L 120x120x10		240	10	99,240	8	14,96	
Transv. Girder	T 300x12 / 100x10							
Web			300	12	2,950	244	20,34	
Face Bar			100	10	2,950	244	5,65	
								82,316
Inner Shell (Tank)	Steel Plate		4,406	10	99,240	2	68,65	
Long. Ord. Frame	L 120x120x10		240	10	99,240	8	14,96	
Transv. Girder	T 300x12 / 100x10							
Web			300	12	4,406	244	30,38	
Face Bar			100	10	4,406	244	8,44	
Long. Girder	T 300x12 / 100x10							
Web			300	12	99,240	2	5,61	
Face Bar			100	10	99,240	2	1,56	
								129,594
End Wall (Accom.)	Steel Plate		2,300	11	2,950	4	2,34	
End Wall Frame	L 120x120x10		240	10	2,300	16	0,69	
								3,037
End Wall (Tank)	Steel Plate		3,000	11	4,350	4	4,51	
End Wall Frame	L 120x120x10		240	10	3,000	16	0,90	
Transv. Girder	T 300x12 / 100x10							
Web			300	12	3,000	4	0,34	
Face Bar			100	10	3,000	4	0,09	
								5,845
WTD BHD (Accom.)	Steel Plate		2,300	9	2,950	12	5,75	
BHD Frame	L 120x120x10		240	10	1,900	48	1,72	
								7,471
WTD BHD (Tank)	Steel Plate		3,000	9	2,950	12	7,50	
BHD Frame	L 120x120x10		240	10	3,000	48	2,71	
Transv. Girder	T 300x12 / 100x10							
Web			300	12	3,000	12	1,02	
Face Bar			100	10	3,000	12	0,28	
								11,516
Wash BHD (Tank)	Steel Plate		3,000	9	2,950	14	8,75	
BHD Frame	L 120x120x10		240	10	3,000	50	2,83	

Transv. Girder	T 300x12 / 100x10							
Web			300	12	3.000	14	1,19	
Face Bar			100	10	3.000	14	0,33	
								13,096
Hor. Wash BHD	Steel Plate		3.000	16	99.240	2	74,79	
Transv. Girder	T 150x12 / 100x12							
Web			150	12	99.240	8	11,22	
Face Bar			100	12	99.240	8	7,48	
								93,484
All Bracket (5%)							35,52	
Welding (3%)							21,31	
				<i>Weight all Side Wall</i>			767,29	

Perhitungan Modulus *Side Wall*

Perhitungan Modulus <i>Side Wall</i>									
No.	Profil		L	t	Jarak	Luas	Luas x Jarak	Jarak (NA)	Momen Inersia
1	Profil L (120 x 80 x 10)	Web	10	120	7240	1200	8688000	3758	16948516800
		Flange	80	10	7175	800	5740000	3693	10910605867
2	Profil L (120 x 80 x 10)	Web	10	120	7240	1200	8688000	3758	16948516800
		Flange	80	10	7175	800	5740000	3693	10910605867
3	Profil L (120 x 80 x 10)	Web	10	120	7240	1200	8688000	3758	16948516800
		Flange	80	10	7175	800	5740000	3693	10910605867
4	Profil L (120 x 80 x 10)	Web	10	120	7240	1200	8688000	3758	16948516800
		Flange	80	10	7175	800	5740000	3693	10910605867
5	Profil L (120 x 80 x 10)	Web	120	10	6710	1200	8052000	3228	12503990800
		Flange	10	80	6673	800	5338400	3191	8146411467
6	Profil L (120 x 80 x 10)	Web	120	10	6710	1200	8052000	3228	12503990800
		Flange	10	80	6673	800	5338400	3191	8146411467
7	Profil L (120 x 80 x 10)	Web	120	10	6120	1200	7344000	2638	8350862800
		Flange	10	80	6083	800	4866400	2601	5412587467
8	Profil L (120 x 80 x 10)	Web	120	10	6120	1200	7344000	2638	8350862800
		Flange	10	80	6083	800	4866400	2601	5412587467
9	Profil L (120 x 80 x 10)	Web	120	10	5530	1200	6636000	2048	5033174800
		Flange	10	80	5493	800	4394400	2011	3235723467
10	Profil L (120 x 80 x 10)	Web	120	10	5530	1200	6636000	2048	5033174800
		Flange	10	80	5493	800	4394400	2011	3235723467
11	Profil L (120 x 80 x 10)	Web	120	10	4942	1200	5930400	1460	2557930000
		Flange	10	80	4904	800	3923200	1422	1618093867
12	Profil L (120 x 80 x 10)	Web	120	10	4942	1200	5930400	1460	2557930000
		Flange	10	80	4904	800	3923200	1422	1618093867
13	Profil L (120 x 80 x 10)	Web	10	120	4290	1200	5148000	808	784876800
		Flange	80	10	4225	800	3380000	743	441645866,7
14	Profil L (120 x 80 x 10)	Web	10	120	4290	1200	5148000	808	784876800
		Flange	80	10	4225	800	3380000	743	441645866,7
15	Profil L (120 x 80 x 10)	Web	10	120	4290	1200	5148000	808	784876800
		Flange	80	10	4225	800	3380000	743	441645866,7
16	Profil L (120 x 80 x 10)	Web	10	120	4290	1200	5148000	808	784876800
		Flange	80	10	4225	800	3380000	743	441645866,7
17	Profil L (120 x 80 x 10)	Web	120	10	3625	1200	4350000	143	24548800
		Flange	10	80	3588	800	2870400	106	9415466,667
18	Profil L (120 x 80 x 10)	Web	120	10	3625	1200	4350000	143	24548800
		Flange	10	80	3588	800	2870400	106	9415466,667
19	Profil L (120 x 80 x 10)	Web	120	10	2900	1200	3480000	620	461290000
		Flange	10	80	2863	800	2290400	582	271405866,7
20	Profil L (120 x 80 x 10)	Web	120	10	2900	1200	3480000	620	461290000
		Flange	10	80	2863	800	2290400	582	271405866,7
21	Profil T (300 x 12 & 100 x 10)	Web	300	12	2175	3600	7830000	1307	6149739600
		Flange	10	100	2175	1000	2175000	1307	1709082333
22	Profil T (300 x 12 & 100 x 10)	Web	300	12	2175	3600	7830000	1307	6149739600
		Flange	10	100	2175	1000	2175000	1307	1709082333
23	Profil L (120 x 80 x 10)	Web	120	10	1450	1200	1740000	2070	5141890000

