

## DAFTAR PUSTAKA

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## DAFTAR RIWAYAT HIDUP

1. Nama Lengkap : EKO SOIM MUSTOFA  
2. Tempat / Tgl Lahir : KENDAL, 14 Maret 1993  
3. NIT : 49124626.T  
4. Agama : Islam  
5. Nama Orang Tua



Ayah : Pardimin

Ibu : Murtinem

6. Alamat Asal : Desa wonosari RT 03/02, Kec.Pegandon  
Kab.Kendal, Kod.Pos: 51357

### Riwayat Pendidikan

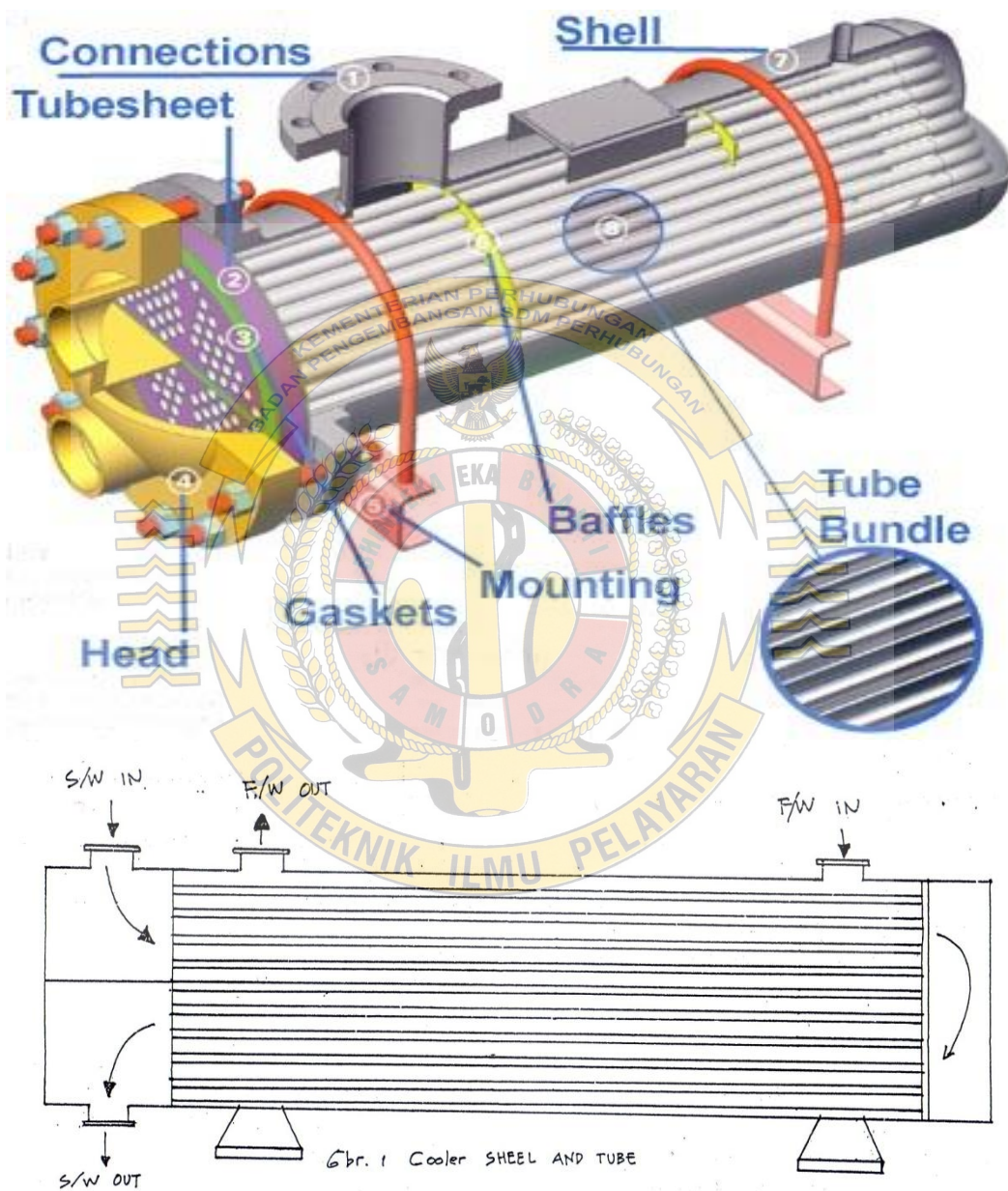
1. Lulus SD : Tahun 2005 (SDN N 1 Puguh)  
2. Lulus SMP : Tahun 2008 (SMP N 1 Pegandon)  
3. Lulus SMK : Tahun 2011 (SMK GAMALIEL 1 Madiun)  
4. Sekarang : PIP Semarang mulai tahun 2012

Pengalaman Praktek / Prala : MV. NAZIHA

PT.Gurita lintas samudera

Pada Tahun : 14 November 2014, Sampai 21 November 2015

LAMPIRAN 1



Sumber : <http://www.southwestthermal.com/shell-tube-exchanger.html>



## LAMPIRAN 2

Kotoran yang  
menempel pada plat  
*cooler*



Sumber : Dokumentasi bribadi

### LAMPIRAN 3

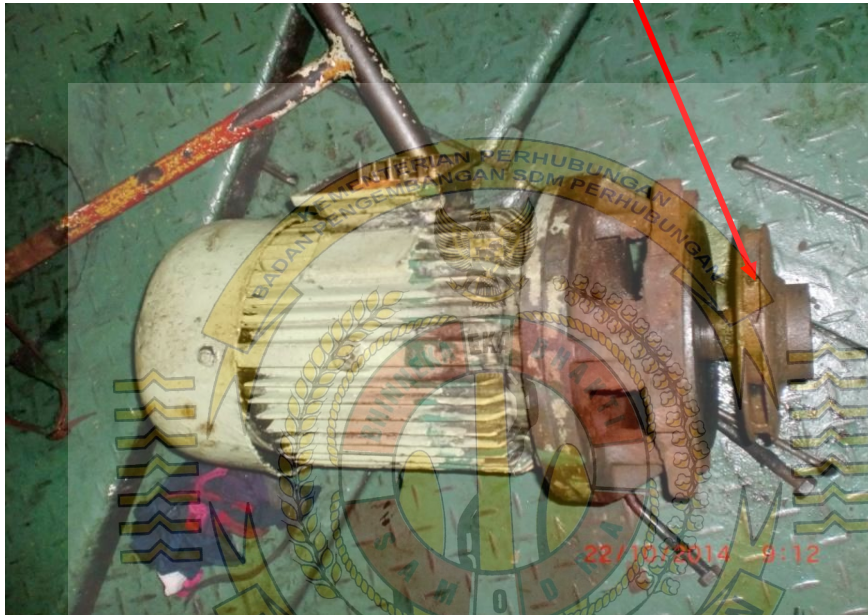
Kotoran & tritip  
yang menempel pada  
*strainer*



