

FASILITAS PELABUHAN PT KRAKATAU BANDAR SAMUDERA

I. MAIN EQUIPMENT

1. TECHNICAL DATA GRAB SHIP UNLOADER #1



Crane Builder : **NEI**

Design Standard : BS 2573 Part 1 & 2

Control System : **ABB**

Year of Manufacture: 1991 (Refurbish at 2016)

No	Description	Specification	Remark
1	Type of machine	Gantry type Grab Ship Unloader for Iron Ore & Coal	
2	Capacity of Machine	20 Tones (Grab + Contents) at 28 m outreach from waterside rail	
3	Rated Capacity (Free Digging)	750 TPH of Iron Ore Pellet, and 1000 TPH of Coal	
4	Grab Buckets	Four Rope Operated, one Grab to suit iron ore pellets @2,2 T/m ³ and one grab to suit coal @1,2 T/m ³ .	
5	Electrical Supply	6.0 kV, 3 Phase, 50 Hz.	
6	Control system	ABB PLC : AC800M Variable Speed Drive : DCS800 & ACS800	
7	Particulars of Motor Powers	Holding :	DMG 280S, ABB

	Main Hoist	251 kW, 1000 rpm, 360V, 750A Field 310V, 14.7A Nom Torque 2380 Nm Max Torque 200% for 30 s Isolation Class F Cooling IC 06 Prot IP23 Terminal box right side seen from drive side2 thermistorer 120 deg C Heater 220 V Closing : 251 kW, 1000rpm, 360V, 750A Field 310V, 14.7A Nom Torque 2380 Nm Max Torque 200% for 30 s Isolation Class F Cooling IC 06 Prot IP23 Terminal box right side seen from drive side2 thermistorer 120 deg C Heater 220 V	DMG 280S, ABB
	Trolley	251 kW, 1000rpm, 360V, 750A Field 310V, 14.7A Nom Torque 2380 Nm Max Torque 200% for 30 s Isolation Class F Cooling IC 06 Prot IP23 Terminal box right side seen from drive side2 thermistorer 120 deg C Heater 220 V	DMG 280S, ABB
	Boom Hoist	57 kW, 1000rpm, 380V, 172A Field 310V, 4.7A Nom Torque 544 Nm Max Torque 904 Nm Isolation Class F Cooling IC 06 Prot IP23 Terminal box right side seen from drive side2 thermistorer 120 deg C Heater 220 V	DMP 1804LB, ABB
	Long Travel (Gantry)	8 Motors, each: 11kW 380V, 3 Phase, 50 Hz, IP 55, Class F 20.9 A 4 Pole, 1460 rpm Brake Voltage: 380 V, 0.4A, 110 Nm included thermistor and heater	SUMITOMO CYCLO DRIVE Type: V132M/4
8	Controllers - Main Hoist - Trolley - Boom Hoist - Long Travel	- DCS800 - DCS800 - DCS800 - ACS800	ABB

9	Traveling Track a. Track Centres b. Size of Rail Head c. Maximun corner load Working, including worst wind. d. Stowed, including starm winds	12,5 m 100 mm 198 tonnes at seaward rail 178 tonnes at landward rail 186 tonnes at seaward rail 186 tonnes at landward rail	
10	Range of lift	Closed Grab 14.0 m above waterside rail level Open Grab reaches 16.0 m below waterside rail level	
11	Speed: a. Main Hoisting b. Lowering c. Trolley d. Boom Hoisting e. Long Traveling	All loads at 132 m/min All loads at 132 m/min All loads at 240 m/min Boom raised in 5 minutes All loads 20 m/min	
12	Automatic Cycle Time Manual Cycle Time	54 second 45 second (free digging)	
13	Traveling Wheels	32 wheels – 8 per corner	
14	Ropes	6 x 36 construction to BS302 in 180 kg/mm sqsteel Factors of safety in accordance with BS 2573 Pt.2	
15	Type of Driver's Cabin	Runway mounted	
16	Particulars of safety & indicating Devices	1) Overhoisting & Overlowering switches onhoist motion. Holding/Closing Limit Switches.Slow Down limit switches on Trolley. Hydraulic buffers on racking. 2) Boom Hoist limit Switches to: Cut off lowering when weight of boom is in far enough to be engaged by holding latch. Boom hoist interlock with trolley and cabinlimit switch to prevent hoisting boom wheneither trolley boom. Cut off the hoist andtrolley motions when boom is raised. 3) Automatically applied thrustor released latch fitted to engaged the boom and relieve the ropes of tension when the boom is in stowedposition. 4) Anemometer on mast head to indicate velocity of wind. 5) Travel audible alarm. 6) Travel limit switches to prevent over-run of the unloaders along the track would be fittedon new outside unloader only. 7) Rail Clamp (ON/OFF) indicatetion in driver's cabin. 8) Storm anchor interlock Switches. Cabin travel Limit Switches. 9) Fire Estinguishers.	
17	Brakes: • Main Hoist	- Holding Unit: 2 – Cutler hammer or equivalent Electromagnetic SM type Brake.	

	• Trolley Unit • Boom Hoist Unit	- Closing Unit: 2 – Cutler hammer or equivalent Electromagnetic SM type Brake. 1 – Cutler hammer or equivalent Electromagnetic SM type Brake. 1 – Cutler hammer or equivalent Electromagnetic SM type Brake. 1 – Cutler hammer or equivalent Electromagnetic SM type Brake (EMERGENCY)	
18	Historycal Refurbishment		
	Mekanik Elektrikal	- Mekanis sistem & Struktur - Up grade control sistem	Tahun 2016

2. TECHNICAL DATA GRAB SHIP UNLOADER #4



Crane Builder : **NEI**

Control System : **ABB** with Computer Control Digital Convertors Full Automatic Operation = GPO

Design Standard : BS 2573 Part 1 & 2

Year of Manufacture: 1991

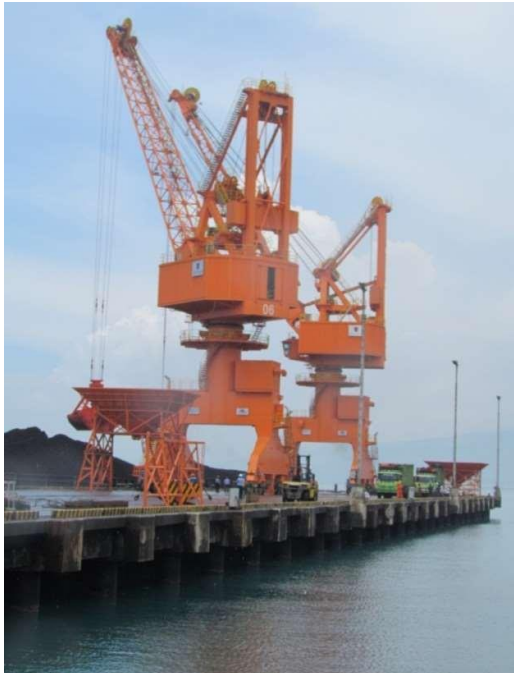
No	Description	Specification	Remark
1	Type of machine	Gantry type Grab Ship Unloader for Iron Ore & Coal	
2	Capacity of Machine	20 Tones (Grab + Contents) at 28 m outreach from waterside rail	
3	Rated Capacity (Free Digging)	750 TPH of Iron Ore Pellet, and 1000 TPH of Coal	
4	Grab Buckets	Four Rope Operated, one Grab to suit iron ore pellets @ 2,2 Te/m ³ and one grab to suit coal @ 1,2 Te/m ³ .	
5	Electrical Supply	6.0 kV, 3 Phase, 50 Hz.	
6	Control system	ABB PLC : MasterPiece 200/1 Variable Speed Drive : Tyrak	
7	Particulars of Motor Powers Main Hoist	Holding : 251 kW, 1000 rpm, 360V, 750A Field 310V, 14.7A Nom Torque 2380 Nm Max Torque 200% for 30 s	DMG 280S, ABB

		Isolation Class F Cooling IC 06 Prot IP23 Terminal box right side seen from drive side2 thermistorer 120 deg C Heater 220 V Closing : 251 kW, 1000rpm, 360V, 750A Field 310V, 14.7A Nom Torque 2380 Nm Max Torque 200% for 30 s Isolation Class F Cooling IC 06 Prot IP23 Terminal box right side seen from drive side2 thermistorer 120 deg C Heater 220 V 251 kW, 1000rpm, 360V, 750A Field 310V, 14.7A Nom Torque 2380 Nm Max Torque 200% for 30 s Isolation Class F Cooling IC 06 Prot IP23 Terminal box right side seen from drive side2 thermistorer 120 deg C Heater 220 V 57 kW, 1000rpm, 380V, 172A Field 310V, 4.7A Nom Torque 544 Nm Max Torque 904 Nm Isolation Class F Cooling IC 06 Prot IP23 Terminal box right side seen from drive side2 thermistorer 120 deg C Heater 220 V 8 Motors, each: 11kW Stator 28A, 380V Rotor 24A 300V Rating 40% 150 Starts 6 Pol AMBC 40 GR C n= 970 rpm included thermistor and heater	DMG 280S, ABB DMG 280S, ABB DMP 1804LB, ABB SUMITOMO CYCLO DRIVE Type: V132M/4
8	Controllers - Main Hoist - Trolley - Boom Hoist - Long Travel	- DCS800 - DCS800 - DCS800 - ACS800	
9	Traveling Track a. Track Centres	12,5 m	

	b. Size of Rail Head c. Maximum corner load Working, including worst wind. d. Stowed, including storm winds	100 mm 198 tonnes at seaward rail 178 tonnes at landward rail 186 tonnes at seaward rail 186 tonnes at landward rail	
10	Range of lift	Closed Grab 14.0 m above waterside rail level Open Grab reaches 16.0 m below waterside rail level	
11	Speed: a. Main Hoisting b. Lowering c. Trolley d. Boom Hoisting e. Long Traveling	All loads at 132 m/min All loads at 132 m/min All loads at 240 m/min Boom raised in 5 minutes All loads 20 m/min	
12	Automatic Cycle Time Manual Cycle Time	54 second 45 second (free digging)	
13	Traveling Wheels	32 wheels – 8 per corner	
14	Ropes	6 x 36 construction to BS302 in 180 kg/mm sqsteel Factors of safety in accordance with BS 2573Pt.2	
15	Type of Driver's Cabin	Runway mounted	
16	Particulars of safety & indicating Devices	1) Overhoisting & Overlowering switches on hoist motion. Holding/Closing Limit Switches. Slow Down limit switches on Trolley. Hydraulic buffers on racking. 2) Boom Hoist limit Switches to: Cut off lowering when weight of boom is in far enough to be engaged by holding latch. Boom hoist interlock with trolley and cabin limit switch to prevent hoisting boom when either trolley boom. Cut off the hoist and trolley motions when boom is raised. 3) Automatically applied thrustor released latch fitted to engaged the boom and relieve the ropes of tension when the boom is in stowed position. 4) Anemometer on mast head to indicate velocity of wind. 5) Travel audible alarm. 6) Travel limit switches to prevent over-run of the unloaders along the track would be fitted on new outside unloader only. 7) Rail Clamp (ON/OFF) indication in driver's cabin. 8) Storm anchor interlock Switches. Cabin travel Limit Switches. 9) Fire Extinguishers.	
17	Brakes: • Main Hoist	- Holding Unit: 2 – Cutler hammer or equivalent Electromagnetic SM type Brake. - Closing Unit:	

