

**KEMENTERIAN PERHUBUNGAN
BADAN PENGEMBANGAN SDM PERHUBUNGAN
SEKOLAH TINGGI ILMU PELAYARAN**



MAKALAH

**OPTIMALISASI KEGIATAN *BUNKERING* MFO
(*MARINE FUEL OIL*) DARI MT. FRONTEK
KE KAPAL LAIN DI PERAIRAN SINGAPURA**

Oleh :

HARYOKO
NIS. 02860/N-1

PROGRAM PENDIDIKAN DIKLAT PELAUT - 1

JAKARTA

2023

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**Diajukan Guna Memenuhi Persyaratan
Untuk Menyelesaikan Program ANT - I**

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LAIN DI PERAIRAN SINGAPURA

Jakarta, Mei 2023

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KATA PENGANTAR

Dengan memanjatkan puja dan puji syukur kehadirat Allah SWT. Karena atas berkat rahmat, taufik dan hidayah-Nya sehingga dapat menyelesaikan makalah ini tepat pada waktunya dan sesuai dengan yang diharapkan. Adapun penyusunan makalah ini guna memenuhi persyaratan penyelesaian Program Diklat Pelaut Ahli Nautika Tingkat I (ANT - I) pada Sekolah Tinggi Ilmu Pelayaran (STIP) Jakarta.

Pada penulisan makalah ini penulis tertarik untuk menyoroti atau membahas tentang keselamatan kerja dan mengambil judul :

“OPTIMALISASI KEGIATAN BUNKERING MFO (*MARINE FUEL OIL*) DARI MT. FRONTEK KE KAPAL LAIN DI PERAIRAN SINGAPURA”

Tujuan penulisan makalah ini adalah untuk memenuhi salah satu persyaratan yang wajib dilaksanakan oleh setiap perwira siswa dalam menyelesaikan pendidikan di Sekolah Tinggi Ilmu Pelayaran (STIP) Jakarta pada jenjang terakhir pendidikan.

Makalah ini diselesaikan berdasarkan pengalaman bekerja penulis sebagai Perwira di atas kapal ditambah pengalaman lain yang penulis dapatkan dari buku-buku dan literatur. Penulis menyadari bahwa makalah ini jauh dari kesempurnaan Hal ini disebabkan oleh keterbatasan-keterbatasan yang ada Ilmu pengetahuan, data-data, buku-buku, materi serta tata bahasa yang penulis miliki.

Dalam kesempatan yang baik ini pula, penulis menyampaikan ucapan terima kasih yang tak terhingga disertai dengan doa kepada Allah Tuhan Yang Maha Kuasa untuk semua pihak yang turut membantu hingga terselesainya penulisan makalah ini, terutama kepada Yang Terhormat:

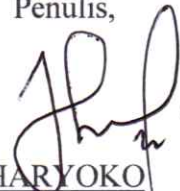
1. H. Ahmad Wahid, S.T.,M.Mar.E., selaku Ketua Sekolah Tinggi Ilmu Pelayaran (STIP) Jakarta.
2. Ibu Meilinasari N H, S.SiT., M.MTr, selaku Ketua Jurusan Nautika Sekolah Tinggi Ilmu Pelayaran Jakarta.
3. Capt. Suhartini, S.SiT.,M.M.,M.MTr, selaku Kepala Divisi Pengembangan Usaha Sekolah tinggi Ilmu Pelayaran (STIP) Jakarta.

4. Bapak Dr. April Gunawan Malau, MM sebagai Dosen Pembimbing I atas seluruh waktu yang diluangkan untuk penulis serta materi, ide/gagasan dan moril hingga terselesaikan makalah ini.
5. Capt. Sajim Budi Setiawan, MM sebagai Dosen Pembimbing II atas seluruh waktu yang diluangkan untuk penulis serta materi, ide/gagasan dan moril hingga terselesaikan makalah ini.
6. Para Dosen Pengajar STIP Jakarta yang secara langsung ataupun tidak langsung yang telah memberikan bantuan dan petunjuknya.
7. Istri tercinta yang membantu atas doa dan dukungan selama pembuatan makalah.
8. Anak tersayang yang telah memberikan semangat selama pengerjaan makalah.
9. Orang tua tercinta yang membantu atas doa dan dukungan selama pembuatan makalah.
10. Semua rekan-rekan Pasis Ahli Nautika Tingkat I Angkatan LXVI tahun ajaran 2023 yang telah memberikan bimbingan, sumbangsih dan saran baik secara materil maupun moril sehingga makalah ini akhirnya dapat terselesaikan.

Akhir kata penulis mengharapkan semoga makalah ini dapat bermanfaat bagi penulis sendiri maupun pihak-pihak yang membaca dan membutuhkan makalah ini terutama dari kalangan Akademis Sekolah Tinggi Ilmu Pelayaran (STIP) Jakarta.

Jakarta, Mei 2023

Penulis,



HARYOKO

NIS. 02860/N-1

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BAB I

PENDAHULUAN

A. LATAR BELAKANG

Dewasa ini sarana transportasi laut masih memegang peranan yang sangat penting dalam proses perdagangan atau pengiriman barang dari satu tempat ke tempat yang lainnya dengan menggunakan kapal karena dinilai lebih efisien dan efektif. Seiring dengan majunya bisnis di bidang perkapalan tersebut, maka dibutuhkan sarana untuk menunjang semuanya itu. Kebutuhan yang paling mendasar untuk menggerakkan moda transportasi tersebut adalah bahan bakar seperti *Marine Fuel Oil* (MFO).

MFO merupakan salah satu produk minyak sebagai bahan bakar kapal. Oleh sebab itu kapal *bunker* yang menyuplai bahan bakar kapal memegang peranan penting didalam menunjang kelancaran transportasi laut. Kapal *bunker* tampil dengan menunjukkan peranannya yang cukup dominan didalam menyuply bahan bakar kapal di wilayah perairan Singapura. Kapal - kapal *bunker* dirancang sama dengan kapal *tanker* pada umumnya dari segi perlengkapan navigasi maupun alat- alat penunjang keselamatan. Akan tetapi kapal *bunker* dilengkapi alat bantu yang dapat mendukung dalam pengoperasian *bunkering* ke kapal lain. Singapura sebagai pelabuhan transit dan pelabuhan yang sangat sibuk dalam kegiatan pelayaraan, sekaligus sebagai negara transit untuk pengisian bahan bakar kapal.

Kendala - kendala yang dapat menghambat kegiatan *bunkering* MFO di Singapura adalah informasi waktu kedatangan kapal yang akan *dibunkeri* atau ETA (*Estimate Time Arrival*) dan informasi lokasi kapal yang akan di *bunker* tidak sesuai dengan jadwal yang diberikan agen atau *programmer* kapal. Pada tanggal 17 December 2022 pukul 06.00Hrs MT. Frontek menerima *order* dari *programmer* untuk *bunker* kapal, ETA (*Estimate Time Arrival*) kapal penerima

(*receiving vessel*) pada pukul 20.00Hrs dengan lokasi AESPA (*Eastern Special Purpose Anchorage*). Setelah MT. Frontek mendekati area bunker yang telah disepakati yaitu AESPA (*Eastern Special Purpose Anchorage*) dan melakukan laporan kepada *east control* dalam perijinan kegiatan *bunker*, informasi yang didapat dari *east control* ternyata kapal penerima *bunker* belum tiba di Singapura.

Hal lain yang dapat menghambat pelaksanaan *bunkering* adalah kurangnya perawatan peralatan *bunker*. Kurangnya dari perawatan peralatan *bunker* dapat mengakibatkan terjadinya keterlambatan pada saat proses pelaksanaan *bunker* (*statement of fact* lihat pada lampiran 1), perawatan peralatan *bunker* yang baik dapat mengoptimalkan kegiatan *bunker* ke kapal lain, Berdasarkan latar belakang kejadian yang pernah terjadi di MT. Frontek, maka saya tertarik untuk mengangkat dan membahas judul **“OPTIMALISASI KEGIATAN *BUNKERING* MFO (*MARINE FUEL OIL*) DARI MT. FRONTEK KE KAPAL LAIN DI PERAIRAN SINGAPURA”**.

B. IDENTIFIKASI MASALAH

Berdasarkan latar belakang di atas, maka penulis dapat mengidentifikasi beberapa masalah sebagai berikut:

1. Terjadinya keterlambatan dalam proses *bunkering* MFO (*Marine Fuel Oil*) dari MT. Frontek ke kapal lain.
2. Terjadinya kerusakan peralatan *bunker* pada saat proses pelaksanaan *bunker*.
3. Masih rendahnya keterampilan Anak Buah Kapal dalam pelaksanaan *bunker*.
4. Waktu tiba ETA (*Estimate Time of Arrival*) kapal penerima *bunker* yang tidak sesuai dengan jadwal yang diberikan oleh agen.
5. Kurangnya komunikasi dan koordinasi pada saat pelaksanaan *bunker*.
6. Padatnya jadwal *bunker* dari *company*.
7. Kurangnya dukungan *spare part* dari *company*.
8. Terjadinya cuaca buruk dalam pelaksanaan proses *bunker*.

C. BATASAN MASALAH

Mengingat bahwa pelaksanaan *bunkering* dapat menyangkut hal yang sangat luas dan harus dibahas dalam waktu yang relatif singkat dan terbatas dan agar pembahasan tetap fokus dan tidak melebar, maka sesuai dengan judul diatas maka penulis membatasi ruang lingkup bahasan yaitu pada :

1. Waktu tiba ETA (*Estimate Time of Arrival*) kapal penerima *bunker* yang tidak sesuai dengan jadwal yang diberikan oleh agen.
2. Terjadinya kerusakan peralatan *bunker* pada saat proses pelaksanaan *bunker*.

D. RUMUSAN MASALAH

Berdasarkan uraian pada batasan masalah diatas, maka untuk mempermudah dalam mencari pemecahan masalahnya penulis merumuskan pembahasan pada makalah ini sebagai berikut:

1. Mengapa waktu tiba ETA (*Estimate Time of Arrival*) kapal penerima *bunker* tidak sesuai dengan jadwal yang diberikan oleh agen ?
2. Mengapa kerusakan peralatan *bunker* pada saat proses pelaksanaan *bunker* masih terjadi ?

E. TUJUAN DAN MANFAAT PENELITIAN

1. Tujuan Penelitian

- a. Untuk mengetahui dan menganalisis mengapa waktu tiba ETA (*Estimate Time Arrival*) kapal penerima *bunker* tidak sesuai dengan jadwal yang diberikan oleh agen.
- b. Untuk mengetahui dan menganalisis mengapa masih terjadi kerusakan peralatan *bunker* pada saat proses pelaksanaan *bunker*.
- c. Untuk memenuhi salah satu persyaratan yang wajib dilaksanakan oleh setiap perwira siswa ANT I dalam menyelesaikan pendidikan di Sekolah Tinggi Ilmu Pelayaran (STIP) Jakarta pada jenjang terakhir pendidikan

2. Manfaat Penelitian

a. Secara Teoritis

Diharapkan dapat memperkaya pengetahuan bagi penulis khususnya dan bagi teman-teman satu profesi pada umumnya. Sebagai tambahan

rujukan dan bacaan ilmiah untuk memperkaya pengetahuan khususnya yang menyangkut pelaksanaan *bunkering* MFO (*Marine Fuel Oil*) dari MT. Frontek ke kapal lain.

b. Secara Praktis

Sebagai panduan dan pedoman praktis bagi ABK dalam menjalankan tugas dan tanggung jawabnya saat melakukan kegiatan *bunkering* MFO (*Marine Fuel Oil*) dari MT. Frontek ke kapal lain.

F. SISTEMATIKA PENULISAN

Penulisan makalah ini disajikan sesuai dengan sistematika penulisan makalah yang telah ditetapkan dalam buku pedoman penulisan makalah yang dianjurkan oleh STIP Jakarta. Dengan sistematika yang ada maka diharapkan untuk mempermudah penulisan makalah ini secara benar dan terperinci. Makalah ini terbagi dalam 4 (empat) bab sesuai dengan urutan penelitian ini. Adapun sistematika penulisan makalah ini adalah sebagai berikut:

BAB I PENDAHULUAN

Berisikan pendahuluan yang mengutarakan latar belakang dalam upaya pelayanan kapal *bunker*, identifikasi masalah yang terjadi di MT. Frontek, batasan masalah, rumusan masalah, tujuan dan manfaat penulisan, serta sistematika penulisan.

BAB II LANDASAN TEORI

Berisikan teori-teori yang digunakan untuk menganalisa data-data yang didapat melalui buku-buku sebagai referensi untuk mendapatkan informasi dan juga sebagai tinjauan pustaka. Pada landasan teori ini juga terdapat kerangka pemikiran yang merupakan model konseptual tentang bagaimana teori berhubungan dengan berbagai faktor yang telah diidentifikasi sebagai masalah yang penting.

BAB III ANALISIS DAN PEMBAHASAN

Data yang diambil dari lapangan berupa fakta-fakta berdasarkan pengalaman penulis selama bekerja di MT. Frontek. Dengan digambarkan dalam deskripsi data, kemudian dianalisis mengenai permasalahan yang terjadi dan menjabarkan pemecahan dari

permasalahan tersebut sehingga permasalahan yang sama tidak terjadi lagi dengan kata lain menawarkan solusi terhadap penyelesaian masalah tersebut.

BAB IV KESIMPULAN DAN SARAN

Berisikan penutup yang mengemukakan kesimpulan dari perumusan masalah yang dibahas dan saran yang berasal dari evaluasi pemecahan masalah yang dibahas didalam penulisan makalah ini dan merupakan masukan untuk perbaikan yang akan dicapai.

BAB II

LANDASAN TEORI

A. TINJAUAN PUSTAKA

Untuk mempermudah pemahaman dalam makalah ini, maka penulis membuat tinjauan pustaka yang akan memaparkan definisi-definisi, istilah-istilah dan teori-teori yang terkait dan mendukung pembahasan pada makalah ini. Adapun beberapa sumber yang oleh penulis dijadikan sebagai landasan teori dalam penyusunan makalah ini adalah sebagai berikut:

1. Pengertian Optimalisasi, Komunikasi dan Koordinasi

Menurut Kamus Besar Bahasa Indonesia (KBBI) (2018:1174) optimalisasi berasal dari kata optimal yang artinya terbaik atau tertinggi. Mengoptimalkan berarti menjadi paling baik atau paling tinggi. Sedangkan optimalisasi yaitu sebuah proses mengoptimalkan sesuatu, dengan kata lain bahwa proses menjadikan sesuatu menjadi paling baik atau paling tinggi. Jadi optimalisasi adalah suatu proses mengoptimalkan sesuatu atau proses menjadikan sesuatu menjadi lebih baik atau paling baik.

Pengertian dari optimalisasi dari Darmanto (2016), menurut Hysocc bahwa optimalisasi yaitu sebuah proses untuk mencapai hasil yang ideal atau optimasi (nilai efektif yang dapat dicapai). Optimasi dapat diartikan sebagai suatu bentuk mengoptimalkan sesuatu hal yang sudah ada atau pun merancang dan membuat sesuatu secara optimal. Dengan demikian, optimalisasi adalah upaya, proses, metode dan tindakan untuk menggunakan suatu sumber daya dalam mencapai kondisi yang terbaik sangat menguntungkan dan paling diinginkan dalam kisaran tertentu dengan beberapa kriteria yang ada.

Koordinasi menurut Ndraha dalam bukunya yang berjudul *Kybernology* (2003:291): Koordinasi dapat didefinisikan sebagai proses penyepakatan bersama secara mengikat berbagai kegiatan atau unsur yang berbeda-beda sedemikian rupa sehingga di sisi yang satu semua kegiatan atau

unsur itu terarah pada pencapaian suatu tujuan yang telah ditetapkan dan di sisi lain keberhasilan yang satu tidak merusak keberhasilan yang lain.

Pengertian komunikasi menurut KBBI online <https://kbbi.web.id/komunikasi> komunikasi adalah pengiriman dan penerimaan pesan atau berita antara dua orang atau lebih sehingga pesan yang dimaksud dapat dipahami.

2. Perawatan dan *Plan Maintenance System (PMS)*

Menurut Lindley R. Higgs and Keith Mobley (2017:33) dalam *Maintenance engineering handbook, sixth edition*, Perawatan adalah suatu kegiatan yang dilakukan secara berulang-ulang dengan tujuan agar peralatan selalu memiliki kondisi yang sama dengan keadaan awalnya. *Maintenance* atau Perawatan juga dilakukan untuk menjaga agar peralatan tetap berada dalam kondisi yang dapat diterima oleh penggunanya. *Plan Maintenance System (PMS)* adalah sistem perawatan kapal yang dilakukan secara terus menerus atau berkesinambungan terhadap peralatan dan perlengkapan agar kapal selalu dalam keadaan laik laut dan siap operasi.

3. *Bunkering*

a. Definisi

Menurut Energia, (2017:12) bahwa *bunkering* adalah proses memasukkan dan mengeluarkan *cargo* yang digunakan entah untuk digunakan sendiri maupun *cargo* yang ditransportasikan. Kegiatan monitoring aktivitas *loading / unloading cargo* dan *bunkering* dengan melibatkan *independent surveyor* yang kompeten dan profesional dilakukan untuk mendorong proses *bunkering* yang transparan dan memberikan rekomendasi solusi tindak lanjut bilamana terjadi perbedaan antara pengiriman dan penerimaan *bunker*. Menurut Kluijven (2015:04) bahwa *bunker* adalah mensuplai kapal dengan bahan bakar, minyak lumas, air yang dapat diangkut, yang biasa dilakukan di pelabuhan. *Bunker* biasanya dilakukan di pelabuhan atau di tempat berlabuh jangkar. *Bunker* paling efektif dilakukan dengan metode *ship to ship* saat kapal berlabuh jangkar untuk menghemat waktu dan biaya karena kapal tidak harus membayar biaya pelabuhan.

b. *Standard Operating Procedure (SOP)*

Mengacu pada peraturan standar *bunker* di Singapura SS600:2022 *Bunker delivery processes, roles and responsibilities* sebagai berikut :

1) General

This clause aims to clearly define the bunker delivery processes, roles and responsibilities at each stage of the bunkering operation. This comprises pre-bunker delivery, during bunker delivery and post-bunker delivery activities.

2) Pre-bunker delivery

- a) *Prior to the commencement of the bunker delivery, a pre-delivery conference shall be conducted between the representatives of the bunker tanker, vessel and bunker surveyor.*
- b) *Health, safety, environmental and effective communications shall be pre agreed between the bunker tanker and vessel.*
- c) *The cargo officer shall invite the chief engineer and bunker surveyor to witness the opening gauge (meter reading) and the taking of cargo temperature of all the cargo tanks of the bunker tanker.*
- d) *When the declaration of arrival stock remaining on board is through the stock movement logbook, this shall be made available to the chief engineer and bunker surveyor.*
- e) *If more than one grade of bunker(s) is to be supplied, the cargo officer shall indicate on the bunker requisition form the order in which the grades are to be supplied.*
- f) *When delivering different grades of products from the same bunker tanker, the bunker tanker shall ensure that there is no contamination of the different grades of products.*

3) Miscellaneous requirements for bunker surveyor

- a) *The bunker surveyor should arrive on board the bunker tanker in good time so as to complete the opening checks on board the bunker tanker*
- b) *On boarding the vessel, the bunker surveyor shall identify himself by producing a valid bunker surveyor licence for examination by the bunker tanker representative.*
- c) *The bunker surveyor shall record the time of all relevant events related to the entire bunkering operation in the bunker surveyor's time log until their return to base.*

- d) *The times shall be neatly recorded in the survey time-log.*
- e) *Abnormal events shall be stated in a statement of fact as set out, a copy of which shall be submitted to the implementing authority.*

4) *During bunker delivery*

- a) *During the entire bunkering operation, no other bunker tanker shall be allowed to come alongside the bunker tanker delivering bunker(s) to the vessel, unless two different products are to be delivered to the vessel simultaneously.*
- b) *It shall be the chief engineer's responsibility to prepare the vessel for receiving bunker(s), including removal of the blank flange(s) from the vessel's bunker manifold(s).*
- c) *Once the pre-delivery requirements have been completed and bunker hose(s) has/have been properly connected, the bunkering operation shall commence after confirmation by the chief engineer.*
- d) *A crew member appointed by the chief engineer of the vessel and a crew member appointed by the cargo officer of the bunker tanker shall oversee the safety of the respective areas of responsibility for the entire bunkering operation.*
- e) *Communication between the bunker tanker and the vessel shall be maintained throughout the entire bunkering operation.*
- f) *The cargo officer shall ensure that the agreed maximum pumping rate is not exceeded by bunker tanker.*
- g) *When an order to stop pumping is given by the vessel, the bunker tanker shall stop the pumping immediately.*
- h) *All stoppages and reasons for doing so shall be properly documented.*
- i) *Stripping of bunker tanks if agreed and line clearing of bunker hose(s) shall only be carried out at the end of the pumping operation.*
- j) *The procedures for stripping and line clearing the bunker hose(s) are as follows:*

- (1) *The cargo officer shall notify the chief engineer and bunker surveyor prior to the commencement of the stripping and line clearing operations.*
- (2) *The chief engineer and bunker surveyor should gauge the received amount prior to the stripping and line clearing operations, where applicable.*
- (3) *The cargo officer shall close the discharge valve after the pump 'and build up the pressure in the pipeline by using the bunker tanker's pump.*
- (4) *Once the pressure is built up, the cargo officer shall open the discharge valve for the remaining bunker(s) in the bunker hose(s) to be cleared into the vessel's tank.*
- k) *No air compressors or air bottles shall be used by the bunker tanker for the line clearing process.*
- l) *The line clearing process shall not be carried out more than twice after the completion of the pumping operation.*
- m) *Once the line clearing process is completed, the residue contents in the hose(s) shall be drained back into the bunker tanker before the final gauging is taken.*
- n) *No re-pumping of bunkers shall be allowed, and post-delivery checks and documentation shall commence.*

5) *Post-bunker delivery*

- a) *On completion of the bunkering operation, the closing gauge shall only be conducted upon . confirmation from the cargo officer that the bunkering operation is completed and that the cargo pumping operation has stopped.*
- b) *The cargo officer/bunker surveyor shall invite the chief engineer to witness the closing gauge and the cargo temperatures of all cargo tanks of the bunker tanker.*
- c) *The chief engineer should witness the tank gauging of all the cargo tanks on the bunker tanker after completion of the bunker delivery.*
- d) *The cargo officer and chief engineer, together with the bunker surveyor shall carry out the following checks:*

- (1) *Gauging and inspection of contents of all the non-cargo tanks and spaces as in the General Arrangement (GA) plan of the bunker tanker only during a quantity dispute. Gauged readings shall be recorded in the non-cargo tank declaration/inspection form.*
- (2) *Gauging of all nominated and non-nominated cargo tanks.*
- (3) *The temperatures of the bunker in the nominated and non-nominated tanks shall be determined by using a calibrated thermometer. If the tank temperature cannot be measured due to any reason, or where a remote temperature instrument is used, it shall be clearly recorded in the bunker tanker measurement report.*
- (4) *Free water checks shall be taken by using water-indicating paste.*
- (5) *Any free water detected shall be recorded and highlighted to the chief engineer and in the survey report.*
- (6) *The free water detected shall be deducted for the GSV calculations.*
- (7) *In the event of traces of water found in the oil as a result of the water-cut exercise conducted, the result thereof shall be recorded. .*
- (8) *The zero-dip volume of the tank(s), shall be included in the bunker tanker calculations.*
- e) *The cargo officer and bunker surveyor shall carry out the gauging procedure.*
- f) *Gauged readings and temperature measurements shall be recorded in the gauging ticket, bunker tanker measurement report and non-cargo tank declaration/inspection form.*
- g) *Any non-conformance with the procedure(s) shall be recorded in a statement of fact.*
- 6) **Verification of delivered quantity**
 - a) *Quantity determination shall be based on bunker tanker measurement and shall be final and binding.*

- b) *The quantity measurement, determination processes and procedures for the bunker tanker and vessel.*
- c) *The bunker tanker's certified tank calibration tables shall be made available by the cargo officer.*
- d) *The bunker tanker shall only carry its latest certified tank calibration tables, an identical copy of which has been deposited with the implementing authority.*
- e) *The cargo officer shall allow the chief engineer and/or and bunker surveyor to make photocopies of the relevant pages of the latest certified tank calibration tables, when requested.*
- f) *Vessel measurements shall be used for reference purposes only.*
- g) *The delivered quantity shall be based on the bunker tanker's tank gauging and calculations as witnessed by the cargo officer, bunker surveyor and the chief engineer.*
- h) *The calculations shall be based on the opening and closing gauges of the bunker tanker's tanks and the cargo temperatures as witnessed by the cargo officer, chief engineer and bunker surveyor.*
- i) *Bunker calculations shall be carried out independently by the responsible parties and/or their authorised representatives.*
- j) *Bunker surveyors shall not adjust quantity figures as measured during a survey on the bunker tanker and vessel. This shall apply even if a commercial settlement is subsequently reached between the buyer and seller.*
- k) *The chief engineer and bunker surveyor shall verify the delivered quantity as stated in the BDN*
- (1) *Upon completion of delivery, the bunker tanker's cargo officer shall complete and issue the following documents which are signed by the cargo officer and chief engineer:*
- (2) *BDN and Bunker tanker measurement report in conjunction with the closing gauge and the recording of the cargo temperature of every tank or volumetric meter delivery report and Non-cargo tank declaration/inspection form.*

7) End of bunkering

The end of the bunkering operation shall be when the work process are fulfilled. A BDN shall be issued for the bunker delivery together with the respective representative samples drawn and the seal numbers recorded in the BDN.

8) Disputes

a) General

Shipowners/buyers and bunker suppliers should incorporate an arbitration clause into the contract for the supply of bunkers in order to facilitate the settlement of any dispute arising from bunker deliveries..

b) Quantity dispute

The chief engineer and bunker surveyor shall be allowed to inspect, gauge and verify all noncargo tanks on the bunker tanker and the cargo officer shall record and complete Part II of the noncargo tank declaration/inspection form.

c) *If the chief engineer declines to witness, the cargo officer shall record it in the note of protest and the bunker surveyor shall record this in the statement of fact..*

d) *The chief engineer and the bunker surveyor shall carry out the following:*

- (1) Use a fresh gauging ticket for every re-check of the measurements.*
- (2) Re-check the reference heights and tank gauging of all tanks.*
- (3) Re-check the reference heights and tank gauging of all nominated, non-nominated and the non cargo tanks of the bunker tanker.*
- (4) Re-check the tank calibration tables of both the bunker tanker and the receiving vessel to confirm that all physical measurements correspond to those in the calibration tables.*

- (5) *Re-check all calculation and figures used for quantity determination of both the bunker tanker and the receiving vessel.*
 - (6) *Confirm that all relevant tanks and lines have not been modified from that as stated in the tank capacity plan and piping diagram.*
 - (7) *Obtain and examine photocopies of the relevant pages of the bunker tanker's stock movement logbook, where applicable, showing all the stock movements related to the bunker delivery.*
 - (8) *Obtain and examine the relevant pages of the receiving vessel's engine logbook and onboard records.*
 - (9) *Investigate and determine the pipeline content of both the bunker tanker and the receiving vessel including any possible leakage point(s) e.g., bilge well, pump-room space etc. Where applicable, the draining back of the lines should be carried out and shown to the chief engineer and the bunker surveyor.*
 - (10) *Obtain photocopy of the relevant pages of the bunker tanker calibration tables for reference and verify with the implementing authority that the tank calibration tables used, are the latest certified copies.*
 - (11) *Examine and obtain copies of the last certificate of quantity or Bill of Lading by the cargo provider (terminal or vessel), and the bunker tanker measurement report as issued at the terminal or vessel.*
 - (12) *If any of the preceding steps are disallowed, the reasons shall be recorded in the statement of fact by the bunker surveyor or a note of protest shall be issued by the chief engineer or the cargo officer.*
- e) *The bunker surveyor shall record all the relevant details and findings of the dispute in a statement of fact. This document should be completed and acknowledged by the chief engineer and/or cargo officer.*

- f) *If the dispute remains unresolved, the chief engineer shall raise a note of protest. The note of protest shall be signed and stamped by both parties.*
- g) *The cargo officer of the bunker tanker should also raise a note of protest if the cargo officer disagrees with the alleged shortage.*
- h) *A copy each of the notes of protest raised by the bunker tanker and the vessel, together with a copy of the BDN, shall be sent to the "Executive Director, Singapore Shipping Association" and the implementing authority kept informed within 14 days after the bunker delivery.*

9) *Quality dispute*

- a) *In the event of any dispute with respect to the quality of bunker(s) delivered, the vessel/buyer should tender a complaint in writing to the bunker supplier within 30 days (or such extended period as may be agreed between the parties) after the bunker delivery.*
- b) *A copy of the complaint with a copy of the BDN should simultaneously be lodged with the "Executive Director, Singapore Shipping Association" and the implementing authority kept informed.*
- c) *The parties shall have the quality of the mutually agreed sample analysed in accordance with ISO 8217 by a mutually agreed, independent testing laboratory. The laboratory and tests conducted shall be accredited to ISO/IEC 17025 under the national accreditation body. For any grade of bunkers other than the categories specified by ISO 8217, the quality shall comply with the bunker specifications as agreed by the bunker supplier and the buyer prior to the bunkering operation.*

Berpedoman kepada SMM (*Safety Management Manual*) Chapter 4 – *Cargo operation* (2022) dari perusahaan di tempat penulis bekerja mengenai standar operasional prosedur teknis *bunker* sebagai berikut:

- (1) *Confirm (as instructed by the cargo officer) that correct line set up is set for cargo tank to discharge.*
- (2) *Confirm through communications that receiving ship is ready*

to load into their tanks.