Sumber : Dokumentasi pribadi

## LAMPIRAN 4

*Impeler yang aus  
ukura akan mengecil*



Sumber : Dokumentasi pribadi



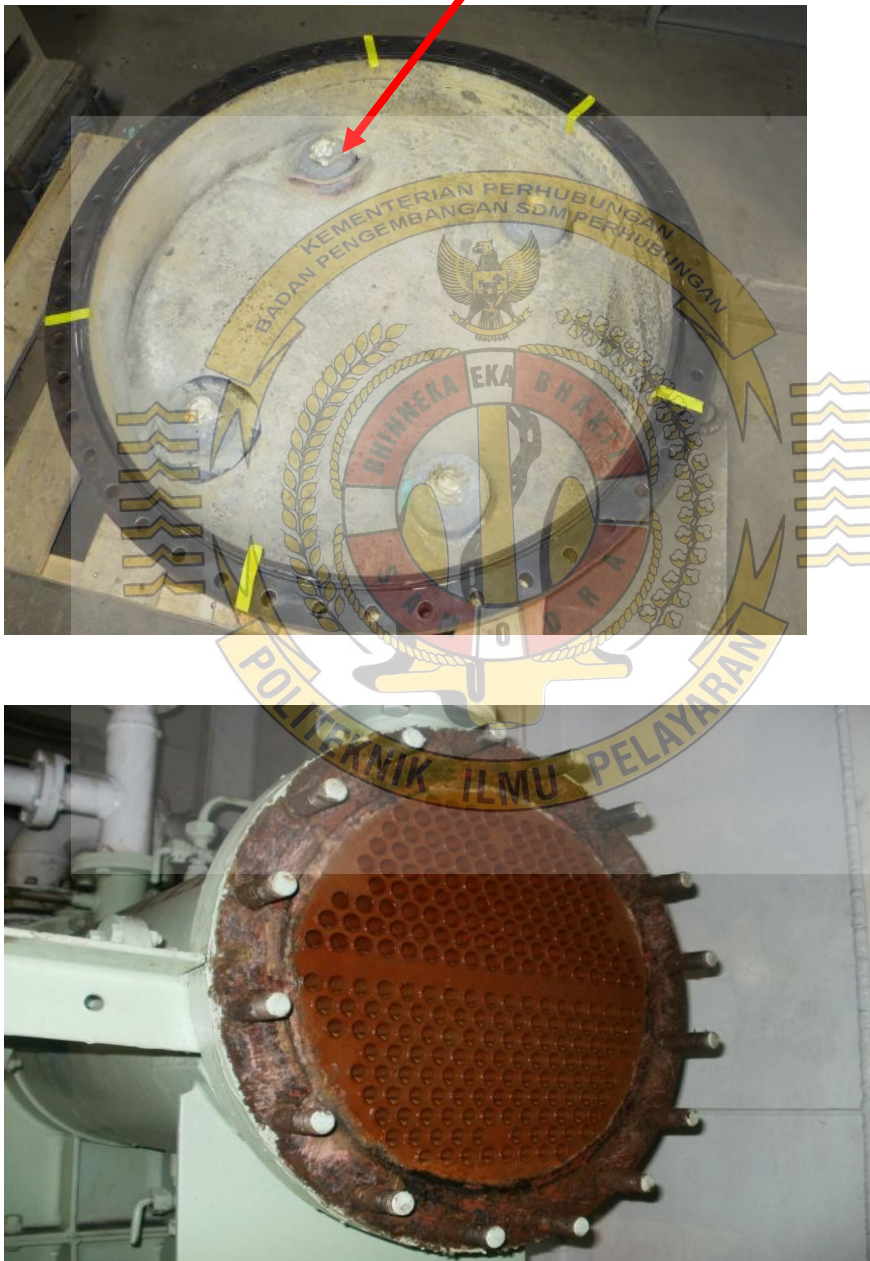
LAMPIRAN 5



Sumber : Dokumentasi pribadi

## LAMPIRAN 6

Zinc anode pada cover



Sumber : Dokumentasi pribadi



LAMPIRAN 7

SUSUNAN PERWIRA MV. NAZIHA



**BAGIAN DECK :**

No	Nama	Sex	Jabatan	Ijazah	No of Seaman Book	Expiry of Seaman Book
1	Raden Bambang Sentjaki	M	Master	ANT - I	W 036826	06/05/16
2	Bustanul Asikin	M	CH.OFF	ANT - II	W 002783	12/03/16
3	Bustanul Arifin	M	2/OFF	ANT - III	Y 078843	04/06/17
4	Nurhasim	M	3/OFF	ANT - III	X 026789	25/04/17

**BAGIAN MESIN :**

No	Nama	Sex	Jabatan	Ijazah	No of Seaman Book	Expiry of Seaman Book
1	Imron Rosyadi	M	C/ENGR	ATT - I	C 015348	27/01/17
2	Prayogo Suka Laksono	M	1/ENGR	ATT - II	Y 036921	05/09/16
3	Andik Supriyanto	M	2/ENGR	ATT - III	D 050787	17/03/18
4	Puguh Setyadi	M	3/ENGR	ATT - III	A 036137	03/05/17