	• Trolley Unit • Boom Hoist Unit	2 – Cutler hammer or equivalent Electromagnetic SM type Brake. 1 – Cutler hammer or equivalent Electromagnetic SM type Brake. 1 – Cutler hammer or equivalent Electromagnetic SM type Brake. 1 – Cutler hammer or equivalent Electromagnetic SM type Brake (EMERGENCY)	
18	Historical Refurbishment		
	Mekanik Elektrikal	- Struktur hopper - Upgrade Sistem Control	Tahun 2019

3. TECHNICAL DATA PORTAL HARBOR CRANE 01 & 02



Manufacture : Shanghai GangYi port Machinery Co.
 Ltd.Year of Manufacture 2010
 Operation Start 2011
 Control System : SIEMENS

No	Description	Specification	Remark
1	Type of machine	Portal Harbor Crane	
2	Control System	SIEMENS PLC : S7-300 Variable Speed Drive : SINAMICS S120	
3	Particulars of Motor Powers - Holding Unit - Closing Unit - Slewing Unit - Luffing Unit - Gantry Unit	ABB, M3BP 3558MB6 B3 400V/50Hz/357A / 200KW 993Rpm ABB, M3BP 3558MB6 B3 400V/50Hz/357A / 200KW 993Rpm ABB, ABB M3BP2258MB4 V1 400V / 50Hz / 47,1A 45KW 1480rpm ABB M3BP 3158 MC6 IMB3/IM 1001 400V / 50Hz / 202A / 110KW 991rpm SEW-EURODRIVE,	

		DV160L4/BM/HF/TH/C/OS2 Output : 15 kW Voltage and Frequency : 400 VΔ, 690 VY, 50Hz Speed : 1460 r/min	
4	Lifting Capacity	• Hook : 100t/17m • Grab : 37t/31m • Spreader : 35t/31m • Hook :12/40m	
5	Hook:		
	a. Working range	11 m ~ 17 m	
	b. Rated Lifted Load	100 Ton	
	c. Lifting Height		
	- Above the Rail	32 m	
	- Below the Rail	16 m	
	d. Working range	11m ~ 40 m	
	e. Rated Lifted Load	12 Ton	
	f. Lifting Height		
	- Above the Rail	32 m	
	- Below the Rail	16 m	
6	Grab:		
	a. Working range	11 m ~ 31 m	
	b. Rated Lifted Load	37 Ton	
	c. Lifting Height		
	- Above the Rail	20 m	
	- Below the Rail	16 m	
7	Spreader:		
	a. Working range	11 m ~ 31 m	
	b. Rated Lifted Load	35 Ton	
	c. Lifting Height		
	- Above the Rail	28 m	
	- Below the Rail	16 m	
8	Slewing Range	Continuous ± 360°	
9	Gantry Travel Length	240 m	
10	Hoist Speed		
	a. Heavy Load Operation	100 Ton – 15 m/min 50 Ton – 25 m/min 26 Ton – 40 m/min	
	b. Normal Operation	45 Ton – 40 m/min 25 Ton – 65 m/min 10 Ton – 85 m/min	
11	Average luffing speed		
	a. Normal Operation	45 m/min	
	b. Heavy Load Operation	20 m/min	
12	Slewing speed		
	a. Normal Operation	1.4 m/min	
	b. Heavy Load Operation	0.63 m/min	
13	Maximal Peripheral Speed	220 m/min	
14	Gantry Traveling Speed	45 m/min	
15	Rail Gauge x Wheel Distance	10.44m x 12m	
16	Gantry Clearance Height	7 m	
17	Tai Slewing Radius	8 m	
18	Wheel Load	≤30 ton	
19	Steel rail type	A100	
20	Power	6000 V, 50 Hz	

21	Field Power Supply	3 phase 380 V, 50 Hz	
22	Wind Condition: a. Operating Wind b. Non-operating Wind	<20 m/s <42 m/s	
23	Crane Operating Grade a. Utility grade b. Load spectrum c. Operating grade	U8 Q4 A8	
24	Historycal Refurbishment		
	Mekanik Elektrikal	- Struktur hopper	Tahun 2017

4. TECHNICAL DATA GANTRY GRAB SHIP UNLOADER 05 & 06



Manufacture :
 DINSON
 Year of Manufacture : 2013
 Operation Start : 2013
 Control System : ABB

No	Description	Specification	Remark
1	Type of machine	Gantry type Grab Ship Unloader for Iron Ore& Coal	
2	Control system	ABB PLC : AC800M Variable Speed Drive : ACS800	
3	Lifting Capacity: - Rated load under the trolley - Rated load in the grab - Weight of grab	45 ton 27.2 ton 17.8 ton	
4	Rated Capacity	1500 TPH	
5	Open/Closing Speed: - Hoisting (grab hoist and grab close) with loaded grab - Lowering (grab hoist grab close)with empty grab - Closing	100 m/min 150 m/min 100	
6	Trolley Speed:	180 m/min	
7	Gantry Speed	30 m/min	
8	Operating outreach from waterside rail	43 m	
9	Operating backreach from waterside rail	16 m	
10	Rail gage (center to center distance)	20 m	
11	Lift height above rail to underside of grab	26 m	
12	Lift height below rail to underside of grab	18 m	
13	Total lifting height	44 m	



	c. Gantry drive brake	Type : inside the motor Braking moment : 100 Nm Qty: 16 Unit	SEW
	d. Wheel brake	Type : YLZ40-180CP Braking moment : 73 kN Qty: 8 Unit	Huawu

5. DOUBLE LEVEL LUFFING CRANE



Manufacture : QINGDAO HAIXI HEAVY-DUTY MACHINERY CO., LTD. (HHMC)
 Manufacturing Date : 15 March
 2019 Control System : SIEMENS

No	Description	Specification	Remark
	Type of Crane	Double Level Luffing Portal Crane (MQS 40T JIB CRANE)	
	Group Classification	A8	
	Control system	SIEMENS PLC : S7-1500 Variable Speed Drive : SINAMICS S120	
	Material to be handled	Coal, SBM, Corn, Wheat, fertilizer. (Bulk density: 0.9 ~ 1.4 t/m ³)	
	Rated Capacity	750 TPH (Coal) based on cycle time	
	Ship to be handled (max.)	Panamax, 70,000 DWT	
	Lifting Capacity: • Loading / unloading capacity (SWL)	40t / 33m Min 40 ton, at min rad 33 m outreach from center crane	
	Grab / Hook Capacity: • Grab • Grab Type • Dead weight of grab	± 28 m ³ Clamp shell with 4 rope grab Approx. 17 ton	
	Working Radius from the Crane Center: • Maximum • Minimum	33 meter 10 meter	
	Vertical Outreach: • Hoisting height above rails to hook / grab • Lowering depth (below rails)	24 meter -16 meter (minus)	



	c. Slewing	Capacity : 75 kW Type : Speed : 985 rpm Voltage : 400 VAC Duty : S1 Qty : 1 unit	SEW
	d. Gantry travel	Capacity : 7.5 kW Type : DV132M4 Speed : 1450 rpm Voltage : 400 VAC Duty : S2 Qty : 16 unit	
20	Brake:		
	e. Main hoist / close brake	Type : SB28-800x30-Ed201/6 Braking moment : 8800 Nm Qty: 4 Unit	BUBENZER
	f. Main trolley brake	Type : SB28-630x30-Ed201/6 Braking moment : 6600 Nm Qty: 1 Unit	BUBENZER
	g. Gantry drive brake	Type : inside the motor Braking moment : 100 Nm Qty: 16 Unit	SEW
	h. Wheel brake	Type : YLZ40-180CP Braking moment : 73 kN Qty: 8 Unit	Huawu

6. TECHNICAL DATA GRAIN MECHANICAL CONTINUOUS SHIP UNLOADER



Manufacture : BUHLER AG, UZWIL, SWITZERLAND
 Manufacturing Date : November 2019
 Type : PORTALINK 1300/90RK
 Control System : SIEMENS

CAPACITY	Nominal unloading capacity based on wheat	1300	[tons/h]
	Peak unloading capacity based on wheat	1365	[tons/h]
PRODUCTS	Wheat bulk density	0,75	[tons/m3]
DIMENSIONS	General Lay-Out drawing	04484-LAY-0001-04	
	Ship size : Bulk-Carriers up to	90,000(max 38m beam)	[DWT]
	Boom length (Boom bearing - HL-SKT suspension)	29.50	[m]
	Total height , approx	32.70	[m]
	Length of HL-SKT (Suspension - Intake Boot)	26.50	[m]
	Rail- / Track-gauge	9.00	[m]
	Portal clearance , approx	7.00	[m]
	Number of wheels per corner seaside	12	[-]
	Number of wheels per corner landside	12	[-]
MANOEUVRING RANGE	Boom luffing, highest position	+45	[degree]
	Boom luffing, highest working position	+30	[degree]
	Boom luffing, lowest position	-30	[degree]