- (3) *Open own ship manifold valves.*
- (4) *Commence at the agreed safety checklist initial loading rate.*
- (5) *When confirmed by communications to increase the rate, gradually increase pump rpm to the maximum requested rate.*
- (6) *When communications receive to reduce to the agreed topping off rate, gradually reduce the pump rpm to suit the pumping rate.*
- (7) *Stripping with main cargo pump*

When the sounding is about 20cm open the stripping valve and gradually close the main valve.

- (8) *Stripping with stripping pump*

When the sounding is about 20cm open the stripping valve, start the stripping pump and gradually close the main valve and stop the main pump

- (9) *When completed discharge and blow through (**MFM fitted ships do not require blow through lines**) close the manifold valve and notify other ship.*
- (10) *Make sure own hose blank flange is fully and securely bolted before hoisting back to own ship. Confirm by sighting,*
 - a) *All cargo line valves (on deck and in the pump room) are closed (tied over valve handle)*
 - b) *All cargo tank covers including sighting ports are fully bolted down*
 - c) *All cargo tank sounding pipes are securely closed.*

4. Marine Fuel Oil (MFO)

Marine Fuel Oil (MFO) adalah bahan bakar minyak yang digunakan untuk pembakaran langsung di dapur industri dan pemakaian lainnya seperti untuk Marine Fuel Oil. MFO merupakan bahan bakar minyak yang bukan termasuk jenis distillate tetapi masuk jenis residue yang lebih kental pada suhu kamar serta berwarna hitam pekat MFO memiliki tingkat kekentalan yang tinggi dibandingkan minyak diesel. Pemakaian minyak bakar ini umumnya untuk pembakaran langsung pada industri besar dan digunakan sebagai bahan bakar untuk steam power station. Selain itu bahan bakar MFO juga dipakai

sebagian besar untuk bahan bakar mesin kapal. Dilihat dari segi ekonomi penggunaan minyak bakar ini dinilai lebih murah (Poeswanto dan Ahmad Yani, 2015:35).

5. Ship to Ship (STS)

Menurut SOLAS Consolidated (2014:354), menyatakan bahwa, “*Ship to ship activity means any activity not related to a port facility that involves the transfer of goods or person from one ship to another*”. Dalam ISGOTT (International Safety Guide for Oil Tanker and Terminals) Sixth edition 2020 (Chapter 12:249) *in STS Transfer both tankers should comply fully with safety precautions for normal operations. If either ship not observing the precautions should not start or should be stopped if in progress. STS transfer in port or at sea should be approve by the port or local marine authority in accordance with Marpol regulations. STS transfer alongside a berth may include a simultaneous cargo transfer to shore as well as between the participating tankers. This operation should be risk assessed taking into account applicable limiting condition for operation alongside terminals and include as minimum the following:*

- a. *Local port/coastal authority and regulatory approvals.*
- b. *Use of lightering and the PIC of operations*
- c. *SIMOPS consideration (see section 4.6)*
- d. *Number of crew their competency and experience.*
- e. *Enviromental sensitivity of location*
- f. *Metoccean condition weather, waves and swell, current and tide etc.*
- g. *Communications*
- h. *Terminal or port requirements*
- i. *Notifications.*

In ship to barge or barge to ship transfer of hydrocarbon only authorized and properly equipped should be used. Precaution similar to those in ICS/SIGTTO/CDI/OCIMF's ship to ship transfer guide for petroleum, chemical and liquefied gases should be followed. If the barge or tanker are not observing the precaution the operation should not star or should be stopped if in progrees. Ship master should be aware that barge crews may not be familiar with the requirement of the ship to ship transfer guide for petroleum, chemical

and liquefied gases. The pumping rate from ship to barge should be controlled according to the size and nature of the barge, particularly if the freeboard difference is large. In any case, the barge crew should allow for sufficient space in tanks for hose contents to be transfer upon cargo completion. An agreed method of communication should be established and maintained throughout the duration of operations. Arrangement should be made to release the barge in an emergency, accounting for nearby of properly. If the tanker is anchor the barge may drop anchor clear of the tanker. It can remain secure there waiting for assistance. A barge should be cleared from the ship's side as soon as possible after it has finished loading or dishcarging volatile petroleum.

6. Proses Bunkering

a. Persiapan sebelum pengoperasian kegiatan bongkar *Marine Fuel Oil (MFO)* ke kapal lain

- 1) Menyiapkan tali temali dalam kegiatan kapal sandar di kapal lain atau ship to ship maupun di pelabuhan.
- 2) Setelah kegiatan sandar selesai maka dilanjutkan dengan mempersiapkan peralatan – peralatan keselamatan dalam kegiatan bongkar muat seperti, Radio komunikasi, SOPEP (*Shipboard Oil Pollution Emergency Plan*), alat - alat pemadam kebakaran, *scupper plugs* dan lainnya.
- 3) Proses pemasangan *cargo hose* atau selang muatan.
- 4) Mempersiapkan dokumen – dokumen yang diperlukan seperti :
 - a) *Pre delivery safety checklist*
 - b) *Bunker requisition form*
 - c) *Inspection form*
 - d) *Ship to ship safety check list / ship to shore safety check list and BDN (Bunker Delivery Note)*
- 2) Mempersiapkan tanki muatan yang akan di bongkar dan kran kran serta pompa cargo yang akan di pakai dalam kegiatan bongkar muatan.

b. Prosedur saat proses pengisian bahan bakar minyak MFO ke kapal lain

- 1) Pihak kapal bunker dan kapal penerima *bunker* menyaksikan pengambilan *sample* MFO yang akan di *supply* kan.
- 2) Memonitor bagian sambungan pada *manifold* atau sambungan dari *cargo hose* untuk memastikan tidak adanya kebocoran minyak.

- 3) Melakukan pengecekan pada *mooring ropes* agar bias dilihat kekencangan dan kekendorannya saat kapal sudah sandar.
- 4) Mengadakan pengecekan jumlah minyak yang di bongkar atau di *bunker* ke kapal lain.
- 5) Mengadakan pengecekan posisi kapal pada saat proses *bunkering* dan keadaan disekitar kapal.

c. Prosedur setelah selesai kegiatan *bunker* / bongkar muatan minyak MFO ke kapal lain.

- 1) Menutup kran tanki tanki yang muatannya dibongkar
- 2) Melepas *cargo hose* dengan mengeringkan bagian dalam terlebih dahulu
- 3) Mengecek muatan yang dibongkar
- 4) Penandatanganan dokumen BDN (*Bunker Delivery Note*)
- 5) Mencatat jumlah muatan yang dibongkar di *Oil Record Book*

7. Peralatan *Bunkering*

Maritime Port Authority (MPA) Singapore dalam circular “*Standards for Port Limit Bunker Tankers*” covers equipment, operational performance and efficiency of bunker tankers operating in the port mencakup peralatan bunker mencakup hal sebagai berikut ini :

a. *Pumping Rate* (kecepatan pompa)

Untuk jenis minyak *Bio Solar B30 / HSD (High Speed Diesel)* kapal-kapal *bunker* harus memenuhi standarisasi kecepatan minimum dengan memompa jenis minyak B30 Viscositas pada 3° *Centrigrade* (C) dengan tekanan 7 kg/cm² dengan menggunakan *flow meter*.

- 1) 250 sampai kurang dari 500 GT, minimum kecepatan pompa 300 cum/jam.
- 2) 500 sampai kurang dari 1500 GT, minimum kecepatan pompa 500 cum/jam.
- 3) 1500 GT ke atas, minimum kecepatan pompa 800 cum/jam.

b. *Flow Meter* (alat ukur quantity)

Semua kapal bunker harus memiliki *Flow Meter* Dengan mengacu kepada standar *ISO/IEC 17025:2017* sebagai berikut :

- 1) *Flow Meter* adalah alat untuk mengetahui jumlah minyak yang akan dikeluarkan dari *Flow Meter* tersebut.

2) *Flow Meter* ini harus di kalibrasi secara berkala atau telah mencapai waktu kalibrasi yang ditentukan oleh laboratorium (*Direktorat Metrologi*)

3) *Flow Meter* yang digunakan harus di sesuaikan dengan kebutuhan di atas kapal.

c. *Bunker Boom* (crane boom)

Seluruh kapal-kapal *bunker* dengan 250 GT dan di atasnya harus terpasang crane boom yang memenuhi standarisasi sebagai berikut:

1) Tekanan atau pengangkatan dioperasikan dengan kekuatan tekanan 10 kg/cm² dan dapat dioperasikan oleh satu orang.

2) Daya angkat minimum haruslah seimbang dengan besar dari *boom*.

3) Untuk kapal *bunker* yang mempunyai *crane boom* yang menyatu dengan pipa *bunker*, kendali untuk pengangkat dan katrol harus tersedia ditempat-tempat yang tepat disekitar batang *boom* untuk menahan pipa dan menjaganya dari pada membengkok.

d. *Manifold Size* (ukuran manifold)

Kapal-kapal *bunker* harus mempunyai paling tidak *manifold* sebagai berikut:

1) 250 sampai kurang dari 500 GT ukuran *manifold* 100 mm diameter.

2) 500 sampai kurang dari 1500 GT ukuran *manifold* 150 mm diameter.

3) 1500 GT dan lebih ukuran *manifold* 200 mm diameter.

e. *Reducers for hose Connection* (*reducer* untuk sambungan)

Kapal-kapal *bunker* harus membawa *reducer* dan *adaptor standard* dari *Japanese Industrial Standards* (*JIS*) and *American National Standards Institute* (*ANSI*) di atas kapal untuk mengakomodasi perbedaan-perbedaan ukuran dari *manifold* pada kapal penerima.

f. *Bunker Hose* (selang *bunker*)

Bunker hose harus mengikuti standar :

1) *Hose* lentur yang mengerut dengan gulungan spiral yang bekerja pada tekanan 10 kg/cm².

2) Tipe campuran karet yang merekat dengan lingkaran besi mempunyai tekanan yang bekerja pada tekanan 10 kg/cm².

- 3) Menjadi bagian untuk uji tekanan sesuai dari PSB atau sama dengan spesifikasi-spesifikasi dua kali setiap lima tahunan. Periode dari masing-masing dua uji tekanan tidak lebih dari tiga (3) tahun.
- 4) Menjadi bagian yang diperiksa oleh seorang dari badan klasifikasi yang diakui dalam *survey* tahunan dari kapal *bunker*.

g. *Bunker Quality Control* (Control Kualitas *Bunker*)

Kapal-kapal *bunker* diharuskan memiliki dokumen-dokumen dan peralatan pengukur kualitas dari bahan bakar. Tangki-tangki kapal-kapal *bunker* harus dikalibrasi dan diakui oleh klasifikasi yang sah atau sebuah perusahaan *survey* yang diterima. Sebuah salinan asli dari tabel-tabel kalibrasi tangki harus disimpan di atas kapal.

h. *Bunker Quality Control* (kontrol kualitas bahan bakar)

Kapal *bunker* harus dilengkapi dengan peralatan *sampling* sendiri seperti yang tertera di bawah.

1) *Sampling Equipment* (peralatan sampling)

Kapal *bunker* harus dilengkapi dengan perlengkapan *sampling* seperti yang disyaratkan oleh standar bunker. Di atas kapal bunker harus dilengkapi dengan peralatan untuk mengambil sampel (*sounding equipment*). *Sounding equipment* harus memenuhi syarat sebagai berikut:

- a) Ujung dari *sounding equipment* harus tertutup
- b) Bagian dindingnya dilubangi dengan lubang berdiameter 5 mm berjarak 20 mm yang terpisah dari seluruh panjangnya
- c) Batang *sounding equipment* harus dapat dilepaskan untuk pembersihan dan pengecekan.
- d) Sebuah tempat sampling yang tahan air dengan kapasitas tidak kurang dari 4 liter dan dapat disegel dengan aman.

2) *Automatic Sampling Equipment* (peralatan sampel otomatis)

- a) Peralatan sampel otomatis yang dipasang pada kapal *bunker* harus diakui oleh pihak-pihak yang berwenang jika digunakan.
- b) Alat sampel otomatis harus mempunyai kemampuan untuk mencapai sebuah sampel selama proses *bunker* berlangsung.
- c) Jika sampel dijalankan secara otomatis membagi 4 atau lebih dalam setiap satu liter botol-botol sampel, alat sampel tersebut harus dapat mengisi dalam level yang sama botol-botol sampel tersebut. Botol-

botol sampel paling tidak terisi 80 persen pada akhir dan proses *bunker*.

- i. Pihak kapal penerima harus memperoleh informasi dari pihak *supply bunker* mengenai hal-hal sebagai berikut:
 - 1) Bagaimana urutan *supply bunker* (terutama jika lebih dari satu jenis muatan) tanki-tanki mana dulu yang akan dimuati sesuai dengan *stowage plan*.
 - 2) Berapa tekanan minyak yang akan diberikan oleh pihak *supply bunker* (*rate*).
 - 3) Berapa jumlah minyak yang akan diberikan oleh pihak *supply bunker*.
 - 4) Berapa lama waktu yang diperlukan dan apa tandanya jika kapal menghendaki stop muatan. Biasanya pihak kapal dan pihak *supply bunker* sudah menyetujui hal-hal tersebut di dalam *Disch / Loading Agreement* yang telah ditandai oleh kedua belah pihak dan disaksikan oleh *Cargo Surveyor* yang sedang bertugas pada saat itu.
 - 5) Bagi kapal-kapal yang dilengkapi dengan IGS (*Inert Gas System*) maka alat tersebut harus bekerja sebagaimana mestinya.
 - 6) Sebelum kegiatan *supply bunker* berlangsung *chief officer* memberikan *Dich / Loading Order* kepada *ABK Deck* tentang rencana, urutan, *final ullage* untuk tiap-tiap tanki.
- j. Memperhatikan/memeriksa faktor keselamatan
 - 1) Semua alat-alat navigasi elektronik dan radio harus dimatikan kecuali VHF yang *standby* pada ch. 16 dan pada posisi *power* 1W dan ch. HT yang telah disepakati
 - 2) Mesin Induk kapal harus dalam keadaan *standby* bila terjadi keadaan *emergency* dan dapat berolah gerak dengan segera bila terjadi keadaan darurat
 - 3) Sekoci penolong harus dalam keadaan siap pakai
 - 4) Semua pintu-pintu dan jendela-jendela akomodasi kapal harus dalam posisi tertutup rapat
 - 5) Tangga akomodasi yang menghubungkan kapal dengan *supply bunker* harus dipasang *safety net*
 - 6) Selang pemadam kebakaran di *maindeck* harus dalam keadaan siap pakai (terpasang pada *connection* dan dilengkapi dengan *nozzle*), alat pemadam

api ringan (jinjing) harus *standby* di *main deck*. *Safety wire* harus dipasang pada sisi luar kapal haluan dan buritan dan lain-lain faktor keselamatan yang diisyaratkan di dalam ISGOTT (*International Safety Guide for Oil Tanker and Terminals*).

Peralatan bunker merupakan peralatan untuk menunjang atau mempermudah pekerjaan dalam proses bunkering, peralatan bunkering terdiri dari:

a. Peralatan pengukuran

Peralatan pengukuran pada bunker adalah untuk mengetahui volume bahan bakar dan kualitas bahan bakar pada saat bunker, peralatan ini terdiri dari:

1) Sounding Tape

Stainless Steel Merupakan alat yang digunakan untuk mengukur ullage (jika ujung bandul rata) dan image/Deeping (jika ujung bandul runcing) antara bandul dan tape hanya ada satu ring joint connection selain itu terpasang bonding cable pada body sounding tape dan terbuat dari material berbahan kuningan sehingga berat atau tidak melayang di dalam minyak, untuk panjang bandul nya 165 cm.

2) MMC UTI

Tape MMC UTI Tape adalah alat yang fungsinya sama dengan Sounding Tape MMC digunakan untuk mengukur ulage temperature mendeteksi Free Water pada bagian dasar cargo oil tank. MMC juga terpasang bonding cable pada body bersertifikat dan rutin di kalibrasi, di kapal minimal terdapat duah buah dan lengkap dengan Stick/Sounding Tape.

3) Bottom Oil Sample

Bottom Oil Sampler adalah alat yang digunakan untuk mengambil sample cargo di dasar COT termasuk Free Water berbahan non spark yang pada bagian bawah terdapat chuck sebagai alat untuk mengambil sample bunker.

4) Temperatur Dalam

Temperatur Dalam digunakan untuk mengukur temperatur di dalam tangki dengan suhu -10 °C atau 0 °C s/d 100 °C. Angka skala terletak pada body temperatur dan terdapat mangkok yang berguna untuk

mempertahankan suhu cargo atau bunker sampai di luar COT.

5) Temperatur Luar

Temperatur luar digunakan untuk mengukur temperatur cargo atau bunker yang diletakan di dalam *Hydro Jar*/ Gelas Duga yang bersamaan dengan Density °C dengan skala -10°C s/d 100°C atau 0°C s/d 100 °C angka skala terletak pada body temperatur.

6) *Density 15°C*

Density 15°C adalah alat yang digunakan untuk mengukur temperature Density yang di letakan di dalam Hydro jar/Gelas Duga yang bersamaan dengan tempratur luar dengan skala 0.650 s/d 0.950.

7) *Hydro Jar* / Gelas Duga

Hydro Jar / Gelas Duga adalah alat yang digunakan sebagai tempat mengukur Density tempratur luar.

8) *Oil Sampling Can*

Oil Sampling Can adalah alat yang digunakan untuk mengambil sample cargo bunker di dalam COT, umumnya di buat dari bahan kuningan atau tembaga (non spark) dengan tutup berbahan gabus dan terdapat pemberat dibagian bawah

- b. Peralatan jika terjadi tumpahan minyak Mencegah terjadinya tumpahan minyak pada bunker manifold harus di siapkan peralatan sesuai SOPEP yg di simpan dan siap sedia di gunakan jika keadaan darurat (oil spill). SOPEP Shipboard Oil Pollution Emergency Plan harus memiliki minimum dari item yang ditentukan di bawah ini:

- 1) Serbuk gergaji
- 2) Ember
- 3) Chemical oil spill dispersant
- 4) Bahan penyerap (majun)
- 5) Sapu
- 6) Sekop
- 7) Pel
- 8) Pasir.

8. *Bunkering Area di Perairan Singapura*

Menurut buku *Singapore Port Information 2022/ 2023*, pembagian wilayah untuk berlabuh terdiri dari 3 wilayah, yaitu *eastern part*, *westernpart* dan *jurong part* untuk kegiatan *bunkering* bahan bakar kapal di perairan singapura. Adapun nama-nama tempat anchor per wilayah adalah sebagai berikut ini:

a. *Eastern part*

- 1) *Changi barge temporary holding (ACBTH)*
- 2) *Change general purpose anchorage (ACGP)*
- 3) *Man of War Anchorage (AMOW)*
- 4) *Eastern bunkering alfa anchorage (AEBA)*
- 5) *Eastern bunkering bravo anchorage (AEBB)*
- 6) *Eastern petroleum charlie anchorage (AEPC)*
- 7) *Small Craft B (ASCB)*
- 8) *Small Craft A (ASCA)*
- 9) *Eastern petroleum bravo anchorage (AEPB)*
- 10) *Eastern special purpose alfa anchorage (AESPA)*
- 11) *Eastern bunkering charlie anchorage (AEBC)*
- 12) *Eastern anchorage (AEW)*
- 13) *Eastern holding A (AEHA)*
- 14) *Estern petroleum A (AEPA)*
- 15) *Eastern holding B (AEHB)*
- 16) *Eastern holding C (AEHC)*

b. *Western part*

- 1) *Western quarantine and immigration (AWQI)*
- 2) *Western anchorage (AWW)*
- 3) *Western petroleum alfa anchorage (AWPA)*
- 4) *Western holding (AWH)*
- 5) *Western petroleum bravo anchorage (AWPB)*
- 6) *Raffles reserved (ARAFR)*
- 7) *Raffles petroleum anchorage (ARP)*
- 8) *Selat pauh (ASPLU)*
- 9) *Selat pauh petroleum anchorage (ASPP)*
- 10) *Sudong explosive (ASUEX)*

11) *Sudong special purpose anchorage (ASSPU)*

12) *Sudong holding (ASH)*

c. *Jurong part*

1) *Very large crude carrier anchorage (AVLCC)*

9. *Standart of Training Certification for Seafarers (STCW) 1978*

Di dalam *Standart of Training Certification for Seafarers (STCW) 1978* Amandemen 2010 Bab VI section A-VI/1 tentang standar kompetensi, disebutkan bahwa:

- a. Pelatihan dan pengalaman untuk mencapai pengetahuan, pemahaman dan kecakapan yang cukup harus mempertimbangkan pedoman yang diberikan didalam bagian STCW Code.
- b. Setiap calon yang akan memperoleh sertifikat harus membuktikan bahwa telah mencapai standar kompetensi yang diharuskan selama 5 tahun, sesuai dengan metode untuk menunjukkan kompetensi.
- c. Diklat Dasar Keselamatan (*Basic Safety Training*) telah ditingkatkan kontennya dengan memberikan perhatian lebih pada pencegahan polusi terhadap lingkungan laut, komunikasi dan *Human Relationship* di atas kapal.

Semua pelaut dipersyaratkan untuk mengikuti program pendidikan, latihan dan keterampilan berkaitan dengan pengenalan dan kesadaran terhadap keselamatan sesuai dengan ketentuan pada *Standart of Training Certification for Seafarers (STCW) 1978* amandemen 2010 Bab VI seksi A-VI/. Dinas jaga adalah segala sesuatu kegiatan pengawasan yang dilakukan selama 24 (dua puluh empat) jam yang dilakukan dengan tujuan urusan pekerjaan supaya terciptanya keselamatan dan kemandirian saat sedang bertugas. Pelaksanaan dinas jaga yang dilakukan oleh petugas jaga di kapal pada waktu kapal sedang berlayar maupun kapal sedang berlabuh jangkar telah diatur oleh peraturan *Standart Of Training Certification And Watchkeeping (STCW)*. Dari sumber diatas dinas jaga adalah suatu pekerjaan jaga yang dilakukan di kapal atau di pelabuhan untuk menciptakan situasi dan kondisi agar aman dan terkendali. Maksud dan tujuan dilaksanakannya dinas jaga adalah:

- a. Menjaga keamanan, keselamatan, ketertiban kapal, muatan, penumpang dan lingkungannya.
- b. Melaksanakan/mentaati peraturan dan ketentuan-ketentuan yang berlaku (Nasional/Internasional).

- c. Melaksanakan perintah/instruksi dari perusahaan maupun nakhoda (tertulis lisan) atau Master Standing Order.

B. METODE PENDEKATAN

1. Metode Penelitian

Metode pendekatan yang digunakan dalam penelitian ini adalah Metode Deskriptif Kualitatif, dimana peneliti menjelaskan permasalahan-permasalahan yang terjadi dan mencari solusi dengan menganalisis data-data yang ada.

2. Teknik Analisis Data

Teknik analisis yang digunakan dalam penelitian ini adalah sebagai berikut:

a. *Study Kasus*

Peneliti mengambil masalah-masalah yang terjadi dan yang dialami langsung oleh peneliti pada saat bekerja di atas kapal dan melakukan analisa untuk memecahkan masalah dengan mengacu pada teori-teori yang ada dan di implementasikan di tempat bekerja.

b. *Study kepustakaan*

Pemecahan masalah diambil berdasarkan buku-buku dan referensi jurnal dari penelitian terdahulu yang memiliki kesamaan dengan teknik yang peneliti lakukan.

3. Teknik Pengumpulan Data

Dalam melaksanakan pengumpulan data yang diperlukan sehingga selesainya penulisan makalah ini, digunakan beberapa metode pengumpulan data. Data dan informasi yang lengkap, objektif dan dapat dipertanggung jawabkan data agar dapat diolah dan disajikan menjadi gambaran dan pandangan yang benar. Untuk mengolah data empiris diperlakukan data teoritis yang dapat menjadi tolak ukur oleh karena itu agar data empiris dan data teoritis yang diperlakukan untuk menyusun makalah ini dapat terkumpul peneliti menggunakan teknik pengumpulan data yang berupa:

a. Observasi

Peneliti melakukan pengamatan dalam pengambilan data secara langsung di atas kapal berkaitan dengan pelaksanaan proses *bunkering* dan peralatan yang digunakan.

b. Dokumentasi

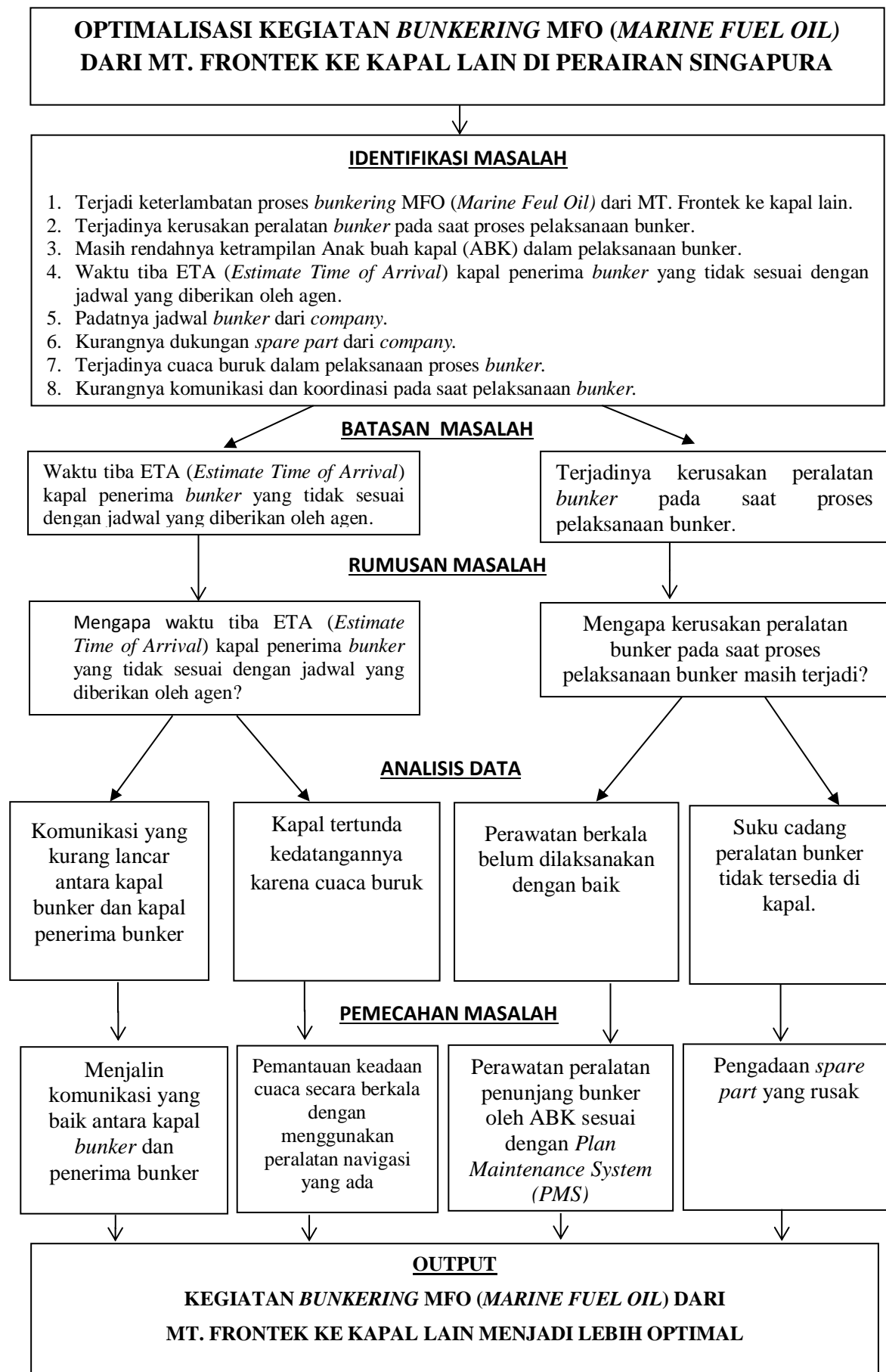
Peneliti mengambil dokumentasi berupa photo-photo kegiatan pelaksanaan

bunkering.

c. Kepustakaan

Peneliti mengambil referensi buku-buku dan penelitian terdahulu berupa jurnal-jurnal yang memiliki kesamaan dengan topik yang peneliti lakukan.