**ENGINE MAINTENANCE REPORT**

Ship : MV. NAZIHA		Report Month : July 31, 2014
Place /date	Machinery	Detail of works
Sun 06.07.2014 At sea	Boiler  Others	- renewed boiler burner atomizer - Rectified FO line pressure gauge - Cleaned engine room bilge well - Cleaned suction filter of FO purifier feed pump
Mon 07.07.2014 At sea	FO purifier	-checked cargo pump -.O/H no.2 feed pump of FO purifier -.cleaned engine room floor - rectified flood light of engine room
Tue 08.07.2014 At sea	AE 3  ME  FO purifier	-.maintenance aux engine -.continues paint upper floor wall - checked and grease air cylinder no.5 & 6 - checked air filter/strainer manoeuvring system -.rectified FO heater of FO purifier - cleaned exh gas economizer area
Wed 09.07.2014 At sea	Pump	-.rectified hydraulic ballast pump in p/room -.cleaned engine room floor -.cleaned and arrange engine room store
Thu 10.07.2014 Anchore at sea	AE 2	-.ceck instalation AE cooling sistim -.cleaned FW & SW filter, cleaned FW cooler -.cleaned filter of sea chast - rectified FW sterilizer - ceck pomp FW & SW sistim repair impeler & bearing pump
Fri 11.07.2014 Anchore at sea	ME	-.cleaned and paint boiler upper floor -.cleaned fuel injection valve ME (spare) -.cleaned body of pumps in engine room
Sat 12.07.2014 Freeport	Economizer  Pump Weekly test	-.cleaned gas side of exh gas economizer -.rectified of steam tracing pipe -.prepared for overhaul ME sea water cooling pump - running test of em'cy fire pump, em'cy generator, Life boat engine p/s, FO leak alarm ME & AE, 15ppm alarm
Sun 13.07.2014 Freeport	Others	- Cleaned engine room floor - Cleaned workshop
Mon 14.07.2014 Freeport	Weekly  Others	-.cleaned and paint economizer floor -.cleaned engine room lower floor -.cleaned steering gear room and machinery - painted axh gas economizer body - painted exh gas pipe
Tue 15.07.2014 Freeport	Others  Acc AC	-.cleaned and paint engine room 2 <sup>nd</sup> floor -.cleaned main engine body - cleaned suction filter of FO purifier feed pump -soot bolw exh gas economizer - cleaned condenser of accommodation air condition

GLS

To record: Every Month

To keep: for infinity

**ENGINE MAINTENANCE REPORT**

Ship : MV. NAZIHA		Report Month : July 31, 2014
Place /date	Machinery	Detail of works
Wed 11.05.2015 At sea	Sewage Acc AC  Others	-sewage plant maintenance , function test & add sterilizing tablet -added freon of accommodation air conditioning -cleaned floor of engine room - painted engine room floor ,2 <sup>nd</sup> floor - cleaned suction filter of FO purifier feed pump - soot blow exhaust gas economizer
Thu 12.05.2016 At sea	Others	-cleaned steering gear room -cleaned and paint wood plank of st-gear room -cleaned body of main engine - cleaned engine room lower floor - cleaned suction filter of FO purifier feed pump - soot blow exhaust gas economizer
Fri 13.05.2016 At sea & Banjarmasin	Purifier	-cleaned suction filter of FO purifier feed pump - manoeuvring arrival Banjarmasin anchorage -cleaned body of aux engine 1 & 2 -cleaned floor area aux engine and foundation - manoeuvring alongside for berthing
Sat 14.05.2016 Banjarmasin	ME  Weekly test	-cleaned bowl head of FO purifier no.2 -changed and clean t/c air filter of main engine -cleaned engine room 2 <sup>nd</sup> floor - cleaned and arrange engine workshop - running test of em'cy fire pump, em'cy generator, Life boat engine p/s, FO leak alarm ME & AE, 15ppm alarm
Sun 15.05.2016 Banjarmasin & At sea	Others	- checked emergency light battery - checked emergency generator battery - Cleaned suction filter of FO purifier feed pump - soot blow exh gas economizer
Mon 16.05.2016 At sea	Vent fan Sewage Sea chest	-cleaned and paint tank top for side -filled-up grease point of vent fan flap -flushing sewage plant by fresh water - cleaned sea chest filter low and high - cleaned suction filter of FO purifier feed pump - soot blow exhaust gas economizer
Tue 17.05.2016 At sea	Hot wtr pump AE	-cleaned and paint tank top for side -cleaned and paint foundation of AE 1 & 2 -painted floor area AE - replaced mechanical seal of hot water circulating pump - changed and clean air filter t/c and alternator - cleaned suction filter of FO purifier feed pump - soot blow exhaust gas economizer
Wed 18.05.2016 At sea & E-OPL	ME  FW cooler	- cleaned suction filter of FO purifier feed pump - manoeuvring arrival E-OPL anchorage -replaced exhaust valve cyl.2 & 3 - checked and retest FIV cyl. 1 3 & 5 - cleaned fresh water cooler of main engine

GLS

To record: Every Month

To keep: for infinity



**ENGINE MAINTENANCE REPORT**

Ship : MV. NAZIHA		Report Month : July 31, 2014
Place /date	Machinery	Detail of works
Thu 19.05.2016 E-OPL	LO cooler  Air comp Boiler	-cleaned lube oil cooler of main engine -cleaned bilge well below flay wheel -maintenance main air compressor , clean and renew LO crankcase - cleaned boiler fire chamber - cleaned engine room 1 <sup>st</sup> floor
Fri 20.05.2016 E-OPL	Air comp ME	-cleaned tank cleaning heater in pump room -cleaned tank top and paint - cleaned fresh water cooler of main air compressor -checked camshaft roller guide condition And check exhaust valve actuator cyl.5
Sat 21.05.2016 E-OPL	Weekly	-cleaned floor of aux engine area -cleaned and arrange engine room store - running test of em'cy fire pump, em'cy generator, Life boat engine p/s, FO leak alarm ME & AE, 15ppm alarm
Sun 22.05.2016 WPA	Purifier	- Cleaned suction filter of FO purifier feed pump - soot blow exh gas economizer
Mon 23.05.2016 WPA & Shell Bukom	ME	- changed and clean air filter t/c main engine - changed and clean main engine FO 2 <sup>nd</sup> filter - added lube oil sump tank main engine - cleaned and paint tank top
Tue 24.05.2016 Shell Bukom	ME Battery Pump	-painted engine room wall lower side -cleaned main engine FO 1 <sup>st</sup> filter - added distilled water of emergency gen battery - rectified electric motor fan of boiler feed pump no.1
Wed 25.05.2016 Shell Bukom & at sea	boiler	-cleaned and paint tank top -prepared fabricate the antipiracy door -replaced steam valve for main return line in main deck - rectified return pipe of boiler burner pump - cleaned suction filter of FO purifier feed pump - soot blow exhaust gas economizer
Thu 26.05.2016 At sea	ME Ref comp AE.1	-take p-max & main engine performance -cleaned condenser of ref compressor -cleaned lube oil cooler and fresh water cooler - fabricated the antipiracy door - cleaned suction filter of FO purifier feed pump - soot blow exhaust gas economizer
Fri 27.05.2016 At sea	AE.1  Purifier	-cleaned and paint machinery foundation in grey -checked and clean fuel injection valve 1 - 6 -cleaned body aux engine - cleaned engine room 1 <sup>st</sup> floor - cleaned workshop and arrange - cleaned suction filter of FO purifier feed pump - soot blow exhaust gas economizer