	Boom luffing, lowest working position	-30	[degree]
	HL-SKT max. kick-out	30	[degree]
	HL-SKT max. kick-in	20	[degree]
	Boom slewing range	+/-98	[degree]
	Unloader travelling range, (drawing 04484-LAY-0002-02)	182.50	[m]
MANOEUVRING SPEEDS	Travelling speed (adjustable), max. speed	16	[m/min]
	Boom luffing up and down (adjustable), max speed	10	[m/min]
	Boom slewing left and right (adjustable), max speed	10	[m/min]
AUXILIARY HOIST	Hoisting capacity	15	[tons]
	Auxiliary hoist up/down	7.5	[m/min]
WEIGHTS	Steel Structure, approx	243	[tons]
	Mechanical- / Electrical Equipment , approx	123	[tons]
	Counterweight (concrete) , approx	172	[tons]
	Bogie, approx	69	[tons]
	Total weight , approx	607	[tons]
LOAD DATA	Max. corner load in operation (20 m/sec wind), seaside approx.	1948	[kN]
	Max. corner load in operation (20 m/sec wind), landside, approx.	2187	[kN]
	Max. corner load out of operation (42 m/sec wind), seaside, approx.	2092	[kN]
	Max. corner load out of operation (42 m/sec wind), landside, approx.	2416	[kN]
POWER DATA	Supply Voltage	20.00	[kV]
	Installed electric power consumption:	745.00	[kW]
	Frequency	50	[Hz]
	Motor Voltage	400	[Hz]
	Control Voltage AC	230	[V]
	Control Voltage DC	24	[V]
METEOROLOGI CAL DATA	Average ambient temperature (for design)	+10 / + 35	[°C]
	Wind velocity in operation max.	20	[m/s]
	Wind velocity in emergency conditions max.	25	[m/s]
	Wind velocity out of operation (parking position)	42	[m/s]
ASPIRATION	Aspiration Fan, Capacity	81	[m3/min]
	Pressure	1650	[Pa]
	Filter Type FP-18, Filter Area	20.3	[m2]
	Air to Cloth Ratio	5.00	[m3/min/m2]

HL-SKT MARINE LEG	Type HL-SKT 1300/29.5, Length between pulleys	29.7	[m]
	Drive: Hydraulic Motor Hägglunds CA 210, Specific Torque	210	[Nm/bar]
	Nominal revolutions on drive shaft for soyabean	37.9	[rpm]
	Nominal Chain Speed for soyabean approx. (adjustable)	2.3	[m/ s]
BOOM CONVEYOR	Type Boom SKT 1300/29.5, Total Length	32.9	[m]
	Drive: 2 Gearmotors NORD, each 110 kW	220	[kW]
	Nominal revolutions on drive shaft , approx	262.85	[rpm]
	Nominal Chain Speed , approx	1.28	[m/ s]
PORTAL CONVEYOR	Type AHKG-1000, Total Length	17.5	[m]
	Drive: 1 Gearmotor NORD	45	[kW]
	Nominal revolutions on drive shaft , approx	38.41	[rpm]
	Nominal Chain Speed , approx	1.07	[m/ s]
STANDARDS	Structural steelwork design		DIN 13001
	Earthquake factors	8 / max. 0.2g	
	Stability factors		DIN 1993
	Electrical Installations		IEC-204
	Protection Classes min. / max.	IP54 / IP67	IEC
	Component Classes - Bogies	M5	FEM
	- Slewing	M5	FEM
	- Luffing	M5	FEM
	- Aux.Hoist	M4	FEM

7. TECHNICAL DATA CONVEYOR CIGADING 01



No	Description	Specification				
		PBCN1	C02	PBCN2	BCNO	Buffer Stock Yard
1	Manufacture	Klockner Industrie - ANLAGEN GMBH	Klockner Industrie - ANLAGEN GMBH	Babcock Contractors Limited	Babcock Contractors Limited	PT KPDP
2	Year of manufacture	1976	1976	1991	1991	2013
3	Year of Refurbish	2015	2015	2015	2015	-
4	Lenght	550 m	1200 m	550 m	1200 m	190 m
5	Rated Capacity	1500 t/h IOP 1100 t/h Coal	1500 t/h IOP 1100 t/h Coal	1500 t/h IOP 1100 t/h Coal	1500 t/h IOP 1100 t/h Coal	750 t/h IOP 550 t/h Coal
6	Belt Wide	1000 mm	1000 mm	1000 mm	1000 mm	1000 mm
7	Belt Spec	EP 800/4	ST 1000	EP 800/4	ST 1000	ST 1000
8	Motor Drive	1 x 132 kW 6 Pole	2 x 132 kW 6 Pole	1 x 132 kW 6 Pole	2 x 132 kW 6 Pole	1 x 132 kW 4 Pole
9	Gearbox	Sumitomo	Sumitomo	Sumitomo	Sumitomo	Sumitomo
10	Belt Speed	2.5 – 4.15 m/s	2.5 – 4.15 m/s	2.5 – 4.15 m/s	2.5 – 4.15 m/s	2.1 m/s
11	Troughung angel	45°	45°	45°	45°	30°
12	Idler diameter	133 mm	133 mm	133 mm	133 mm	133 mm
13	Carry Idler	3 x 45°	3 x 45°	3 x 45°	3 x 45°	3 x 30°
14	Return Idler	2 x 10°	2 x 10°	2 x 10°	2 x 10°	2 x 10°
15	Carry idler spacing	1.25 m	1.25 m	1.25 m	1.25 m	1.25 m
16	Return Idler Specing	3 m	3 m	3 m	3 m	3 m
17	Control System	PLC : SIEMENS, S7-300 Variable Speed Drive : ABB, ACS 800				System DOL

8. TECHNICAL DATA CONVEYOR CIGADING 02



No	Description	Specification			
		A101	A102	A103	TFH
1	Manufacture	PP	PP	PP	PP
2	Year of manufacture	2013	2013	2013	2013
3	Year of Refurbish	-	-	-	-
4	Lenght	300 m	1140 m	182 m	
5	Rated Capacity	3000 t/h IOP 3000 t/h Coal	3000 t/h IOP 3000 t/h Coal	3000 t/h IOP 3000 t/h Coal	2000 t/h IOP 2000 t/h Coal
6	Belt Wide	1800 mm	1800 mm	1800 mm	1600 mm
7	Belt Spec	ST 1000	ST 1400	ST 1400	EP 800
8	Motor Drive	1 x 250 kW 4 Pole	3 X 315 kW 6 Pole	2 x 200 kW 6 Pole	1 x 200 kW 6 Pole
10	Belt Speed	2.25 – 4.5 m/s	2.25 – 4.5 m/s	2.25 – 4.5 m/s	2.25 – 4.5 m/s
11	Trough angel	35°	35°	35°	35°
12	Idler diameter	152 mm	152 mm	152 mm	152 mm
13	Carry Idler	3 x 35°	3 x 35°	3 x 35°	3 x 35°
14	Return Idler	2 x 10°	2 x 10°	2 x 10°	2 x 10°
15	Carry idler spacing	1.5 m	1.5 m	1.5 m	1.5 m
16	Return Idler Specing	3 m	3 m	3 m	3 m
17	Control System	PLC : SIEMENS, S7-300 Variable Speed Drive : SIEMENS, SINAMICS G150			

Drive Unit Data:

CONVEYOR NO.		A-101		A-102		A-103		TFH	
Material Hendled		Coal	Iron Ore	Coal	Iron Ore	Coal	Iron Ore	Coal	Iron Ore
Belt Speed	m/s	4.5	2.25	4.5	2.25	4.5	2.25	4.5	2.25
No. of Drive		1		3		2		1	
Drive efficiency	%	85	85	85	85	85	85	85	85
Peripheral Force at Pulley	kN	29.61	41.93	147.6	258.92	60.84	101.63	31.98	56.58
Absorb Power at Pulley	kW	133.24	94.93	664.2	582.57	273.78	228.67	143.91	127.3
Absorb Power at Motor	kW	156.75	110.99	260.47	228.46	161.05	134.51	169.31	149.76