C. KERANGKA PEMIKIRAN



BAB III

ANALISIS DAN PEMBAHASAN

A. DESKRIPSI DATA

MT. Frontek adalah kapal *bunker* berbendera Singapura yang beroperasi di perairan Singapura atau *home trade*. Untuk menunjang kelengkapan penelitian ini penulis sampaikan data kapal MT. Frontek sebagai berikut, *year built* 2012, *trading area*: Singapore harbour, *main engine* Chong Qing Weichai, 540KW X 2, *deck crane*: SWL 2.0 T, *hoist height* 30M, *cargo hose* : length 20 M, diameter 6 Inch, *accomodation* 13 person. MT. Frontek sebagai kapal jenis *tanker* utamanya dipergunakan untuk mengangkut muatan minyak MFO (*Marine Fuel Oil*) dengan bermacam *grades* (berbeda kekentalan).

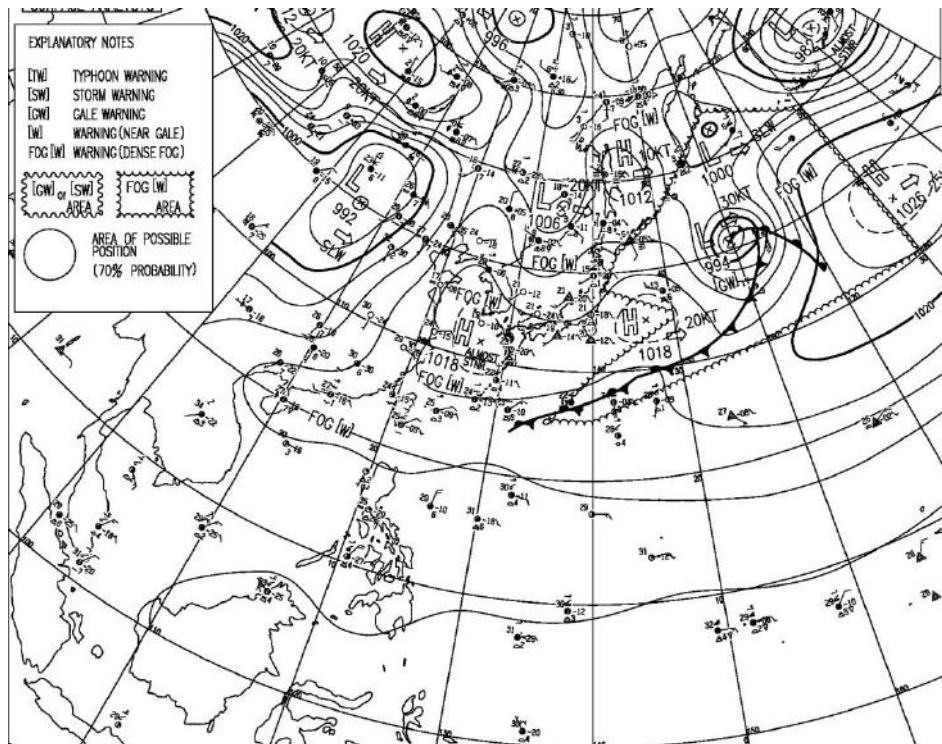
MT. Frontek dengan rutinitas kegiatan *bunkering* ke kapal lain yang tinggi dalam pelaksanaan *supply bunker* MFO (*Marine Fuel Oil*) memiliki beberapa kendala yang menghambat dalam pelaksanaan *supply bunker* MFO (*Marine Fuel Oil*). Adapun cara untuk mencapai hasil yang optimal maka dibutuhkan koordinasi yang baik antara pihak kantor dalam hal ini *programmer* selaku ko-ordinator kegiatan *bunkering* yang bekerjasama dengan pihak agen kapal yang akan *disupply* dalam pemberian informasi tentang (*Estimate Time of Arrival*), banyaknya minyak yang akan *disupply*, lokasi kapal yang akan menerima *bunker*. Dan juga di butuhkan peran dari pihak ABK kapal sebagai operator kegiatan *bunkering*.

Dalam hal ini yang menjadi sumber permasalahan terkait dengan optimalisasi kegiatan *bunkering* MFO (*Marine Fuel Oil*) dari di MT. Frontek ke kapal lain di perairan singapura adalah Waktu tiba ETA (*Estimate Time of Arrival*) kapal penerima *bunker* yang tidak sesuai dengan jadwal yang di berikan agen dan lamanya proses *bunker* ke kapal lain akibat dari terjadinya kerusakan peralatan *bunker* pada saat proses pelaksanaan *bunker* karena peralatan *bunker* yang kurang terawat.

1. Waktu tiba ETA (*Estimate Time of Arrival*) kapal penerima bunker yang tidak sesuai dengan jadwal yang diberikan oleh agen.

Pada tanggal 17 December 2022 pukul 06.00Hrs MT. Frontek menerima *order* dari *programmer* untuk *membunkeri* kapal, ETA (*Estimate Time Arrival*) kapal penerima (*receiving vessel*) pada 17 December 2022 pukul 20.00Hrs dengan lokasi AESPA (*Eastern Special Purpose Anchorage*) akan mengambil *bunker* sebanyak 300 MT dengan prioritas *order* utama *Remark* “MFO 1st” atau “MFO *supply* 1st”. MT. Frontek yang pada saat itu baru saja selesai melakukan kegiatan memuat MFO dari terminal JPUT (Jurong Port Universal Terminal) Singapore pada jam 18.00Hrs langsung bergerak ke lokasi pembunkeran untuk menyuply kapal Sino Ocean, pelayaran dari JPUT (Jurong Port Universal Terminal) Singapore ke AESPA (*Eastern Special Purpose Anchorage*) berjarak 20 Nm, kecepatan kapal pada waktu perjalanan 6 knot, pembagian jarak dengan kecepatan kapal akan diperoleh waktu tempuh 3 Jam. Selama perjalanan segala persiapan untuk melaksanakan *bunker* telah dilakukan.

Setelah kapal mendekati area bunker yang telah disepakati yaitu AESPA (*Eastern Special Purpose Anchorage*) melakukan laporan kepada *east control* dalam perijinan kegiatan bunker ke Sino Ocean, informasi yang di dapat dari *East Control* ternyata Sino Ocean belum tiba di Singapura. Kemudian nahkoda menghubungi *programmer* untuk menanyakan informasi yang tepat dan lebih akurat mengenai ETA (*Estimate Time Arrival*) Singapura dari kapal Sino Ocean, dan *programmer* memberikan informasi lebih lanjut yang di peroleh dari pihak agen kapal Sino Ocean bahwa kapal mengalami *delay* atau keterlambatan dikarenakan adanya cuaca buruk yang terjadi dalam pelayaran dari Jepang ke Singapura, dan kapal Sino Ocean akan tiba pada tanggal 18 December 2022 pada pukul 00.01 hrs dan langsung berlabuh jangkar di AESPA (*Eastern Special Purpose Anchorage*) Singapura.



Gambar 3.1 : Weather forecast tentang cuaca buruk

Sumber : JMH Japan Meteorological

Nahkoda memutuskan untuk berlabuh jangkar dikarenakan kapal Sino Ocean belum tiba di pelabuhan Singapura, maka nahkoda meminta izin kepada *east control* untuk berlabuh jangkar di AEPB (*Eastern Petroleum Bravo Anchorage*) sampai kapal Sino Ocean tiba di Singapura. Hal tersebut dapat terjadi karena kurang koordinasi yang baik antara pihak kantor yaitu programmer selaku koodinator kegiatan bunkering dengan pihak agen kapal Sino Ocean sebagai kapal penerima (*receiving vessel*) dalam hal infomasi ETA kapal sehingga dapat menghambat kegiatan *bunkering* MFO dari MT. Frontek ke kapal Sino Ocean.

Tidak akuratnya informasi ini jelas menimbulkan kerugian pada pihak penyupply, karena pekerjaan yang seharusnya bisa dilaksanakan sesuai jadwal akhirnya mengalami keterlambatan. Keterlambatan yang dialami adalah 4 jam dari perkiraan waktu tiba yang diberikan oleh agen, dari sebelumnya jam 20.00Hrs menjadi 00.01Hrs, sehingga mengakibatkan kegiatan *bunker* dilakukan dengan terburu-buru karena adanya jadwal *bunkering* selanjutnya yang sudah terjadwal sebelumnya.

2. Terjadinya kerusakan peralatan *bunker* pada saat proses pelaksanaan *bunker*

Dalam melaksanakan kegiatan *bunkering* MFO (*Marine Fuel Oil*) dari MT. Frontek ke kapal lain diperlukan sarana penunjang untuk membantu kegiatan tersebut agar lebih cepat dan efisien. Untuk itu dibutuhkan peralatan *bunker* harus selalu dalam kondisi baik dan harus siap dipergunakan. Supaya peralatan *bunker* yang ada di MT. Frontek dapat digunakan setiap saat maka diperlukan perawatan atau pemeliharaan. Pada tanggal 19 Januari 2023 *programmer* memberikan jadwal orderan kegiatan *bunkering* melalui *handphone* kapal MT. Frontek untuk memberikan *bunker* ke kapal dengan nama Seacon Manila lokasi *bunker* di AESPA (*Eastern Special Purposes Anchorage*) dengan jumlah *bunker* 300 MT, ETA 04.00Hrs pada tanggal 20 Januari 2023. Saat kapal sudah sandar di kapal Seacon Manila.

Cargo officer MT. Frontek selaku pihak penyupply dan *Chief Enginer* dari kapal Seacon Manila sebagai kapal penerima (*receiving vessel*) berkoordinasi tentang banyaknya *bunker* MFO yang akan di *transfer*. Pencocokan data banyaknya minyak MFO yang akan dilakukan ini berguna untuk mengetahui banyaknya muatan MFO yang dapat diterima atau ditampung di dalam tanki bahan bakar kapal Seacon Manila agar tidak terjadi *over flow*.

Setelah itu, kru kapal yang bertugas jaga yaitu Bosun dan 2 Juru mudi melakukan persiapan sesuai prosedur *bunkering*, salah satunya adalah pemasangan *cargo hose* dari MT. Frontek yang di pasang di manifold kapal Seacon Manila. Bosun melakukan pengambilan *ullage* di semua tanki muatan MT. Frontek yang di damping oleh *Cargo officer* dan *Chief Engginer* dari kapal Seacon Manila dilanjutkan dengan pemeriksaan *flow meter* di *cargo control room* dan semua isi didalam check list sudah dilaksanakan dan diperiksa.

Proses *bunker* akan dimulai setelah adanya konfirmasi dari pihak kapal Seacon Manila yang bertugas jaga bahwa mereka sudah siap menerima *bunker* MFO dari MT. Frontek. Pemompaan MFO dari MT. Frontek dimulai dengan tekanan rendah 1-2 Kg/Cm². Hal ini dilakukan untuk menjaga agar sambungan *cargo hose* pada *manifold* tidak terjadi

kebocoran dan menunggu konfirmasi dari kru kapal Seacon Manila yang sedang bertugas jaga untuk mengkonfirmasi bahwa MFO sudah diterima masuk ke tangki yang mereka rencanakan sebelumnya. Hal ini kira – kira memerlukan waktu 10-15 menit dari mulainya pemompaan. Setelah itu tekanan akan dinaikkan sesuai dengan persetujuan antara kedua belah pihak yaitu 3-4 Kg/Cm².

Proses *bunkering* sudah berjalan dengan tekanan 3-4 Kg/Cm², Juru mudi MT. Frontek yang bertugas jaga memberitahukan kepada Bosun bahwa ada kebocoran di *pump room* pada *flexible joint pipe* sebelah kiri yang menghubungkan antara cargo pump dengan *discharge pipeline* di *main deck* dan *crane boom*. Dan setelah dilakukan pengecekan diketahui bahwa penyebabnya adalah adanya kebocoran pada *flexible joint pipe*.



Gambar 3.2: *flexible join pipe* yang bocor

Sumber: MT. Frontek

Bosun segera melaporkan kejadian ini kepada *chief officer*, kemudian *chief officer* mengecek langsung di *pump room* untuk mengidentifikasi kebocoran yang terjadi, lalu *chief officer* memerintahkan kepada bosun untuk segera mematikan *cargo pump* dan menutup *valve-valve* muatan yang terbuka yang digunakan saat proses *bunker* karena jika

dibiarkan akan menimbulkan kebocoran di *pumproom*. *Chief Officer* memberitahukan kepada kru kapal Seacon Manila yang sedang bertugas jaga bahwa proses bunker dihentikan sementara waktu untuk pergantian penggunaan *cargo pump* sebelah kanan.

Chief Officer meminta kepada *engineer* jaga untuk *start cargo pump* sebelah kanan namun setelah beberapa menit ditunggu *chief engineer* melaporkan bahwa *cargo pump* sebelah kanan tidak dapat di *start*. Menurut keterangan *chief engineer* kerusakan terjadi pada selenoid *gear box*, dari kerusakan *selenoid gear box* mengakibatkan juga terjadinya kerusakan pada beberapa *electrical part* yang terbakar. *Chief Engineer* mengatakan tidak ada *spare part* di *engine store*. Untuk perbaikan *cargo pump* sebelah kanan, *engineer* menyatakan tidak dapat memperbaiki *cargo pump* karena tidak tersedianya *spare part* di kapal dan juga harus menunggu teknisi dari darat untuk melakukan pengecekan lebih lanjut.

Chief officer mengecek *deck store* untuk mencari *spare* dari *flexible join pipe*, ternyata setelah melakukan pengecekan tidak ada *spare* dari *flexible join pipe*, kemudian *chief officer* melaporkan kepada nakhoda. Nakhoda melaporkan kejadian tersebut kepada *technical superintendent* untuk berkoordinasi mengenai penggantian *flexible join pipe* sebelah kiri yaitu dengan cara meminjam *flexible join pipe* dari kapal lain dengan tipe kapal yang sama dan masih satu perusahaan yang berada dekat dengan lokasi *bunker*. Setelah *flexible joint pipe* datang diantar ke kapal dengan menggunakan boat dari kantor, *deck crew* bekerjasama dengan *engineer* untuk melakukan penggantian *flexible joint pipe* sebelah kiri.

Setelah penggantian *flexible joint pipe* selesai proses *bunkering* akhirnya dilanjutkan kembali, *chief officer* menginformasikan ke kapal Seacon Manila bahwa pemompaan akan dilanjutkan kembali. Selama proses *bunker* berlangsung pengecekan *flexible joint pipe* dan manifold serta *valve – valve* yang digunakan selama proses *bunker* dilakukan untuk memastikan dalam keadaan baik dan tidak ada lagi kebocoran. *Chief engineer* kapal Seacon Manila meminta untuk menaikkan tekanan pompa menjadi 5 Kg/Cm² agar proses bunker cepat selesai dengan alasan kapal akan segera berangkat.

Proses *bunker* MFO dari MT. Frontek ke kapal Seacon Manila sesuai dengan kapasitas maksimal *flow rate* dari *Mass Flow meter* (lampiran

11) dan kesepakatan *flow rate* antara *cargo officer* dengan *chief engineer* melalui komunikasi radio, dapat diperkirakan *bunker* diselesaikan dalam waktu 2 jam, karena adanya kebocoran pada *flexible joint pipe* maka terjadi keterlambatan bunkering selama 5 jam. Kurangnya perawatan pada *flexible joint pipe* kapal sebagai alat penunjang kegiatan bunkering, Inilah yang menjadi faktor yang dapat menghambat kelancaran dalam kegiatan bunkering dari MT. Frontek ke kapal lain



Gambar 3.3: proses penggantian *flexible join pipe*

Sumber: MT. Frontek



Gambar 3.4: *flexible join pipe* yang baru

Sumber: MT. Frontek

B. ANALISIS DATA

Berdasarkan permasalahan utama dapat disimpulkan yang menjadi sumber permasalahan terkait dengan optimalisasi kegiatan *bunkering MFO (Marine Fuel Oil)* dari di MT. Frontek ke kapal lain di perairan singapura adalah Waktu tiba ETA (*Estimate Time of Arrival*) kapal penerima *bunker* yang tidak sesuai dengan jadwal yang sudah ditentukan dan masih terjadinya kerusakan peralatan *bunker* pada saat pelaksanaan *bunker* lain akibat dari peralatan *bunker* yang kurang terawat.

A. Waktu tiba ETA (*Estimate Time of Arrival*) kapal penerima *bunker* yang tidak sesuai dengan jadwal yang diberikan oleh agen

Penyebabnya adalah:

a. Komunikasi kurang lancar antara kapal bunker dengan kapal penerima bunker

Programmer dari perusahaan sebagai pemasok memberikan *order* kapal MT. Frontek, dengan detail jumlah muatan dan perkiraan waktu kedatangan kapal ETA (*Estimate Time of Arrival*). Faktanya,

tidak jarang kapal penerima (*receiving vessel*) belum juga tiba tepat waktu yang diberikan oleh agen kapal penerima. Pelaksanaan kegiatan pemasokan bahan bakar akan dapat berjalan sesuai dengan rencana dan target yang telah ditentukan, apabila diimbangi dengan adanya jalinan komunikasi antara pihak pemasok dan pihak pengguna jasa.

Kenyataannya membuktikan bahwa dalam pengoperasiannya sering terjadi kesalahan dalam pemberian order oleh pihak programmer yang bertugas membuat perencanaan untuk pengoperasian kapal bunker yang disebabkan karena kesalahan informasi dari pihak agen kapal niaga yang tidak selalu meng *up to date* dari pada posisi dan kondisi kapal yang akan dipasok bahan bakarnya.

Kesalahan informasi ini bukan berarti dibebankan seluruhnya kepada pihak Agen, agar komunikasi lancar sebagai pihak pensuplai dalam hal ini perusahaan dan kapalnya sebagai pelaksana seharusnya mengambil langkah-langkah untuk mengatasinya. Agar senantiasa dilakukan pengecekan secara terus menerus kepada pihak Agen untuk memastikan kapal yang akan dipasok. Sedangkan apabila akan melakukan pengecekan kendala lain yang ditemui yaitu bahwasannya sulit sekali untuk menghubungi Agen. Keadaan ini jelas merugikan pihak pensuplai, karena pekerjaan yang seharusnya bisa dilaksanakan dengan cepat akhirnya mengalami penundaan, bahkan waktu yang sudah sangat terbatas oleh adanya order-order yang lain menjadi sangat sempit sehingga mengakibatkan pekerjaan dilaksanakan dengan terburu-buru dan tidak cukup waktu.

b. Kapal tertunda kedatangannya karena cuaca buruk

MT. Frontek tiba di lokasi untuk melakukan *bunker* ke kapal penerima (*receiving vessel*). Namun faktanya terdapat beberapa kapal penerima (*receiving vessel*) mengalami keterlambatan kedatangan yang disebabkan cuaca buruk yang terjadi selama pelayaran menuju ke negara Singapura. Adapun juga faktor lain yang menjadi penyebab penghambat proses *bunkering*. Adalah kapal yang belum siap untuk menerima *bunker* MFO (*Marine Fuel Oil*) karena kapal penerima (*receiving vessel*) tidak hanya menerima satu jenis bahan bakar akan

tetapi juga menerima *bunker* jenis minyak lain, sehingga MT. Frontek tidak dapat melakukan *bunkering* dan harus menunggu.

B. Terjadinya kerusakan peralatan *bunker* pada saat proses pelaksanaan *bunker*

Penyebabnya adalah:

a. Perawatan berkala belum dilaksanakan dengan baik

Pada kapal pengangkut *Fuel Oil*, perawatan dan pengecekan alat-alat bantu muat bongkar, khususnya sistem perawatan pompa muatan serta selang muatan mendapat perhatian istimewa. Pemeliharaan muatan selama dalam pelayaran maupun pemuatan atau pembongkaran muatan *Fuel Oil* perlu dijaga temperaturnya agar tidak terjadi masalah pada waktu pembongkaran muatan dan dapat berjalan dengan lancar serta menunjang kelancaran pengoperasian kapal. Tetapi pada prakteknya banyak mengalami gangguan yang menghambat pelaksanaan dalam pemeliharaan muatan dan pembongkaran *Fuel Oil*. Oleh karena itu perlu diadakan persiapan, perawatan dan pengecekan alat-alat muat bongkar.

Perawatan adalah kegiatan rutin yang diulang-ulang yang diperlukan untuk menjaga agar suatu fasilitas dalam keadaan yang sama dengan kondisi. Jadi tanpa perawatan dan pengecekan yang teratur atau rutin, maka efektifitas dari alat-alat bantu muat bongkar tersebut tidak dapat diandalkan sesuai dengan fungsi serta kemampuan / kekuatannya. Perawatan peralatan penunjang kegiatan *bunker* seringkali terabaikan oleh anak buah kapal yang tidak adanya waktu yang cukup dengan dikarenakan padatnya kegiatan *bunkering* ke kapal lain untuk melakukan perawatan sesuai dengan PMS (*Plan Maintenance Schedule*).

b. Suku cadang peralatan *bunker* tidak tersedia di kapal

Kendala dan hambatan yang dihadapi terkait dengan peralatan bunker yaitu tidak tersedianya suku cadang di atas kapal. Kondisi menyebabkan, jika terjadi kerusakan pada peralatan bunker, seperti pompa muatan, cargo hose dan lainnya tidak dapat segera diganti dengan suku cadang baru. Pengadaan dan penyediaan suku cadang tidak tersedia di dalam store kapal dan masalah ini sangat mengganggu dalam proses kegiatan

operasional dan kelancaran bongkar muat di pelabuhan. Salah satu masalah ini yang sering dihadapi pihak kapal adalah terbatasnya dan kurang cukupnya ketersediaan suku cadang.

Untuk menyediakan suku cadang, perusahaan sering mengalami kesulitan yaitu sulitnya suku cadang diperoleh di pasaran bebas, sehingga perusahaan pelayaran harus memesan khusus dari pabrik pembuat atau pada bengkel khusus. Proses ini tentu saja membutuhkan waktu yang lama, sehingga akan mempengaruhi jadwal dan kegiatan operasional kapal yang telah ditentukan.

Technical Superintendent dari perusahaan mengorder suku cadang langsung dari cina untuk suku cadang tertentu, salah satunya adalah *flexible join pipe*, setelah barang datang di Singapura akan dikirimkan ke kapal. Suku cadang tidak langsung dikirimkan oleh kapal yang membutuhkan suku cadang, karena kapal membutuhkan suku cadang tidak selalu berada di Singapura pada saat proses pengiriman suku cadang. Maka suku cadang disimpan di kapal yang berada di Singapura. Bilamana kapal tersebut membutuhkan suku cadang, suku cadang akan di kirim dengan *boat office*.

C. PEMECAHAN MASALAH

1. Alternatif Pemecahan Masalah

- a. Waktu tiba ETA (Estimate Time of Arrival) kapal penerima bunker yang tidak sesuai dengan jadwal yang diberikan oleh agen
Alternatif pemecahan masalahnya yaitu:

- 1) **Menjalin komunikasi yang baik antara kapal *bunker* dan kapal penerima *bunker***

Dalam hal ini MT. Frontek harus aktif dan rutin berkomunikasi dan berkoordinasi dengan pihak kantor yaitu *programmer* selaku koordinator kegiatan *bunker* untuk mendapatkan informasi yang akurat dan *up to date* dari agen kapal penerima (*receiving vessel*), dengan cara bertanya langsung melalui *telephone* ke *programmer* atau selalu *update* informasi dari *programmer* yang disampaikan melalui email kapal, selain itu juga dapat melakukan komunikasi dengan Singapura *port control* dengan radio VHF kapal melalui VHF Ch. 12 (East control) apabila kapal berada di wilayah Eastern

dan VHF Ch. 68 (West control) untuk wilayah Western mengenai posisi dan waktu tiba / ETA kapal penerima (*receiving vessel*) di lokasi *bunker*.

Komunikasi yang baik dan benar serta mudah dimengerti dalam kegiatan di atas kapal terutama pada saat proses muat bongkar sangat penting guna menghindari kejadian-kejadian yang tidak diinginkan, maka sarana komunikasi seperti VHF radio *portable* sangat diperlukan untuk berkomunikasi antar anak buah kapal dalam menunjang kegiatan tersebut. Tentunya alat komunikasi yang dimaksud harus safety dan sesuai dengan ketentuan yang diijinkan untuk dapat dipergunakan di atas kapal tanker. Dengan menggunakan radio *portable* sebagai alat bantu dalam berkomunikasi diharapkan dapat membantu kelancaran kegiatan di atas kapal. Disamping menggunakan VHF radio *portable* dapat juga menggunakan bahasa isyarat yang sudah dimengerti oleh anak buah kapal terutama yang sedang bertugas di *deck*.

Chief officer sebagai salah satu perwira senior tidak hanya harus tahu bagaimana melaksanakan tugas-tugas mereka sendiri, tetapi mereka juga harus tahu bagaimana mendapatkan hasil kerja yang terbaik dari bawahan mereka. Juga harus paham bagaimana mengelola anak buah dan bagaimana memperoleh kepercayaan dari mereka. Untuk mengatasi hal-hal ini kiranya dapat ditempuh dengan beberapa cara seperti:

- a) Setiap kali menerima order dan setiap akan bergerak hendaknya pihak kapal mengkonfirmasi akan letak/posisi kapal yang akan dipasok.
- b) Memanggil Kapal niaga di VHF Ch 16. Bila menjawab tanyakan ke Nakhoda kapal niaga, channel berapa yang bisa digunakan agar setiap saat dapat menghubungi kapal yang akan dipasok, sehingga dalam pergerakan menuju lokasi kita dapat langsung berhubungan dengan kapal yang dimaksud.

- c) Antara pengirim dengan penerima informasi harus melakukan pertukaran informasi yang penting secara perlahan dan diulang dua sampai tiga kali, bila perlu menggunakan kata sandi alphabet.
- d) Menanyakan informasi kapal niaga yang dituju kepada Singapore Port Operation baik melalui VHF Channel 12 (*Singapore East Control*) atau channel 68 (*Singapore West Control*).
- e) Menggunakan AIS (*Automatic Identification System*) dengan cara mencari posisi kapal niaga tersebut pada jarak tertentu.
- f) Menggunakan media on line untuk memonitor kapal niaga yang akan disuplai, beberapa website yang menyediakan akses untuk dapat mencari posisi kapal niaga yang dimaksud seperti *marinetraffic.com*, dan *findship.com*.