GLS

To record: Every Month

To keep: for infinity

**ENGINE MAINTENANCE REPORT**

Ship : MV. NAZIHA		Report Month : July 31, 2014
Place /date	Machinery	Detail of works
Sat 28.05.2016	Pumps	<ul style="list-style-type: none"> <li>-cleaned body of main engine</li> <li>-checked condition of DO transfer pump</li> <li>-checked condition of exh valve driving oil pump</li> <li>- defrosted of meat room and clean</li> <li>- cleaned engine room floor</li> </ul>
Sun 29.05.2016	Others	<ul style="list-style-type: none"> <li>-changed and clean air filter turbo charge main engine</li> <li>-cleaned engine room 2<sup>nd</sup> floor</li> </ul>
Mon 30.05.2016	Others	<ul style="list-style-type: none"> <li>-cleaned and paint piping in engine room</li> <li>-fabricated the antipiracy door</li> <li>-rectified exh valve grinding machine motor</li> <li>- cleaned suction filter of FO purifier feed pump</li> <li>- soot blow exhaust gas economizer</li> </ul>
Tue 31.05.2016	COP Others	<ul style="list-style-type: none"> <li>-rectified purging line of COP.4P</li> <li>-checked condition of DO purifier</li> <li>-fabricated the antipiracy door</li> <li>- cleaned suction filter of FO purifier feed pump</li> <li>- soot blow exhaust gas economizer</li> </ul>

**Andik Supriyanto**Prepared by: 2<sup>nd</sup> Engineer**Imron Rosyadi**

Confirmed by: Chief Engineer

**ENGINE MAINTENANCE REPORT**

Ship : MV. NAZIHA		Report Month : Junni 31, 2015
Place /date	Machinery	Detail of works
Sun 11.06.2015 At sea	Boiler  Others	- renewed boiler burner atomizer - Rectified FO line pressure gauge - Cleaned engine room bilge well - Cleaned suction filter of FO purifier feed pump
Mon 12.06.2015 At sea	FO purifier	-checked cargo pump -.O/H no.2 feed pump of FO purifier -.cleaned engine room floor - rectified flood light of engine room
Tue 16.06.2015 At sea	AE 3  ME  FO purifier	-.maintenance aux engine -.continues paint upper floor wall - checked and grease air cylinder no.5 & 6 - checked air filter/strainer manoeuvring system -.rectified FO heater of FO purifier - cleaned exh gas economizer area
Wed 17.06.2015 At sea	AE 1	-.ceck instalation FW & SW sistim -.cleaned FW cooler, & cleaned FW, SW filter -.cleaned filter of sea chast - rectified FW sterilizer - ceck pump FW & SW sistim repair impeler & bearing pump
Thu 18.06.2015 Anchore at sea	Pump	-.rectified hydraulic ballast pump in p/room -.cleaned engine room floor -.cleaned and arrange engine room store
Fri 19.06.2015 Anchore at sea	ME	-.cleaned and paint boiler upper floor -.cleaned fuel injection valve ME (spare) -.cleaned body of pumps in engine room
Sat 20.06.2015 Freeport	Economizer  Pump Weekly test	-.cleaned gas side of exh gas economizer -.rectified of steam tracing pipe -.prepared for overhaul ME sea water cooling pump - running test of em'cy fire pump, em'cy generator, Life boat engine p/s, FO leak alarm ME & AE, 15ppm alarm
Sun 21.06.2015 Freeport	Others	- Cleaned engine room floor - Cleaned workshop
Mon 22.06.2015 Freeport	Weekly  Others	-.cleaned and paint economizer floor -.cleaned engine room lower floor -.cleaned steering gear room and machinery - painted axh gas economizer body - painted exh gas pipe
Tue 23.06.2015 Freeport	Others  Acc AC	-.cleaned and paint engine room 2 <sup>nd</sup> floor -.cleaned main engine body - cleaned suction filter of FO purifier feed pump -soot bolw exh gas economizer - cleaned condenser of accommodation air condition

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Thu 12.05.2016 At sea	Others	-cleaned steering gear room -cleaned and paint wood plank of st-gear room -cleaned body of main engine - cleaned engine room lower floor - cleaned suction filter of FO purifier feed pump - soot blow exhaust gas economizer
Fri 13.05.2016 At sea & Banjarmasin	Purifier	-cleaned suction filter of FO purifier feed pump - manoeuvring arrival Banjarmasin anchorage -cleaned body of aux engine 1 & 2 -cleaned floor area aux engine and foundation - manoeuvring alongside for berthing
Sat 14.05.2016 Banjarmasin	ME  Weekly test	-cleaned bowl head of FO purifier no.2 -changed and clean t/c air filter of main engine -cleaned engine room 2 <sup>nd</sup> floor - cleaned and arrange engine workshop - running test of em'cy fire pump, em'cy generator, Life boat engine p/s, FO leak alarm ME & AE, 15ppm alarm
Sun 15.05.2016 Banjarmasin & At sea	Others	- checked emergency light battery - checked emergency generator battery - Cleaned suction filter of FO purifier feed pump - soot blow exh gas economizer
Mon 16.05.2016 At sea	Vent fan Sewage Sea chest	-cleaned and paint tank top for side -filled-up grease point of vent fan flap -flushing sewage plant by fresh water - cleaned sea chest filter low and high - cleaned suction filter of FO purifier feed pump - soot blow exhaust gas economizer
Tue 17.05.2016 At sea	Hot wtr pump AE	-cleaned and paint tank top for side -cleaned and paint foundation of AE 1 & 2 -painted floor area AE - replaced mechanical seal of hot water circulating pump - changed and clean air filter t/c and alternator - cleaned suction filter of FO purifier feed pump - soot blow exhaust gas economizer
Wed 18.05.2016 At sea & E-OPL	ME  FW cooler	- cleaned suction filter of FO purifier feed pump - manoeuvring arrival E-OPL anchorage -replaced exhaust valve cyl.2 & 3 - checked and retest FIV cyl. 1 3 & 5 - cleaned fresh water cooler of main engine

