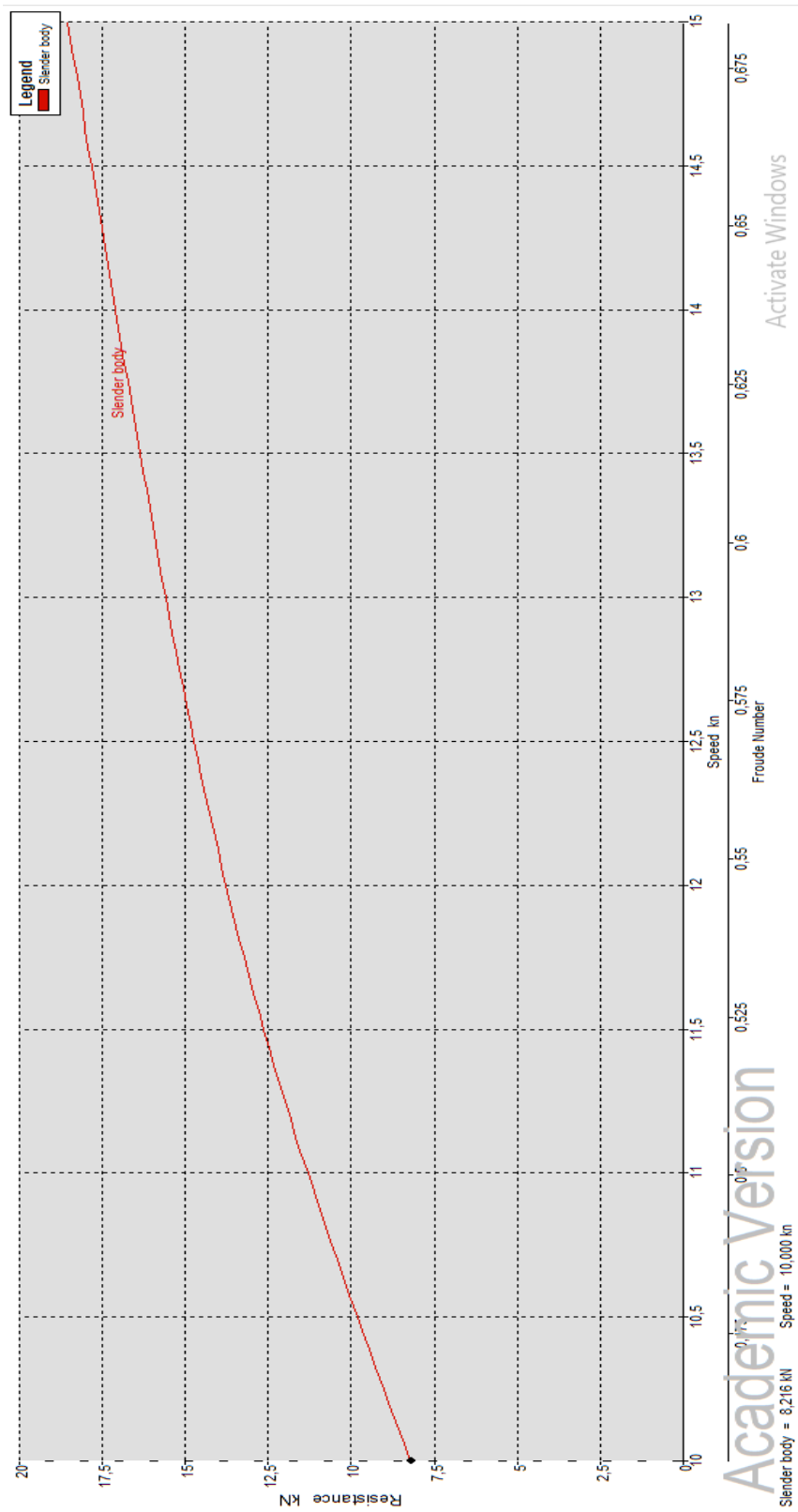


LAMPIRAN

Lampiran 1 Hasil Hitungan Hambatan Kapal Rancangan

Speed (knot)	Froude number (LWL)	Froude number (V disp)	Resistance (kN)	Power (kW)
10,000	0,455	1,042	8,20	42,265
10,125	0,461	1,055	8,60	44,883
10,250	0,466	1,068	9,00	47,569
10,500	0,478	1,094	9,80	53,014
10,625	0,483	1,107	10,20	55,737
10,750	0,489	1,12	10,60	58,488
11,000	0,500	1,146	11,30	64,004
11,125	0,506	1,159	11,70	66,767
11,250	0,512	1,172	12,00	69,468
11,500	0,523	1,198	12,60	74,776
11,625	0,529	1,211	12,90	77,407
11,750	0,534	1,225	13,20	79,971
12,000	0,546	1,251	13,80	85,051
12,125	0,552	1,264	14,00	87,49
12,250	0,557	1,277	14,30	89,942
12,500	0,569	1,303	14,70	94,814
12,625	0,574	1,316	15	97,121
12,750	0,58	1,329	15,2	99,544
13,000	0,591	1,355	15,6	104,255
13,125	0,597	1,368	15,8	106,629
13,250	0,603	1,381	16	108,942
13,500	0,614	1,407	16,4	113,642
13,625	0,62	1,42	16,6	116,004
13,750	0,625	1,433	16,7	118,407
14,000	0,637	1,459	17,1	123,168
14,125	0,642	1,472	17,3	125,562
14,250	0,648	1,485	17,5	127,989
14,500	0,66	1,511	17,8	133,007
14,625	0,665	1,524	18	135,501
14,750	0,671	1,537	18,2	137,912
15,000	0,682	1,563	18,6	143,281