Pulley Diameter	mm	1036		1236		1036		1024	
Pulley Speed	rpm	82.96	41.48	69.53	34.77	82.96	41.48	83.93	41.96
Ambient Temperature	°C	40		40		40		40	
Duty	hours	24		24		24		24	
SIEMENS LOW VOLTAGE MOTOR 400 V / 50Hz / IP55 / IMB3 / CLASS F									
Motor Type		1PQ8 315-4PB40- ZA61+A78+H73+K26 +K54+M27+M50		1PQ8 355-6PB40- ZA61+A72+H80+K26 +K54+M27+M50		1PQ8 315-6PB40- ZA61+A72+H80+K26 +K54+M27+M50		1PQ8 315-6PB40- ZA61+A72+H80+K26 +K54+M27+M50	
Rated Power	kW	250		315		200		200	
Actual Power	kW	250	125	315	236.25	200	150	200	150
Rated Speed	rpm	1488		993		988		988	
Operational Speed	rpm	1500	750	1500	750	1500	750	1500	750
Rated Torque	Nm	1605		3040		1930		1930	
Motor Pole		4		6		6		6	
Output Shaft	mm	Ø 90 x 170		Ø 100 x 170		Ø 90 x 170		Ø 90 x 170	
Frame Size		315		355		315		315	
Extra Fam, Space Heater, PTC		Yes		Yes		Yes		Yes	
Weight	kg	1400		2100		1400		1400	
SIEMENS (FLENDER) N-NEUPEX FLEXIBLE COUPLING WITH DRUM BRAKE									
Model & Size		P 280		P 315		P 280		P 280	
Nominal Torque	Nm	3900		5500		3900		3900	
Running Torque	Nm	769.23	1089.31	1364.68	2393.93	797.15	1333.29	829.36	1467.28
Service Factor		5.07	3.58	4.03	2.3	4.89	2.93	4.7	2.66
Bore D1	mm	Ø 90 x 170		Ø 100 x 170		Ø 90 x 170		Ø 90 x 170	
Bore D2	mm	Ø 55 x 80		Ø 80 x 130		Ø 70 x 105		Ø 70 x 105	
Brake drum	mm	Ø 500 x 190		Ø 500 x 190		Ø 500 x 190		Ø 500 x 190	
Weight	kg	121		139		121		121	
SIEGERLAND DRUM BRAKE WITH ELDO THRUSTER									
Model & Size		TE500 Ed121/6		TE500 Ed121/6		TE500 Ed121/6		TE500 Ed121/6	
Braking Torque @my=0.4	Nm	200 - 3400		200 - 5400		200 - 3400		200 - 3400	
Drum Brake (D x d)	mm	Ø 500 x 240		Ø 500 x 240		Ø 500 x 240		Ø 500 x 240	
Weight	kg	93		99		93		93	
SIEMENS (FLENDER) BEVEL HELICAL GEAR UNIT WITH HOLLOW SHAFT AND SHRINK DISC									
Model & Size		B3 DH 10		B3 DH 14		B3 DH 11		B3 DH 11	
Selected Gear Ratio		19.94		22.28		19.74		19.74	
Actual Input Speed	rpm	1654.17	827.08	1549.35	774.68	1637.91	818.95	1657.1	828.55
Nominal Torque	Nm	39300		108000		63500		63500	
Running Torque	Nm	15338.53	21720.76	30407.84	53341	15758.72	26324.4	16374.97	28969.96
Service Factor		2.56	1,81	3.55	2.02	4.03	2.41	3.88	2.19
Input Shaft	mm	Ø 55 x 80		Ø 80 x 130		Ø 70 x 105		Ø 70 x 105	
Hollow Shaft	mm	H 150/155		H 210/215		H 165/170		H 165/170	
Backstop		No		Yes		Yes		Yes	
Cooling Type		Fan		Fan		Fan		Fan	
Output Shaft Rotation view from Pulley		ANTICLOCKWISE		ANTICLOCKWISE		ANTICLOCKWISE		ANTICLOCKWISE	

Gearbox Design		DESIGN A	DESIGN A	DESIGN A	DESIGN A
Weight	kg	1460	2750	1455	1455
SWING BASE WITH TORQUE ARM					
Seing Base		Yes	Yes	Yes	Yes
Flexible pedestal with torque arm		Yes	Yes	Yes	Yes
Guard for Input Shaft		Yes	Yes	Yes	Yes

9. TECHNICAL DATA GRAIN FEEDING CONVEYOR SGT & TERREOS



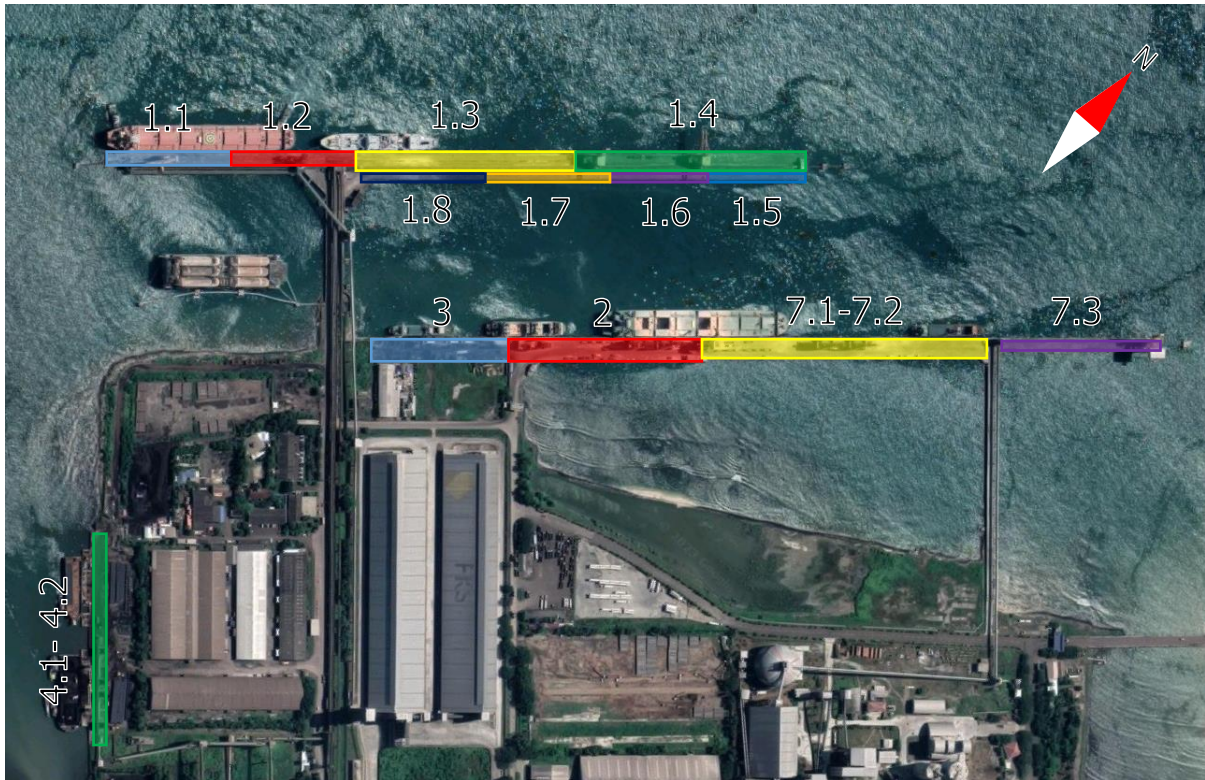
Description		Specification
1	Manufacture	Bukaka Teknik Utama, PT. - Indonesia
2	Year of Manufacture	2001
3	Model	SC 48-30
4	Merk	YORK
5	Material Diangkut	Grain (ref. Corn)
6	Kapasitas Nominal	700 TPH (ref. Corn)
7	Konsumsi Tenaga	132 kW
8	Tinggi Overall	-
9	Jarak c/c Pulley	-
10	Tinggi Permukaan Curah	31.6 M (SGT) dan 28.6 M (Redwood))
11	Kecepatan Pulley	52 RPM
12	Kecepatan Belting	3.32 M/Sec. (653 FPM)
13	Jarak Antar Bucket (Cup)	228 mm (9")
14	Tipe Pemasangan Bucket	Double Bucket
15	Jumlah Unit	1 Set.
16	Diameter Drive Pulley	1.219 mm (48")
17	Diameter Boot Pulley	1.219 mm (48")
18	Diameter Poros (Shaft) Boot Pulley	87 mm (3-7/16")
19	Belting (Food Aplication) :	
	Type	Heavy Duty Pillow Block
	Merk	Standart Pabrikan
	Belt Strength	450# PIW

	Belt Width	863 mm (34")
20	Bucket (Food Application) :	
	Type	Plastic Bucket
	Material	High Polythelene
	Dimension (PxLxT)	406 x 203 x 203 mm
	Top Cover	Standart Pabrikan
	Bottom Cover	Standart Pabrikan (16" x 8" x 8")
	Quantity	Standart Pabrikan
21	Electric Motor :	
	Merk	SIEMENS
	Model	1LA6 313-4AA
	Type	Induction Motor
	Rating Power	132 kW/4p/50 Hz/380 V
	Output Speed	1500 RPM (Nom.)
	Voltage	380 V
	Phase	3 ph.
	Frequency	50 Hz,
	Deg. Of Protection	IP 55
	Insulation Class	F
	Control System	Y/D
	Bearing Life Time	30.000 Hrs.
	Mounting Type	B3 (Foot Mounted)
	Assesories	Brake
	Dia. Poros Output	Standart Pabrikan
22	Gear Reducers :	
	Merk	Dodge
	Model	TXT-10
	Type	Speed Reducers
	Gear Type	Helical
	Gear Ratio	28.85
	Output Speed	52 RPM
23	System Transmisi :	
	Type	V-Belt Transmission
	Coupling	Fluid Coupling
	Size Coupling	Standart Pabrikan
	Assesories	Belt Guard
24	Casing :	
	Type	Steel casing, Independend Belt Line & Flanges Connection
	Material	SS 41
	Tebal Plat	
	Top Casing	4.7 mm (7 Gauge)
	Midle (Leg) Casing	1.8 mm (14 Gauge)
	Bottom Casing	4.7 mm (7 Gauge)
	Linner	Urethane (Pada Upper Casing, lantai Boot & Chute)
	Assesories	Main Hole at Bottom casing Each Midle (Leg) casing & Top Casing

II. DERMAGA

A. LAYOUT DERMAGA

1. CIGADING 01



2. CIGADING 02



B. DETAIL DERMAGA

1. DERMAGA D1.1

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
	1.1 Tipe dermaga	Bulk Carrier
	1.2 Dimensi dermaga	150 m x 17.5 m
	1.3 Kedalaman rencana	-15.00 m LWS
	1.4 Tipe kapal	Panamax
	1.5 Bentang rel container crane	9.0 m
	1.6 Fender	Cylindrical 1800 x2500 and frontal Pad
2.	Karakteristik Kapal	
	2.1 Rencana kapal sandar	Maksimum kapal 70,000 DWT
	2.2 Loaded displacement tonnage	1.4 x DWT
	2.3 length Overall (LOA)	224 m
	2.4 Breadth Molded	32.2 m
	2.5 Full load draft	13 m
3.	Material	
	3.1 Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700\sqrt{f'c}$ - Berat jenis beton = 2.40 ton/m^3
	3.2 Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress $D 12.5$ mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3
	3.3 Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240$ MPa
	3.4 Tiang Pancang Baja (Steel Pipe Pile)	- Kuat leleh minimum, $f_y = 310$ Mpa (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000$ Mpa
4.	Pembebanan	
	4.1 Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m^3 - Berat jenis beton basah = 2.500 ton/m^3 - Berat jenis beton prestressed = 2.450 ton/m^3 - Berat jenis baja = 7.850 ton/m^3 - Berat jenis kayu = 1.000 ton/m^3 - Berat jenis pasir = 2.000 ton/m^3 - Berat jenis asphalt = 2.200 ton/m^3 - Berat jenis air laut = 1.025 ton/m^3
	4.2 Beban Hidup	
	4.2.1 Beban hidup merata	- 4 ton/m^2