GLS

To record: Every Month

To keep: for infinity

**ENGINE MAINTENANCE REPORT**

Ship : MV. NAZIHA		Report Month : Junni 31, 2015
Place /date	Machinery	Detail of works
Thu 19.05.2016 E-OPL	LO cooler  Air comp Boiler	-cleaned lube oil cooler of main engine -cleaned bilge well below flay wheel -maintenance main air compressor , clean and renew LO crankcase - cleaned boiler fire chamber - cleaned engine room 1 <sup>st</sup> floor
Fri 20.05.2016 E-OPL	Air comp ME	-cleaned tank cleaning heater in pump room -cleaned tank top and paint - cleaned fresh water cooler of main air compressor -checked camshaft roller guide condition And check exhaust valve actuator cyl.5
Sat 21.05.2016 E-OPL	Weekly	-cleaned floor of aux engine area -cleaned and arrange engine room store - running test of em'cy fire pump, em'cy generator, Life boat engine p/s, FO leak alarm ME & AE, 15ppm alarm
Sun 22.05.2016 WPA	Purifier	- Cleaned suction filter of FO purifier feed pump - soot blow exh gas economizer
Mon 23.05.2016 WPA & Shell Bukom	ME	- changed and clean air filter t/c main engine - changed and clean main engine FO 2 <sup>nd</sup> filter - added lube oil sump tank main engine - cleaned and paint tank top
Tue 24.05.2016 Shell Bukom	ME Battery Pump	-painted engine room wall lower side -cleaned main engine FO 1 <sup>st</sup> filter - added distilled water of emergency gen battery - rectified electric motor fan of boiler feed pump no.1
Wed 25.05.2016 Shell Bukom & at sea	boiler	-cleaned and paint tank top -prepared fabricate the antipiracy door -replaced steam valve for main return line in main deck - rectified return pipe of boiler burner pump - cleaned suction filter of FO purifier feed pump - soot blow exhaust gas economizer
Thu 26.05.2016 At sea	ME Ref comp AE.1	-take p-max & main engine performance -cleaned condenser of ref compressor -cleaned lube oil cooler and fresh water cooler - fabricated the antipiracy door - cleaned suction filter of FO purifier feed pump - soot blow exhaust gas economizer
Fri 27.05.2016 At sea	AE.1  Purifier	-cleaned and paint machinery foundation in grey -checked and clean fuel injection valve 1 - 6 -cleaned body aux engine - cleaned engine room 1 <sup>st</sup> floor - cleaned workshop and arrange - cleaned suction filter of FO purifier feed pump - soot blow exhaust gas economizer

GLS

To record: Every Month

To keep: for infinity

**ENGINE MAINTENANCE REPORT**

Ship : MV. NAZIHA		Report Month : Juni 31, 2015
Place /date	Machinery	Detail of works
Sat 28.05.2016	Pumps	<ul style="list-style-type: none"> <li>-cleaned body of main engine</li> <li>-checked condition of DO transfer pump</li> <li>-checked condition of exh valve driving oil pump</li> <li>- defrosted of meat room and clean</li> <li>- cleaned engine room floor</li> </ul>
Sun 29.05.2016	Others	<ul style="list-style-type: none"> <li>-changed and clean air filter turbo charge main engine</li> <li>-cleaned engine room 2<sup>nd</sup> floor</li> </ul>
Mon 30.05.2016	Others	<ul style="list-style-type: none"> <li>-cleaned and paint piping in engine room</li> <li>-fabricated the antipiracy door</li> <li>-rectified exh valve grinding machine motor</li> <li>- cleaned suction filter of FO purifier feed pump</li> <li>- soot blow exhaust gas economizer</li> </ul>
Tue 31.05.2016	COP Others	<ul style="list-style-type: none"> <li>-rectified purging line of COP.4P</li> <li>-checked condition of DO purifier</li> <li>-fabricated the antipiracy door</li> <li>- cleaned suction filter of FO purifier feed pump</li> <li>- soot blow exhaust gas economizer</li> </ul>

**Andik Supriyanto**Prepared by: 2<sup>nd</sup> Engineer**Imron Rosyadi**

Confirmed by: Chief Engineer



## LAMPIRAN 10

Sebelum



Sesudah



Sumber : Dokumentasi pribadi

# LAMPIRAN 11

PT. GURITA LINTAS SAMUDERA						GLS-062	
REQUISITION OF STORE						P/K	SET
NAME OF VESSEL : MV NAZIHA							
PORT OF CALL				: GERSIK			
Item	Tgl: 08.09.2015	PART NUMBER	Unit	Remaining	Required	To Be Issued	Remarks
CYLINDER LINER							
1		CYLINDER LINER W 21241	PCS		2		
2		O-RING W 21251	PCS		6		
3		O-RING W 21252	PCS		6		
4		O-RING W 21253 Z	PCS		6		
5		O-RING W 21254	PCS		6		
6		PASSAGE FOR LUBRICATING QUILL W 21387	PCS		3		
CYLINDER COVER							
1		O-RING FOR W27101 W 27117	PCS		6		
2		O-RING FOR W27101 W27118	PCS		6		
FUEL VALVE							
1		NOZLE BODY WITH NEEDLE W 27242	PCS		12		
PISTON							
1		PISTON HEAD (SEDANG DI REKONDISI DI BENGKEL) W 34060	PCS		2		
2		PISTON RING KO R9V W 34406	PCS		6		
3		PISTON RING KO R7 W 34407 Z	PCS		18		