Lanjutan lampiran 1 Hasil Hitungan Hambatan Kapal Rancangan

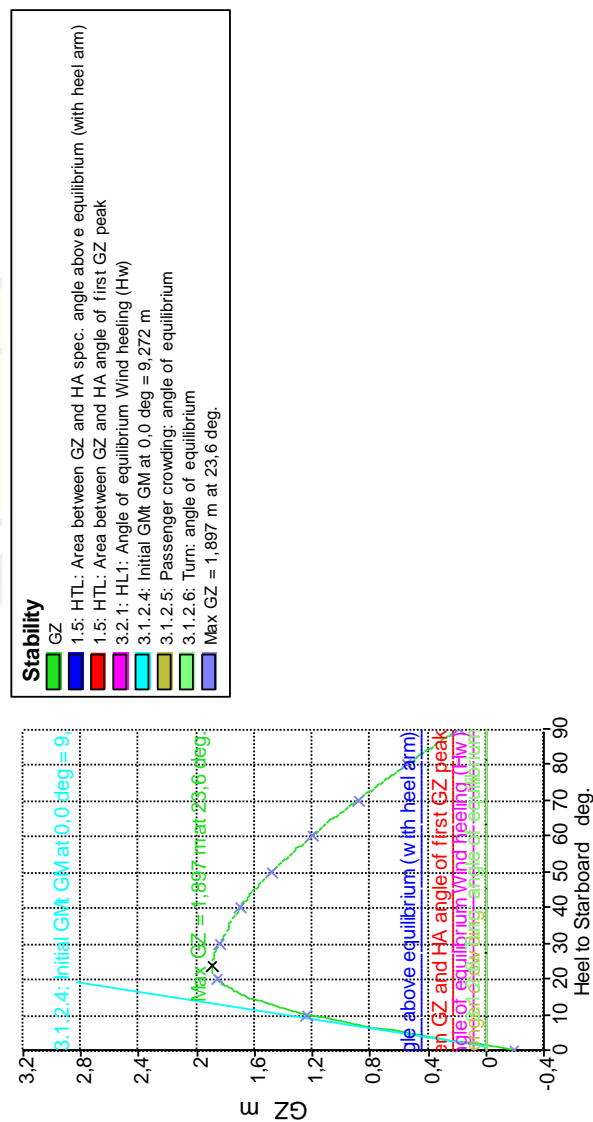


Lampiran 2 Hasil Hitungan Stabilitas Kapal Rancangan

Heel to Starboard deg	0	10	20	30	40	50	60	70	80	90
GZ m	-0,254	1,166	1,803	1,796	1,663	1,453	1,187	0,88	0,547	0,199
Area under GZ curve from zero heel m.deg	0	4,9703	20,5236	38,8074	56,1392	71,7837	85,0177	95,3825	102,534	106,269
Displacement t	23,59	23,59	23,59	23,59	23,59	23,59	23,59	23,59	23,59	23,59
Draft at FP m	1,029	1,004	0,828	0,508	0,119	-0,398	-1,183	-2,659	-6,957	n/a
Draft at AP m	0,843	0,786	0,55	0,112	-0,457	-1,231	-2,424	-4,666	-11,014	n/a
WL Length m	13,24	13,633	13,906	14,096	14,099	14,103	14,107	14,111	14,112	14,109
Beam max extenis on WL m	5,986	5,985	3,145	3,124	2,837	2,505	2,172	1,819	1,446	1,587
Wetted Area m ²	103,827	80,66	59,36	57,291	57,413	57,605	57,643	57,678	57,274	56,414
Waterpl. Area m ²	76,497	56,093	37,006	29,202	22,805	19,134	16,921	15,821	16,118	17,334
Prismatic coeff. (Cp)	0,837	0,838	0,847	0,833	0,834	0,835	0,835	0,835	0,834	0,83
Block coeff. (Cb)	0,296	0,274	0,365	0,489	0,634	0,783	0,914	0,972	0,919	0,779
LCB from zero pt. (+ve fwd) m	6,556	6,558	6,564	6,578	6,595	6,615	6,636	6,654	6,663	6,66
LCF from zero pt. (+ve fwd) m	6,461	6,743	6,94	6,809	6,79	6,799	6,815	6,76	6,521	6,278
Max deck inclination deg	0,8167	10,0438	20,0315	30,0343	40,0391	50,0405	60,0375	70,0289	80,0147	90
Trim angle (+ve by stern) deg	-0,8167	-0,9561	-1,2211	-1,7393	-2,53	-3,6569	-5,4425	-8,761	-17,299	n/a

Lanjutan lampiran 2 Hasil Hitungan Stabilitas Kapal Rancangan

Criteria	Nilai Minimal	Nilai perhitungan	Satuan	Status
Angle of maximum GZ	10	23,6	degree	Pass
Area 0 to 30	3,151	40,68	meter.deg	Pass