4.2.2 Beban hidup conatiner crane	- Beban roda 30 ton/m' - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
4.2.3 Beban hidup truck	- Truck T-50
4.2.3 Beban Conveyor	- 4 ton/kaki
4.3 Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type cone/super cell
4.4 Beban Tambat Kapal	- Kapasitas Bollard ton 100 ton
4.5 Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
4.6 Beban Arus	- Kondisi normal = 1.0 Knot
	- Kondisi Extrim = 2.40 Knot
4.7 Beban Angin	- Kondisi Operasional 40 km/h
	- Kondisi Extrim = 120 km/h
4.8 Beban Gelombang	- 0.5 m (asumsi)
4.9 Beban Temperature	- Rentang 33°C
5. Data Pondasi	
Faktor Keamanan (FS) daya dukung tanah	- FS = 2.5 (Compression) - FS = 2.5 (Tension)

2. DERMAGA D1.2

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
1.1	Tipe dermaga	Bulk Carrier
1.2	Dimensi dermaga	150 m x 17.5 m
1.3	Kedalaman rencana	-15.00 m LWS
1.4	Tipe kapal	Panamax
1.5	Bentang rel container crane	9.0 m
1.6	Fender	cylindrical 1800x2500 and frontal Pad
2.	Karakteristik Kapal	
2.1	Rencana kapal sandar	Maksimum kapal 70,000 DWT
2.2	Loaded displacement tonnage	1.4 x DWT
2.3	length Overall (LOA)	224 m
2.4	Breadth Molded	32.2 m
2.5	Full load draft	13 m
3.	Material	
3.1	Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700\sqrt{f'c}$ - Berat jenis beton = 2.40 ton/m³

3.2	Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress $D 12.5$ mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3
	3.3 Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240$ MPa
	3.4 Tiang Pancang Baja (Steel Pipe Pile)	- Kuat leleh minimum, $f_y = 310$ Mpa (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000$ Mpa
	4. Pembebanan	
4.1	Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m^3 - Berat jenis beton basah = 2.500 ton/m^3 - Berat jenis beton prestressed = 2.450 ton/m^3 - Berat jenis baja = 7.850 ton/m^3 - Berat jenis kayu = 1.000 ton/m^3 - Berat jenis pasir = 2.000 ton/m^3 - Berat jenis asphalt = 2.200 ton/m^3 - Berat jenis air laut = 1.025 ton/m^3
4.2	Beban Hidup	
	4.2.1 Beban hidup merata	- 4 ton/m^2
	4.2.2 Beban hidup container crane	- Beban roda 30 ton/m^2 - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
	4.2.3 Beban hidup truck	- Truck T-50
	4.2.3 Beban Conveyor	- 4 ton/kaki
4.3	Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type cone/super cell
4.4	Beban Tambat Kapal	- Kapasitas Bollard 100 ton
4.5	Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
4.6	Beban Arus	- Kondisi normal = 1.0 Knot
		- Kondisi Extrim = 2.40 Knot
4.7	Beban Angin	- Kondisi Operasional 40 km/h
		- Kondisi Extrim = 120 km/h
4.8	Beban Gelombang	- 0.5 m (asumsi)
4.9	Beban Temperature	- Rentang 33°C
5.	Data Pondasi	
	Faktor Keamanan (FS) daya dukung	- $FS = 2.5$ (Compression)

tanah	- FS = 2.5 (Tension)
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3. DERMAGA D1.3

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
	1.1 Tipe dermaga	Bulk Carrier
	1.2 Dimensi dermaga	270 m x 20 m
	1.3 Kedalaman rencana	-17.00 m LWS
	1.4 Tipe kapal	Panamax
	1.5 Bentang rel container crane	12.50 m
	1.6 Fender	cylindrical 1800 x 2500 and frontal Pad
2.	Karakteristik Kapal	
	2.1 Rencana kapal sandar	Maksimum kapal 70,000 DWT
	2.2 Loaded displacement tonnage	1.4 x DWT
	2.3 length Overall (LOA)	224 m
	2.4 Breadth Molded	32.2 m
	2.5 Full load draft	13 m
3.	Material	
	3.1 Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700\sqrt{f'c}$ - Berat jenis beton = 2.40 ton/m^3
	3.2 Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress D 12.5 mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3
	3.3 Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240$ MPa
	3.4 Tiang Pancang Baja (Steel Pipe Pile)	- Kuat leleh minimum, $f_y = 310$ Mpa (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000$ Mpa
4.	Pembebanan	
	4.1 Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m^3 - Berat jenis beton basah = 2.500 ton/m^3 - Berat jenis beton prestressed = 2.450 ton/m^3 - Berat jenis baja = 7.850 ton/m^3 - Berat jenis kayu = 1.000 ton/m^3 - Berat jenis pasir = 2.000 ton/m^3 - Berat jenis asphalt = 2.200 ton/m^3 - Berat jenis air laut = 1.025 ton/m^3

4.2	Beban Hidup	
4.2.1	Beban hidup merata	- 4 ton/m ²
4.2.2	Beban hidup container crane	- Beban roda 30 ton/m' - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
4.2.3	Beban hidup truck	- Truck T-50
4.2.3	Beban Conveyor	- 4 ton/kaki
4.3	Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type cone/super cell
4.4	Beban Tambat Kapal	- Kapasitas Bollard ton 100 ton
4.5	Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
4.6	Beban Arus	- Kondisi normal = 1.0 Knot
		- Kondisi Ekstrem = 2.40 Knot
4.7	Beban Angin	- Kondisi Operasional 40 km/h
		- Kondisi Ekstrem = 120 km/h
4.8	Beban Gelombang	- 0.5 m (asumsi)
4.9	Beban Temperature	- Rentang 33°C
5.	Data Pondasi	
	Faktor Keamanan (FS) daya dukung tanah	- FS = 2.5 (Compression) - FS = 2.5 (Tension)

4. DERMAGA D1.4

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
1.1	Tipe dermaga	Bulk Carrier
1.2	Dimensi dermaga	283 m x 20 m
1.3	Kedalaman rencana	-20.00 m LWS
1.4	Tipe kapal	Cape Size
1.5	Bentang rel container crane	12.50 m
1.6	Fender	SCK Cell fender 2000 With Frontal Pad
2.	Karakteristik Kapal	
2.1	Rencana kapal sandar	Maksimum kapal 150,000 DWT
2.2	Loaded displacement tonnage	1.4 x DWT
2.3	length Overall (LOA)	279 m
2.4	Breadth Molded	43.0 m
2.5	Full load draft	16.7 m
3.	Material	

3.1	Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700v f'c$ - Berat jenis beton = 2.40 ton/m^3
3.2	Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress $D 12.5$ mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3
3.3	Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240$ MPa
3.4	Tiang Pancang Baja (Steel Pipe Pile)	- Kuat leleh minimum, $f_y = 310$ Mpa (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000$ Mpa
4.	Pembebanan	
4.1	Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m^3 - Berat jenis beton basah = 2.500 ton/m^3 - Berat jenis beton prestressed = 2.450 ton/m^3 - Berat jenis baja = 7.850 ton/m^3 - Berat jenis kayu = 1.000 ton/m^3 - Berat jenis pasir = 2.000 ton/m^3 - Berat jenis ashpalt = 2.200 ton/m^3 - Berat jenis air laut = 1.025 ton/m^3
4.2	Beban Hidup	
4.2.1	Beban hidup merata	- 4 ton/m^2
4.2.2	Beban hidup conatiner crane	- Beban roda 30 ton/m^2 - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
4.2.3	Beban hidup truck	- Truck T-50
4.2.3	Beban Conveyor	- 4 ton/kaki
4.3	Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type cone/super cell
4.4	Beban Tambat Kapal	- Kapasitas Bollard ton 100 ton
4.5	Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
4.6	Beban Arus	- Kondisi normal = 1.0 Knot - Kondisi Extrim = 2.40 Knot
4.7	Beban Angin	- Kondisi Operasional 40 km/h - Kondisi Extrim = 120 km/h
4.8	Beban Gelombang	- 0.5 m (asumsi)

	4.9 Beban Temperature	- Rentang 33°C
5.	Data Pondasi	
	Faktor Keamanan (FS) daya dukung tanah	- FS = 2.5 (Compression)
		- FS = 2.5 (Tension)

5. DERMAGA D1.5

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
	1.1 Tipe dermaga	Bulk Carrier/General Cargo
	1.2 Dimensi dermaga	121.5m x 10.8 m
	1.3 Kedalaman rencana	-15.00 m LWS
	1.4 Tipe kapal	Handymax
	1.5 Bentang rel container crane	
	1.6 Fender	Cylindrical Rubber 1200 x 1500
2.	Karakteristik Kapal	
	2.1 Rencana kapal sandar	Maksimum kapal 25,000 DWT
	2.2 Loaded displacement tonnage	1.4 x DWT
	2.3 length Overall (LOA)	167 m
	2.4 Breadth Molded	26 m
	2.5 Full load draft	10.3 m
3.	Material	
	3.1 Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700vf'c$ - Berat jenis beton = 2.40 ton/m^3
	3.2 Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress D 12.5 mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3
	3.3 Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240$ MPa
	3.4 Tiang Pancang Baja (Steel Pipe Pile)	- Kuat leleh minimum, $f_y = 310$ Mpa (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000$ Mpa
4.	Pembebanan	