Chief Officer/Chief Engineer/Radio Officer :

Master :

Received / Approved :

CC. Two Copies for Head Office.

## LAMPIRAN 12

Tidak ada kotoran  
pada plat *cooler*  
setelah di bersihkan



Sumber : Dokumentasi pribadi

### LAMPIRAN 13

Tidak ada kotoran & tritip pada *strainer* setelah di bersihkan

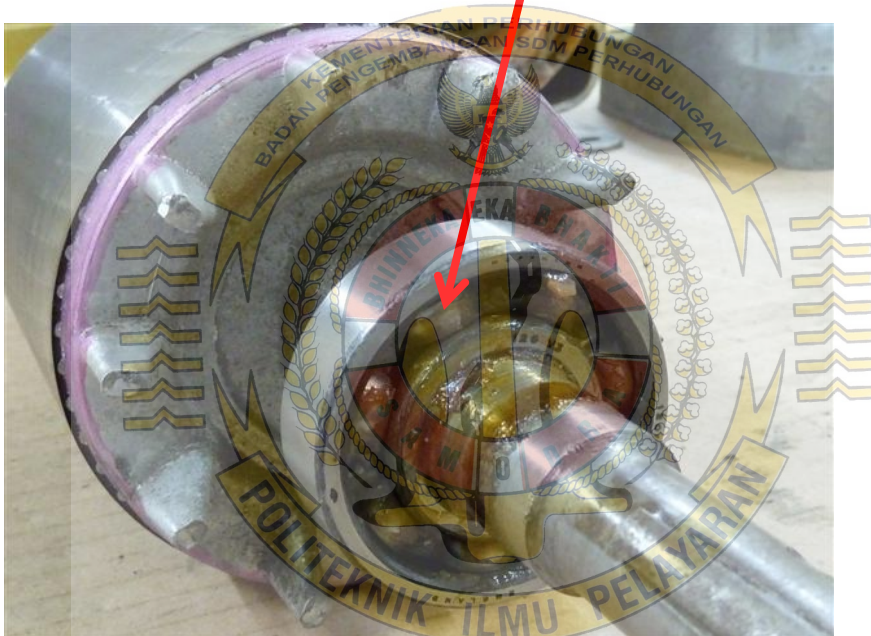


Sumber : Dokumentasi pribadi



## LAMPIRAN 14

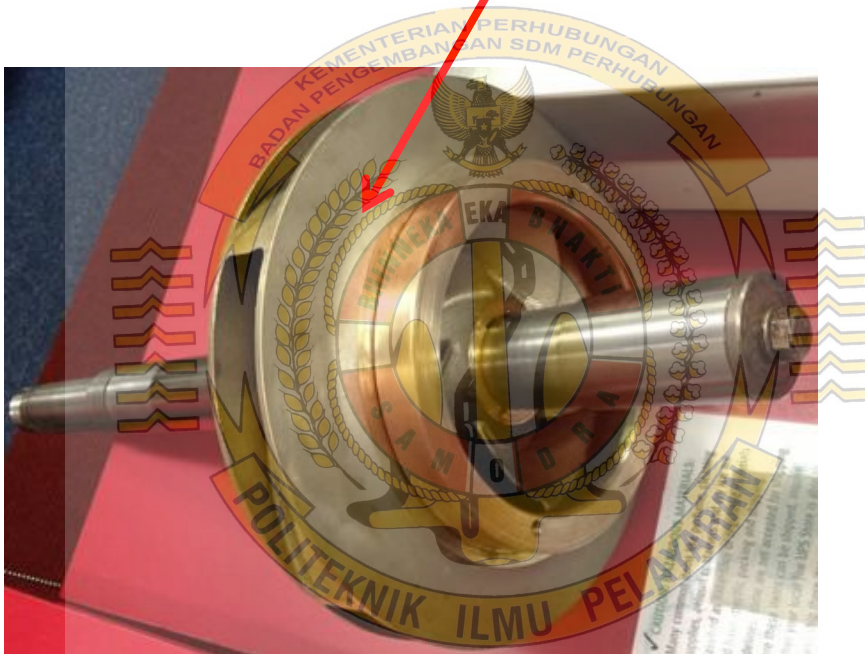
*Bearing yang sudah  
di ganti ball space  
lebih sesuai*



Sumber : Dokumentasi pribadi

## LAMPIRAN 15

Kondisi *impeler*  
yang masi baru



Sumber : Dokumentasi pribadi

## LAMPIRAN WAWANCARA

Dalam proses pengumpulan data-data skripsi dengan judul “Pengaruh perawatan sistem air pendingin terhadap kerja mesin *diesel generator* di MV. Naziha dengan metode *fishbone*”. Penulis mengambil metode pengumpulan data dengan cara wawancara kepada masinis/*engineer* di MV. Naziha. Adapun daftar wawancara yang penulis lakukan di atas kapal adalah sebagai berikut:

### A. Wawancara Dengan Masinis/*engineer* diatas Kapal:

1. Nama : Andik Supriyanto

Jabatan : Masinis Dua

Pertanyaan :

1. Faktor-faktor apa saja yang menyebabkan tidak tercapainya suhu air pendingin?

Jawaban:

Yang menjadi faktor-faktor meningkatnya suhu air pendingin mesin *diesel generator* adalah diakibatkan karena kotornya pada sistem *cooler* dan saringan *sea chest*, sehingga air yang masuk pada sirkulasi air tawar maupun air laut sangat berpengaruh dalam proses pendinginan mesin *diesel generator*. Karena jika sistem dalam kondisi kotor, maka banyaknya kalor yang diserap oleh media pendingin juga sedikit. Sehingga akan terjadi penumpukan panas secara terus-menerus yang akhirnya akan mengakibatkan kerusakan pada material. Namun apabila sistem dalam kondisi bersih, maka banyaknya kalor yang diserap oleh media pendingin juga besar, jika hal ini berlangsung lama maka suhu pada material yang didinginkan juga akan kecil.

2. Bagaimana cara merawat sistem air pendingin agar selalu bekerja secara baik guna mencapai suhu air pendingin yang normal?