2) Pemantauan keadaan cuaca secara berkala dengan menggunakan peralatan navigasi yang ada

Untuk mengantisipasi keterlambatan kedatangan kapal penerima (*receiving vessel*) yang mungkin muncul, MT. Frontek harus melakukan monitoring berita cuaca baik dari navtex, radio broadcast, ataupun dari sumber internet mengenai *weather forecast*. MT. Frontek juga harus melakukan *checking* ulang (*Recheck*) posisi kapal penerima. *Recheck* ini dapat dilakukan dengan menggunakan radio komunikasi yang ada, selain itu, kapal juga dapat memanfaatkan penggunaan peralatan navigasi yang ada seperti radar, ARPA, AIS dan menggunakan aplikasi *find ship* yang tersedia. Pemantauan keadaan cuaca ini dilakukan oleh *officer* jaga pada saat dinas jaga.

Segala bentuk kondisi atau hambatan yang dihadapi oleh kapal penerima (*receiving vessel*) seperti terjadinya keterlambatan atau tertundanya kedatangan kapal penerima (*receiving vessel*) dikarenakan adanya cuaca buruk harus disampaikan atau diminta agar MT. Frontek dapat memberikan informasi tentang kondisi perairan yang dilewati untuk

membantu kapal penerima (*receiving vessel*) dalam berlayar menuju lokasi *bunkering* sehingga nahkoda dapat memperkirakan kapan akan bergerak menuju ke kapal penerima (*receiving vessel*) untuk melakukan kegiatan bunkering sesuai jadwalnya. Segala bentuk informasi yang berhubungan dengan posisi kapal penerima (*receiving vessel*), gangguan maupun hambatan yang dihadapi harus diterima dengan akurat oleh MT. Frontek agar dapat menentukan dan memperkirakan *schedule bunkering* baik ke kapal tersebut maupun ke kapal selanjutnya. Apabila kapal niaga yang dimaksud sudah dipastikan posisinya dan dapat dihubungi, agar tetap menjaga komunikasi untuk menanyakan hal-hal yang berkaitan dengan pelaksanaan kegiatan pemasokan bahan bakar. Sebagai pihak yang mewakili kapal-kapal yang akan dipasok maka semua keterangan tentang keperluan dari kapal tersebut bisa diminta secara lengkap dari agen.

Terjadinya kesalahan tentang letak/posisi kapal yang akan dipasok berawal dari informasi yang diberikan oleh agen ke perusahaan. Untuk itu apabila terjadi suatu perubahan apapun atas kapal-kapal yang akan dipasok diharapkan untuk secepatnya memberitahukan kepada perusahaan yang nantinya akan diteruskan ke pihak kapal. Atau pihak agen bisa langsung menghubungi kapal mengenai adanya perubahan-perubahan tersebut. Biasanya informasi perubahan-perubahan tersebut antara lain mengenai:

- a) Waktu tiba kapal niaga yang datang
- b) Lokasi berlabuh jangkar
- c) Jenis atau jumlah bahan bakar yang diperlukan
- d) Adanya antrian dalam mensupply logistik terhadap kapal

b. Terjadinya kerusakan peralatan *bunker* pada saat proses pelaksanaan *bunker* ke kapal lain

Alternatif pemecahan masalahnya yaitu:

1. **Perawatan peralatan penunjang kegiatan *bunker* oleh ABK sesuai dengan *Plan Maintenance System (PMS)***

Kurangnya perawatan peralatan *bunker* dapat mempengaruhi kelancaran kegiatan *bunkering* ke kapal lain. Agar peralatan penunjang kegiatan *bunker* dapat digunakan setiap saat maka perlu adanya perhatian dan perawatan oleh ABK (Anak Buah Kapal).

Di dalam *ISM code Part A – Implementation Chapter 10*, dikatakan bahwa perusahaan harus menyusun prosedur untuk memastikan bahwa kapal dipelihara sesuai dengan ketentuan aturan yang berlaku, melaksanakan inspeksi secara interval dan persiapan dalam keadaan darurat. Hal inilah yang membuat system perencanaan perawatan dibuat dan diterapkan diatas kapal. (*chapter 10.4*)

Di dalam *SMM (Ship Management Manual)* salah satu cara untuk melakukan perawatan agar tetap dalam kondisi baik adalah dengan mengikuti *PMS (Plan Maintenance Schedule)* yang di dalamnya terdapat perawatan berkala serta dapat mengontrol kondisi peralatan penunjang *bunkering* ke kapal lain yang harus diikuti dan dilaksanakan oleh ABK (Anak Buah Kapal). Didalam menyusun rencana kerja serta manajemen perawatan dan perbaikan harus direncanakan sedemikian rupa, dengan memperhatikan kendala-kendala yang dapat dihadapi, seperti:

- a) Pengenalan yang cermat terhadap penggunaan suku cadang serta peralatan-peralatan yang ada di kapal.
- b) Kemampuan anak buah kapal yang tidak saja dituntut sebagai operator, tetapi juga harus mampu sebagai pelaksana pemeliharaan / perawatan serta perbaikan.

Di dalam menggerakkan anak buah kapal untuk melaksanakan perawatan yang sudah terencana dan teratur harus disertai dengan pengawasan yang baik, sehingga dapat dijamin kualitas pekerjaan perawatan peralatan dengan baik, serta mencegah hal-hal yang tidak diinginkan akibat kecerobohan dalam pekerjaan. Sesuai dengan isi dalam aturan Manajemen Keselamatan Internasional (*ISM Code*) pada code 10 tentang Pemeliharaan

kapal dan perlengkapannya, menyatakan bahwa perusahaan harus menyusun prosedur untuk memastikan bahwa kapal dan peralatannya dipelihara sesuai dengan ketentuan peraturan yang berlaku dan peraturan beserta setiap persyaratan tambahan yang dikeluarkan oleh perusahaan.

Berikut ini cara perawatan peralatan penunjang kegiatan *bunkering* adalah :

- (1) Inspeksi adalah kegiatan pemeliharaan periodik untuk memeriksa kondisi komponen peralatan yang merupakan kegiatan pemeliharaan untuk memeriksa kondisi peralatan melalui penglihatan, perasaan dan pendengaran.
- (2) Pemeliharaan berjalan adalah kegiatan pemeliharaan yang dilaksanakan tanpa menghentikan kerja peralatan.
- (3) Penggantian komponen kecil adalah kegiatan pemeliharaan yang berupa penggantian komponen kecil.
- (4) Pemeliharaan berhenti adalah pemeliharaan yang dapat dilakukan hanya pada saat peralatan berhenti atau tidak dipergunakan.

Kemampuan ABK (anak buah kapal) yang tidak saja dituntut sebagai operator, tetapi juga harus mampu sebagai pelaksana pemeliharaan / perawatan serta perbaikan namun ada kalanya ABK tidak mampu untuk melakukan perbaikan dengan alasan antara lain padatnya kegiatan *bunkering* ke kapal lain sehingga tidak adanya waktu untuk melakukan perbaikan pada peralatan *bunker* yang rusak dan terbatasnya pengetahuan/ kemampuan dan peralatan serta tidak adanya *spare part* di kapal untuk untuk memperbaiki peralatan penunjang *bunker* yang rusak.

Pada saat penulis bekerja di MT. Frontek kegiatan *bunkering* dari MT. Frontek ke kapal lain mempunyai intensitas yang tinggi, dengan *crew deck rating* yang hanya berjumlah 5 (lima) orang yang terdiri dari 1 (satu) Bosun dan 4 (empat) AB atau juru mudi, kegiatan bongkar muat dan perawatan peralatan

tidak bisa dilakukan secara bersamaan karena seluruh kru berfokus pada kegiatan bunkering saja.

Sehingga pada akhirnya perusahaan menunjuk teknisi dari darat untuk bekerjasama dalam memperbaiki peralatan *bunkering* ke kapal lain yang mengalami kerusakan tersebut yaitu kerusakan pada *cargo pump*, baik dikerjakan di atas kapal dan ataupun peralatan *bunker* yang rusak dikirim ke darat untuk diperbaiki oleh teknisi darat dan perusahaan pun diuntungkan dengan adanya garansi perbaikan dari teknisi darat.

2. Pengadaan *spare part* yang rusak

Dalam pemeliharaan tidak terlepas dari perbaikan, karena bagaimanapun juga sebuah peralatan pada suatu saat bagian – bagiannya akan mengalami keausan maupun kerusakan. Dengan demikian tersedianya *spare part* untuk peralatan – peralatan utama yang digunakan dalam kegiatan proses *bunkering* ke kapal lain merupakan hal yang penting dan sangat menunjang dalam pelaksanaan perawatan pada peralatan penunjang kegiatan *bunkering* ke kapal lain.

Dalam hal ini adalah *spare part* dari peralatan *bunker* yang sering di pakai dalam kegiatan bunkering sehingga potensi untuk rusak sangat cepat seperti, cargo hose, gasket/ seals, valve- valve, kunci ring pass, sprayer, dan spare part pada cargo crane. Permintaan *spare part* harus diajukan jauh – jauh hari sebelum *spare part* yang terakhir di pakai. Hal ini mengingat waktu yang di butuhkan untuk pengiriman *spare part* cukup lama, sehingga kapal tidak akan sampai mengalami kekosongan atau kekurangan *spare part*. Dalam permintaan *spare part* perlu diperhatikan kekuatan dari komponen – komponen tersebut, jenis dan jumlah *spare part* yang digunakan.

Sebagian peralatan-peralatan di atas kapal sudah ada yang diperbaiki dan menggunakan suku cadang yang asli dan telah disupply suku cadang baru buatan china yang keasliannya diragukan karena kurangnya ketelitian orang yang menangani suku cadang. Sepintas lalu, kalau kita amati seperti asli, setelah

dipasang dan dioperasikan hanya bertahan satu voyage saja. Contohnya seperti *flexible join pipe*, kalau yang asli dapat bertahan sampai dengan beberapa tahun asalkan pengoperasiannya yang benar.

Seperti yang penulis alami yang telah di bahas pada analisa penyebab masalah di atas. Untuk menghindari agar minyak tidak tumpah sehingga mengakibatkan pencemaran lingkungan maka pembongkaran muatan diberhentikan sementara dengan terlebih dahulu koordinasi kepada *receiving vessel* dan memberitahukan kepada pihak yang terkait lainnya supaya pembongkaran diberhentikan sementara untuk memperbaiki yang bocor tersebut, lalu sambungan *flexible join pipe* sudah pecah sehingga terjadi kebocoran. Oleh karena itu pembongkaran menjadi terlambat selama penggantian.

Pengadaan *spare part* di kapal memerlukan waktu dengan proses yang berbelit-belit. Pihak kapal membuat Laporan Kerusakan dari suatu alat, Berita Acara Kerusakan, Laporan *Deficiency*, *Requisition List*, Surat Permohonan dan Surat Pengantar yang semuanya ditujukan ke *technical superintendent* dua bulan kemudian spare parts yang diminta, baru datang.

2. Evaluasi Terhadap Alternatif Pemecahan Masalah

a. Waktu tiba ETA (*Estimate Time of Arrival*) kapal penerima bunker yang tidak sesuai dengan jadwal yang diberikan oleh agen

1) Menjalin komunikasi yang baik antara kapal bunker dan kapal penerima bunker

Keuntungannya :

Dengan menjalin komunikasi yang baik maka dapat berkoordinasi secara efektif, informasi yang akurat dan terbaru dapat disampaikan dengan tepat waktu. Hal ini memungkinkan untuk menghindari kejadian-kejadian yang tidak diinginkan dan meningkatkan optimalisasi proses *bunkering*.

Kerugiannya :

Membutuhkan peran aktif dari pihak kapal penerima *bunker* dengan agen, agen dengan *programmer* dan *programmer* dengan kapal bunker. Terkadang pada lokasi tertentu tidak ada jaringan, hal ini dapat menghambat pertukaran informasi yang cepat dan akurat.

2) Pemantauan cuaca secara berkala dengan menggunakan peralatan navigasi yang ada

Keuntungannya :

Dengan adanya pemantauan cuaca di daerah pelayaran kapal penerima *bunker* secara berkala maka dapat diketahui kondisi cuaca sebelum tiba sehingga dapat mengkonfirmasi perkiraan waktu tiba dan bilamana ada perubahan keadaan cuaca maka dapat menginformasikan kepada pihak terkait sehingga bilamana ada perubahan waktu tiba dapat diinformasikan lebih awal.

Kerugiannya :

Dibutuhkan ketelitian pembacaan berita cuaca dan peran aktif dari *chief officer* maupun nakhoda yang harus memonitor keadaan cuaca setiap waktu. Mengandalkan sumber informasi cuaca *online* dapat menjadi masalah jika terjadi gangguan ataupun kesalahan pada sumber tersebut. Keterbatasan akses ke informasi yang di perlukan dapat menghambat perencanaan dan pengambilan keputusan yang efektif.

b. Terjadinya kerusakan peralatan *bunker* pada saat proses pelaksanaan *bunker* ke kapal lain

1. Perawatan peralatan penunjang kegiatan *bunker* oleh ABK sesuai dengan *Plan Maintenance System (PMS)*

Keuntungannya :

Perawatan yang terencana dan teratur dapat memastikan bahwa peralatan penunjang kegiatan *bunkering* tetap dalam kondisi baik. Mengikuti dari *Plan Maintenance System (PMS)* dan melibatkan anak buah kapal (ABK) dalam perawatan dapat meningkatkan pengetahuan dan ketrampilan serta memperkuat

tanggung jawab mereka sebagai anak buah kapal (ABK).
Kerugiannya :

Terbatasnya waktu dan intensitas kegiatan bunkering yang tinggi dapat menjadi kendala dalam melakukan perawatan. Perawatan membutuhkan ketrampilan prosedur perawatan yang benar, belum tentu anak buah kapal (ABK) memiliki ketrampilan yang baik.

3. Pengadaan *spare part* yang rusak

Keuntungannya :

Ketersediaan *spare part* yang ada diatas kapal dibutuhkan untuk perawatan peralatan penunjang bunker kapal sehingga saat terjadi kerusakan dapat segera dilakukan perbaikan.

Kerugiannya :

Proses pengadaan *spare part* di kapal melibatkan prosedur yang rumit dan membutuhkan waktu yang lama dalam mengirimkan suku cadang ke kapal.

3. Pemecahan Masalah yang di pilih

a. Waktu tiba ETA (*Estimate Time of Arrival*) kapal penerima *bunker* tidak sesuai dengan jadwal yang diberikan oleh agen

Berdasarkan evaluasi terhadap alternatif pemecahan masalah di atas, maka pemecahan masalah yang dipilih untuk mengatasinya yaitu menjalin komunikasi yang baik antara kapal bunker dan kapal penerima *bunker*.

b. Terjadinya kerusakan peralatan *bunker* pada saat proses pelaksanaan *bunker* ke kapal lain

Berdasarkan evaluasi terhadap alternatif pemecahan masalah di atas, maka pemecahan masalah yang dipilih untuk mengatasinya yaitu perawatan peralatan penunjang kegiatan *bunker* oleh ABK sesuai dengan *Plan Maintenance System (PMS)*.

BAB IV

KESIMPULAN DAN SARAN

A. KESIMPULAN

Berdasarkan analisa dan pembahasan didukung oleh data maka dapat disimpulkan sebagai berikut:

1. Terjadinya keterlambatan dalam proses *bunkering* MFO (*Marine Fuel Oil*) dari MT. Frontek ke kapal lain dikarenakan waktu tiba ETA (*Estimate Time of Arrival*) kapal yang tidak sesuai dengan jadwal yang sudah ditentukan sebelumnya karena kurangnya koordinasi antara pihak kapal bunker, pihak kantor yaitu *programmer* dan pihak agen kapal penerima *bunker* maka perlu dilakukan komunikasi yang baik dan benar yang merupakan kunci penting dalam menjalankan kegiatan *bunkering* di atas kapal. MT. Frontek perlu aktif dan rutin berkomunikasi dan berkoordinasi dengan pihak terkait untuk mendapatkan informasi yang akurat, selain itu komunikasi juga dapat dilakukan dengan *Singapore port control* untuk mengetahui perkiraan waktu tiba kapal. Informasi tentang kondisi dan hambatan yang dihadapi oleh kapal penerima *bunker* dalam hal ini cuaca buruk ataupun hal lainnya, harus disampaikan dengan cepat dan akurat agar dapat menentukan jadwal *bunker* yang tepat waktu. Komunikasi yang terjaga mengenai keperluan *bunkering* dan perubahan informasi mengenai waktu tiba kapal harus segera disampaikan kepada perusahaan, agen dan kapal pemasok bahan bakar.
2. Terjadinya keterlambatan dalam proses *bunkering* MFO (*Marine Fuel Oil*) dari MT. Frontek ke kapal lain karena kerusakan peralatan *bunker* yang diakibatkan dari kurangnya perawatan berkala yang dilakukan MT. Frontek maka diperlukan perawatan rutin dan pengecekan peralatan *bunker* sesuai dengan *Plan Maintenance System (PMS)* dari perusahaan, hal ini sangat penting untuk menjaga kinerja dari peralatan *bunker* yang akan membantu mencegah

kerusakan peralatan bunker dan memastikan kinerja yang optimal. Kendala lain yang dihadapi adalah kurangnya dukungan *spare part* sebagai peralatan penunjang *bunker* ke kapal lain dari perusahaan.

B. SARAN

1. Ditujukan kepada Nakhoda

Nakhoda agar memastikan koordinasi yang baik antara *programmer* kantor, agen dan kapal penerima *bunker*, jika diperlukan mengadakan *meeting* atau komunikasi secara berkala yang dapat membantu memastikan pemahaman yang jelas tentang jadwal bunker serta memastikan semua pihak memiliki informasi yang sama, nakhoda juga harus menjaga komunikasi yang aktif dan teratur dengan pihak terkait seperti *programer*, agen, kapal penerima *bunker* dan Singapore *port control*. Nakhoda dapat melakukan evaluasi terhadap proses *bunker* yang ada dan mencari peluang perbaikan, hal ini dapat meliputi memperbaiki prosedur komunikasi, koordinasi, mengatur jadwal dengan lebih tepat. Dengan demikian, keterlambatan waktu tiba dan masalah koordinasi dapat diminimalkan dan proses *bunkering* dapat berjalan dengan lebih optimal.

2. Ditujukan Kepada *chief officer*, anak buah kapal (ABK) dan perusahaan.

Chief officer agar mengimplementasikan dan mematuhi *Plan Maintenance System (PMS)* yang telah ditetapkan oleh perusahaan, memastikan bahwa semua perawatan rutin dan pengecekan peralatan *bunker* dilakukan sesuai dengan *Plan Maintenance System (PMS)* yang telah ditentukan, hal ini akan membantu mencegah kerusakan peralatan *bunker* dan menjaga kinerja optimal. Mengawasi pelaksanaan perawatan berkala oleh anak buah kapal (ABK) dan memastikan bahwa mereka memahami pentingnya perawatan yang rutin dan tepat waktu.

Anak buah kapal (ABK) agar melakukan perawatan berkala sesuai dengan *Plan Maintenance System (PMS)* yang telah ditetapkan, hal ini meliputi pemeriksaan, pemeliharaan dan penggantian *spare part* jika diperlukan. Melaporkan setiap kerusakan atau masalah pada peralatan bunker secara cepat kepada *chief officer* agar tindakan perbaikan dapat segera diambil juga melaporkan kebutuhan suku cadang yang diperlukan. Mengikuti pelatihan dan peningkatan ketrampilan

terkait perawatan dan pengoperasian peralatan *bunker* agar dapat melaksanakan tugas dengan baik.

Perusahaan agar memastikan bahwa *Plan Maintenance System (PMS)* yang telah disusun dan diterapkan berjalan dengan baik, *Plan Maintenance System (PMS)* harus mencakup jadwal peralatan berkala pengecekan peralatan bongkar muat dan memenuhi kebutuhan *spare part*. Memastikan ketersediaan dan kelengkapan *spare part* yang diperlukan di dalam *store* kapal sesuai dengan permintaan *store* yang diajukan oleh pihak kapal, hal ini dapat dilakukan dengan menjalin kerjasama yang baik dengan *supplier spare part*. Memberikan dukungan terhadap *officer* dan anak buah kapal (ABK) berupa pelatihan dan peningkatan ketrampilan terkait perawatan peralatan bunker dan manajemen *Plan Maintenance System (PMS)*.

Dengan mengikuti langkah-langkah tersebut, *chief officer*, (ABK) anak buah kapal dan perusahaan dapat bekerja sama dalam memastikan perawatan berkala yang tepat pada peralatan bunker dan ketersediaan *spare part* yang memadai. Hal ini akan membantu mencegah kerusakan peralatan dan keterlambatan dalam proses pelaksanaan *bunkering* serta memastikan kinerja yang optimal dalam operasional kapal.

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MGM SHIPMANAGEMENT PTE LTD

VOL.00 FORM

Date: 1 May 2022



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Ver.: 2.0

STATEMENT OF FACTS

Date	Ship Name	Master Name	Location
20 Jan 2023	Frontek	Karyadi Eka Subrata	AESPA

Enter the time if known (All times refer to at or about)	STATEMENT
20 Jan 2023 06.30Hrs	<p>During the bunkering operation between MT. Frontek and the vessel Seacon Manila at AESPA (Eastern Special Purposes Anchorage), a leak was discovered in the pump room's flexible joint pipe connecting the cargo pump to the discharge pipeline on the main deck and crane boom. The leak was confirmed to be caused by a fault in the flexible joint pipe portside. Following the discovery of a leak in the pump room's flexible joint pipe on the port side during the bunkering operation, the bosun promptly reported the incident to the Chief Officer. The Chief Officer conducted a direct inspection in the pump room to identify the source of the leak. Subsequently, the Chief Officer instructed the bosun to immediately shut down the cargo pump and close the open cargo valves used during the bunkering process to prevent further leaks in the pump room. The Chief Officer informed the crew of the Seacon Manila, who were on duty, that the bunkering process was temporarily suspended for the replacement of the starboard side cargo pump. The Chief Officer requested the engineer Frontek on duty to start starboard side cargo pump; however, after a few minutes of waiting, the Chief Engineer reported that the starboard side cargo pump could not be started. According to the Chief Engineer, the damage occurred in the solenoid gear box, resulting in the burning of several electrical parts, and there were no spare parts available in the engine store.</p>

This statement has been written to the best of my knowledge	 Master Signature	 Ship Stamp
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Attach supporting documents including pictures if any.

MGM SHIPMANAGEMENT PTE LTD





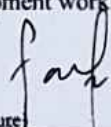


VOL. 02 FORM

Date: 1 May 2022

PMS-DEF

Ver.: 2.0





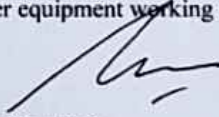



Damage & Repair Report

Vessel / Dept : Frontek	Date : 20 January 2023
DETAILS OF DEFECT : * Starboard cargo pump unable to start due to solenoid and short in electric part	
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;">  <u>Reported by : (Signature)</u> (Rank / Name) Fajar Setiyadi </div> <div style="text-align: center;">  </div> </div> <div style="margin-top: 10px;"> Priority : High (1 week) <input checked="" type="checkbox"/> Medium (2 weeks) <input type="checkbox"/> Low (1 month) <input type="checkbox"/> </div>	
Results of the ROOT CAUSE ANALYSIS This may due to damage, loose connections, or corrosion. As a result, the solenoid is unable to activate the pump, leading to its failure to start.	
CORRECTIVE ACTION : * The faulty solenoid should be either repaired or replaced. This involves disconnecting the power supply, removing the damaged solenoid, and installing a new one or repairing the existing solenoid by fixing loose connections, replacing damaged components, or cleaning corrosion. Ensure that the solenoid is compatible with the pump's specifications	
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;">  <u>Serviced by : (Signature)</u> (Rank / Name) Technical Superintendent/ Ting </div> <div style="text-align: center;">  </div> </div>	
After repairs were carried out, the equipment was tested and found to be in satisfactory operational condition Tested the bunker equipment working satisfactory and no leaking .	
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;">  <u>Accepted : (Signature)</u> (Rank / Name) CE/Fajar Setiyadi </div> <div style="text-align: center;">  </div> </div>	
PREVENTIVE ACTION / CLOSE-OUT : Implement a scheduled maintenance plan for the cargo pump system. This should include periodic inspections of electrical components, such as solenoids and wiring, to identify and address potential issues before they lead to pump failure	
25 January 2023 <u>Date approved and "Closed-out"</u>	<div style="text-align: center;">  <u>Technical Superintendent / Ting Sheng Liang</u> (Signature / Name / Rank) </div>

*Attach supporting documents, photos, etc, if any

[Back](#)

Damage & Repair Report

Vessel / Dept : Frontek	Date : 20 January 2023
DETAILS OF DEFECT : * Leakage of flexible join pipe in the pump room during bunkering	
<div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;">  Reported by : (Signature) (Rank / Name) Haryoko </div> <div style="text-align: center;">  </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> Priority : High (1 week) <input checked="" type="checkbox"/> Medium (2 weeks) <input type="checkbox"/> Low (1 month) <input type="checkbox"/> </div>	
Results of the ROOT CAUSE ANALYSIS lack of sufficient time for the crew to conduct regular maintenance and inspections of the bunkering equipment, leading to potential inefficiencies and disruptions in the cargo maintenance and bunkering processes.	
CORRECTIVE ACTION : * improve the effectiveness and reliability of the bunkering equipment, promoting smooth cargo operations and enhancing overall vessel performance and safety. Replacement of flexible join pipe with new one	
<div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;">  Serviced by : (Signature) (Rank / Name) CO/Haryoko </div> <div style="text-align: center;">  </div> </div>	
After repairs were carried out, the equipment was tested and found to be in satisfactory operational condition Tested the bunker equipment working satisfactory and no leaking .	
<div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;">  Accepted : (Signature) (Rank / Name) Master/Karyadi Eka Subrata </div> <div style="text-align: center;">  </div> </div>	
PREVENTIVE ACTION / CLOSE-OUT : Maintenance as per PMS, raise requisition for spare part, any deficiencies report and take early action to solve the deficiencies	
20 January 2023 Date approved and "Closed-out"	<div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;">  Technical Superintendent / Ting Sheng Liang (Signature / Name / Rank) </div> <div style="text-align: center;">  </div> </div>

*Attach supporting documents, photos, etc, if any

[Back](#)

SENTEK**SENTEK MARINE & TRADING PTE LTD**

24 & 26 Sam Leong Road, Singapore 207915. Tel: (65) 6299-6630 Fax: (65) 6299-1134

E-mail: bunkers@sentek.com.sg RCB No. 199303409Z Licence No. 93167

BUNKER DELIVERY NOTE
(MASS FLOW METERING)BDN NO. **F 045512**Date : **18.12.2022**

Port : **SINGAPORE** Bunker Metering Ticket No. : **1211**

Delivery Location : **AESPA** Vessel's Name : **SINO OCEAN**

Bunker Tanker's Name : **FRONTEK** Vessel's IMO No. : **9408255**

SB No. : **0742Z** Gross Tonnage : **32957**

Alongside Vessel : **18.12.2022 00:20HRS** Owner/Operator : **OWNERS**
(Date / Time)

Commenced Pumping : **18.12.2022 02:01HRS** ETD : **18.12.2022**
(Date / Time)

Completed Pumping : **18.12.2022 04:13HRS** Next Port : **SAUDI ARABIA**
(Date / Time)

PRODUCT SUPPLIED

Product Name	MFO 3800ST	Flash Point (°C) (ISO 2719)	77.0
Viscosity at 40°C or 50°C (mm ² /s) (ISO 3104)	364.8	Sulphur Content (% m/m) (ISO 14596 or ISO 8754)	2.75
COQ* density at 15°C (kg/m ³) (ISO 3675 or ISO 12185)	0.9749		
Water Content (% V/V) (ISO 3733)	0.20	Metric Tons Delivered (Mass in Air)	298.411

*The COQ (Certificate of Quality) Density stated above is for fuel specification only and not for transfer quantity determination.