		Flange	10	80	1413	800	1130400	2032	3303645867
24	Profil L (120 x 80 x 10)	Web	120	10	1450	1200	1740000	2070	5141890000
		Flange	10	80	1413	800	1130400	2032	3303645867
25	Profil L (120 x 80 x 10)	Web	120	10	725	1200	870000	2795	9374440000
		Flange	10	80	668	800	534400	2757	6081265867
26	Profil L (120 x 80 x 10)	Web	120	10	725	1200	870000	2795	9374440000
		Flange	10	80	668	800	534400	2757	6081265867
27	Profil T (145 x 12 & 100 x 10)	Web	12	145	150	1740	261000	3410	20235942625
		Flange	100	10	73	1000	73000	3332	11102232333
28	Profil T (500 x 12 & 100 x 10)	Web	12	500	504	6000	3024000	3232	62799944000
		Flange	100	10	205	1000	205000	2978	8868492333
29	Profil T (145 x 12 & 100 x 10)	Web	12	145	150	1740	261000	3410	20235942625
		Flange	100	10	73	1000	73000	3332	11102232333
30	Profil T (500 x 12 & 100 x 10)	Web	12	500	504	6000	3024000	3232	62799944000
		Flange	100	10	205	1000	205000	2978	8868492333
31	Profil T (145 x 12 & 100 x 10)	Web	12	145	150	1740	261000	3410	20235942625
		Flange	100	10	73	1000	73000	3332	11102232333
32	Plat		2300	11	7306	25300	184841800	3824	3,69962E+11
33	Plat		10	2950	5825	29500	171837500	2343	1,83338E+11
34	Plat		9	2950	5825	26550	154653750	2343	1,65004E+11
35	Plat		2300	11	4356	25300	110206800	874	19326317908
36	Plat		10	4350	2175	43500	94612500	1307	1,42903E+11
37	Plat		10	4406	2175	44060	95830500	1307	1,46543E+11
38	Plat		3000	11	6	33000	198000	3488	4,01483E+11

Total Luas x Jarak	1058975650	mm^2
Total Luasan	306630	mm^2
Titik Berat pada bottom	3453,594397	mm
Titik Berat pada deck	3946,405603	mm
Total Inersia	1,94102E+12	mm^4
Modulus pada bottom	562030239,9	mm^3
	0,56203024	m^3
Modulus pada deck	491846171,7	mm^3
	0,491846172	m^3