4.1	Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m³ - Berat jenis beton basah = 2.500 ton/m³ - Berat jenis beton prestressed = 2.450 ton/m³ - Berat jenis baja = 7.850 ton/m³ - Berat jenis kayu = 1.000 ton/m³ - Berat jenis pasir = 2.000 ton/m³ - Berat jenis asphalt = 2.200 ton/m³ - Berat jenis air laut = 1.025 ton/m³
4.2	Beban Hidup	
4.2.1	Beban hidup merata	- 4 ton/m ²
4.2.2	Beban hidup container crane	- Beban roda 30 ton/m' - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
4.2.3	Beban hidup truck	- Truck T-50
4.2.3	Beban Conveyor	- 4 ton/kaki
4.3	Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type cone/super cell
4.4	Beban Tambat Kapal	- Kapasitas Bollard ton 100 ton
4.5	Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
4.6	Beban Arus	- Kondisi normal = 1.0 Knot - Kondisi Extrim = 2.40 Knot
4.7	Beban Angin	- Kondisi Operasional 40 km/h - Kondisi Extrim = 120 km/h
4.8	Beban Gelombang	- 0.5 m (asumsi)
4.9	Beban Temperature	- Rentang 33°C
5.	Data Pondasi	
	Faktor Keamanan (FS) daya dukung tanah	- FS = 2.5 (Compression) - FS = 2.5 (Tension)

6. DERMAGA D1.6

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
1.1	Tipe dermaga	Bulk Carrier/General Cargo
1.2	Dimensi dermaga	121.5m x 10.8 m
1.3	Kedalaman rencana	-15.00 m LWS
1.4	Tipe kapal	Handymax
1.5	Bentang rel container crane	
1.6	Fender	Cylindrical Rubber 1200 x 1500

2.	Karakteristik Kapal	
	2.1 Rencana kapal sandar	Maksimum kapal 25,000 DWT
	2.2 Loaded displacement tonnage	1.4 x DWT
	2.3 length Overall (LOA)	167 m
	2.4 Breadth Molded	26 m
	2.5 Full load draft	10.3 m
3.	Material	
	3.1 Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700vf'c$ - Berat jenis beton = 2.40 ton/m^3
	3.2 Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress $D 12.5$ mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3
	3.3 Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240$ MPa
	3.4 Tiang Pancang Baja (Steel Pipe Pile)	- Kuat leleh minimum, $f_y = 310$ Mpa (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000$ Mpa
4.	Pembebanan	
	4.1 Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m^3 - Berat jenis beton basah = 2.500 ton/m^3 - Berat jenis beton prestressed = 2.450 ton/m^3 - Berat jenis baja = 7.850 ton/m^3 - Berat jenis kayu = 1.000 ton/m^3 - Berat jenis pasir = 2.000 ton/m^3 - Berat jenis asphalt = 2.200 ton/m^3 - Berat jenis air laut = 1.025 ton/m^3
	4.2 Beban Hidup	
	4.2.1 Beban hidup merata	- 4 ton/m^2
	4.2.2 Beban hidup container crane	- Beban roda 30 ton/m^2 - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
	4.2.3 Beban hidup truck	- Truck T-50
	4.2.3 Beban Conveyor	- 4 ton/kaki
	4.3 Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type cone/super cell
	4.4 Beban Tambat Kapal	- Kapasitas Bollard ton 100 ton

	4.5	Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
	4.6	Beban Arus	- Kondisi normal = 1.0 Knot - Kondisi Ekstrem = 2.40 Knot
	4.7	Beban Angin	- Kondisi Operasional 40 km/h - Kondisi Ekstrem = 120 km/h
	4.8	Beban Gelombang	- 0.5 m (asumsi)
	4.9	Beban Temperature	- Rentang 33°C
	5.	Data Pondasi	
		Faktor Keamanan (FS) daya dukung tanah	- FS = 2.5 (Compression) - FS = 2.5 (Tension)

7. DERMAGA D1.7

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
	1.1 Tipe dermaga	Bulk Carrier/General Cargo
	1.2 Dimensi dermaga	150 m x 10.8 m
	1.3 Kedalaman rencana	-15.00 m LWS
	1.4 Tipe kapal	Handymax
	1.5 Bentang rel container crane	
	1.6 Fender	Super Cell 1800 Rubber wit Prontal Fender
2.	Karakteristik Kapal	
	2.1 Rencana kapal sandar	Maksimum kapal 40,000 DWT
	2.2 Loaded displacement tonnage	1.4 x DWT
	2.3 length Overall (LOA)	204 m
	2.4 Breadth Molded	32.3 m
	2.5 Full load draft	12 m
3.	Material	
	3.1 Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700vf'c$ - Berat jenis beton = 2.40 ton/m^3
	3.2 Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress D 12.5 mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3
	3.3 Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240$ MPa

	3.4	Tiang Pancang Baja (Steel Pipe Pile)	- Kuat leleh minimum, $f_y = 310 \text{ Mpa}$ (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000 \text{ Mpa}$
4.	Pembebanan		
	4.1	Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m^3 - Berat jenis beton basah = 2.500 ton/m^3 - Berat jenis beton prestressed = 2.450 ton/m^3 - Berat jenis baja = 7.850 ton/m^3 - Berat jenis kayu = 1.000 ton/m^3 - Berat jenis pasir = 2.000 ton/m^3 - Berat jenis asphalt = 2.200 ton/m^3 - Berat jenis air laut = 1.025 ton/m^3
	4.2	Beban Hidup	
	4.2.1	Beban hidup merata	- 4 ton/m^2
	4.2.2	Beban hidup container crane	- Beban roda 30 ton/m^2 - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
	4.2.3	Beban hidup truck	- Truck T-50
	4.2.3	Beban Conveyor	- 4 ton/kaki
	4.3	Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type cone/super cell
	4.4	Beban Tambat Kapal	- Kapasitas Bollard ton 100 ton
	4.5	Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
	4.6	Beban Arus	- Kondisi normal = 1.0 Knot - Kondisi Extrim = 2.40 Knot
	4.7	Beban Angin	- Kondisi Operasional 40 km/h - Kondisi Extrim = 120 km/h
	4.8	Beban Gelombang	- 0.5 m (asumsi)
	4.9	Beban Temperature	- Rentang 33°C
5.	Data Pondasi		
	Faktor Keamanan (FS) daya dukung tanah		- $FS = 2.5$ (Compression) - $FS = 2.5$ (Tension)

8. DERMAGA D1.8

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
	1.1	Tipe dermaga
	1.2	Dimensi dermaga
	1.3	Kedalaman rencana

	1.4	Tipe kapal	Handymax
	1.5	Bentang rel container crane	
	1.6	Fender	Super Cell 1800 Rubber wit Prontal Fender
2.		Karakteristik Kapal	
	2.1	Rencana kapal sandar	Maksimum kapal 40,000 DWT
	2.2	Loaded displacement tonnage	1.4 x DWT
	2.3	length Overall (LOA)	204 m
	2.4	Breadth Molded	32.3 m
	2.5	Full load draft	12 m
3.		Material	
	3.1	Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700\sqrt{f'c}$ - Berat jenis beton = 2.40 ton/m^3
	3.2	Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress D 12.5 mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3
	3.3	Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240$ MPa
	3.4	Tiang Pancang Baja (Steel Pipe Pile)	- Kuat leleh minimum, $f_y = 310$ Mpa (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000$ Mpa
4.		Pembebanan	
	4.1	Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m^3 - Berat jenis beton basah = 2.500 ton/m^3 - Berat jenis beton prestressed = 2.450 ton/m^3 - Berat jenis baja = 7.850 ton/m^3 - Berat jenis kayu = 1.000 ton/m^3 - Berat jenis pasir = 2.000 ton/m^3 - Berat jenis asphalt = 2.200 ton/m^3 - Berat jenis air laut = 1.025 ton/m^3
	4.2	Beban Hidup	
	4.2.1	Beban hidup merata	- 4 ton/m^2
	4.2.2	Beban hidup container crane	- Beban roda 30 ton/m^2 - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
	4.2.3	Beban hidup truck	- Truck T-50
	4.2.3	Beban Conveyor	- 4 ton/kaki
	4.3	Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type cone/super cell

4.4	Beban Tambat Kapal	- Kapasitas Bollard ton 100 ton
4.5	Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
4.6	Beban Arus	- Kondisi normal = 1.0 Knot - Kondisi Ekstrem = 2.40 Knot
4.7	Beban Angin	- Kondisi Operasional 40 km/h - Kondisi Ekstrem = 120 km/h
4.8	Beban Gelombang	- 0.5 m (asumsi)
4.9	Beban Temperature	- Rentang 33°C
5.	Data Pondasi	
	Faktor Keamanan (FS) daya dukung tanah	- FS = 2.5 (Compression) - FS = 2.5 (Tension)

9. DERMAGA D2

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
1.1	Tipe dermaga	Bulk Carrier/General Cargo
1.2	Dimensi dermaga	240 m x 30 m
1.3	Kedalaman rencana	-15.00 m LWS
1.4	Tipe kapal	Panamax
1.5	Bentang rel container crane	10.44 m
1.6	Fender	Super Cell Rubber 1250 with Frontal Pad
2.	Karakteristik Kapal	
2.1	Rencana kapal sandar	Maksimum kapal 70,000 DWT
2.2	Loaded displacement tonnage	1.4 x DWT
2.3	length Overall (LOA)	240 m
2.4	Breadth Molded	32.3 m
2.5	Full load draft	13.3 m
3.	Material	
3.1	Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700v f'c$ - Berat jenis beton = 2.40 ton/m^3
3.2	Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress D 12.5 mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3
3.3	Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240$ MPa
3.4	Tiang Pancang Baja (Steel Pipe Pile)	- Kuat leleh minimum, $f_y = 310$ Mpa (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000$ Mpa
4.	Pembebanan	

4.1	Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m³ - Berat jenis beton basah = 2.500 ton/m³ - Berat jenis beton prestressed = 2.450 ton/m³ - Berat jenis baja = 7.850 ton/m³ - Berat jenis kayu = 1.000 ton/m³ - Berat jenis pasir = 2.000 ton/m³ - Berat jenis asphalt = 2.200 ton/m³ - Berat jenis air laut = 1.025 ton/m³
4.2	Beban Hidup	
4.2.1	Beban hidup merata	- 4 ton/m ²
4.2.2	Beban hidup container crane	- Beban roda 30 ton/m' - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
4.2.3	Beban hidup truck	- Truck T-50
4.2.3	Beban Conveyor	- 4 ton/kaki
4.3	Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type cone/super cell
4.4	Beban Tambat Kapal	- Kapasitas Bollard ton 100 ton
4.5	Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
4.6	Beban Arus	- Kondisi normal = 1.0 Knot
		- Kondisi Extrim = 2.40 Knot
4.7	Beban Angin	- Kondisi Operasional 40 km/h
		- Kondisi Extrim = 120 km/h
4.8	Beban Gelombang	- 0.5 m (asumsi)
4.9	Beban Temperature	- Rentang 33°C
5.	Data Pondasi	
	Faktor Keamanan (FS) daya dukung tanah	- FS = 2.5 (Compression) - FS = 2.5 (Tension)