SUPPLIER'S CONFIRMATION**Declaration that bunker fuel supplied conforms with MARPOL Annex VI**

We declare that the bunker fuel supplied conforms with Regulation 18.3 of this Annex and that the sulphur content of the fuel oil supplied does not exceed:

Please mark (X) in the applicable box(es) below:

- ☐ the limit value given by Regulation 14.1 of this Annex;
- ☐ the limit value given by Regulation 14.4 of this Annex; or
- ☒ the purchaser's specified limit value of **3.50** (% m/m),

as completed by the fuel oil supplier's representative and on the basis of the purchaser's notification that the fuel oil is intended to be used:

1. in combination with an equivalent means of compliance in accordance with Regulation 4 of this Annex; or
2. is subject to a relevant exemption for a ship to conduct trials for sulphur oxides emission reduction and control technology research in accordance with Regulation 3.2 of this Annex.

For **Sentek Marine & Trading Pte Ltd**
Company's Name and Stamp

Signature of Cargo Officer

KENNY LIM HK

Full Name in Block Letters



Bunker Tanker's Stamp

MASTER'S / CHIEF ENGINEER'S ACKNOWLEDGEMENT

We acknowledge receipt of the above product and confirm that the following samples were jointly taken by continuous drip sampler at the vessel's manifold, sealed and numbered:

	Seal no.	Counter Seal no. (if any)
Vessel	4486791	—
MARPOL	4486792	—
Bunker Tanker	4486793	—
	4486794	—
Surveyor	—	—
Others	4486795 (To specify)	— (To specify)

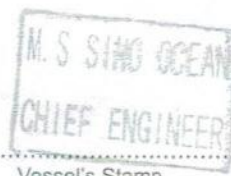
Acknowledged By:

LIUQUANJIN
Signature of Master/Chief Engineer

Full Name in Block Letters

18.12.2022 05:00HRS

Date and Time



Vessel's Stamp

REMARKS**NIL**Was a copy of SDS received? **Yes** ~~No~~Was a Note of Protest issued? **Yes** ~~No~~

Sentek Marine & Trading Pte Ltd's General terms and conditions (Latest Edition) are applicable to this supply and are accepted by the vessel in accepting delivery of the bunker fuel.

No disclaimer stamp of any type or form will be accepted on this receipt, nor should any such stamp be applied, will alter, change, or waive seller's/supplier's lien against the vessel or waive the vessel's ultimate responsibility and/or liability for the debt incurred through this transaction.

Warning: Fuel used in SOx emission control area are subject to Vessel discretion.

(TR 48-2015 / 010417 / C)

BUNKER METERING TICKET
*****ORIGINAL*****

Vessel ID:
MT FRONTEK
SB 0742 Z
System ID:
NB000324430



BTN.:
1211 / MFO

Printout Time:
2022/DEC/18 04:13:39

Start Time:
2022/DEC/18 02:01:07

End Time:
2022/DEC/18 04:13:27

Totalizer Loading
at Operation Start:
357792.667 t (in air)

Totalizer Loading
at Operation End:
357792.667 t (in air)

Totalizer Delivery
at Operation Start:
353149.883 t (in air)

Totalizer Delivery
at Operation End:
353448.294 t (in air)

Mass DELIVERED:
298.411 t (in air)

Signatures:

Chief Engineer

Cargo Officer



***ATTACH THIS TICKET TO
BDN***

All times GMT+08:00 Kuala
Lumpur, Singapore



SENTEK MARINE & TRADING PTE LTD

24 & 26 Sam Leong Road, Singapore 207915. Tel: (65) 6299-6630 Fax: (65) 6299-1134

E-mail: bunkers@sentek.com.sg RCB No. 199303409Z Licence No. 93167

BUNKERING PRE-DELIVERY SAFETY CHECKLIST

Vessel's Name SINO OCEAN

Bunker Tanker's Name FRONTEK

Vessel's IMO No. 9408255

Agent —

Vessel's Location AESPA

Port SINGAPORE

Date 18.12.2022

All questions should be jointly answered by the cargo officer and the chief engineer by clearly **initialling** in the appropriate box, unless both parties agree to a "N.A." entry. A copy of the completed checklist should be retained by both the bunker tanker and the vessel.

No.	Items To Be Checked	Bunker Tanker		Vessel		Remarks								
		Yes	No	Yes	No									
1	Is the vessel securely moored? The condition of fenders are checked.	✓		✓		Code R								
2	Is the vessel ready to move under its own power?	✓		✓		Code P, Code R								
3	Has the maximum line pressure been agreed upon?	✓		✓		State max. pressure : <u>3</u> bar								
4	Have the vessel pre-loading plan, transfer sequence, rates, and volumes to be delivered been agreed upon? State sequence and rates <table border="1" style="width: 100%;"> <tr> <th>Grade</th> <th>Initial Rate</th> <th>Max Rate</th> <th>Topping Rate</th> </tr> <tr> <td>MFO 38038</td> <td>50</td> <td>200</td> <td>50</td> </tr> </table>	Grade	Initial Rate	Max Rate	Topping Rate	MFO 38038	50	200	50	✓		✓		No transfer of bunker in bulk to be carried out during bunkering operation. Cargo oil contents to be monitored at regular intervals. MSDS made available where requested. Code R
Grade	Initial Rate	Max Rate	Topping Rate											
MFO 38038	50	200	50											
5	Has the notice period required for completion of transfer been agreed upon?	✓		✓		State notice period: <u>10</u> minutes								
6	Has the procedure for draining delivery hoses on completion of transfer been agreed upon?	✓		✓		State procedure: <u>SS648</u>								
7	Are transfer hoses in good condition, and properly rigged with all flange holes fully bolted?	✓		✓										
8	Is there a person in constant attendance at both the delivery and receiving hose connections?	✓		✓		Responsible person: <u>Y/B</u> Vessel : <u>Y/B</u> Bunker tanker : <u>BOSUN</u>								
9	Are all bunker tank lids closed?	✓		✓										
10	Are unused delivery connections blanked & fully bolted?	✓		✓										
11	Are required delivery warning notices in position?	✓		✓										
12	Are all crew / staff members involved in the bunkering operations wearing the appropriate personal protective equipment including H ₂ S and O ₂ monitors?	✓		✓		Gas content has been identified and understood. H ₂ S: <u>0</u> ppm O ₂ : <u>20.9</u> % Code R								
13	Are hand torches of an approved type?	✓		✓										
14	Are portable electronic devices of an approved type (for marine usage)?	✓		✓										
15	Are restrictions on smoking and the use of naked lights being observed?	✓		✓		Smoke room: <u>MESS ROOM</u> Ship: <u>MESS ROOM</u> Bunker tanker: <u>MESS ROOM</u> Code A, Code R								
16	Is fire fighting equipment positioned and ready for immediate use?	✓		✓		Code R								
17	Is emergency oil spill response equipment positioned adjacent to both hose connections?	✓		✓		Code R								
18	Are all external doors and portholes in the accommodation closed?	✓		✓		Code R								

No.	Items To Be Checked	Bunker Tanker		Vessel		Remarks
		Yes	No	Yes	No	
19	Are window type air conditioning units (where fitted) disconnected?	NA	/	NA	/	
20	Are air conditioning intakes which may permit the entry of cargo vapours closed?	✓		✓		
21	Is effective communication established between the bunker tanker and the vessel?	✓		✓		State method: <u>VERBAL</u> Code R
22	Has the Emergency signals and shut down procedure been agreed upon?	✓		✓		State procedure: <u>HAND SIGNAL</u>
23	Are there sufficient persons on board and at the delivery point to deal with emergencies?	✓		✓		State number of persons: Vessel : <u>7</u> Bunker Tanker : <u>2</u>
24	Is there safe access between the bunker tanker and the vessel?	✓		✓		Circle the access method: Accommodation ladder / SOLAS-approved ladder Code R
25	Are the scuppers and drains on board properly plugged? Temporarily removed plugs will be monitored.	✓		✓		Code R
26	Is adequate lighting available to perform operations during hours of darkness?	✓		✓		
27	Are bunker connection point spill trays plugged?	✓		✓		Code R
28	Are day & night signals exhibited?	✓		✓		Code R
29	Fixed VHF & AIS is in low power mode or switched off.	✓		✓		
30	Main radio transmitter aerials are earthed & radar is switched off.	✓		✓		
31	Measures have been taken to ensure sufficient mechanical ventilation in the pump room.	✓		✓		Code R
32	The maximum wind and swell criteria for operations have been agreed.	✓		✓		Stop cargo: <u>25</u> kt Disconnect at: <u>30</u> kt Cast off at: <u>35</u> kt
33	C.O.T and bunker tank high level alarms if fitted, are operational and tested.	✓		✓		
34	Overboard valves connected to the cargo system, engine room bilges and bunker lines are closed and sealed.	✓		✓		

We have also made arrangements to carry out repetitive checks as necessary and agree that those items with code 'R' in the "Remarks" column should be re-checked at intervals not exceeding 1 hours.

Record of repetitive checks :

Date	18/12	18/12	18/12	18/12					
Time	0115	0215	0315	0415					
Initial for Vessel	<u>王</u>	<u>王</u>	<u>王</u>	<u>王</u>					
Initial for Bunker Tanker	<u>王</u>	<u>王</u>	<u>王</u>	<u>王</u>					

Declaration

We, the undersigned have jointly covered all items on this checklist and have satisfied ourselves that the entries we have made are correct and to the best of our knowledge.

For Bunker Tanker :	For Vessel :	For Bunker Surveyor :
Name : <u>KENNY LIM</u>	Name : <u>LIVANJIN</u>	(For Receipt Only)
Signature <u>王</u>	Signature <u>王</u>	Name : <u>NA</u>
Date : <u>18.12.2022</u> Time : <u>0030 Hrs</u>	Date : <u>18.12.2022</u> Time : <u>0030 Hrs</u>	Signature <u>王</u>
		Date : _____ Time : _____

Code A: (Agreement). This indicates an agreement or procedure that should be identified in the Check-List or communicated in some other mutually acceptable form.

Code P: (Permission). In the case of a negative answer to the statement coded 'P', operations should not be concluded without the written permission from the appropriate authority.

Code R: (Re-check). This indicates items to be re-checked at appropriate intervals, as agreed between both parties and stated in the declaration.

Chapter 4

CARGO OPERATIONS

Loading, Discharging, Internal transfer, Supplying and Receiving bunkers

1. RESPONSIBILITIES

1.1. Cargo custody officer

1. Strictly comply with the Company's Operations department personnel instructions,
 - On oil cargo operation (loading, discharging, bunkering and own ship engine bunker) requirements
 - On bunker supply schedule requirements
2. Oversee, look after (care for) the Company's cargo on board:
 - Company instructions are correctly noted down and
 - Clear instructions given to master or chief officer for correct oil cargo quantity,
 - To load
 - Internal oil cargo (tank to tank) transfer
 - Discharge during ship to ship operations
 - Bunkered to customer vessels
 - Bunkers for own ship engine use
3. Provide master with bunker supply schedule information.
4. Make sure that the cargo quality is maintained at all times,
 - Confirm oil cargo specifications (density, Sulphur content, grade) are proper and correct as instructed by the Company before loading and on the Certificate of Quality issued.
 - The cargo tank is well secured to prevent unintentional comingling.
 - The crew is well instructed on the nominated cargo tank(s) for the intended cargo operation.

Intentionally left blank

5. When bunkering strictly comply with SS600:2014,

- Required before and after bunkering documents
- Proper procedures for before and after bunkering procedures
- Procedures for sampling
- Procedures for disputes
 - Re-check reference heights and tank gauging of all cargo and non-cargo tanks of bunker tanker.
 - Re-check all physical measurement against the tank calibration tables (TCT) of bunker tanker.
 - Re-check all calculation and figures used for quantity determination on board bunker tanker.
 - Confirm no modification to all relevant tanks and lines.
 - Examine the stock movements in the bunker tanker's stock movement logbook related to the bunker delivery.
 - Investigate and determine the pipeline content of the bunker tanker including any possible leakage point.
 - Examine the last certificate of quantity or equivalent document and surveyor's bunker tanker measurement reports.

6. Monitor master and ship staff coordination for efficient bunkering operations.

7. Report immediately to the Company on any changes found or noted to the quantity and or quality of the oil cargo.

8. Available to produce for sighting while on duty on board,

- Your personal identity card and
- Your certified bunker cargo officer document.

9. Other Requirements but not limited to the following,

9.1. Oil cargo loading and discharging

1. Upon receipt of cargo operations instructions from the Company operations department, notify chief officer of the cargo details and requirements.

2. Keep custody of related cargo documents:

Loading,

- Safe keeping of the bill of lading (B/L) if applicable
- Cargo manifest if applicable
- Certificate of Quality
- Certificate of Quantity
- Other required documents

Discharging or Bunkering

- If applicable, handover B/L and other documents to designated person as per Company instructions
- Complete Bunker Delivery Note (BDN) and file endorsed copy.
- Report immediately to the Company operations manager:
 - Any issue related to the cargo quantity and or quality received
 - Any issue related to the cargo quantity and or quality delivered
 - Any incorrect data listed in the documents presented by the loading representative
 - Any issue related to the cargo quantity and or quality on board
 - Any complaints from the terminal representative or from customer vessel chief engineer.

1.2. Chief Officer

1. Cargo stowage planning

1. Obtain cargo information from the cargo custody officer.
2. Enter the cargo quantity, density, expected temperature in cargo form
3. Enter the consumable weights; engine room F.O & L.O tanks, F.W, Ballast and remaining oil in the cargo tanks.
4. The cargo to load must not be greater than the maximum to load quantity.
5. Plan the cargo stowage
6. Enter the cargo tank sequence
7. Enter volume into the tanks to load
8. Head trim should be avoided for final trim condition
9. Tanks must not be loaded more than 98% volume taking cargo temperature into account. Recommended load to 95% volume. Partial filled cargo and ballast tanks should be avoided as it reduces GM due to free surface effects
10. If tanks are partially loaded refer to the intact stability booklet on this matter.
11. If there are any errors found during the cargo stowage planning stage,
 - Notify the cargo custody officer for confirmation
12. When the acceptable cargo plan is completed, proceed to the master for approval and endorsement.

2. Documents

1. Complete the pre-bunkering safety checklist for bunkering operations or complete the ship shore safety checklist for loading / discharging operations. (Use the oil terminal ship shore safety checklist.
2. Update the following as it progresses,
 - The time log section of the cargo form
 - The 'R' (repetitive) checks in the pre-bunkering safety or ship shore safety checklist

3. Organizing the cargo watch team

1. Brief the deck officer, bosun and the rest of the cargo watch personnel,
 - Cargo quantity expected
 - Cargo tank sequence
 - Expected load or discharge rates
 - Connection location, hose type and size
 - Safety and anti-pollution measures compliances.
 - Compliances to oil terminal safety requirements

1.3. Master

1. Read through the cargo stowage plan completed by the chief officer.
2. If found to be in order, endorse the cargo plan.
3. If there is any incorrect detail found in the cargo plan immediately notify the cargo custody officer for clarification.
4. Plan ship movement to provide on time bunker supply delivery.
5. Report any cargo operations safety or anti-pollution lapses or issues to the DPA immediately.
6. Take precautionary measures to prevent or reduce any damage or harm.

1.4. Deck Duty Officer

1. Test communications channel with loading or discharging point personnel
2. Be familiarized with the emergency stop procedures
3. If supplying bunkers - Comply with the requested initial, maximum and topping off rates.
If loading monitor loading rates is according to the requested rates.
4. Check day and night signals are available.
5. Ensure no unauthorized craft alongside.
6. Ensure compliance with oil terminal or SS600 safety requirements.
7. Make sure that,
 - Proper PPE is complied with – safety helmet, shoes, gloves and life vest
 - A charged and working condition portable gas detector is available to the duty personnel on deck and during tank temperature or volume gauging.
8. Carry out at sufficiently frequent intervals to monitor,
 - Proper cargo operations are in progress in accordance to the chief officer briefing
 - Safety and anti-pollution measures are in order
 - Weather and sea conditions to take early actions in maintaining a safe and pollution free operation.
9. If any unsafe situation arises stopped the cargo operations and notify loading point personnel, chief officer and master immediately.

Intentionally left blank

1.5. Bosun

1. Supervise the cargo watch personnel.
2. Preparations for hose connection.
3. Setting cargo pipe line system for the cargo operation.
4. Visually and manually confirm,
 - Securing of the scuppers plugged.
 - Manifold blank flanges are fully bolted.
 - Manifold drip tray cover removed
5. Report to chief officer,
 - Any equipment defects
 - Any issues which may affect the performance of cargo watch duties

1.6. Cargo Watch Support Team Leaders (Deck Ratings)

- Check communications are in working condition and correct channel allotted.
- A charged and working condition portable gas detector is available to the duty personnel on deck and during tank temperature or volume gauging.
- Monitor the loading rate to prevent overflow or spills with manual tank soundings and visual checks to obtain a good monitoring check. (Do not rely solely on counter readings)
- Plan early to open or close valves in good time.
- Identify closed valves by over hand knot on the valve handle.
- Re-checked loaded cargo tank to make sure valves are closed.
- Strictly comply with the safety measures and anti-pollution measures.
- If any unsafe situation arises stopped the cargo operations and notify loading point personnel and duty officer.
- Prepare sample bottles, make sure proper connection of the sample bottle and monitor sampling progress at the manifold point.

2. SAFETY MEASURES

2.1. PPE

Comply fully with the Company PPE matrix placard

2.2. MSDS (material Safety Data Sheet)

Read, explain and make sure all duty personnel understand the information in it.

2.3. Thunderstorms and severe lightning

- Stop cargo operations.
- Confirmed by communications and verified by sight that,
 - Cargo operation has ceased and manifold valve and PV valves are closed
 - Cargo oil tank covers and sighting ports are closed
- Stay clear of the open deck.

2.4. Over / under pressure

- Confirm by handling breather / PV valves is set in open position.
- Verify by manual movement of vacuum disc for working condition.

2.5. Fire and Explosions

- Strictly comply with safety deck requirements,
 - Keep all accommodation doors and port holes closed.
 - No naked flames
 - Only intrinsically safe equipment and digital devices are allowed
 - No mobile phone usage
 - No static charges (Refer 2.8)
 - No unauthorized boarding
 - No boats allowed to be moored alongside except only for authorized boarding and disembarking.
 - Keep cargo oil tank covers closed. Sightings ports must have flame screen fitted.

2.6. Hydrocarbon gases (LEL), Hydrogen sulphide (H2S), Oxygen (O2) levels

- Personal multi gas detectors are charged and in working condition.
- All duty personnel are aware of the limitations for the gases:
 - O2 reading 20.9%
 - H2S range not more than 10ppm. Continuous exposure not more than 8 hours at 10ppm.
 - LEL reading not more than 10%

2.61. Petroleum Vapors

Whenever taking cargo tank volume or temperature measurements or looking into the sighting ports or tank coamings or open manhole, stand to one side to allow the wind to drive the petroleum vapors away from you.

2.7. Pump room

Ensures following in order,

- The exhaust fan is switch on.
- Door is closed.
- Only authorized entry is permitted.
- Any entry requires,
 - Duty officer permission
 - Complete the pump room entry checklist

Intentionally left blank

2.8. Static Precautions

2.8.1. Precautions to take when ullaging, dipping, gauging or sampling cargo in the tanks:

1. No synthetic ropes or tapes should be used.
2. Metal tapes or other gauging / sampling devices must be earthed or bonded before lowering into the tanks till after removal.
3. Do not introduce or remain any metallic equipment for dipping, ullaging or sampling till 30 minutes after the completion of loading.
4. After 30 minutes has lapsed, ensure that the equipment is effectively bonded before lowering it into the tank till after removal from tank
(Non-conducting equipment with no metal parts may be used at any time)

2.8.2. Comply with the initial loading rates to prevent splashing. (Make sure the tank pipeline outlet is covered before increasing the rate)

2.8.3. Use only intrinsically safe equipment on deck.

2.8.4. Do not drag any sparking items on deck.

2.8.5. Use insulating manifold flanges.

3. ANTI-POLLUTION MEASURES

3.1. Manifold

- The blank flanges are fully bolted.
- Dip tray drain plug is securely closed.
- The dip tray cover is removed.
- Pressure gauges are in working condition.

3.2. Main deck

- Scuppers are securely plugged. (Unplug and re-plug after draining water)
- Deck lightings are sufficiently lit at night or in poor visibility.
- Diaphragm pump shall be correctly rigged (discharge hose coupled to slop tank and bonding cable secured to deck point) and ready for immediate use. (Deck service air is available)
- Anti- pollution equipment is available for immediate use.
- Cargo tank overfill alarms switched on, visual and aural in working condition.

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3.3. Moorings

1. Minimum recommended but always comply with the terminal mooring requirements,
 - Two (2) head lines
 - One (1) forward spring line
 - Two (2) stern lines
 - One (1) aft spring line
2. Master shall instruct to use more lines or using breast lines as is required for the circumstances due to changes in wind, sea, tidal stream or due to vessels hull form mooring conditions.
3. At sufficiently frequent intervals (at intervals to be able to prepare for expected changes in wind, sea, tidal streams, rate of loading conditions or any other situations that require attention) check,
 - The mooring lines and pick up any slack lines.
 - Use more lines as required in sufficient good time before the situation arises. (Deteriorating wind and sea conditions)

4. The fenders

Check fenders for,

- Correct positioning and in safe condition for use
- Re-positioning

4. Organization

4.1 Manning

Ensure the required number of fit for duty personnel are on deck at all times.

4.2 Communications

Ensure communications are in order,

- Tested in working condition
- Stopping signals are understood
- Normal and emergency communication channels are understood

4.3 Cargo line system

Confirm by sighting own ship cargo line system is correctly set up.

4.4 Cargo plan

- Complete the cargo Form: C-OPS to determine correct quantity to load
- Comply fully with the load or discharge sequence plan.
- Refer 5.3 for maximum loading rate

4.5 Requested rates

- Comply with the requested initial, topping off and maximum rates.
- Monitor with manual gauging at sufficiently frequent intervals to ensure the rate expected is not exceeded. If found to be exceeded immediate instructions to reduce the rate to the expected rate is required.

4.6. Loading Guidelines

- After confirming that ship cargo lines are set, notify loading party through communications that ship is ready to load.
- Confirm by sounding or sighting port correct cargo tank is loaded into.
- Increase to maximum rate when the cargo tank pipe outlet is covered with the loaded oil.
- Monitor rate of loading (regular sounding or meter reading) to make sure correct loading rate is maintained.

4.6.1. Changing tanks

- Make sure in good time sufficient personnel are available to handle the next cargo tank loading sequence.
- Confirm oil is entering correct cargo tank.
- Continue monitoring loading rate.

4.6.2. Topping off

- Allow sufficient time to notify topping off to loading point personnel.
- Confirm by sounding or meter reading that requested topping off rate is given.

4.6.3. Completion of Loading

- Confirm through communication that loading point valve is closed before closing own ship manifold valve.
- Remove loading arm or loading hose.
- Confirm loading point flange is fully securely bolted
- Blank own ship manifold and confirm fully and securely bolted.
- Confirm by sighting,
 - All cargo line valves (on deck and in the pump room) are closed (tied over valve handle)
 - All cargo tank covers including sighting ports are fully bolted down
 - All cargo tank sounding pipes are securely closed.

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4.6.4. Discharging or Bunkering Guidelines

- Confirm (as instructed by the cargo officer) that correct line set up is set for cargo tank to discharge.
- Confirm through communications that receiving ship is ready to load into their tanks.
- Open own ship manifold valves.
- Commence at the agreed safety checklist initial loading rate.
- When confirmed by communications to increase the rate, gradually increase pump rpm to the maximum requested rate.
- When communications receive to reduce to the agreed topping off rate, gradually reduce the pump rpm to suit the pumping rate.
- **Stripping**
Stripping with main cargo pump
 When the sounding is about 20cm open the stripping valve and gradually close the main valve.
Stripping with stripping pump
 When the sounding is about 20cm open the stripping valve, start the stripping pump and gradually close the main valve and stop the main pump.
- When completed discharge and blow through (**MFM fitted ships do not require blow through lines**) close the manifold valve and notify other ship.
- Make sure own hose blank flange is fully and securely bolted before hoisting back to own ship.
- Confirm by sighting,
 - All cargo line valves (on deck and in the pump room) are closed (tied over valve handle)
 - All cargo tank covers including sighting ports are fully bolted down
 - All cargo tank sounding pipes are securely closed.

5. Limitations**5.1 Manning**

CARGO OPERATIONS	MINIMUM MANNING
Duty deck officer	1
Duty engineer officer	1
Below 4,000 DWT A.B	2
4,000 DWT to 8,000 DWT A.B	3
Above 8,000 DWT	4

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5.2. Wind condition

- The master will take into account the effect of the wind direction and speed on,
 - The ship's mooring
 - The ship's gangway
 - The hard arm of the shore connection
- The ship shall take note of the terminal's maximum wind limits to stop loading, disconnect hose and cast off requirements.
- However for safety consideration, the master will use the lower wind limits guide.
- Company recommended guide,

Ship displacement (MT)	Stop cargo operations (Kts)	Disconnect hose (Kts)	Cast off (Kts)
Above 2,000	20	22	25
Below 2,000	18	20	22

5.3 Initial loading rate

Based on smallest pipeline diameter in the ship line system and number of tanks open for loading, the initial loading rate (m^3) at 1m/s will be in accordance to the tabulation,

Minimum nominal diameter of piping	Loading one P&S cargo tank simultaneously
80mm	34 m^3/hr
100mm	58 m^3/hr
150mm	232 m^3/hr
200mm	240 m^3/hr
250mm	366 m^3/hr
305mm	524 m^3/hr

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5.3.1 Initial flow rate

To prevent splashing of oil loading into the tank,

- Start the loading at a rate of 1m/s flow rate.
- When the cargo tank level is about 30cm, gradually increase to the required loading rate.

Example, ship smallest pipeline diameter is 200mm, from below table maximum flow rate is 792m³.

At 1m/s the initial loading rate is 792/7, 113m³/hr.

5.3.2 The maximum flow rate

The maximum loading rate will be the smallest pipeline diameter in the ship cargo line system based on a flow rate of 7m/s for our petroleum product.

Diameter cargo pipeline	Maximum Flow Rate
75mm	111m ³
100mm	198m ³
150mm	445m ³
200mm	792m ³
250mm	1237m ³

5.3.3. The venting flow rate

1. The venting flow of the air will be based on the vent branch line pipeline diameter at a flow rate of 30m/s.

Diameter vent branch line	Maximum venting capacity
75mm	381m ³
100mm	678m ³
150mm	1526m ³
200mm	2715m ³
250mm	4242m ³

2. The maximum loading rate is the smaller of these two numbers – ‘Maximum venting capacity’ and ‘Maximum loading rate’.

Example, for a ship with smallest cargo pipeline of 200mm and vent branch line of 100mm:

From above tables, maximum loading rate is 792m³ and vent capacity is 678m³.

Therefore, the maximum loading rate is 678m³/hour.

The captain may however decide on a lower loading rate where safety is concerned.

6. References

- ISGOTT
- Ship to Ship Transfer

7. Records and Documentation

- Pre-bunkering safety checklist
- Form: C-SSC (Ship Shore Safety checklist)
- Form: C-OPS (Cargo form)
- Form: C-CGM (Combustible Gas Monitoring)

8. APPENDICES

Appendix 1: Risk Management

Appendix 2: Cargo Tank Cleaning

Appendix 3: Receiving Bunkers for Own Ship Engine

RISK MANAGEMENT

This table does not represent a complete list. The ship safety committee is to carry out a risk assessment for the required activities if it is not available in this table.