Perhitungan Modulus Ponton

Perhitungan Modulus Ponton									
No.	Profil		L	t	Jarak	Luas	Luas x Jarak	Jarak (NA)	Momen Inersia
1	Profil L (120 x 80 x 10)	Web	120	10	2524	1200	3028800	1.307	2048513951
		Flange	10	80	2474	800	1979200	1.257	1263571547
2	Profil L (120 x 80 x 10)	Web	120	10	2524	1200	3028800	1.307	2048513951
		Flange	10	80	2474	800	1979200	1.257	1263571547
3	Profil L (120 x 80 x 10)	Web	120	10	2524	1200	3028800	1.307	2048513951
		Flange	10	80	2474	800	1979200	1.257	1263571547
4	Profil L (120 x 80 x 10)	Web	120	10	2524	1200	3028800	1.307	2048513951
		Flange	10	80	2474	800	1979200	1.257	1263571547
5	Profil L (120 x 80 x 10)	Web	120	10	2524	1200	3028800	1.307	2048513951
		Flange	10	80	2474	800	1979200	1.257	1263571547
6	Profil L (120 x 80 x 10)	Web	120	10	1548	1200	1857600	331	131130129,3
		Flange	10	80	1498	800	1198400	281	63395666,05
7	Profil L (120 x 80 x 10)	Web	120	10	1548	1200	1857600	331	131130129,3
		Flange	10	80	1498	800	1198400	281	63395666,05
8	Profil L (120 x 80 x 10)	Web	120	10	1548	1200	1857600	331	131130129,3
		Flange	10	80	1498	800	1198400	281	63395666,05
9	Profil L (120 x 80 x 10)	Web	120	10	714	1200	856800	503	304157937,6
		Flange	10	80	664	800	531200	553	245467538,3
10	Profil L (120 x 80 x 10)	Web	120	10	714	1200	856800	503	304157937,6
		Flange	10	80	664	800	531200	553	245467538,3
11	Profil L (120 x 80 x 10)	Web	120	10	714	1200	856800	503	304157937,6
		Flange	10	80	664	800	531200	553	245467538,3
12	Profil L (120 x 80 x 10)	Web	120	10	714	1200	856800	503	304157937,6
		Flange	10	80	664	800	531200	553	245467538,3
13	Profil L (120 x 80 x 10)	Web	120	10	714	1200	856800	503	304157937,6
		Flange	10	80	664	800	531200	553	245467538,3
14	Profil L (120 x 80 x 10)	Web	10	120	120	1200	144000	1.097	1446701971
		Flange	80	10	60	800	48000	1.157	1071749343
15	Profil L (120 x 80 x 10)	Web	10	120	120	1200	144000	1.097	1446701971
		Flange	80	10	60	800	48000	1.157	1071749343
16	Profil L (120 x 80 x 10)	Web	10	120	120	1200	144000	1.097	1446701971
		Flange	80	10	60	800	48000	1.157	1071749343
17	Profil L (120 x 80 x 10)	Web	10	120	120	1200	144000	1.097	1446701971
		Flange	80	10	60	800	48000	1.157	1071749343
18	Profil L (120 x 80 x 10)	Web	10	120	120	1200	144000	1.097	1446701971
		Flange	80	10	60	800	48000	1.157	1071749343
19	Profil L (120 x 80 x 10)	Web	10	120	120	1200	144000	1.097	1446701971
		Flange	80	10	60	800	48000	1.157	1071749343
20	Profil L (120 x 80 x 10)	Web	10	120	120	1200	144000	1.097	1446701971
		Flange	80	10	60	800	48000	1.157	1071749343
21	Profil L (120 x 80 x 10)	Web	10	120	120	1200	144000	1.097	1446701971
		Flange	80	10	60	800	48000	1.157	1071749343
22	Profil L (120 x 80 x 10)	Web	10	120	120	1200	144000	1.097	1446701971
		Flange	80	10	60	800	48000	1.157	1071749343
23	Profil L (120 x 80 x 10)	Web	10	120	120	1200	144000	1.097	1446701971

		Flange	80	10	60	800	48000	1.157	1071749343
24	Profil L (120 x 80 x 10)	Web	10	120	120	1200	144000	1.097	1446701971
		Flange	80	10	60	800	48000	1.157	1071749343
25	Profil L (120 x 80 x 10)	Web	10	120	120	1200	144000	1.097	1446701971
		Flange	80	10	60	800	48000	1.157	1071749343
26	Profil L (120 x 80 x 10)	Web	10	120	120	1200	144000	1.097	1446701971
		Flange	80	10	60	800	48000	1.157	1071749343
27	Profil L (120 x 80 x 10)	Web	10	120	120	1200	144000	1.097	1446701971
		Flange	80	10	60	800	48000	1.157	1071749343
28	Profil T (300 x 12 & 100 x 10)	Web	300	12	714	3600	2570400	503	912487012,7
		Flange	10	100	664	1000	664000	553	307134422,8
29	Profil T (300 x 12 & 100 x 10)	Web	300	12	714	3600	2570400	503	912487012,7
		Flange	10	100	664	1000	664000	553	307134422,8
30	Plat		200	10	1548	2000	3096000	331	218550215,4
31	Plat		200	10	1548	2000	3096000	331	218550215,4
32	Plat		13620	10	2600	136200	354120000	1.383	2,60342E+11
33	Plat		2600	10	1300	26000	33800000	83	177416275,6
34	Plat		13620	10	5	136200	681000	1.212	2,00218E+11