Area 0 to 40	5,157	58,45	meter.deg	Pass
Area 30 to 40	1,719	17,76	meter.deg	Pass
Max GZ at 30 or greater	0,2	1,84	meter	Pass
Initial GMt	0,15	9,272	meter	Pass



Lampiran 3 Panel Surya



Warranty						
Product Warranty	30 Years					
Power Warranty	12 Years of 90% Output Power, 25 Years of 80% Output Power					
Electrical Data at STC						
Maximum Power (Pmax)	460 Wp	470 Wp	480 Wp	490 Wp	500 Wp	510 Wp
Voltage at Maximum Power (Vmpp)	48.01 V	48.25 V	48.35 V	48.45 V	48.63 V	48.73 V
Current at Maximum Power (Impp)	9.59 A	9.74 A	9.93 A	10.12 A	10.28 A	10.47 A
Open Circuit Voltage (Voc)	58.75 V	58.82 V	58.89 V	58.89 V	58.95 V	59.05 V
Short Circuit Current (Isc)	9.78 A	9.9 A	10.04 A	10.67 A	10.87 A	11.07 A
Panel Efficiency	17.95 %	18.34 %	18.73 %	19.12 %	19.51 %	19.9 %
Power Tolerance (Positive)	+ 3 %	+ 3 %	+ 3 %	+ 3 %	+ 3 %	+ 3 %
<i>Standard Test Conditions (STC): air mass AM 1.5, irradiance 1000W/m², cell temperature 25°C</i>						

Material Data	
Panel Dimension (H/W/D)	1956x1310x45 mm
Weight	26 kg
Cell Type	Monocrystalline
Cell Size	156.75x156.75 mm
Cell Number	96
Glass Type	Tempered
Glass Thickness	3.2 mm
Frame Type	Anodized Aluminium Alloy
Junction Box Diodes	6
Junction Box Protection Class	IP 67
Connector Type	MC4
Cable Crossection	4 mm ²

Lampiran 4 Baterai untuk perlengkapan listrik dan navigasi

Specifications

Grid-scale ESS



High Energy
Long-duration applications with continuous power supply (2-24 hours)

High Energy Module



Models	M48145P5B	M48218P5B	M48290P5B
Energy [kWh]	7.4	11.2	14.9
Capacity [Ah]	145	210	290
Nominal Voltage [V]	51.4		
Voltage Range [V]	42.0-58.0		
Dimension [W x H x D, mm]	445 x 110 x 620	445 x 110 x 915	445 x 110 x 1162
Weight [kg]	46	60	80