	Circumstances leading to potential risk	Potential risks	Measures to be taken to achieve low risk
1	Bunkering container ship at the container wharf	Falling objects onto bunker tanker deck	<ol style="list-style-type: none"> 1. Walk on the seaward side. 2. Working under supervision
2	Deteriorating weather and sea conditions.	Break away from moorings	<ol style="list-style-type: none"> 1. Be alert to changes in weather and sea conditions and take measures to address the expected situation. 2. Check weather reports for expected weather. 3. Sufficiently frequent checking on the ship moorings.
3	Thunderstorms with severe lightning	Lightning strikes leading to fire and explosion. Affecting the business reputation of the Company and stake holders interest.	<ol style="list-style-type: none"> 1. Ceased cargo operations 2. Check no slack mooring lines. 3. Close and securely lock all cargo oil tank covers including sighting port covers. 4. Check with terminal for safe closing of manifold valves. 5. PV valves lever to close position. 6. All personnel to stay clear of the deck.
4	<ol style="list-style-type: none"> 1. Non-compliances of the anti-pollution measures. 2. Cargo documents (Safety checklist – maximum rates, cargo plan) details incomplete and or incorrectly entered. 	Pollution Overflow. Affecting the business reputation of the Company and stake holders interest.	<ol style="list-style-type: none"> 1. Strictly comply with the anti-pollution measures in paragraph 6. 2. Duty officer to make frequent rounds to check on the anti-pollution measures. Cargo custody officer and chief officer to verify all entries is correct and fully complete.

	Circumstances leading to potential risk	Potential risks	Measures to be taken to achieve low risk
5	Non-compliances of the safety and explosion measures in paragraph 5.	Fire and explosions	<ol style="list-style-type: none"> 1. Strictly comply with the safety and explosion measures in paragraphs 5. 2. Duty officer to make frequent rounds to check on the safety and explosion measures.
6	Transceivers not fully charged and no spare fully charged sets available.	Failure of communications.	<ol style="list-style-type: none"> 1. Re-charge all transceivers after every period of use. 2. Make sure back up sets are fully charge before every operation. 3. Test the sets before use.
7	Cargo documents (COQ, BDN, Safety checklist) details incomplete and or incorrectly entered and Cargo quality or quantity disputes, protest.	Breach of contractual agreement and Cargo discrepancy claims affecting the business reputation of the Company. And stake holders interest.	<ol style="list-style-type: none"> 1. Cargo officer to take note of Company instructions regarding cargo specifications and is to check COQ details are correct before accepting (and endorsing for) certificate. 2. Cargo officer to check entered cargo data are correct in the BDN before submitting to the customer chief engineer for endorsement. 3. Master to ensure safety checklist is strictly complied with to prevent unsafe and pollution incidents.
8	Non-compliance to or misinterpretation of the Company instructions.	Cargo contamination and Cargo loss	Verify instructions (request re-confirmation if not sure of intended instructions) from the Company before issuing cargo quantity instructions to the chief officer for load or discharge stowage planning.
9	Not fully compliant to the engine room bunkering checklist	Pollution or bunker fuel contamination.	Chief engineer and deck duty officer must be responsible in their roles and fully compliant to the checklist.

	Circumstances leading to potential risk	Potential risks	Measures to be taken to achieve low risk
10	No proper safety briefing and risk assessment carried out before tank cleaning and poor supervision during tank cleaning.	Explosion, fire, Loss of lives and ship	<ul style="list-style-type: none"> • Master and chief officer must make sure of, • Strict compliance of the procedures • Carry out a proper risk assessment before commencing tank cleaning. • Strict supervision by the Master or chief officer throughout the cleaning process.
11	Assign new or untrained seafarer(s) at the mooring station	Injuries and fatalities due to unfamiliarity with the mooring hazards	Ship safety officer shall be alert to and comply with Company procedures for joining and existing seafarers onboard to be aware of the mooring hazards and not assign new personnel until verified (assessed through training and observations) safe for assignment.
12	Defective or deficient equipment including mooring ropes.	<ul style="list-style-type: none"> • Injuries and fatalities, environment and property damage. • Customer complaints due to bunker delays • Affect the company name and business. 	<ul style="list-style-type: none"> • Master and chief engineer must strictly comply with the Company PMS requirements. • Superintendents and port captains and ship management level deck and engineer officers must fulfil their role responsibilities
13	Only one man operating the mooring – winch and rope handling	Fatal or serious injuries	Master must verify that no one man at the mooring stations before mooring commences.
14	Slacking the lines without master permission.	<ul style="list-style-type: none"> • Contact damage • Injuries 	<ul style="list-style-type: none"> • Mooring station in-charge must strictly comply with bridge instructions. • Frequent refresher briefing on mooring safety and best practices and during pre-mooring briefings.

	Circumstances leading to potential risk	Potential risks	Measures to be taken to achieve low risk
15	Inadequate number of lines or improper positioning of lines	<ul style="list-style-type: none"> • Contact damage • Breakaway from moorings • Pollution 	<ul style="list-style-type: none"> • Master shall make sure that at all times the ship has sufficient number lines and proper lines effectively positioned (head and stern lines, fore and aft breast lines and forward and aft spring lines) to maintain the ship securely moored alongside.
16	Unattended moored lines	<ul style="list-style-type: none"> • Contact damage • Pollution • Injuries 	Duty personnel must sufficiently frequent carry out mooring checks.
17	Improper tank cleaning	<ul style="list-style-type: none"> • Cargo contamination • Tarnish Company business name • Possible legal actions and subject to claims payment • Delay in ship turnaround 	Operations department personnel must provide specific cleaning instructions and ensure proper and clear instructions to the master. Master must ensure proper compliances to the instructions and verify with chief officer on effective tank cleaning.
18	Not complying to charterer or shipper instructions	Demurrage claims on stakeholders Affect Company business name	Master must ensure proper compliances to the specific shipper or charterer instructions. Operations department manager must verify proper written instructions given to the master and with the master's acknowledgment.
19	No proper review of the passage plan.	Piracy attacks and or hijack	The Company security officer must carry out a proper review of the current or expected piracy hotspots along the passage.

End of the Appendix

CARGO OIL TANK WASHING IN A NON-INERTED TANK

1. Responsibilities

1. The master shall ensure that the tank washing team is aware of the following:
 1. These guidelines are to be strictly adhered to during the tank washing.
 2. The hazards of explosion or fire may occur due to negligence.
 3. Person in-charge of specific task example, lowering of equipment into the tank shall fully understand the importance of complying with these guidelines.
 4. Equipment used for the washing to be checked for electrical continuity and or bonded.
 5. Tank washing equipment shall be check for defects which may cause ignition inside the tank.
 6. All other equipment must be intrinsically safe.
 7. Complete a risk assessment before the tank cleaning
2. The chief officer shall be responsible for,
 1. The tank's atmospheric condition at all times during the tank washing.
 2. Form: C-GAS (Gas free status of cargo oil tank) shall be updated during the tank cleaning period
 3. Refer to the ISGOTT tank washing safety flow chart for reference

2. BEFORE WASHING

1. If there is a common vent branch line isolate it from the other tanks
2. Do not use tank washing machine
3. Use the main cargo pumps and lines to flush the tank bottom with water.
4. Ensure all parts are covered – cross-over lines, discharge lines and cargo pump.
5. Strip the tank.
6. Drain to the designated tank or slop tank
7. Ventilate the tank till the LEL is 10% or less
8. Ensure that the gas test is done at various levels
9. When the LEL is 10% or lower commence the tank washing.

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3. DURING WASHING

3.1. Control of the atmosphere

1. Maintain continuous tank ventilation.
2. Take frequent atmosphere readings.
3. (May need to ceased washing to obtain a reliable reading especially due to effect of water)
4. Do not exceed a reading greater than 35% LEL.
5. Immediately cease washing when the reading exceeds 35% LEL.
6. Resume only when the LEL reading is 10% or less.

3.2. Control of ignition source

1. Do not use re-circulated wash water.
2. Water output from the machine shall not exceed 60 m³/h
3. The total water throughput per cargo tank should be kept as low as practicable and must not exceed 180m³/h.
4. Water may be heated but not more than 60 C
5. Never inject steam into the tank.
6. At all times the discharge into the wash water reception/slop tank should be below the liquid in the tank.
7. The tank must be kept drained.
8. Cease washing when there is a buildup of water.
9. Portable washing machine –
 - Do not lower into tank unless the LEL is 10% or less.
 - Hose connections must be done before lowering into the tank.
 - Any disconnection is to be done outside the tank.
10. Sounding rods
 - Do not lower a metal rod suspended on a fiber rope into the tank.
 - A metal rod may be used on the end of a metal tape if earthed to the ship by means of a clamp or bolted metal connection.
 - Sounding rods may be introduced into the tank made with full depth sounding pipe.
11. Ropes

No synthetic polymers should be introduced into the tank.

Example nylon and polypropylene ropes

12. Mechanical sparks

- Do not dropped or drag or allow friction of metallic objects into and inside the tank.
- Example of such tools are, sounding rods, sample buckets, hand tools etc.

13. Portable washing machines and hoses

- There must be bonding between tank washing machine and hoses.
- Washing machine must be electrically bonded to the water hose.
- The washing machines shall be suspended by a natural fiber rope.
- The outer casing of the portable washing machine should be a material that will not give rise to an incendive spark on contact with the internal structure of a cargo tank.

End of this Appendix

BUNKERING FOR OWN SHIP USE

(FROM BUNKER TANKER OR FROM OWN CARGO OIL TANK)

1. RESPONSIBILITIES

1.1. CHIEF ENGINEER

1. Notify duty deck officer
2. Check that bunkers quantity and specifications as instructed by cargo officer are correct – Density, Grade, Sulphur content
3. Check intended fuel tank to receive bunkers does not exceed 95% of the tank volume.
4. Brief the engine room team for the engine room bunkering requirements,
 - The fuel tank to receive the bunker
 - The available standby overfill tank
 - Setting the lines for the fuel tank
 - Communications for start, emergency stops, topping off arrangement,
 - Between engine room personnel
 - Between bunker tanker personnel and engine room personnel (for bunkers from another bunker tanker)
 - Between own bunker vessel deck personnel and engine room personnel (for bunkers from own cargo tank)
 - The initial, maximum and topping off rate.
 - Confirm correct fuel tank loaded into
 - Continuous rate monitoring
 - Confirm bunker line valves are correctly open before notification to commence bunkering
5. Prepare, update (repetitive safety checks) and complete the Forms: Q-BUN1 or Q-BUN2 for the bunkering operation.
6. Complete the bunkering safety checklist.

1.2. WATCHKEEPING ENGINEERS

- Comply with the chief engineer instructions
- Assist to manage the engine room bunkering
- Observe all safety and anti-pollution procedures

1.3. DUTY DECK OFFICER

1. Prepare deck crew to handle mooring for the bunker tanker arrival.
2. Display day and night signal.
3. Check that anti-pollution measures are in order,
 - Scuppers are securely plugged
 - Oil spill equipment are ready for immediate use
 - Fenders are well spaced, sufficient and in acceptable condition
 - Bunker manifold flange is fully and securely bolted

1.4. IF SUPPLYING FROM OWN CARGO TANK(S)

Chief Officer

1. Prepare cargo form for the own ship engine room bunkers
2. Brief duty officer and deck crew on bunkering requirements,
 - Cargo oil tank and quantity to transfer to engine room
 - Initial, maximum and topping rates
 - Stoppage tank sounding or counter reading

2. RECORDS

Form: Q-BUN1 Engine room bunkering

Form: Q-BUN2 Engine room bunkering from COT

End of this Appendix

MARITIME AND PORT AUTHORITY OF SINGAPORE **STANDARDS FOR PORT LIMIT BUNKER TANKERS**

INTRODUCTION

The “Standards for Port Limit Bunker Tankers” covers equipment, operational performance and efficiency of bunker tankers operating in the port. All steel-hulled bunker tankers shall comply with the standards as set out in this document before the owners / operators apply for the SB licence.

The classification of size of port limits bunker tankers is in Gross Tonnes (GT) measured in accordance with the international Tonnage Convention 1969 (ITC 69). For the purpose of setting the standards, port limit bunker tankers are classified into the following 4 sizes:

Unclassified	-	Below 250 GT
Small	-	250 to less than 500 GT
Medium	-	500 to less than 1,500 GT
Large	-	1,500 GT and above

All standards listed in this document are subject to review by the Maritime and Port Authority of Singapore (MPA) from time to time and new standards may be added. All port limit bunker tankers are also required to comply with Port Marine Circulars issued by the Port Master / Marine Services Department, MPA from time to time.

STANDARDS FOR PORT LIMIT BUNKER TANKERS

All steel-hulled bunker tankers shall comply with all items of this document

1 Manoeuvring Requirements

1.1 Manoeuvring Flexibility

The following propulsion types and requirements are set:

<u>250 to less than 500 GT</u>	<u>500 to less than 1,500 GT</u>	<u>1,500 GT and above</u>
Single Screw or equivalent performance	Twin Screw or Single Screw with Bow Thruster(s) or equivalent performance	Twin Screw with Bow Thruster(s) or equivalent performance

1.2 Speed

For bunker tankers of 500 GT and above with twin-screw propulsion, single screw propulsion with bow thruster(s), twin-screw with bow thruster(s) or equivalent, a minimum speed of 8 knots measured at 100% of engine rated load at the time of sea trial under loaded condition shall be attained.

1.3 Engine Reliability

For bunker tankers of 500 GT and above, the following standards shall apply:

(i) Number of Engine Starting

The minimum number of successful starts attainable by the engine shall at least meet the requirement set by the approved Classification Societies.

(ii) Engine Response time

With the bunker tanker travelling at a speed of at least 4 knots, the engine response time from stop to ahead or astern shall not exceed 3 seconds.

(iii) Stopping Distance at Load Draft

The stopping distance at loaded draft with a speed of 5 knots shall not be greater than three ships' length.

(iv) Turning Circle in Confined Waters

The bunker tanker shall have a turning circle of not more than 1.5 times of its own length, and the time taken to complete a swing of 180 degrees from a stationary position shall not exceed 2 minutes.

For bunker tankers of 5,000 GT and above, the time taken to complete a swing of 180 degrees from a stationary position shall not exceed 4 minutes.

(v) Bridge-controlled Propulsion Machinery

The bunker tanker shall have Centralized Bridge Control for the main propulsion system which shall incorporate stopping, reversing and speed control of the main engine(s).

2 Pumping Rate

For marine fuel oil, pumping rates shall be determined at the bunker tanker manifold(s). The bunker tanker shall achieve the following minimum pumping rates when pumping 380cSt fuel [viscosity at 50 degrees Centigrade (C)] and under the pressure of 7 kg/cm² without the use of flow-meter.

<u>250 to less than 500 GT</u>	<u>500 to less than 1,500 GT</u>	<u>1,500 GT and above</u>
300 cu m/hour	500 cu m/hour	800 cu m/hour

For marine diesel and marine gas oil, pumping rates shall be measured in relation of the deadweight of the bunker tanker. The bunker tanker shall achieve the following minimum standards:

<u>Deadweight</u>	<u>Standards</u>
400 - 1000 tonnes	Within 4 hours
1001 – 2000 tonnes	Within 5 hours
2001 – 3000 tonnes	Within 6 hours
More than 3000 tonnes	800 cu m/hour

3 Pipeline Outlets

The bunker tanker manifold(s) shall be fitted with ANSI 150 flange or equivalent.

4 **Loading Rate**

- 4.1 For marine fuel oil, the bunker tanker shall achieve the following minimum loading rates when receiving 380cSt fuel [viscosity at 50 degrees Centigrade (C)] and under the pressure of 7 kg/cm²:

<u>250 to less than 500 GT</u>	<u>500 to less than 1,500 GT</u>	<u>1,500 GT and above</u>
300 cu m/hour	500 cu m/hour	800 cu m/hour

For marine diesel and marine gas oil, loading rates shall be measured in relation to the deadweight of the bunker tanker. The bunker tanker shall achieve the following standards:

<u>Deadweight</u>	<u>Standards</u>
400 - 1000 tonnes	Within 4 hours
1001 – 2000 tonnes	Within 5 hours
2001 – 3000 tonnes	Within 6 hours
More than 3000 tonnes	800 cu m/hour

4.2 **Air-pipes**

All cargo tanks' air-pipes shall be sized according to the loading rate and shall comply with the approved Classification Societies' requirements.

5 **Bunker Boom**

All bunker tankers of 250 GT and above shall have bunker boom fitted. The bunker boom shall meet the following standards:

- (i) Pneumatically or hydraulically operated with a safe working pressure of 10 kg/cm² and can be operated by one man.
- (ii) The minimum safe working load shall commensurate with the size of the boom.
- (iii) For non-flow bunker boom having bunker hose attached, lifting bridles and saddles shall be provided at suitable positions along the boom to support the hose and prevent it from bending.

6 **Product Segregation**

If more than one grade of bunkers are carried, it is recommended that double - valve segregation at the pump room and at the manifold(s) between grades be incorporated. In addition, the bunker tanker shall comply with the following:

- (i) has segregated tanks to minimise product contamination.
- (ii) has two main cargo systems.

7 **Manifold Size**

7.1 The bunker tanker shall have at least the following standard manifold sizes:

<u>250 to less than 500 GT</u>	<u>500 to less than 1,500 GT</u>	<u>1,500 GT and above</u>
100 mm dia.	150 mm dia.	200 mm dia.

7.2 The main manifold(s) shall be located at the mid-ship to facilitate loading and supply.

8 **Manifold Drip/Spill Pan**

- 8.1 The manifold(s) of the bunker tanker shall be fitted with drip spill pan to contain any oil spill.
- 8.2 Gutter plate shall also be provided on the main deck to contain any oil spill on deck.

9 **Reducers for Hose Connection**

The bunker tanker shall carry Japanese Industrial Standards (JIS) and American National Standards Institute (ANSI) standard reducers and adaptors on board to accommodate the different sizes of bunker manifold flanges on the receiving vessels. The sizes of the reducers and adaptors carried would vary according to the gross tonnage (GT) of the tankers as follows:

<u>500 GT and below</u>	<u>501 to 1,500 GT</u>	<u>Above 1,500 GT</u>
80 mm and 3-inch	80 mm and 3-inch	100 mm and 4-inch
100 mm and 4-inch	100 mm and 4-inch	125 mm and 5-inch
125 mm and 5-inch	125 mm and 5-inch	150 mm and 6-inch
150 mm and 6-inch	150 mm and 6-inch	200 mm and 8-inch
-	200 mm and 8-inch	250 mm and 10-inch

10 **Bunker Hoses**

Bunker hoses shall meet the following standards:

- (i) Corrugated flexible hoses with spring coils having a working pressure of 10 kg/cm², or
- (ii) Composite rubber reinforced type with steel rings having a working pressure of 10 kg/cm².
- (iii) Be subjected to a pressure test based on PSB (Ex-SISIR) or equivalent specifications twice every 5 years. The period between the two tests shall not exceed 3 years.
- (iv) Be visually inspected by an approved Classification Society during the annual survey of the bunker tanker.

11 **Bunker Quantity Control - Cargo Measurement System**

The bunker tanker shall have the following document and equipment for measuring the quantity of bunkers:

11.1 **Tank Calibration Tables**

- (i) The bunker tanker tanks shall be calibrated and certified by an approved Classification Society or a surveying company acceptable to MPA. An original certified copy of the tank calibration tables shall be kept onboard.
- (ii) The tank calibration tables shall contain the following: -
 - (a) name and SB licence number of the bunker tanker;
 - (b) list /trim correction;
 - (c) cargo tanks measurement;
 - (d) reference height of every cargo tank;
 - (e) name and stamp of the company which calibrated the tanks;
 - (f) date of calibration;
 - (g) page number on every page; and
 - (h) tank capacity plan of the bunker tanker.

- (iii) The tank calibration tables shall be sealed and properly bound to prevent any unauthorised tampering.
- (iv) The bunker tanker shall only carry its latest certified tank calibration tables for verification by the vessel receiving bunkers and by the relevant authority. An identical copy of the tank calibration tables shall have been deposited with MPA.
- (v) Should there be any change in the tank capacity of a bunker tanker, the owner and/or operator of the bunker tanker shall not carry out any delivery of bunkers until new tank calibration tables for the affected or modified tanks, which comply with the requirements mentioned in items 11.1 (i) to 11.1 (iv) above, are placed onboard the bunker tanker and a true copy of the same, with each page certified, deposited with the MPA.

11.2 Sounding Pipe

- (i) Each sounding pipe of the cargo tank shall have a reference height which shall be clearly stated in the tank calibration tables.
- (ii) A template stating the reference height shall also be permanently fitted onto every sounding pipe of the cargo tank.

11.3 Ullage and Temperature Measuring Devices

- (i) The bunker tanker shall carry at least one set of portable steel gauging tape approved by ASTM with a 150 mm (6") weight attached to one end.
- (ii) The bunker tanker shall carry at least one set of API/ASTM/IP approved thermometer on board for taking temperature of the oil.
- (iii) The latest ASTM-IP Petroleum Measurement Table 54B and Table 56 shall be available on board for calculation of bunker volume.

11.4 Automatic gauging (Level or Volume) (Optional)

If automatic gauging system is fitted as a supplement to the manual tank sounding / ullaging system, the following standards shall apply:

- (i) The system shall be able to provide remote oil temperature readings to allow for volumetric correction of the bunker quantity.
- (ii) Every cargo tank shall be installed with one level and multiple temperature sensors. The sensors shall preferably be located at the after-bulkheads of the tanks.

- (iii) The system may also be connected to a computer having sounding, volume and weight calculations with specific gravity and temperature corrections.

11.5 High Level Alarm

For bunker tankers which have their keels laid on or after 1 Jun 94, high level alarm shall be provided for the cargo tanks.

11.6 Flow - meter (Optional)

If a flow-meter is used for measurement of the bunker quantity, the following standards shall apply:

- (i) The flow-meter shall have an accuracy of plus or minus 0.2%.
- (ii) Instructions on the flow-meter volumetric calculation shall be available for reference.
- (iii) A certificate of verification issued by the Weights and Measures Office, Singapore, for the flow-meter shall be carried on board.
- (iv) The seal of the flow-meter by the Weight & Measures Office shall be intact.
- (v) The flow-meter shall be calibrated at least once in every 12 months.

11.7 Plans and Diagrams

- (i) General layout plan of the bunker tanker shall be conspicuously displayed on board.
- (ii) Tank capacity plan, Piping Diagram and Trim and Stability Tables shall be available on board for inspection by any party concerned.

12 Bunker Quality Control

The bunker tanker shall be equipped with proper sampling equipment as described below.

12.1 Sampling Equipment

- (i) The bunker tanker shall be equipped with the sampling equipment as per SS 600's requirements:
 - a. A sampling probe extends across the full diameter of the sampler. The end of the sampling probe shall be closed and the wall perforated with 5mm diameter holes spaced 20mm apart throughout its length. A needle valve, with provision for sealing, shall be fitted at

the bottom of the sampling probe outside the sampler to control the rate at which a continuous drip sample can be drawn. This shall also serve as a stop valve for the sampling. The sampling probe shall be detachable for cleaning and inspection.

b. A weather-tight sampling container having a capacity of not less than four litres which can be security sealed.

(ii) An illustration of the sampling equipment is shown in the Appendix 1.

12.2 Automatic Sampling Equipment

(i) Automatic sampling equipment installed on board the bunker tanker shall be approved by the relevant authority for usage.

(ii) The automatic sampling equipment shall be capable of obtaining a sample during the entire bunker process.

(iii) Where the sample is automatically divided into 4 or more individual one-litre sample bottles simultaneously, the sampling equipment must be capable of filling the individual sample bottles to the same level. The sample bottles should be at least 80 percent full at the end of the bunker delivery.

13 Navigation Equipment/Charts/Nautical Publications

(i) The bunker tanker shall have a compass fitted at the main steering position for the helmsman to steer.

(ii) A second compass or other appropriate equipment shall be fitted for taking bearings if the compass mentioned in item 13 (i) above is not suitable for this purpose.

(iii) Appropriate nautical instruments, adequate and updated charts and other nautical publications including the latest "Singapore Tide Tables and Port Information" for the intended voyage shall be carried on board.

14 Signaling Equipment/Document

(i) The bunker tanker shall have the following signaling equipment / document on board:

(ii) Full complement of flags and pendants.

(iii) A copy of the International Code of signals.

(iv) A daylight signaling lamp.

- (v) A ship whistle

15 Communication Equipment

The bunker tanker shall be equipped with a radiotelephone which is capable of operating in the International Maritime Mobile VHF Radiocommunication Service in the 156-174 MHz and on such channels as may be specified by the Port Master from time to time.

16 Other Standards

16.1 Identification Marks

- (i) The licence number of the bunker tanker shall be painted in large letters on each side of the bow against a contrasting background and carved on, cut in, or centre punched into the main beam.
- (ii) The licence number of the bunker tanker shall also be painted or carved in large letters on each side of the navigating bridge and on the bridge front for easy identification purposes.
- (iii) The minimum height (with proportionate breadth and thickness) of the letters and numbers comprising the licence number of the bunker tanker at the bow shall be as follows:

<u>Length of Bunker Tanker</u>	<u>Height</u>	<u>Breadth</u>	<u>Thickness of Letters and Numbers</u>
Between 5 & 20m	20 cm	15 cm	4 cm
Above 20 m	30 cm	20 cm	5 cm

16.2 Lighting

- (i) The bunker tanker shall be fitted with adequate safe lighting to cover the area of the bunker tanker, bunker manifold connection and hose handling equipment.
- (ii) The minimum illumination at night shall be at least 50 lux at the bunker manifold(s).

16.3 Fender

The bunker tanker shall have proper fender system to minimise damage to the receiving vessel during bunkering.

16.4 Anti Oil-pollution Equipment

The bunker tanker shall carry anti oil-pollution equipment and a minimum of 400 litres of approved dispersants at all time.

16.5 Operational Safety

The bunker tanker shall have on board a copy of the International Safety Guide for Oil Tankers & Terminals (ISGOTT).