Total Luas x Jarak	445097800	m ²
Total Luasan	365600	m ²
Titik Berat pada bottom	1217,4447	mm
Titik Berat pada deck	1382,5553	mm
Total Inersia	5,188E+11	mm ⁴
Modulus pada bottom	426109056	mm ³
	0,4261091	m ³
Modulus pada deck	375221339	mm ³
	0,3752213	m ³

Perhitungan Momen

Momen Bocor 1 ponton (Side Wall)					
No	Bagian	Q	L	W	Mx
1	Kapal	24,65	14,92	183,87	2.743,39
2	Ponton (1)	12,41	14,92	92,55	1.380,91
3	Side Wall	7,73	14,92	57,66	860,23
Total				276,43	4.984,53

Momen Bocor 2 ponton (Side Wall)					
No	Bagian	Q	L	W	Mx
1	Kapal	24,65	29,19	359,74	13.409,38
2	Ponton (2)	12,41	29,19	181,08	6.749,74
3	Side Wall	7,73	29,19	112,80	4.204,73
Total				540,81	24.363,85

Momen Bocor 1 ponton (Ponton)					
No	Bagian	Q	L	W	Mx
1	Kapal	24,65	13,62	335,70	2.286,15
2	Ponton (1)	12,41	13,62	168,98	1.150,75
3	Side Wall	7,73	13,62	52,63	716,86
Total				504,68	4.153,76

Perhitungan Daya angkat dok apung

Floating dock 7 Ponton

LWT Side Wall	767,29	Ton		
LWT				
Accessories	0,00	Ton		
LWT Pontoon	186,98	Ton	Floating 1 Pontoon	813,06 TLC
LWT 7 Pontoon	1.308,84	Ton	Floating 7 Pontoon	5.691,42 TLC

TLC Floating dock = Floating (7 Pontoon) - LWT (Side Wall+Acc+7Pontoon)
3.615,29 TLC

Floating dock 6 Ponton

LWT Side Wall	767,29	Ton		
LWT				
Accessories	0,00	Ton		
LWT Pontoon	186,98	Ton	Floating 1 Pontoon	813,06 TLC
LWT 6 Pontoon	1.308,84	Ton	Floating 6 Pontoon	4.878,36 TLC

TLC Floating dock = Floating (6 Pontoon) - LWT (Side Wall+Acc+7Pontoon)
2.802,23 TLC

Floating dock 5Ponton

LWT Side Wall	767,29	Ton		
LWT				
Accessories	0,00	Ton		
LWT Pontoon	186,98	Ton	Floating 1 Pontoon	813,06 TLC
LWT 5 Pontoon	1.308,84	Ton	Floating 5 Pontoon	4.065,30 TLC

TLC Floating dock = Floating (5 Pontoon) - LWT (Side Wall+Acc+7Pontoon)
1.989,17 TLC

DAFTAR RIWAYAT HIDUP



Penulis bernama lengkap **Achmad Idrus Zainuri** dilahirkan di kota Surabaya, tanggal Enam Belas bulan Januari tahun Seribu Sembilan Ratus Delapan Puluh Sembilan. Merupakan anak pertama dari tiga bersaudara. Penulis telah menempuh pendidikan formal yaitu tingkat pertama pada tahun 1995 - 2001 di SD Negeri Simokerto 1 Surabaya, kemudian melanjutkan ke SMP Negeri 6 Surabaya pada tahun 2001 - 2004, selanjutnya ke SMA Negeri 1 Surabaya pada tahun 2004 - 2007 dan penulis melanjutkan ke tingkat Diploma III (D-III) Jurusan Teknik Bangunan Kapal, Politeknik Perkapalan Negeri Surabaya, Institut Teknologi Sepuluh Nopember pada tahun 2007 - 2010. Setelah lulus dari tingkat Diploma III pada tahun 2010, penulis bekerja disalah satu perusahaan kontraktor swasta di Surabaya. Karena memiliki keinginan yang kuat melanjutkan studi pada tingkat Sarjana (S1), namun keterbatasan waktu yang dimiliki oleh penulis, maka penulis pada tahun 2014 mendaftar kuliah program kelas karyawan di Universitas Muhammadiyah Surabaya, Fakultas Teknik, Program Studi Teknik Perkapalan, sampai dengan penulisan skripsi ini penulis masih aktif sebagai karyawan dan mahasiswa.

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