Jawaban:

Masalah-masalah yang sering terjadi yang dapat mempengaruhi meningkatnya suhu air pendingin pada mesin diesel dikarenakan system pendingin air tawar yang bekerja kurang maksimal. Proses lancarnya/stabilnya suhu air pendingin yang bersikulasi masuk ke mesin *diesel generator* memerlukan perawatan yang terencana guna mencapai suhu normal air pendingin sesuai dengan jangka waktu yang ditentukan

dengan instruksi manual book, oleh sebab itu perlu dilakukan beberapa hal antara lain:

a. Pembersihan *Cooler*

Pembersihan *cooler* sangat penting karena proses pemindahan panas yang terjadi sangat berpengaruh, jika *cooler* kotor maka perpindahan panas yang terjadi tidak maksimal sehingga akan mempengaruhi terhadap proses pendinginan, maka pembersihan *cooler* harus dilakukan.

b. Pembersihan *Strainer*

Bila *strainer* kotor, tekan dan isapan pompa akan kecil karena adanya penyumbatan pada *straine* sehingga akan berakibat pada *cooler*, proses sistem perpindahan panas pada *cooler* akan terganggu, maka dari itu pembersihan pada *strainer* juga harus di dilakukan.





LAMPIRAN WAWANCARA

Dalam proses pengumpulan data-data skripsi dengan judul “Pengaruh perawatan sistem air pendingin terhadap kerja mesin *diesel generator* di MV. Naziha dengan metode *fishbone*”. Penulis mengambil metode pengumpulan data dengan cara wawancara kepada masinis/*engineer* di MV. Naziha. Adapun daftar wawancara yang penulis lakukan di atas kapal adalah sebagai berikut:

A. Wawancara Dengan Masinis/*engineer* diatas Kapal:

1. Nama : Prayogo Suka Laksono

Jabatan : Masinis Satu

Pertanyaan :

1. Faktor-faktor apa saja yang menyebabkan tidak tercapainya suhu air pendingin?

Jawaban:

Yang menjadi faktor-faktor meningkatnya suhu air pendingin mesin *diesel generator* adalah diakibatkan karena adanya keausan pada sistem pompa yaitu keausan pada impeler dan keausan pada *bearing* , sehingga air yang masuk dan naik turunnya tekanan pada sirkulasi air tawar maupun air laut sangat berpengaruh dalam proses pendinginan mesin *diesel generator*. Karena jika sistem dalam kondisi tidak normal, maka banyaknya kalor yang diserap oleh media pendingin juga sedikit karena tekanan kurang. Sehingga akan terjadi penumpukan panas secara terus-menerus yang akhirnya akan mengakibatkan kerusakan pada material. Namun apabila sistem dalam kondisi normal, maka tekanan akan tinggi dan sirkulasi air pendingin akan cepat sehingga banyaknya kalor yang diserap oleh media pendingin juga besar, jika hal ini berlangsung lama maka suhu pada material yang didinginkan juga akan kecil.

2. Bagaimana cara merawat sistem air pendingin agar selalu bekerja secara baik guna mencapai suhu air pendingin yang normal?

Jawaban:

Masalah-masalah yang sering terjadi yang dapat mempengaruhi meningkatnya suhu air pendingin pada mesin *diesel* dikarenakan system pendingin air tawar yang bekerja kurang maksimal. Proses lancarnya/stabilnya suhu air pendingin yang bersirkulasi masuk ke mesin *diesel generator* memerlukan perawatan yang terencana guna mencapai

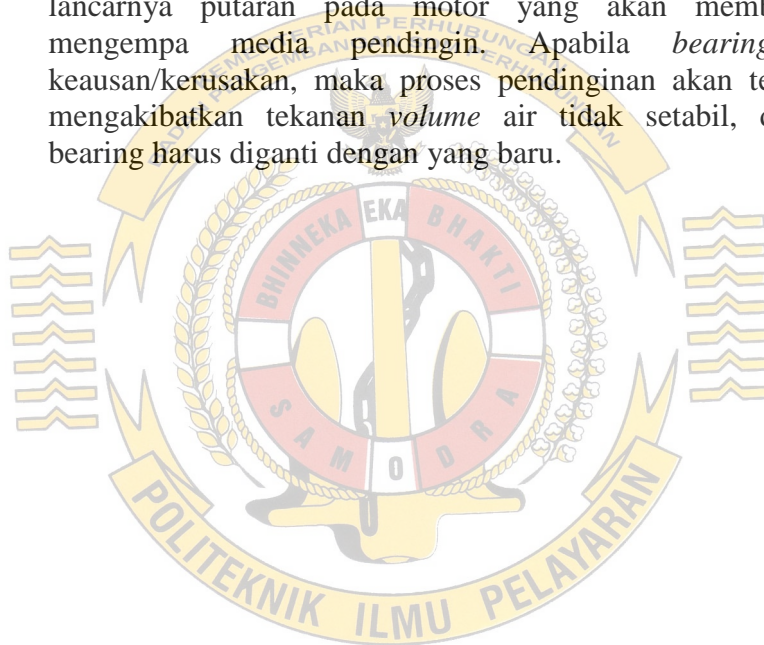
suhu normal air pendingin sesuai dengan jangka waktu yang ditentukan dengan instruksi manual book, maka dari itu diperlukan beberapa hal antara lain:

a. Penggantian *Impeler*

Pemakaian bahan/benda yang terlalu lama mengakibatkan bahan akan rapuh, aus dan akan mudah rusak karna lamanya pemakaian akibat gesekan yang terjadi terlalu sering, sehingga bahan pasti akan mengalami keausan dalam jangka waktu tertentu, jika kondisi pada *impeler* aus maka tekanan juga akan rendah karena ruang kempa tidak maksimal dan sebaiknya *impeler* harus diganti dengan yang baru.

b. Penggantian *Bearing*

Keausan pada *bearing*, hal ini berpengaruh juga terhadap tingginya suhu air pendingin, *bearing* tersebut berfungsi sebagai proses lancarnya putaran pada motor yang akan membantu *impeler* mengempakan media pendingin. Apabila *bearing* mengalami keausan/kerusakan, maka proses pendinginan akan terganggu yang mengakibatkan tekanan *volume* air tidak stabil, dan sebaiknya *bearing* harus diganti dengan yang baru.