- End -

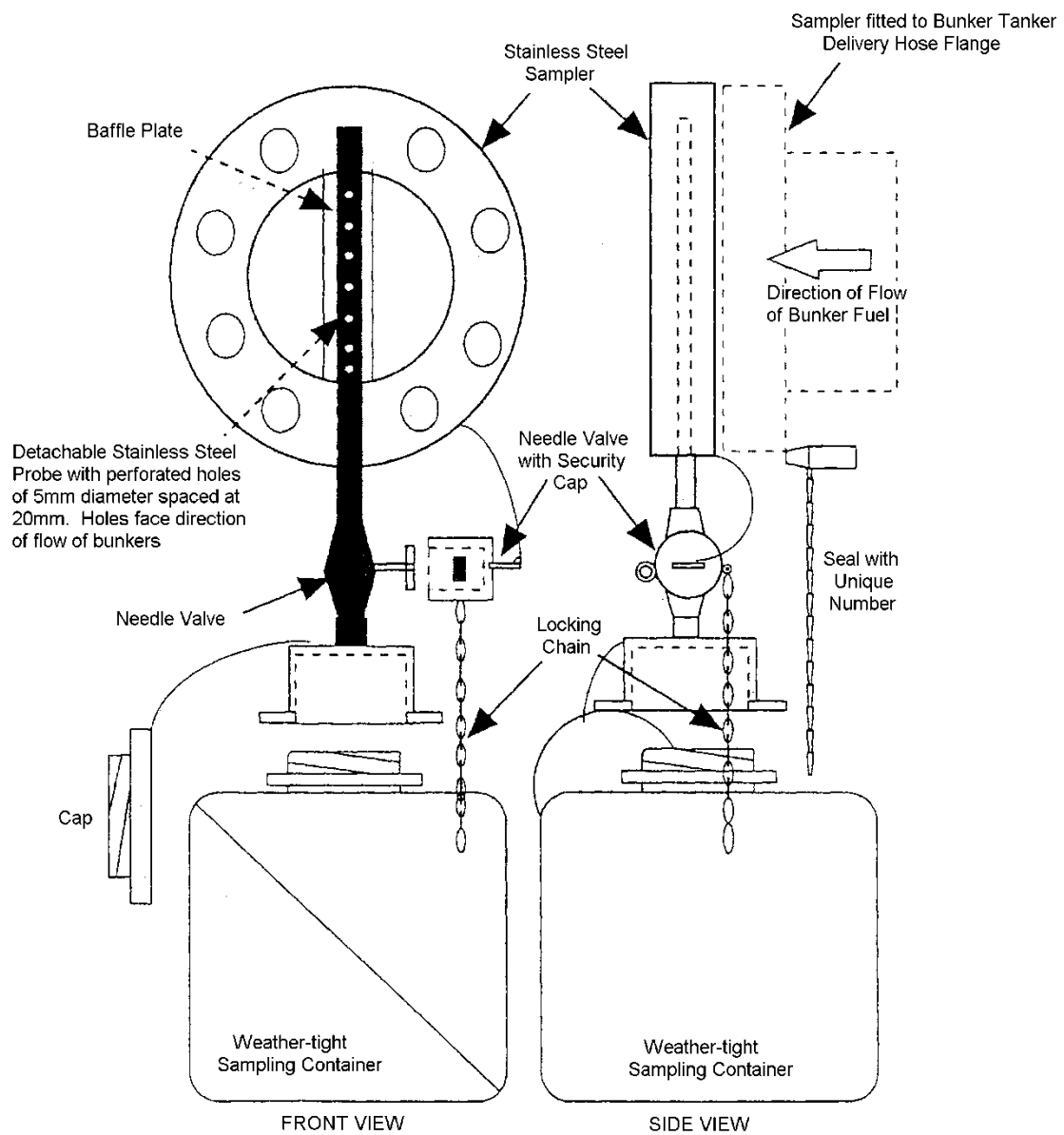
PORT MASTER
MARINE SERVICES DEPARTMENT
MARITIME AND PORT AUTHORITY OF SINGAPORE

Updated as at 22 Apr 2008

Appendix 1 (Informative)

Diagrams of sampling equipment

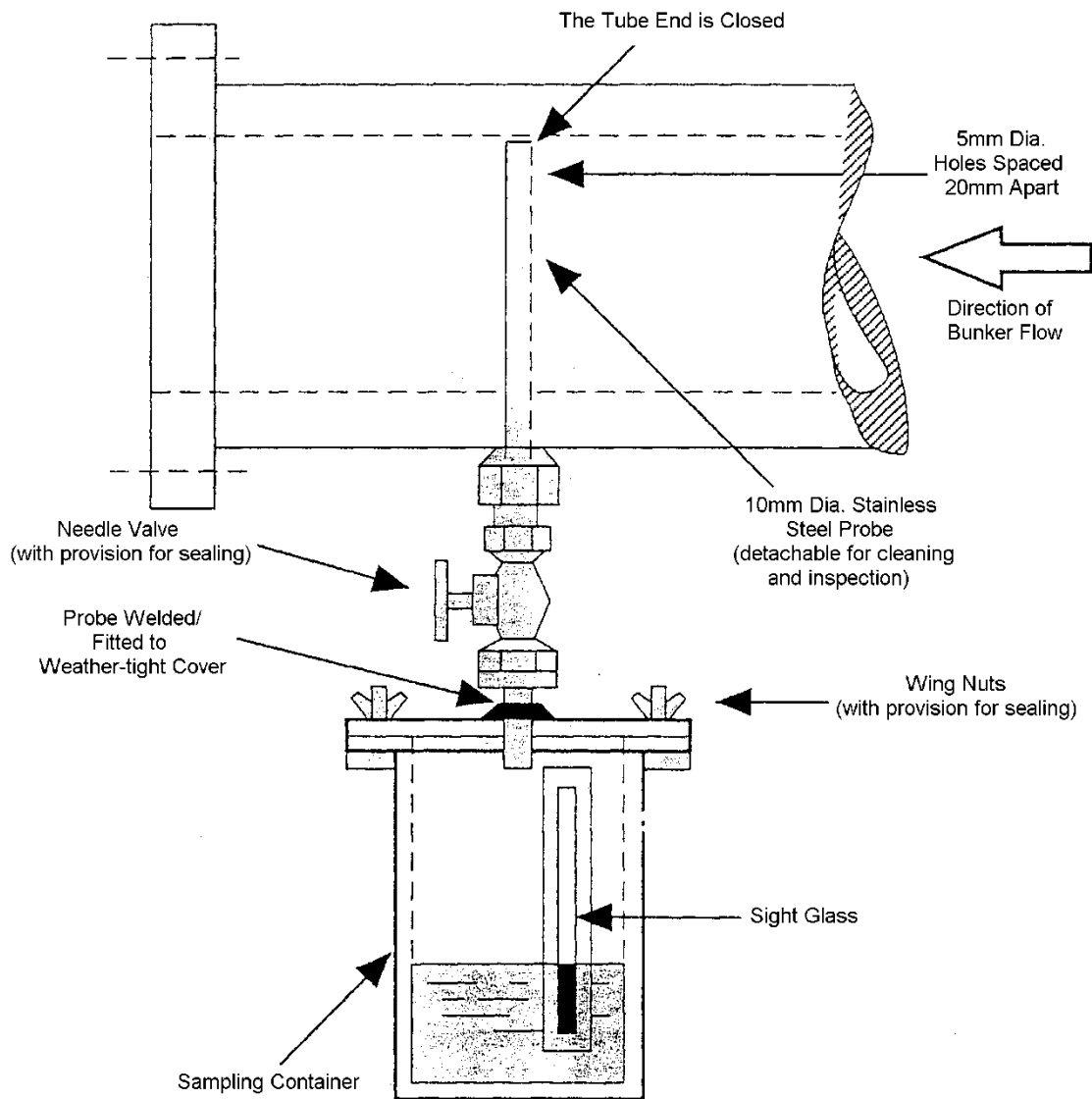
Design of sampling equipment - Example 1



Not to Scale

Design of sampling equipment - Example 2

This sampling equipment should only be used for sample collection if Chapter One of SS 600, clause 1.11.4.2 is applicable.



NOTE – Alternative design of sampling equipment with provisions for sealing if approved in advance by the implementing authority shall also be acceptable.

FORM 22

IMMIGRATION ACT
(CHAPTER 133)

IMMIGRATION REGULATIONS

CREW LIST

GDV NO :
P C NO :

GRT : 1589 T
 NRT : 560 T
 FLAG : SINGAPORE
 TYPE : FUEL OIL TANKER
 L.O.C. :
 P.I.C. :
 CREW : 11 INCLUDING MASTER
 TEL :
 C/SIGN : 9V8556
 NAME OF VESSEL M.T. "FRONTEK"

REGULATION 31 (1)

NAME OF VESSEL M.T. "FRONTEK"

OWNER : MGM SHIPPING MANAGEMENT PTE. LTD

AGENT IN SINGAPORE :

MGM SHIPPING MANAGEMENT PTE. LTD

LAST PORT OF CALL:
 NEXT PORT OF CALL:

DATE OF ARRIVAL : 20 January 2023

DATE OF PROPOSED DEPARTURE :

NO	NAME	FIN NO	WORK PERMIT NUMBER	SEX	DATE OF BIRTH	NATIONALITY	TRAVEL DOCUMENT NO	DATE OF T.D. EXPIRE	DUTIES ON BOARD	DATE OF W/P EXPIRE	PLACE OF BIRTH
1	KARYADI EKA SUBRATA	G2329715P	0 08099057	M	30-Mar-1985	INDONESIA	C7459420	19-Mar-2026	Master	3-Nov-2024	JEMBER
2	HARYOKO	G2193186T	0 07961049	M	7-Apr-1984	INDONESIA	C8196643	6-Jun-2027	Ch. Off	3-Nov-2024	PEKALONGAN
3	FAUZI	G8603976T	0 09284656	M	8-Nov-1986	INDONESIA	C6788703	18-Mar-2025	2nd Off	27-Jul-2024	JAKARTA
4	FADJAR SETIYADI	G7893028X	0 05799333	M	21-Dec-1977	INDONESIA	C4485052	19-Aug-2024	Ch. Eng	19-Jul-2024	BANYUMAS
5	RADEN MAS	G8761837Q	0 09545964	M	21-Jan-1994	INDONESIA	C7129869	21-Oct-2025	2nd Eng	3-Nov-2024	BATAM
6	FAISAL HILYA SAPUTRA	M3029281W	0 82164065	M	31-Jan-1998	INDONESIA	C1993665	13-Nov-2023	3rd Eng	13-Oct-2023	SUKABUMI
7	MERVIN TOLETE IBARRA	G2040166X	0 26134021	M	15-Jun-1982	FILIPINO	P5137082B	24-Mar-2030	BOSUN	3-Nov-2024	BUGUEY CAGAYAN
8	EDWIN CHAVEZ GAMUSO	G6630311Q	0 25268288	M	29-Sep-1977	FILIPINO	P0265961B	15-Jan-2029	AB	3-Nov-2024	MONCADA TARLAC
9	SAIFULLAH	G 2665522L	0 08656377	M	6-Dec-1991	INDONESIA	C3513848	14-Nov-2024	AB	14-Oct-2024	GRESIK
10	DEHYANG AGENG UMSUR PUTRA	M3013323K	0 82134832	M	18-Jun-2003	INDONESIA	C5779472	27-Nov-2024	AB	27-Oct-2024	CIREBON
11	ARKAR MIN	M3052707T	0 95148921	M	4-Oct-2000	MYANMAR	MF 360458	29-Sep-2026	AB	3-Nov-2024	YANGON

MASTER

MT. FRONTEK
DECK DEPARTMENT

Year: **2023**

PMS#	ITEMS	INTERVAL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DECK FITTING & EQUIPMENT														
PORT & STBD ANCHOR WINDLASS														
D001	Grease Anchor Windlass Bearing Area and Greasing	3 MONTH	X			X			X			X		
D002	Check Brake Band & Brake Pad Wear Rate and	3 MONTH	X			X			X			X		
D003	Check Chain Stopper Condition and Securing for	3 MONTH	X			X			X			X		
D004	Gease and Check Condition of Chain Roller	3 MONTH	X			X			X			X		
D005	Check Windlass Foundation and Securing Bolts	3 MONTH	X			X			X			X		
D006	Check Remote Control Valve and Piping for Any	3 MONTH	X			X			X			X		
D007	Visual Inspection of Anchor Chain and Accessories	3 MONTH	X			X			X			X		
D008	Anchor Chain Calibration	60 MONTH												
FORWARD MOORING WINCH														
D009	Grease Winch Bearing Area and Greasing Points	3 MONTH	X			X			X			X		
D010	Check Brake Band & Brake Pad Wear Rate and	3 MONTH	X			X			X			X		
D011	Check Winch Foundation and Securing Bolts	3 MONTH	X			X			X			X		
D012	Check Remote Control Valve and Piping for Any	3 MONTH	X			X			X			X		
D013	Visual Inspection of Mooring Rope	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
AFT MOORING WINCH														
D014	Grease Winch Bearing Area and Greasing Points	3 MONTH		X			X			X			X	
D015	Check Brake Band & Brake Pad Wear Rate and	3 MONTH		X			X			X			X	
D016	Check Winch Foundation and Securing Bolts	3 MONTH		X			X			X			X	
D017	Check Remote Control Valve and Piping for Any	3 MONTH		X			X			X			X	
D018	Visual Inspection of Mooring Rope	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
HULL FITTINGS														
D019	Grease and Check Condition Universal Fairlead	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D020	Check Condition of Closed Chocks	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D021	Check Condition of P & S Double Bitt Bollards	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D022	Check Condition of P & S Mooring Pipes	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D023	Check Condition of Pedestal Rollers	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
MAIN CARGO CRANE														
D024	Check Joint, Hose, Connection, Piping for Leakage	3 MONTH	X			X			X			X		
D025	Grease all Greasing Points and Crane Wire	3 MONTH	X			X			X			X		
D026	Check Crane Hook Condition, Safety Latch and Wire	3 MONTH	X			X			X			X		
D027	Check Turn Table Gearing Condition	12 MONTH												X
D028	Renewal of Crane Wire	60 MONTH												
D029	Load Test	60 MONTH												
WATERTIGHT DOORS & HATCHES														
D030	Check Condition of Frame, Hinges, Lock Handle and	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D031	Grease the Door Hinges	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
COT & SLOP TANK HATCHES COVER														
D032	Check Condition of Frame, Hinges, Lock Handle and	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D033	Grease on Greasing Point	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
COT SIGHTING PORT														
D034	Check Condition of Frame, Hinges, Lock Handle,	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D035	Flame Screen and Rubber Packing	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
CARGO OIL SYSTEM														
D036	Greasing Valve & Deck Valve Spindle	3 MONTH			X			X			X			X
D037	Check Condition of Valve Body, Gland Packing	3 MONTH			X			X			X			X
D038	Valve Opening and Closing Function Test	3 MONTH			X			X			X			X
D039	System Pressure Test	12 MONTH	X											
D040	Valve Overhaul	36 MONTH												

PMS#	ITEMS	INTERVAL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
FOAM & FIRE LINE SYSTEM														
D041	Greasing Valve & Deck Valve Spindle	3 MONTH			X			X			X			X
D042	Check Condition of Valve Body, Gland Packing	3 MONTH			X			X			X			X
D043	Valve Opening and Closing Function Test Including	3 MONTH			X			X			X			X
D044	System Pressure Test	12 MONTH	X											
D045	Valve Overhaul	36 MONTH												
COMPRESSED AIR SYSTEM														
D046	Greasing Valve & Deck Valve Spindle	3 MONTH		X			X			X			X	
D047	Check Condition of Valve Body, Gland Packing	3 MONTH		X			X			X			X	
D048	Valve Opening and Closing Function Test	3 MONTH		X			X			X			X	
D049	Valve Overhaul	36 MONTH												
FRESHWATER SUPPLY SYSTEM														
D050	Greasing Valve & Deck Valve Spindle	3 MONTH		X			X			X			X	
D051	Check Condition of Valve Body, Gland Packing	3 MONTH		X			X			X			X	
D052	Valve Opening and Closing Function Test	3 MONTH		X			X			X			X	
D053	Valve Overhaul	36 MONTH												
MUSHROOM TYPE VENTILATOR														
D054	Greasing Spindle	3 MONTH		X			X			X			X	
D055	Opening and Closing Function Test	3 MONTH		X			X			X			X	
D056	Check Flame Screen, Rubber Seal and Ventilator	3 MONTH		X			X			X			X	
GOOSE NECK TYPE VENTILATOR														
D057	Greasing of Dog Type Securing Bolts	3 MONTH		X			X			X			X	
D058	Opening and Closing Function Test	3 MONTH		X			X			X			X	
D059	Check Flame Screen, Rubber Seal and Ventilator	3 MONTH		X			X			X			X	
AIR VENT														
D060	Check Flame Screen and Air Vent Condition.	3 MONTH		X			X			X			X	
D061	Internal Inspection of Condition	12 MONTH	X											
PV VALVE														
D062	Check Free Movement & Greasing	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D063	Check Filter Screen on Vacuum Side	3 MONTH		X			X			X			X	
D064	Internal Inspection of Condition	12 MONTH												X
D065	Overhaul, Vacuum and Pressure Testing	60 MONTH												
ER & PR FIRE DAMPERS														
D066	Opening and Closing Function Test	3 MONTH	X			X			X			X		
D067	Greasing	3 MONTH	X			X			X			X		
TANK CLEANING / TANK INSPECTION														
FW TANK CLEANING & INSPECTION														
D068	FWT (P)	12 MONTH	X											
D069	FWT (S)	12 MONTH	X											
BALLAST TANK INSPECTION														
D070	BWT 1C	12 MONTH	X											
D071	BWT APT	12 MONTH	X											
D072	BWT #2 P/S	12 MONTH	X											
D073	BWT #3 P/S	12 MONTH	X											
D074	BWT #4 P/S	12 MONTH	X											
D075	BWT #5 P/S	12 MONTH	X											
CARGO OIL TANK INSPECTION														
D076	COT #1 P/S	60 MONTH												
D077	COT #2 P/S	60 MONTH												
D078	COT #3 P/S	60 MONTH												
D079	COT #4 P/S	60 MONTH												
D080	SLOP P/S	60 MONTH												
NAVIGATION SYSTEM														
MAGNETIC COMPASS														
D081	Performance Check	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D082	Calibration / Adjustment	24 MONTH												

PMS#	ITEMS	INTERVAL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
RADAR #1														
D083	Radar Performance Test	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D084	Exposed Nuts and Bolts on Antenna Unit to Check	6 MONTH					X							
D085	Check and Clean Antenna Radiator	6 MONTH					X							
RADAR #2														
D086	Radar Performance Test	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D087	Exposed Nuts and Bolts on Antenna Unit to Check	6 MONTH					X							
D088	Check and Clean Antenna Radiator	6 MONTH					X							
ECHO SOUNDER														
D089	Cleaning the Display Unit	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D090	Check Power Cable and Transducer Cable Plug Condition and Tightness	6 MONTH						X						
D091	Cleaning of Transducer Face	36 MONTH												
UNIVERSAL AIS FURUNO														
D092	Cleaning the Display Unit	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D093	Check Power Cable Condition and Tightness	6 MONTH						X						
GPS NAVIGATOR FURUNO GPS														
D094	Cleaning the Display Unit	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D095	Check Antenna Unit Fixing Bolts for Tightness	6 MONTH						X						
D096	Check Antenna Cable Condition and Tightness	6 MONTH						X						
D097	Check Power Cable Condition and Tightness	6 MONTH						X						
DOPPLER SPEED LOG														
D098	Cleaning the Display Unit	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
D099	Check Power Cable and Transducer Cable Plug Condition and Tightness	6 MONTH						X						
D100	Cleaning of Transducer Face	36 MONTH												
COMMUNICATION EQUIPMENT														
MF/HF RADIO														
D101	Performance Testing	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
SHIP TELEPHONE SYSTEM														
D102	Performance Testing	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X
VHF MARINE RADIO														
D103	Performance Testing	1 MONTH	X	X	X	X	X	X	X	X	X	X	X	X

PROPOSED BY:



CHIEF OFFICER

APPROVED BY:



ASSISTANT TECHNICAL MANAGER

**MAINTENANCE SCHEDULE FOR
MT. FRONTEK
ENGINE DEPARTMENT**

Year: 2023

PMS#	ITEMS	INTERVAL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MAIN ENGINE SYSTEM														
WEICHAI CW6200ZC-5 MAIN ENGINE PORT SIDE														
M001	Major Overhaul	20000H												
M002	Check Engine Foundation	10000H												
M003	Check Valve Push Rod, Push Rod Roller and Seat	10000H												
M004	Check Fuel Injection Pump Roller	10000H												
M005	Check Crankcase Cover	10000H												
M006	Check Flexible Rubber of Output Coupling	10000H												
M007	Check Camshaft Bearing Condition	10000H												
M008	Check all Main and Thrust Bush Bearing Worn Condition	10000H												
M009	Check Cylinder Liner for Excessive Wear and Corrosion, Replace Seal Ring during Installation	10000H												
M010	Check Monitoring Instruments, Sensor and wiring	5000H												
M011	Check No. 4 & 5 Bush Bearing Worn Condition	5000H												
M012	Overhaul Turbocharger and Governor	5000H												
M013	Inspect, clean and replaced Zinc anode Lube oil, Air and FW Cooler	5000H												
M014	Check Air Distributor, Main Starting Valve	5000H												
M015	Overhaul SW, FW & Lube Oil Pump	5000H												
M016	Check Timing and Idle Gear, Measure Gear Lashes	5000H												
M017	Check Inlet Exhaust Valve and Rocker Arm	5000H												
M018	Overhaul Fuel Injection Pump	5000H												
M019	Check Con Rod Bearing and Con Rod Bolt	5000H												
M020	Check Piston and Piston Pin, Piston Ring to be replaced	5000H												
M021	Cylinder Head Overhaul	5000H												
M022	Change Engine Lube Oil and Governor Oil	1500H												
M023	Check Fuel Pump Delivery Valve	1000H										X		
M024	Check for free movement and Clearance of Fuel Pump and Governor Linkage. Adjust and Oil if Necessary	1000H										X		
M025	Functional Check of Pre-Lube Pump	1000H										X		
M026	Check all System Valve	1000H										X		
M027	Check Surface Condition of Cam and Roller	500H					X					X		
M028	Check all Pressure Gauge, Thermometer and Tachometer	500H					X					X		
M029	Check and Grease Fresh Water Pump	500H					X					X		
M030	Check Main Bearing and Con Rod Tightening Bolts	500H					X					X		
M031	Check Cylinder Head Bolt, Starting Valve, Injector and Rocker Arm Securing Bolts for tightness.	500H					X					X		
M032	Test and Check Fuel Injector	500H					X					X		
M033	Clean All Fuel and Lube Oil Filters	500H					X					X		
M034	Check Valve Lash Clearance	500H					X					X		
M035	Clean Turbocharger and Air Filter	100H	X	X	X	X	X	X	X	X	X	X	X	X
M036	Check Valve bridge Clearance	100H	X	X	X	X	X	X	X	X	X	X	X	X
M037	Clean Turbo Charger Lub oil Line	100H	X	X	X	X	X	X	X	X	X	X	X	X
M038	Check Hose and Clamp	100H	X	X	X	X	X	X	X	X	X	X	X	X
HANGZHOU ADVANCE MAIN ENGINE GEAR BOX PORT SIDE														
M039	Gearbox Internal Inspection, Oil line Cleaning & Bearing Renewal	10000H												
M040	Check Friction Plates, Thrust Ring, Gear Teeth and Sealing Ring	5000H												
M041	Check and Clean Cooler	5000H												
M042	Check and Inspect Oil Pump	5000H												
M043	Oil Change	5000H												
M044	Clean and Check Hydraulic Control Component	1000H										X		
M045	Check and Inspect Coupling and Bolts	1000H										X		
M046	Clean Filter Element	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M047	Check for any leakage and Oil Condition whether Mixed with Water	Weekly	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X
WEICHAI CW6200ZC-5 MAIN ENGINE STBD SIDE														
M048	Major Overhaul	20000H												
M049	Check Engine Foundation	10000H												
M050	Check Valve Push Rod, Push Rod Roller and Seat	10000H												
M051	Check Fuel Injection Pump Roller	10000H												
M052	Check Crankcase Cover	10000H												
M053	Check Flexible Rubber of Output Coupling	10000H												
M054	Check Camshaft Bearing Condition	10000H												
M055	Check all Main and Thrust Bush Bearing Worn Condition	10000H												
M056	Check Cylinder Liner for Excessive Wear and Corrosion, Replace Seal Ring during Installation	10000H												
M057	Check Monitoring Instruments, Sensor and wiring	5000H												
M058	Check No. 4 & 5 Bush Bearing Worn Condition	5000H												
M059	Overhaul Turbocharger and Governor	5000H												
M060	Inspect, clean and replaced Zinc anode Lube oil, Air and FW Cooler	5000H												
M061	Check Air Distributor, Main Starting Valve	5000H												
M062	Overhaul SW, FW & Lube Oil Pump	5000H												
M063	Check Timing and Idle Gear, Measure Gear Lashes	5000H												
M064	Check Inlet Exhaust Valve and Rocker Arm	5000H												

PMIS#	ITEMS	INTERVAL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
M065	Overhaul Fuel Injection Pump	5000H												
M066	Check Con Rod Bearing and Con Rod Bolt	5000H												
M067	Check Piston and Piston Pin, Piston Ring to be replaced	5000H												
M068	Cylinder Head Overhaul	5000H												
M069	Change Engine Lube Oil and Governor Oil	1500H												
M070	Check Fuel Pump Delivery Valve	1000H										X		
M071	Check for free movement and Clearance of Fuel Pump and Governor Linkage. Adjust and Oil if Necessary	1000H										X		
M072	Functional Check of Pre-Lube Pump	1000H										X		
M073	Check all System Valve	1000H										X		
M074	Check Surface Condition of Cam and Roller	500H					X					X		
M075	Check all Pressure Gauge, Thermometer and Tachometer	500H					X					X		
M076	Check and Grease Fresh Water Pump	500H					X					X		
M077	Check Main Bearing and Con Rod Tightening Bolts	500H					X					X		
M078	Check Cylinder Head Bolt, Starting Valve, Injector and Rocker Arm Securing Bolts for tightness.	500H					X					X		
M079	Test and Check Fuel Injector	500H					X					X		
M080	Clean All Fuel and Lube Oil Filters	500H					X					X		
M081	Check Valve Lash Clearance	500H					X					X		
M082	Clean Turbocharger and Air Filter	100H	X	X	X	X	X	X	X	X	X	X	X	X
M083	Check Valve bridge Clearance	100H	X	X	X	X	X	X	X	X	X	X	X	X
M084	Clean Turbo Charger Lub Oil Line	100H	X	X	X	X	X	X	X	X	X	X	X	X
M085	Check Hose and Clamp	100H	X	X	X	X	X	X	X	X	X	X	X	X
HANGZHOU ADVANCE MAIN ENGINE GEAR BOX STBD SIDE														
M086	Gearbox Internal Inspection, Oil line Cleaning & Bearing Renewal	10000H												
M087	Check Friction Plates, Thrust Ring, Gear Teeth and Sealing Ring	5000H												
M088	Check and Clean Cooler	5000H												
M089	Check and Inspect Oil Pump	5000H												
M090	Oil Change	5000H												
M091	Clean and Check Hydraulic Control Component	1000H											X	
M092	Check and Inspect Coupling and Bolts	1000H											X	
M093	Clean Filter Element	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M094	Check for any leakage and Oil Condition whether Mixed with Water	Weekly	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X
AUX ENGINE SYSTEM														
SHANGHAI DIESEL G128 AUX ENGINE PORT SIDE														
M095	Major Overhaul	15000H												X
M096	Top Overhaul	10000H												
M097	Overhaul FW Cooling Pump	7000H												
M098	Overhaul Turbocharger	7000H												
M099	Replace Cooling Water Thermostat	3000H												X
M100	Check Engine Alignment	3000H												X
M101	Check for Leakage of Piping System	1000H				X				X				X
M102	Check Valve Clearance and Adjust if Necessary	1000H				X				X				X
M103	Check and Test Fuel Injector	1000H				X				X				X
M104	Clean Water Oil Separator	1000H				X				X				X
M105	Check Fuel Timing of Fuel Pump and Fuel System	1000H				X				X				X
M106	Check the Tighten Torque of Cylinder Head	1000H				X				X				X
M107	Oil Change and Clean Oil and Fuel Filter	500H		X		X		X		X		X		X
M108	Clean Air filter	500H		X		X		X		X		X		X
M109	Check Condition of Starter and Battery	500H		X		X		X		X		X		X
M110	Check Monitoring System	500H		X		X		X		X		X		X
AUX ENGINE ALTERNATOR PORT SIDE														
M111	Clean Air Filter	Monthly	X	X	X	X	X	X	X	X	X	X	X	X
M112	Check Wiring Connection for Tightness	Monthly	X	X	X	X	X	X	X	X	X	X	X	X
M113	Check Air Gap Rotor Side	6 Month						X						X
M114	Overhaul	60 Month												X
SHANGHAI DIESEL G128 AUX ENGINE STBD SIDE														
M115	Major Overhaul	15000H												X
M116	Top Overhaul	10000H												
M117	Overhaul FW Cooling Pump	7000H												
M118	Overhaul Turbocharger	7000H												
M119	Replace Cooling Water Thermostat	3000H										X		
M120	Check Engine Alignment	3000H										X		
M121	Check for Leakage of Piping System	1000H			X				X				X	
M122	Check Valve Clearance and Adjust if Necessary	1000H			X				X				X	
M123	Check and Test Fuel Injector	1000H			X				X				X	
M124	Clean Water Oil Separator	1000H			X				X				X	
M125	Check Fuel Timing of Fuel Pump and Fuel System	1000H			X				X				X	
M126	Check the Tighten Torque of Cylinder Head	1000H			X				X				X	
M127	Oil Change and Clean Oil and Fuel Filter	500H	X		X		X		X		X		X	
M128	Clean Air filter	500H	X		X		X		X		X		X	
M129	Check Condition of Starter and Battery	500H	X		X		X		X		X		X	
M130	Check Monitoring System	500H	X		X		X		X		X		X	
AUX ENGINE ALTERNATOR STBD SIDE														
M131	Clean Air Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M132	Check Wiring Connection for Tightness	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M133	Check Air Gap Rotor Side	6 Month						X						X
M134	Overhaul	60 Month												X