10. DERMAGA D3

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
1.1	Tipe dermaga	Bulk Carrier/General Cargo
1.2	Dimensi dermaga	170 m x 30 m
1.3	Kedalaman rencana	-12.00 m LWS
1.4	Tipe kapal	Handymax
1.5	Bentang rel container crane	10.44 m

	1.6 Fender	Super Cell 1250 Rubber with Prontal Fender
2.	Karakteristik Kapal	
	2.1 Rencana kapal sandar	Maksimum kapal 30,000 DWT
	2.2 Loaded displacement tonnage	1.4 x DWT
	2.3 length Overall (LOA)	176 m
	2.4 Breadth Molded	26.1 m
	2.5 Full load draft	10.3 m
3.	Material	
	3.1 Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700\sqrt{f'c}$ - Berat jenis beton = 2.40 ton/m^3
	3.2 Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress D 12.5 mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3
	3.3 Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240$ MPa
	3.4 Tiang Pancang Beton (Spoon Pile)	- Kuat leleh minimum, $f_y = 310$ Mpa (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000$ Mpa
4.	Pembebanan	
	4.1 Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m^3 - Berat jenis beton basah = 2.500 ton/m^3 - Berat jenis beton prestressed = 2.450 ton/m^3 - Berat jenis baja = 7.850 ton/m^3 - Berat jenis kayu = 1.000 ton/m^3 - Berat jenis pasir = 2.000 ton/m^3 - Berat jenis asphalt = 2.200 ton/m^3 - Berat jenis air laut = 1.025 ton/m^3
	4.2 Beban Hidup	
	4.2.1 Beban hidup merata	- 5 ton/m^2
	4.2.2 Beban hidup container crane	- Beban roda 30 ton/m' - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
	4.2.3 Beban hidup truck	- Truck T-50
	4.2.3 Beban Conveyor	- 4 ton/kaki
	4.3 Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type cone/super cell

4.4	Beban Tambat Kapal	- Kapasitas Bollard ton 100 ton
4.5	Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
4.6	Beban Arus	- Kondisi normal = 1.0 Knot - Kondisi Extrim = 2.40 Knot
4.7	Beban Angin	- Kondisi Operasional 40 km/h - Kondisi Extrim = 120 km/h
4.8	Beban Gelombang	- 0.5 m (asumsi)
4.9	Beban Temperature	- Rentang 33°C
5.	Data Pondasi	
	Faktor Keamanan (FS) daya dukung tanah	- FS = 2.5 (Compression) - FS = 2.5 (Tension)

11. DERMAGA D4.1-4.2

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
1.1	Tipe dermaga	Bulk Carrier/General Cargo
1.2	Dimensi dermaga	270 m x 16 m
1.3	Kedalaman rencana	-7.00 m LWS
1.4	Tipe kapal	Barge
1.5	Bentang rel container crane	
1.6	Fender	V 500 H Fender
2.	Karakteristik Kapal	
2.1	Rencana kapal sandar	Maksimum kapal 12,000 DWT
2.2	Loaded displacement tonnage	1.4 x DWT
2.3	length Overall (LOA)	100 m
2.4	Breadth Molded	
2.5	Full load draft	
3.	Material	
3.1	Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700\sqrt{f'c}$ - Berat jenis beton = 2.40 ton/m^3
3.2	Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress D 12.5 mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3
3.3	Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240$ MPa
3.4	Tiang Pancang Baja (Steel Pipe Pile)	- Kuat leleh minimum, $f_y = 310$ Mpa (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000$ Mpa
4.	Pembebanan	

4.1	Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m³ - Berat jenis beton basah = 2.500 ton/m³ - Berat jenis beton prestressed = 2.450 ton/m³ - Berat jenis baja = 7.850 ton/m³ - Berat jenis kayu = 1.000 ton/m³ - Berat jenis pasir = 2.000 ton/m³ - Berat jenis asphalt = 2.200 ton/m³ - Berat jenis air laut = 1.025 ton/m³
4.2	Beban Hidup	
4.2.1	Beban hidup merata	- 4 ton/m ²
4.2.2	Beban hidup container crane	- Beban roda 30 ton/m' - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
4.2.3	Beban hidup truck	- Truck T-50
4.2.3	Beban Conveyor	- 4 ton/kaki
4.3	Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type cone/super cell
4.4	Beban Tambat Kapal	- Kapasitas Bollard ton 100 ton
4.5	Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
4.6	Beban Arus	- Kondisi normal = 1.0 Knot
		- Kondisi Extrim = 2.40 Knot
4.7	Beban Angin	- Kondisi Operasional 40 km/h
		- Kondisi Extrim = 120 km/h
4.8	Beban Gelombang	- 0.5 m (asumsi)
4.9	Beban Temperature	- Rentang 33°C
5.	Data Pondasi	
	Faktor Keamanan (FS) daya dukung tanah	- FS = 2.5 (Compression) - FS = 2.5 (Tension)

12. DERMAGA D5

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
1.1	Tipe dermaga	Bulk Carrier/General Cargo
1.2	Dimensi dermaga	240 m x 25 m
1.3	Kedalaman rencana	-9.00 m LWS
1.4	Tipe kapal	Handymax
1.5	Bentang rel container crane	-

	1.6 Fender	V 600H Fender
2.	Karakteristik Kapal	
	2.1 Rencana kapal sandar	Maksimum kapal 20,000 DWT
	2.2 Loaded displacement tonnage	1.4 x DWT
	2.3 length Overall (LOA)	157 m
	2.4 Breadth Molded	23 m
	2.5 Full load draft	9.2 m

3.	Material	
	3.1 Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700\sqrt{f'c}$ - Berat jenis beton = 2.40 ton/m^3
	3.2 Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress D 12.5 mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3
	3.3 Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240$ MPa
	3.4 Tiang Pancang Baja (Steel Pipe Pile)	- Kuat leleh minimum, $f_y = 310$ Mpa (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000$ Mpa
4.	Pembebanan	
	4.1 Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m^3 - Berat jenis beton basah = 2.500 ton/m^3 - Berat jenis beton prestressed = 2.450 ton/m^3 - Berat jenis baja = 7.850 ton/m^3 - Berat jenis kayu = 1.000 ton/m^3 - Berat jenis pasir = 2.000 ton/m^3 - Berat jenis asphalt = 2.200 ton/m^3 - Berat jenis air laut = 1.025 ton/m^3
	4.2 Beban Hidup	
	4.2.1 Beban hidup merata	- 4 ton/m^2
	4.2.2 Beban hidup container crane	- Beban roda 30 ton/m^2 - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
	4.2.3 Beban hidup truck	- Truck T-50
	4.2.3 Beban Conveyor	- 4 ton/kaki

4.3	Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type cone/super cell
4.4	Beban Tambat Kapal	- Kapasitas Bollard ton 100 ton
4.5	Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
4.6	Beban Arus	- Kondisi normal = 1.0 Knot - Kondisi Ekstrem = 2.40 Knot
4.7	Beban Angin	- Kondisi Operasional 40 km/h - Kondisi Ekstrem = 120 km/h
4.8	Beban Gelombang	- 0.5 m (asumsi)
4.9	Beban Temperature	- Rentang 33°C
5.	Data Pondasi	
	Faktor Keamanan (FS) daya dukung tanah	- FS = 2.5 (Compression) - FS = 2.5 (Tension)

13. DERMAGA D6

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
1.1	Tipe dermaga	Bulk Carrier/General Cargo
1.2	Dimensi dermaga	240 m x 25 m
1.3	Kedalaman rencana	-21.00 m LWS
1.4	Tipe kapal	Cape Size
1.5	Bentang rel container crane	20 m
1.6	Fender	Super Cell 2000 with Frontal Pad
2.	Karakteristik Kapal	
2.1	Rencana kapal sandar	Maksimum kapal 200,000 DWT
2.2	Loaded displacement tonnage	1.4 x DWT
2.3	length Overall (LOA)	303 m
2.4	Breadth Molded	47 m
2.5	Full load draft	18 m
3.	Material	
3.1	Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700\sqrt{f'c}$ - Berat jenis beton = 2.40 ton/m^3
3.2	Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress D 12.5 mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3

	3.3	Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240 \text{ MPa}$
	3.4	Tiang Pancang Baja (Steel Pipe Pile)	- Kuat leleh minimum, $f_y = 310 \text{ Mpa}$ (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000 \text{ Mpa}$
4.	Pembebanan		
	4.1	Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m^3 - Berat jenis beton basah = 2.500 ton/m^3 - Berat jenis beton prestressed = 2.450 ton/m^3
			- Berat jenis baja = 7.850 ton/m^3 - Berat jenis kayu = 1.000 ton/m^3 - Berat jenis pasir = 2.000 ton/m^3 - Berat jenis ashpalt = 2.200 ton/m^3 - Berat jenis air laut = 1.025 ton/m^3
	4.2	Beban Hidup	
	4.2.1	Beban hidup merata	- 4 ton/m^2
	4.2.2	Beban hidup conatiner crane	- Beban roda $30 \text{ ton/m}'$ - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
	4.2.3	Beban hidup truck	- Truck T-50
	4.2.3	Beban Conveyor	- 4 ton/kaki
	4.3	Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type cone/super cell
	4.4	Beban Tambat Kapal	- Kapasitas Bollard ton 100 ton
	4.5	Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
	4.6	Beban Arus	- Kondisi normal = 1.0 Knot - Kondisi Extrim = 2.40 Knot
	4.7	Beban Angin	- Kondisi Operasional 40 km/h - Kondisi Extrim = 120 km/h
	4.8	Beban Gelombang	- 0.5 m (asumsi)
	4.9	Beban Temperature	- Rentang 33°C
5.	Data Pondasi		
	Faktor Keamanan (FS) daya dukung tanah		- $FS = 2.5$ (Compression) - $FS = 2.5$ (Tension)