## LAMPIRAN WAWANCARA

Dalam proses pengumpulan data-data skripsi dengan judul “Pengaruh perawatan sistem air pendingin terhadap kerja mesin *diesel generator* di MV. Naziha dengan metode *fishbone*”. Penulis mengambil metode pengumpulan data dengan cara wawancara kepada masinis/*engineer* di MV. Naziha. Adapun daftar wawancara yang penulis lakukan di atas kapal adalah sebagai berikut:

### A. Wawancara Dengan Masinis/*engineer* diatas Kapal:

1. Nama : Andik Supriyanto

Jabatan : Masinis Dua

Pertanyaan :

1. Bagaimana cara merawat sistem air pendingin agar selalu bekerja secara baik guna mencapai suhu air pendingin yang normal?

Jawaban:

Cara merawat sistem air pendingin agar selalu bekerja secara baik guna mencapai suhu air pendingin yang normal perlu dilakukan beberapa hal antara lain:

#### a. Pembersihan *Cooler*

Pembersihan *cooler* sangat penting karena proses pemindahan panas yang terjadi sangat berpengaruh, jika *cooler* kotor maka perpindahan panas yang terjadi tidak maksimal sehingga akan mempengaruhi terhadap proses pendinginan, maka pembersihan *cooler* harus dilakukan.

#### b. Pembersihan *Strainer*

Bila *strainer* kotor, tekan dan isapan pompa akan kecin karena adanya penyumbatan pada *straine* sehingga akan berakibat pada *cooler*, proses sistem perpindahan panas pada *cooler* akan terganggu, maka dari itu pembersihan pada *strainer* juga harus di dilakukan.

#### c. Pemeriksaan *Impeler*

Pemakaian bahan/benda yang terlalu lama mengakibatkan bahan akan rapuh, aus dan akan mudah rusak karna lamanya pemakaian akibat gesekan yang terjadi terlalu sering, sehingga bahan pasti akan mengalami keausan dalam jangka waktu tertentu, jika kondisi pada *impeler* aus maka tekanan juga akan rendah karena ruang kempa tidak maksimal dan sebaiknya *impeler* harus diganti dengan yang baru.

d. Pemeriksaan *Bearing*

Keausan pada *bearing*, hal ini berpengaruh juga terhadap tingginya suhu air pendingin, *bearing* tersebut berfungsi sebagai proses lancarnya putaran pada motor yang akan membantu *impeler* mengempa media pendingin. Apabila *bearing* mengalami keausan/kerusakan, maka proses pendinginan akan terganggu yang mengakibatkan tekanan *volume* air tidak stabil, dan sebaiknya *bearing* harus diganti dengan yang baru.





LAMPIRAN 19

Prepared and Issed by : Designated Person  
 Approved by : Managing Director  
 H.V. Nazila

SHIP BOARD MAINTANCE PLAN  
 (WORK PLAN)

Revision no : 00  
 Issued date :24th February/2010  
 last Issued date : N/A  
 Month of II,AY 2016

NO.	PMS No.	ITEM	DONE	ADVANCED	PENDING	REMARKS
1	1.15	Main Engine				
2	1.16	Cylinder liner No.5				O- Overhaul every 6500-8,000 hrs. Clean inspect, take measurement for liner & piston. Check piston ring/renew if required.
3	1.25	Piston No.5				
4	1.26	Piston No.6				
5	1.35	Cylinder cover No.5				E- C/S items to be carried by C/E S- Overhaul/open for class survey
6	1.36	Cylinder cover No.6				R- Replace with spare O/H one every 3,503hrs C- Check piston condition, renew if necessary
7	1.74	Exhaust valve No.4				C- check clean/cams/ata roller guide condition monthly. O- Complete overhaul Annually. renew O-ring and seal ring renew plunger & barrel if necessary. Check suction valve renew screw bolt & froiler with code 271, renew pin of roller guide
8	1.7.11	Exhaust valve actuator No.5				
9	1.81	Fuel injection pump No.1				C- lift out for cleaning testing and inspection at 2000hrs R- replace by spare O/H one every 4000hrs.
10	1.82	Fuel injection pump No.2				
11	1.83	Fuel injection pump No.3				
12	1.84	Fuel injection pump No.4				
13	1.85	Fuel injection pump No.5				
14	1.86	Fuel injection pump No.6				
15	1.91	Fuel injection valve No.1				
16	1.92	Fuel injection valve No.2				
17	1.96	Fuel injection valve No.6				
18	1.10	start air system				D- drain water from air regulator/control air reservoir C- Check air filter/strainer/indicator and air leaking etc O- Open, check/agrease, rene wparts if necessary
19	1.11	Manoeuvring system				
20	1.115	Reversing air cylinder No.5				O- Move out for thorough clean& inspection at 6000hrs C- Clean & inspect liner/piston with rings at 1000hrs
21	1.116	Reversing air cylinder No.6				R- Take standard record at good weather conditions L- LO sample bind to analys every 6-8 months
22	1.13.1	litter cooler air side				
23	1.15.1	Scavenge chamber				
24	1.20	Engine performance				
25	1.24	stem tube L O				
26	2.1	Aux Engine				
27	2.2	Aux engine No.1				O- Major overhaul every 8000hrs O- Major overhaul every 8000hrs
28	2.2.1	Crank shaft Defection measure				Measure De defaction
29	2.3	Emerg. Genl. Engine				O- Overhaul at 5001 hrs.S-survey, W-test weekly
30	3.1	Aux Boiler				
31	3.4	Oil fired boiler				W- check oil burner weekly. S-Clean&Survey at dock M- monthly function test
32	3.5	water level float/roo (ovabam) test				C- checking condition inside the chamber
33	3.6	combustion chamber inspection				T-test boiler water every 2 days/ B-dn down every day
34	4.1	boiler water analysis/bn down				
35	4.2	Air Compressor				O- O/H every year. C-Check crankcase every month O- O/H every year. C-Check crankcase every month
36	4.2.2	Air compressor No.1				R- renew every 3 month
		Air compressor No.2				
		crankcase oil				

GLS

Sumber : Ship board maintance plan engine room