Lampiran 5 Rincian perhitungan lwt

Perhitungan LWT		
Berat permesinan dan perlengkapan		satuan
motor listrik	0,672	ton
baterai	1,18	ton
perlengkapan	0,05	ton
PV	0,52	ton
kursi penumpang	0,23	ton
pintu	0,029	ton
jendela	0,075	ton
peralatan navigasi	0,1	ton
<i>lifejacket</i>	0,013	ton
<i>lifebuoy</i>	0,02	ton
TV	0,046	ton
kulkas	0,05	ton
Dispenser	0,02	ton
Berat konstruksi		satuan
luas <i>outerhull</i>	28,316	m ²
luas <i>inner hull</i>	12,06	m ²
luas pelat depan	3,589	m ²
luas <i>maindeck</i>	41,087	m ²
luas <i>middlehull</i>	24,299	m ²
luas <i>bottom</i>	3,46	m ²
total luasan lambung dan geladak	112,811	m ²
massa jenis e glass	2550	kg/m ³
tebal fiber	0,04	m
volume	4,512	
berat total	11506,72	kg
	11,51	ton
berat konstruksi	20-25%	
	2,877	ton
konstruksi	14,38	ton
total	17,392	ton

Lampiran 6 Motor listrik Outboard



Technical Data Deep Blue

Deep Blue System	Deep Blue 25 RL / RXL
Input power (continuous) in kW	27.6
Propulsive power in kW	16.2
Comparable petrol outboards (shaft power)	40 HP
Maximum overall efficiency in %	54
Motor weight without battery, including electronics in kg	139 (L) / 145 (XL)
Shaft length	20" / 51 cm (L) 25" / 63.5 cm (XL)
Standard propeller v = speed in km/h at p = power in watts	v50/p50k
Maximum propeller speed in rpm	2.400

	BMW i3 battery	BMW i8 (2018) battery*
Nominal voltage	360 V	355 V
Max. continuous performance	55 kW	25 kW
Capacity	40 kWh	10 kWh
Weight	278 kg	97 kg
Dimensions	1660 x 964 x 174 mm	1460 x 305 (240) x 330 mm

Lampiran 7 Harga BBM Pertamina

Wilayah	Solar Non-Subsidi (IDR)
Prov. Nanggroe Aceh Darussalam	9.400
Prov. Sumatera Utara	9.400
Prov. Sumatera Barat	9.600
Prov. Riau	9.800
Prov. Kepulauan Riau	9.800
Kodya Batam (FTZ)	9.800
Prov. Jambi	9.600
Prov. Bengkulu	9.400
Prov. Sumatera Selatan	9.600
Prov. Bangka-Belitung	9.600
Prov. Lampung	9.600
Prov. DKI Jakarta	9.400
Prov. Banten	9.400
Prov. Jawa Barat	9.400
Prov. Jawa Tengah	9.400
Prov. DI Yogyakarta	9.400
Prov. Jawa Timur	9.400
Prov. Bali	9.400
Prov. Nusa Tenggara Barat	9.400
Prov. Nusa Tenggara Timur	9.400
Prov. Kalimantan Barat	9.600
Prov. Kalimantan Tengah	9.600
Prov. Kalimantan Selatan	9.600
Prov. Kalimantan Timur	9.600
Prov. Kalimantan Utara	9.600
Prov. Sulawesi Utara	9.600
Prov. Gorontalo	9.600
Prov. Sulawesi Tengah	9.600
Prov. Sulawesi Tenggara	9.600
Prov. Sulawesi Selatan	9.600
Prov. Sulawesi Barat	9.600
Prov. Maluku	9.600
Prov. Maluku Utara	9.600
Prov. Papua	9.600
Prov. Papua Barat	9.600

Lampiran 8 Harga Pelumas Pertamina

MEDITRAN 30	209 L	Rp 3.648.000,-
MEDITRAN 40	209 L	Rp 3.774.000,-
MEDITRAN 50	209 L	Rp 3.843.000,-
MEDITRAN P 10 W	209 L	Rp 4.142.000,-
MEDITRAN P 30, 40	209 L	Rp 4.276.000,-
MEDITRAN P 50	209 L	Rp 4.430.000,-
MEDITRAN S 10 W	209 L	Rp 4.073.000,-
MEDITRAN S 30	209 L	Rp 4.096.000,-
MEDITRAN S 40	209 L	Rp 4.142.000,-
MEDITRAN S 50	209 L	Rp 4.330.000,-
MEDITRAN SC 15 W-40	209 L	Rp 4.460.000,-
MEDITRAN SMX 15 W-40	209 L	Rp 4.530.000,-
MEDITRANSMX 40	209 L	Rp 4.188.000,-