14. DERMAGA 7.1 - 7.2

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
	1.1 Tipe dermaga	Bulk Carrier
	1.2 Dimensi dermaga	350 m x 25 m
	1.3 Kedalaman rencana	- 15 m LWS
	1.4 Tipe kapal	Panamax
	1.5 Bentang rel crane	10.4 m
	1.6 Fender	Super Cell 1250
2.	Karakteristik Kapal	
	2.1 Rencana kapal sandar	Maksimum kapal 70,000 DWT
	2.2 Loaded displacement tonnage	1.3 x DWT
	2.3 length Overall (LOA)	233 m
	2.4 Breadth Molded	32.2 m
	2.5 Full load draft	13.0m
3.	Material	
	3.1 Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700vf'c$ - Berat jenis beton = 2.40 ton/m^3
	3.2 Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress D 12.5 mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3
	3.3 Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240$ MPa
	3.4 Tiang Pancang Baja (Steel Pipe Pile)	- Kuat leleh minimum, $f_y = 310$ Mpa (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000$ Mpa
4.	Pembebanan	
	4.1 Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m^3 - Berat jenis beton basah = 2.500 ton/m^3 - Berat jenis beton prestressed = 2.450 ton/m^3 - Berat jenis baja = 7.850 ton/m^3 - Berat jenis kayu = 1.000 ton/m^3 - Berat jenis pasir = 2.000 ton/m^3 - Berat jenis asphalt = 2.200 ton/m^3 - Berat jenis air laut = 1.025 ton/m^3
	4.2 Beban Hidup	
	4.2.1 Beban hidup merata	- 3 ton/m^2

	4.2.2 Beban hidup conatiner crane	- Beban roda 30 ton/m' - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
	4.2.3 Beban hidup truck	- Truck T-50
	4.2.3 Beban Conveyor	- 4 ton/kaki
	4.3 Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type super cell 1250
	4.4 Beban Tambat Kapal	- Kapasitas Bollard ton 100 ton
	4.5 Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
	4.6 Beban Arus	- Kondisi normal = 1.0 Knot - Kondisi Extrim = 2.40 Knot
	4.7 Beban Angin	- Kondisi Operasional 40 km/h - Kondisi Extrim = 120 km/h
	4.8 Beban Gelombang	- 0.5 m (asumsi)
	4.9 Beban Temperature	- Rentang 33°C
5.	Data Pondasi	
	Faktor Keamanan (FS) daya dukung tanah	- FS = 2.5 (Compression) - FS = 2.5 (Tension)

15. DERMAGA 7.3

NO.	ITEM	DETAIL ITEM
1.	Data Umum Dermaga	
	1.1 Tipe dermaga	Bulk Carrier/General Cargo
	1.2 Dimensi dermaga	190 m x 20 m
	1.3 Kedalaman rencana	-12.50 m LWS
	1.4 Tipe kapal	Handymax
	1.5 Bentang rel container crane	12.5 m
	1.6 Fender	SUC 1250 with Frontal Pad
2.	Karakteristik Kapal	
	2.1 Rencana kapal sandar	Maksimum kapal 40,000 DWT
	2.2 Loaded displacement tonnage	1.4 x DWT
	2.3 length Overall (LOA)	190 m
	2.4 Breadth Molded	32 m
	2.5 Full load draft	11 m
3.	Material	

3.1	Mutu Beton	- Kuat tekan minimum beton precast, $f'c = 32$ Mpa K (400) - Kuat tekan minimum beton insitu, $f'c = 32$ Mpa (K 400) - Modulus elastisitas (E) = $4700vf'c$ - Berat jenis beton = 2.40 ton/m^3
3.2	Baja Tulangan	- Tulangan $D < 13$ (polos), $f_y = 240$ MPa, $E_s = 210,000$ MPa - Tulangan $D \geq 13$ (deformed), $f_y = 390$ MPa, $E_s = 210,000$ MPa - Tendon prestress $D 12.5$ mm, $f_y = 1840$ MPa, $E_s = 196,000$ MPa - Berat jenis baja = 7.85 ton/m^3
3.3	Baja Profil, Pelat Baja, dan Material Baja Struktural Lain	- Kuat leleh minimum, $f_y = 240$ MPa
3.4	Tiang Pancang Baja (Steel Pipe Pile)	- Kuat leleh minimum, $f_y = 310$ Mpa (ASTM A252 Gr.3) - Modulus elastisitas, $E_s = 210,000$ Mpa
4.	Pembebanan	
4.1	Beban Mati	- Berat sendiri material struktur dan finishingnya - Berat jenis beton = 2.400 ton/m^3 - Berat jenis beton basah = 2.500 ton/m^3 - Berat jenis beton prestressed = 2.450 ton/m^3 - Berat jenis baja = 7.850 ton/m^3 - Berat jenis kayu = 1.000 ton/m^3 - Berat jenis pasir = 2.000 ton/m^3 - Berat jenis asphalt = 2.200 ton/m^3 - Berat jenis air laut = 1.025 ton/m^3
4.2	Beban Hidup	
4.2.1	Beban hidup merata	- 4 ton/m^2
4.2.2	Beban hidup container crane	- Beban roda 30 ton/m^2 - Jumlah roda (8roda) per 4 group - Jarak antar roda 1.00 m
4.2.3	Beban hidup truck	- Truck T-50
4.2.3	Beban Conveyor	- 4 ton/kaki
4.3	Beban Sandar Kapal	- Beban sandar kapal sesuai dengan perhitungan Berthing Energy BS6349 Part 4 - Kecepatan sandar 0.12 m/s (two contact fender) - Sudut merapat kapal 5° - Fender type super cell 1250
4.4	Beban Tambat Kapal	- Kapasitas Bollard 100 ton
4.5	Beban Gempa	- Mengacu pada SNI 03-1726-2012 - Jenis tanah : Tanah Keras - Dynamic RSA
4.6	Beban Arus	- Kondisi normal = 1.0 Knot
		- Kondisi Extrim = 2.40 Knot
4.7	Beban Angin	- Kondisi Operasional 40 km/h
		- Kondisi Extrim = 120 km/h

	4.8 Beban Gelombang	- 0.5 m (asumsi)
	4.9 Beban Temperature	- Rentang 33°C
5.	Data Pondasi	
	Faktor Keamanan (FS) daya dukung tanah	- FS = 2.5 (Compression)
		- FS = 2.5 (Tension)

III. PERALATAN LISTRIK

1. Ciagading 1

- Sumber daya listrik di suplai dari PT Krakatau Daya Listrik (PT. KDL)
- Total Daya terpasang 7.626 KVA

No.	Nama Trafo(titik ukur)	Beban	Kapasitas(kVA)
1	TS 9.2	Tower 02 & TTN 01	630
2	TS.14	Grain Feeding Conveyor SGT & Redwood, Gudang(F,G,H,I,J), PT. BAM	630
3	TSN 1 / TS 11.1	Tower 01 / PTTN 01	630
4	TS 10	Workshop, Gudang, Pieroffice, ADB, Timbangan, Penerangan Jalan & DL V	315
5	AK 04 SUBST HARBOUR	Crane 1, 2, 3 & 4	1,500
6	AK 11 SUBST HARBOUR	PHC 01 & 02	5,000
7	TS 11.2	MPC	400
8	Dry Port	Dry Port	21

A. MV DISTRIBUTION UNTUK GSU 01 s/d 04



NO.	ITEM	KETERANGAN
1.	Data Umum	
	a. Brand	GEC ALSTHOM
	b. Year of manufacture	1990
	c. MV Switchgear	6 kV, 630A, 25Ka, 3 sec 2 Unit incoming, 4 Unit outgoing, 1 Unit Coupler

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B. MV DISTRIBUTION UNTUK PHC 01 & 02



NO.	ITEM	KETERANGAN
1.	Data Umum	
	a. Brand	SCHNEIDER
	b. Year of manufacture	2007
	c. MV Switchgear	6 kV, 630A, 14.5Ka, 1 sec 1 Unit incoming, 2 Unit outgoing,

C. CAPACITOR BANK & HARMONIC FILTER



NO.	ITEM	DETAIL ITEM
1.	Data Umum	
	a. Kapasitas Harmonic Filter	8 x 300 Ampere
	b. Harmonic Transformer	2 MVA, 6.3/440 kV, Dd0, ONAN, Z=2%
	c. MV Switchgear	1 Unit incoming (630A, 20kA), 3 unit outgoing (630A, 20kA)
	d. Air Circuit Breaker	3350 A, 3 Pole
2.	Power factor	0.9
3.	Total Demand Distortion	5%

2. CIGADING 02

- Sumber daya listrik di suplai dari PT Krakatau Posco Energy (PT. KPE)
- Total Daya terpasang 7.500 KVA

A. MV DISTRIBUTION UNTUK GRAB SHIP UNLOADER DAN CONVEYOR



NO.	ITEM	KETERANGAN
1.	Data MV Switchgear	
	a. Brand	LS
	b. Year of manufacture	2013
	c. MV Switchgear di MCR	1 Unit incoming (36 kV, 1250A, 31.5 kA), 1 Unit incoming (7.2 kV, 1250A, 25 kA) 4 Unit outgoing (7.2 kV, 1250A, 25 kA),
	d. MV Switchgear di P1A	1 Unit incoming (7.2 kV, 630A, 25 kA) 3 Unit outgoing (7.2 kV, 630A, 25 kA)
2.	Data Transformer	
	a. Main Transformer	7.5 MVA, 30/6 kV, Dyn11
	b. P1B Transformer	1.6 MVA, 6/0.4 kV, Dyn11
	c. P1C Transformer	750 kVA, 6/0.4 kV, Dyn11
	d. P1A Transformer	750 kVA, 6/0.4 kV, Dyn11
	e. MCR Transformer	250 kVA, 6/0.4 kV, Dyn11
	f. D5 Transformer	250 kVA, 6/0.4 kV, Dyn11
	g. D6 Transformer	160 kVA, 6/0.4 kV, Dyn11