Lampiran 9 Solar Charge Controller



Model	2010A	4010A	6015A	
Default battery system voltage	12VDC/24VDC (auto detection)		12VDC/24VDC/36VDC/48VDC (auto detection)	
CONTROLLER INPUT	PV open circuit voltage	100VDC @12V / 145VDC @24V		
	PV Array MPPT voltage range	16V~100V @ 12V / 32V~130V @ 24V		
	Max PV input power (12V)	300W	600W	800W
	Max PV input power (24V)	600W	1200W	1600W
	Max PV input power (36V)	—	—	2400W
	Max PV input power (48V)	—	—	3200W
BATTERY	Absorption voltage	12.5VDC / 25.0VDC		
	Refloat voltage	13.7VDC / 27.4VDC		
	Float voltage	14.3VDC / 28.6VDC		
	Low voltage protection point	10VDC / 20VDC		
DC OUTPUT	Output voltage	10.0~14.5VDC		
	Peak conversion efficiency	98% (MPPT Efficiency 99%)		
	Max charging current continuous	20A	40A	60A
	Max output current	20A		
	Low voltage alarm	10.25VDC / 20.5VDC		
	Low voltage cutoff	10.0VDC / 20.0VDC		
GENERAL SPECS	Radiating mode	Automatic cooling		
	LED indicator	Systematic operation, LV indication, LV protection, over charge protection, loads protection, short circuit protection		
DISPLAY & PROTECTION	LCD display	Charge voltage, charge current, battery voltage, capacity of battery, output current		
	Alarm protections	PV array short circuit, PV reverse polarity		
		Battery reverse polarity, over charging protection		
		Output short circuit protection		
MECHANICAL SPECIFICATIONS	Mounting	Wall mount		
	W*H*D (mm)	154*236*88mm	205*371.7*124.3mm	
	Net weight (kg)	2.2Kg	2.65Kg	6.45Kg
OTHER	Environmental rating	Indoor		
	Operation temp	-25°C ~ 55°C		
	Ambient humidity	0~90% relative humidity (non-condensing)		
	altitude	≤3000m		

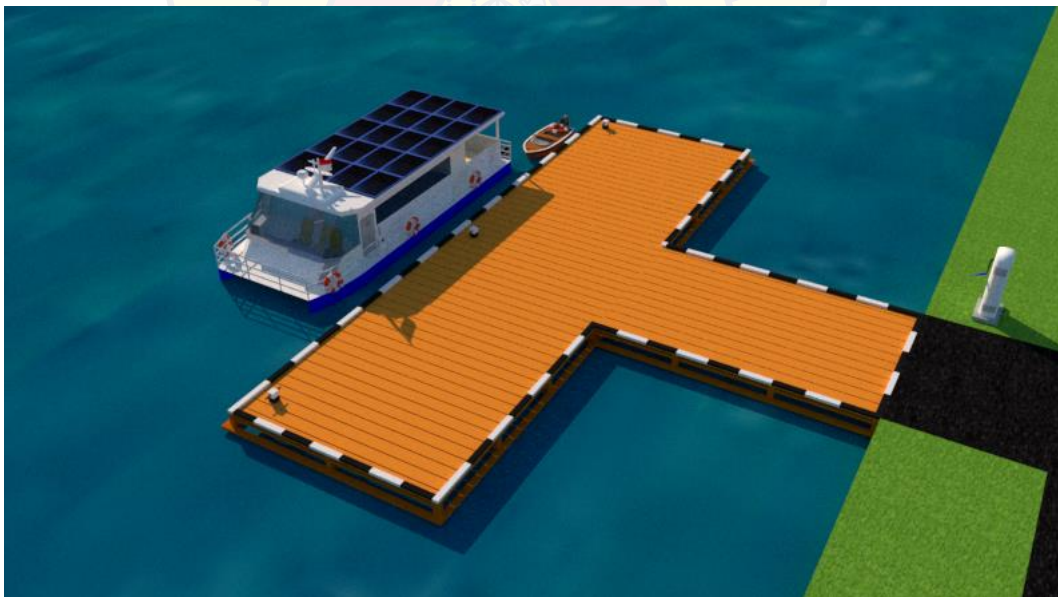


Figure 2-6015A



Figure 1-2010A & 4010A

Lampiran 11 3D Desain Kapal Katamaran



Lanjutan lampiran 11 3D Desain Kapal Katamaran