PMS#	ITEMS	INTERVAL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SHAFTING SYSTEM														
PROPELLER AND SHAFTING PORT SIDE														
M135	Propeller Inspection	36 Month												
M136	Shaft Withdrawal Inspection	60 Month												X
M137	Propeller Shaft Seal Inspection for leakage	6 Month						X						X
PROPELLER AND SHAFTING STBD SIDE														
M138	Propeller Inspection	36 Month												
M139	Shaft Withdrawal Inspection	60 Month												X
M140	Propeller Shaft Seal Inspection	6 Month						X						X
CARGO PUMP SYSTEM														
SHANGHAI G128 CARGO PUMP ENGINE PORT SIDE														
M141	Major Overhaul	15000H												
M142	Top Overhaul	10000H												
M143	Overhaul FW Cooling Pump	7000H												
M144	Overhaul Turbocharger	7000H												
M145	Replace Cooling Water Thermostat	3000H												
M146	Check Engine Alignment	3000H												
M147	Check for Leakage of Piping System	1000H										X		
M148	Check Valve Clearance and Adjust if Necessary	1000H										X		
M149	Check and Test Fuel Injector	1000H										X		
M150	Clean Water Oil Separator	1000H										X		
M151	Check Fuel Timing of Fuel Pump and Fuel System	1000H										X		
M152	Check the Tighten Torque of Cylinder Head	1000H										X		
M153	Oil Change and Clean Oil and Fuel Filter	500H										X		
M154	Clean Air filter	500H					X					X		
M155	Check Condition of Starter and Battery	500H					X					X		
M156	Check Monitoring System	500H					X					X		
HANGZHOU ADVANCE 300 CARGO PUMP ENGINE GEAR BOX PORT SIDE														
M157	Gearbox Internal Inspection, Oil line Cleaning & Bearing Renewal	10000H												
M158	Check Friction Plates, Thrust Ring, Gear Teeth and Sealing Ring	5000H												
M159	Check and Clean Cooler	5000H												
M160	Check and Inspect Oil Pump	5000H												
M161	Oil Change	5000H												
M162	Clean and Check Hydraulic Control Component	1000H										X		
M163	Check and Inspect Coupling and Bolts	1000H										X		
M164	Clean Filter Element	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M165	Check for any leakage and Oil Condition whether Mixed with Water	Weekly	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X
SHANGHAI DIESEL G128 CARGO PUMP ENGINE STBD SIDE														
M166	Major Overhaul	15000H												
M167	Top Overhaul	10000H												
M168	Overhaul FW Cooling Pump	7000H												
M169	Overhaul Turbocharger	7000H												
M170	Replace Cooling Water Thermostat	3000H												
M171	Check Engine Alignment	3000H												
M172	Check for Leakage of Piping System	1000H								X				
M173	Check Valve Clearance and Adjust if Necessary	1000H								X				
M174	Check and Test Fuel Injector	1000H								X				
M175	Clean Water Oil Separator	1000H								X				
M176	Check Fuel Timing of Fuel Pump and Fuel System	1000H								X				
M177	Check the Tighten Torque of Cylinder Head	1000H								X				
M178	Oil Change and Clean Oil and Fuel Filter	500H		X						X				
M179	Clean Air filter	500H		X						X				
M180	Check Condition of Starter and Battery	500H		X						X				
M181	Check Monitoring System	500H		X						X				
HANGZHOU ADVANCE 300 CARGO PUMP ENGINE GEAR BOX STBD SIDE														
M182	Gearbox Internal Inspection, Oil line Cleaning & Bearing Renewal	10000H												
M183	Check Friction Plates, Thrust Ring, Gear Teeth and Sealing Ring	5000H												
M184	Check and Clean Cooler	5000H												
M185	Check and Inspect Oil Pump	5000H												
M186	Oil Change	5000H												
M187	Clean and Check Hydraulic Control Component	1000H								X				
M188	Check and Inspect Coupling and Bolts	1000H								X				
M189	Clean Filter Element	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M190	Check for any leakage and Oil Condition whether Mixed with Water	Weekly	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X
TAIKO CARGO PUMP 1														
M191	Pump Overhaul	36 Month												
M192	Renewal of Roller Bearing, Oil Seal and O-Ring	36 Month												
M193	Check Condition of Shaft Coupling Bolts & Rubber Ring	36 Month												
M194	Check Condition of Mating Faces of Oil Seal	12 Month												X
M195	Check for Loosening of Foundation Bolts	12 Month												X
M196	Greasing	1 Month	X	X	X	X	X	X	X	X	X	X	X	X

PMS#	ITEMS	INTERVAL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
TAIKO CARGO PUMP 2														
M197	Pump Overhaul	36 Month												
M198	Renewal of Roller Bearing, Oil Seal and O-Ring	36 Month												
M199	Check Condition of Shaft Coupling Bolts & Rubber Ring	36 Month												
M200	Check Condition of Mating Faces of Oil Seal	12 Month												X
M201	Check for Loosening of Foundation Bolts	12 Month												X
M202	Greasing	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
PUMP ROOM PORT BULKHEAD SEAL														
M203	Check Seal and Bearing Condition	36 Month												
M204	Greasing	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
PUMP ROOM STBD BULKHEAD SEAL														
M205	Check Seal and Bearing Condition	36 Month												
M206	Greasing	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
AIR CONDITIONING SYSTEM														
M207	Compressor Overhaul	36 Month												
M208	Lube Oil Change	12 Month												
M209	Dryer Change	12 Month												
M210	Pressure Switch Testing	12 Month												
M211	Heat Exchanges Cleaning	3 Month	X			X			X			X		
M212	Compressor Mounting - Check	3 Month	X			X			X			X		
M213	Clean Air filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
PUMP STRIPPING PUMP														
M214	Pump Overhaul	36 Month												
M215	Renewal of O-Ring and Mechanical Seal	36 Month												
M216	Check Shaft Condition, Shaft OD and Contact Point	12 Month												X
M217	Check Condition and Contact Point of Casing Ring and Condition of Impeller	12 Month												X
M218	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M219	Renewal of Bearing	12 Month												X
M220	Check for Loosening of Foundation Bolts	12 Month												X
M221	Greasing	3 Month	X			X			X			X		
AE S.W COOLING PUMP #1														
M222	Pump Overhaul	36 Month												
M223	Renewal of O-Ring and Mechanical Seal	36 Month												
M224	Check Shaft Condition, Shaft OD and Contact Point	12 Month												X
M225	Check Condition and Contact Point of Casing Ring and Condition of Impeller	12 Month												X
M226	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M227	Renewal of Bearing	12 Month												X
M228	Check for Loosening of Foundation Bolts	12 Month												X
M229	Greasing	3 Month	X			X			X			X		
AE S.W COOLING PUMP #2														
M230	Pump Overhaul	36 Month												
M231	Renewal of O-Ring and Mechanical Seal	36 Month												
M232	Check Shaft Condition, Shaft OD and Contact Point	12 Month												X
M233	Check Condition and Contact Point of Casing Ring and Condition of Impeller	12 Month												X
M234	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M235	Renewal of Bearing	12 Month												X
M236	Check for Loosening of Foundation Bolts	12 Month												X
M237	Greasing	3 Month		X			X			X			X	
COPE S.W COOLING PUMP #1														
M238	Pump Overhaul	36 Month												
M239	Renewal of O-Ring and Mechanical Seal	36 Month												
M240	Check Shaft Condition, Shaft OD and Contact Point	12 Month												X
M241	Check Condition and Contact Point of Casing Ring and Condition of Impeller	12 Month												X
M242	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M243	Renewal of Bearing	12 Month												X
M244	Check for Loosening of Foundation Bolts	12 Month												X
M245	Greasing	3 Month	X			X			X			X		
COPE S.W COOLING PUMP #2														
M246	Pump Overhaul	36 Month												
M247	Renewal of O-Ring and Mechanical Seal	36 Month												
M248	Check Shaft Condition, Shaft OD and Contact Point	12 Month												X
M249	Check Condition and Contact Point of Casing Ring and Condition of Impeller	12 Month												X
M250	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M251	Renewal of Bearing	12 Month												X
M252	Check for Loosening of Foundation Bolts	12 Month												X
M253	Greasing	3 Month		X			X			X			X	

PMS#	ITEMS	INTERVAL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AIR CON SW COOLING PUMP														
M254	Pump Overhaul	36 Month												
M255	Renewal of O-Ring and Mechanical Seal	36 Month												
M256	Check Shaft Condition, Shaft OD and Contact Point	12 Month												X
M257	Check Condition and Contact Point of Casing Ring and Condition of Impeller	12 Month												X
M258	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M259	Renewal of Bearing	12 Month												X
M260	Check for Loosening of Foundation Bolts	12 Month												X
M261	Greasing	3 Month	X			X			X			X		
MAIN FIRE PUMP														
M262	Pump Overhaul	36 Month												
M263	Renewal of O-Ring and Mechanical Seal	36 Month												
M264	Check Shaft Condition, Shaft OD and Contact Point	12 Month												X
M265	Check Condition and Contact Point of Casing Ring and Condition of Impeller	12 Month												X
M266	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M267	Renewal of Bearing	12 Month												X
M268	Check for Loosening of Foundation Bolts	12 Month												X
M269	Greasing	3 Month	X			X			X			X		
EMERGENCY FIRE PUMP														
M270	Pump Overhaul	36 Month												
M271	Renewal of O-Ring and Mechanical Seal	36 Month												
M272	Check Shaft Condition, Shaft OD and Contact Point	12 Month												X
M273	Check Condition and Contact Point of Casing Ring and Condition of Impeller	12 Month												X
M274	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M275	Renewal of Bearing	12 Month												X
M276	Check for Loosening of Foundation Bolts	12 Month												X
M277	Greasing	3 Month			X			X			X			X
GS PUMP														
M278	Pump Overhaul	36 Month												
M279	Renewal of O-Ring and Mechanical Seal	36 Month												
M280	Check Shaft Condition, Shaft OD and Contact Point	12 Month												X
M281	Check Condition and Contact Point of Casing Ring and Condition of Impeller	12 Month												X
M282	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M283	Renewal of Bearing	12 Month												X
M284	Check for Loosening of Foundation Bolts	12 Month												X
M285	Greasing	3 Month			X			X			X			X
FOAM PUMP														
M286	Pump Overhaul	36 Month												
M287	Renewal of O-Ring and Mechanical Seal	36 Month												
M288	Check Shaft Condition, Shaft OD and Contact Point	12 Month												X
M289	Check Condition and Contact Point of Casing Ring and Condition of Impeller	12 Month												X
M290	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M291	Renewal of Bearing	12 Month												X
M292	Check for Loosening of Foundation Bolts	12 Month												X
M293	Greasing	3 Month	X			X			X			X		
BALLAST PUMP														
M294	Pump Overhaul	36 Month												
M295	Renewal of O-Ring and Mechanical Seal	36 Month												
M296	Check Shaft Condition, Shaft OD and Contact Point	12 Month												X
M297	Check Condition and Contact Point of Casing Ring and Condition of Impeller	12 Month												X
M298	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M299	Renewal of Bearing	12 Month												X
M300	Check for Loosening of Foundation Bolts	12 Month												X
M301	Greasing	3 Month		X			X			X			X	
MAIN ENGINE LO PRIMING PUMP #1														
M302	Pump Overhaul	36 Month												
M303	Check Condition of Bearing	36 Month												
M304	Renewal of Bearing & Mechanical Seal	36 Month												
M305	Check Shaft Condition, Shaft OD and Contact Point	36 Month												
M306	Check Gear Condition and Side Face, tooth Surface and External Diameter	36 Month												
M307	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M308	Check Condition of Shaft Coupling Bolts and Rubber Ring for Wear	12 Month												X
M309	Tested Safety Valve for Opening Pressure	12 Month												X
M310	Renewal of O Ring	12 Month												X
M311	Check for Loosening of Foundation Bolts	12 Month												X

PMS#	ITEMS	INTERVAL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MAIN ENGINE LO PRIMING PUMP #2														
M312	Pump Overhaul	36 Month												
M313	Check Condition of Bearing	36 Month												
M314	Renewal of Bearing & Mechanical Seal	36 Month												
M315	Check Shaft Condition, Shaft OD and Contact Point	36 Month												
M316	Check Gear Condition and Side Face, tooth Surface and External Diameter	36 Month												
M317	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M318	Check Condition of Shaft Coupling Bolts and Rubber Ring for Wear	12 Month												X
M319	Tested Safety Valve for Opening Pressure	12 Month												X
M320	Renewal of O Ring	12 Month												X
M321	Check for Loosening of Foundation Bolts	12 Month												X
MAIN ENGINE GEARBOX LUBE OIL PUMP														
M322	Pump Overhaul	36 Month												
M323	Check Condition of Bearing	36 Month												
M324	Renewal of Bearing & Mechanical Seal	36 Month												
M325	Check Shaft Condition, Shaft OD and Contact Point	36 Month												
M326	Check Gear Condition and Side Face, tooth Surface and External Diameter	36 Month												
M327	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M328	Check Condition of Shaft Coupling Bolts and Rubber Ring for Wear	12 Month												X
M329	Tested Safety Valve for Opening Pressure	12 Month												X
M330	Renewal of O Ring	12 Month												X
M331	Check for Loosening of Foundation Bolts	12 Month												X
FUEL TRANSFER PUMP														
M332	Pump Overhaul	36 Month												
M333	Check Condition of Bearing	36 Month												
M334	Renewal of Bearing & Mechanical Seal	36 Month												
M335	Check Shaft Condition, Shaft OD and Contact Point	36 Month												
M336	Check Gear Condition and Side Face, tooth Surface and External Diameter	36 Month												
M337	Check Condition of Mechanical Seal Mating Faces	12 Month												X
M338	Check Condition of Shaft Coupling Bolts and Rubber Ring for Wear	12 Month												X
M339	Tested Safety Valve for Opening Pressure	12 Month												X
M340	Renewal of O Ring	12 Month												X
M341	Check for Loosening of Foundation Bolts	12 Month												X
ANCHOR AND MOORING WINCH SYSTEM														
FORWARD ANCHOR WINCH HYDRUALIC MOTOR #1														
M342	Pump Overhaul	60 Month												
M343	Check for Fitting, Piping and Accessories for Tightness and Leakage	3 Month			X			X			X			X
FORWARD ANCHOR WINCH HYDRUALIC MOTOR #2														
M344	Pump Overhaul	60 Month												
M345	Check for Fitting, Piping and Accessories for Tightness and Leakage	3 Month			X			X			X			X
FORWARD ANCHOR WINCH POWER PACK HYDRUALIC MOTOR #1														
M346	Pump Overhaul	60 Month												
M347	Check for Fitting, Piping and Accessories for Tightness and Leakage	3 Month			X			X			X			X
FORWARD ANCHOR WINCH POWER PACK HYDRUALIC MOTOR #2														
M348	Pump Overhaul	60 Month												
M349	Check for Fitting, Piping and Accessories for Tightness and Leakage	3 Month			X			X			X			X
AFT MOORING WINCH HYDRUALIC MOTOR #1														
M350	Pump Overhaul	60 Month												
M351	Check for Fitting, Piping and Accessories for Tightness and Leakage	3 Month			X			X			X			X
AFT MOORING WINCH HYDRUALIC MOTOR #2														
M352	Pump Overhaul	60 Month												
M353	Check for Fitting, Piping and Accessories for Tightness and Leakage	3 Month			X			X			X			X
AFT ANCHOR WINCH POWER PACK HYDRUALIC MOTOR #1														
M354	Pump Overhaul	60 Month												
M355	Check for Fitting, Piping and Accessories for Tightness and Leakage	3 Monthly			X			X			X			X
CARGO CRANE MAIN HYDRAULIC MOTOR														
M356	Pump Overhaul	60 Month												
M357	Check for Fitting, Piping and Accessories for Tightness and Leakage	3 Month			X			X			X			X

PMS#	ITEMS	INTERVAL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	STRAINER													
	MAIN SEA CHEST STRAINER PORT													
M358	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M359	Check Condition of Strainer	36 Month												
	MAIN SEA CHEST STRAINER STBD													
M360	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M361	Check Condition of Strainer	36 Month												
	MAIN ENGINE SEA CHEST STRAINER PORT													
M362	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M363	Check Condition of Strainer	36 Month												
	MAIN ENGINE SEA CHEST STRAINER STBD													
M364	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M365	Check Condition of Strainer	36 Month												
	CARGO PUMP ENGINE SEA CHEST STRAINER PORT													
M366	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M367	Check Condition of Strainer	36 Month												
	CARGO PUMP ENGINE SEA CHEST STRAINER STBD													
M368	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M369	Check Condition of Strainer	36 Month												
	AUX ENGINE SEA CHEST STRAINER PORT													
M370	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M371	Check Condition of Strainer	36 Month												
	AUX ENGINE SEA CHEST STRAINER STBD													
M372	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M373	Check Condition of Strainer	36 Month												
	FIRE PUMP SEA CHEST STRAINER													
M374	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M375	Check Condition of Strainer	36 Month												
	GS PUMP SEA CHEST STRAINER													
M376	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M377	Check Condition of Strainer	36 Month												
	FOAM PUMP SEA CHEST STRAINER													
M378	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M379	Check Condition of Strainer	36 Month												
	BALLAST PUMP SEA CHEST STRAINER													
M380	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M381	Check Condition of Strainer	36 Month												
	CARGO PUMP STRAINER PORT													
M382	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M383	Check Condition of Strainer	36 Month												
	CARGO PUMP STRAINER STBD													
M384	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M385	Check Condition of Strainer	36 Month												
	FUEL TANSFER PUMP STRAINER													
M386	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M387	Check Condition of Strainer	36 Month												
	PUMP ROOM STRAINER													
M388	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M389	Check Condition of Strainer	36 Month												
	FORWARD ANCHOR WINCH POWER PACK HYDRAULIC TANK FILTER STRAINER													
M390	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M391	Check Condition of Strainer	36 Month												
	AFT MOOIRNG WINCH POWER PACK HYDRAULIC TANK FILTER STRAINER													
M392	Cleaning of Strainer Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M393	Check Condition of Strainer	36 Month												
	SEWAGE PLANT													
M394	Check all Pressure Gauges	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M395	Check Screen Filter	3 Month	X			X			X			X		
M396	Check System for Leakage	3 Month	X			X			X			X		
M397	Check Filter Cartridges of Aeration Pump	6 Month	X						X					
M398	Check Tank Compartment Condition	12 Month												X
M399	Check Aeration Pump #1 for Wear	12 Month												X
M400	Check Aeration Pump #2 for Wear	12 Month												X
M401	Check Discharge Pump for Wear	12 Month												X
M402	Check Crushing Pump for Wear	12 Month												X

PMS#	ITEMS	INTERVAL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
OILY WATER SEPARATOR														
M403	Clean Suction Filter	3 Month	X			X			X			X		
M404	Clean Separator of Sludge and Accumulates	3 Month	X			X			X			X		
M405	Clean Measurement Unit	3 Month	X			X			X			X		
M406	Check System for Leakage	3 Month	X			X			X			X		
M407	Check Coalescer	12 Month												X
M408	Check Bilges Pump	12 Month												X
M409	15PPM bilge Alarm - Calibration	60 Month												X
STEERING GEAR														
M410	S/G Hydraulic System to check for leakage	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M411	S/G Greasing	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M412	Clean Power Pack Filter	3 Month												
M413	S/G Hydraulic Ram #1 Overhaul	36 Month												
M414	S/G Hydraulic Ram #2 Overhaul	36 Month												
AIR COMPRESSOR														
M415	Cleaning of Valve	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M416	Cleaning and Check Condition of Suction Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M417	Check Piping & System for Leakage	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M418	Oil Change	3 Month	X			X			X			X		
M419	Check Condition of Valve Plate and Spring Plate	12 Month												X
M420	Completed Overhaul	36 Month												
EMERGENCY GENERATOR														
M421	Complete Overhaul	10000H												
M422	Tappet Clearance	1000H												
M423	Renew Fuel Filter	500H												
M424	Clean Crankcase Breather	500H												
M425	Clean Air Filter	250H												X
M426	Check Belt Tension	250H												X
M427	Renew Lube Oil and Change Lube Oil Filter	250H												X
EMERGENCY GENERATOR ALTERNATOR														
M428	Clean Air Filter	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M429	Check Wiring Connection for Tightness	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
M430	Check Air Gap Rotor Side	6 Month	X						X					
M431	Overhaul	60 Month												X
HEAT EXCHANGER COOLER														
M432	Inspect & Clean M/E F.W Cooler #1	6 Month	X						X					
M433	Inspect & Clean M/E Inter Cooler #1	6 Month												
M434	Inspect & Clean M/E F.W Cooler #2	6 Month	X						X					
M435	Inspect & Clean M/E Inter Cooler #2	6 Month												
M436	Inspect & Clean M/E LO Cooler #1	6 Month	X						X					
M437	Inspect & Clean M/E LO Cooler #2	6 Month												
M438	Inspect & Clean A/E F.W Cooler #1	6 Month	X						X					
M439	Inspect & Clean A/E Inter Cooler #1	6 Month												
M440	Inspect & Clean A/E F.W Cooler #2	6 Month	X						X					
M441	Inspect & Clean A/E Inter Cooler #2	6 Month												
M442	Inspect & Clean A/E LO Cooler #1	6 Month	X						X					
M443	Inspect & Clean A/E LO Cooler #2	6 Month												
M444	Inspect & Clean CP/E F.W Cooler #1	6 Month	X						X					
M445	Inspect & Clean CP/E Inter Cooler #1	6 Month												
M446	Inspect & Clean CP/E F.W Cooler #2	6 Month	X						X					
M447	Inspect & Clean CP/E Inter Cooler #2	6 Month		X						X				
M448	Inspect & Clean CP/E LO Cooler #1	6 Month		X						X				
M449	Inspect & Clean CP/E LO Cooler #2	6 Month		X						X				
M450	Inspect & Clean ME Gear Box LO Cooler #1	6 Month		X						X				
M451	Inspect & Clean ME Gear Box LO Cooler #2	6 Month		X						X				
M452	Inspect & Clean CP/E Gear Box LO Cooler #1	6 Month		X						X				
M453	Inspect & Clean CP/E Gear Box LO Cooler #2	6 Month		X						X				
M454	Inspect & Clean Main AC Cooler	6 Month		X						X				
M455	Inspect & Clean ECR AC Cooler	6 Month		X										
OTHER MACHINERIES														
M456	Air Horn Valve Steel Wire & Rollers - Grease	3 Month		X			X			X			X	
M457	Engine Room Valves - Grease	3 Month		X			X			X			X	
M458	Engine Exhaust Gas Expansion Bellows- Inspect	12 Month												X
SAMPLING														
C001	Hydraulic Oil Shore Laboratory Analysis	12 Month												X
C002	Lub Oil Shore Laboratory Analysis	6 Month						X						X
C003	Foam Test Analysis	12 Month									X			

PMIS#	ITEMS	INTERVAL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SWITCHBOARD														
E001	Megger Test	6 Month	X						X					
E002	Main Switch Board	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
E003	A/E #1 A.C.B	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
E004	A/E #2 A.C.B	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
E005	Emergency Switch Board	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
E006	Navigation Switch Board	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
E007	AC220V Switch Board	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
E008	Emergency 24V Batteries Charging Panel	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
E009	Fwd Winch/Windlass Starting Panel	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
E010	Aft Winch Starting Panel	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
E011	Steering gear pump #1 Panel	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
E012	Steering gear pump #2 Panel	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
E013	Air Compressor #1 Panel	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
E014	Air Compressor #2 Panel	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
MOTOR OVERHAUL														
E015	FW Transfer Pump	36 Month												
E016	FO Transfer Pump #1	36 Month												
E017	FO Transfer Pump #2	36 Month												
E018	S.W Cooling Pump For Air Cond	36 Month												
E019	Fire Pump	36 Month												
E020	G.S Pump	36 Month												
E021	Bilge Pump	36 Month												
E022	Segregated Ballast Pump #1	36 Month												
E023	Segregated Ballast Pump #2	36 Month												
E024	Forward Winch Hydraulic Main Pump #1	36 Month												
E025	Forward Winch Hydraulic Main Pump #2	36 Month												
E026	Aft Winch Hydraulic Main Pump	36 Month												
E027	Cargo Crane Hydraulic Main Pump	36 Month												
E028	A/E S.W Cooling Pump #1	36 Month												
E029	A/E S.W Cooling Pump #2	36 Month												
E030	Emergency Fire Pump	36 Month												
E031	Domestic F.W Pump #1	36 Month												
E032	Domestic F.W Pump #2	36 Month												
E033	Domestic S.W Pump #1	36 Month												
E034	Domestic S.W Pump #2	36 Month												
E035	Sewage Discharge Pump	36 Month												
E036	Sewage Air Pump #1	36 Month												
E037	Sewage Air Pump #2	36 Month												
E038	Sewage Crushing Pump	36 Month												
E039	Engine Room Ventilation/Exhaust Fan #1	36 Month												
E040	Engine Room Ventilation/Exhaust Fan #2	36 Month												
E041	Centre Air-conditioning Blower	36 Month												
E042	Emergency Fire pump Rm Blower	36 Month												
E043	Emergency Gen Set Ventilation Fan	36 Month												
E044	CO2 Battery Room Exhaust Fan	36 Month												
E045	Pump Room Ventilation/Exhaust Fan #1	36 Month												
E046	Pump Room Ventilation/Exhaust Fan #2	36 Month												
E047	Galley Exhaust and Inlet Fan	36 Month												
E048	Steering Gear Room Ventilation Fan	36 Month												
E049	M.E Prelub Pump #1	36 Month												
E050	M.E Prelub Pump #2	36 Month												
E051	M.E Gear Box Priming Pump	36 Month												
E052	Air Compressor #1	36 Month												
E053	Air Compressor #2	36 Month												
E054	Foam Pump	36 Month												
E055	Steering gear pump #1	36 Month												
E056	Steering gear pump #2	36 Month												
E057	FWD Ballast Pump	36 Month												
E058	OWS Bilges Pump	36 Month												
E059	Dirty Oil Pump	36 Month												
FUNCTION TESTING OF SAFETY ALARM														
S001	Emergency Gen Auto Start Test & E-Lighting	1 Week	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X
S002	Emergency Fire Pump Test	1 Week	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X
S003	Quick Closing Valves	1 Week	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X
S004	E/R, P/R and BT/R Bilge High Level Alarm	1 Week	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X
S005	Cargo Tank High Level Alarm	1 Week	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X
S006	ER Bunker Tank High Level Alarm	1 Week	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X
S007	Emergency P/R & E/R Fans and Fuel Pumps Cut off	1 Week	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X
S008	Emergency Stop for Cargo Pump	1 Week	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X	4X
S009	Fixed Gas Detector System	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S010	O.W.S 15PPM Alarm	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S011	Sewage Treatment Plant High Level Alarm	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S012	Emergency Steering & Communication Test	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S013	Fire Detection & General Alarm System	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S014	CO2 System Release Alarm	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S015	Navigation Light Main Power Failure Alarm	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S016	Navigation Light Bulb / Fuse Failure Alarm	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S017	Steering Gear System AC Supply Failure Light	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S018	Steering Gear System Phase Failure Light	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S019	Steering Gear System Control Failure Light	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S020	Steering Gear System Hyd. Tank Low Level Light	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S021	Steering Gear System Motor Overload Light	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S022	Engineer Call alarm Audible	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S023	Sound Power Telephone B/T E/R S/R Bridge	1 Month	X	X	X	X	X	X	X	X	X	X	X	X

PMS#	ITEMS	INTERVAL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
S024	Engine Telegraph Functional Test	1 Month	X	X	X	X	X	X	X	X	X	X	X	X
S025	ME Cooling Water Temp Alarm	3 Month	X			X			X			X		
S026	ME LO Low Pressure Alarm	3 Month	X			X			X			X		
S027	ME Overspeed Trip	3 Month	X			X			X			X		
S028	ME Emergency Stop													
S029	AE Cooling Water Temp Alarm	3 Month		X			X			X			X	
S030	AE LO Low Pressure Alarm	3 Month		X			X			X			X	
S031	AE Fuel Leakage Alarm	3 Month		X			X			X			X	
S032	AE Overspeed Trip	3 Month		X			X			X			X	
S033	AE Emergency Stop	3 Month		X			X			X			X	
S034	COPE Cooling Water Temp Alarm	3 Month		X			X			X			X	
S035	COPE LO Low Pressure Alarm	3 Month		X			X			X			X	
S036	COPE Fuel Leakage Alarm	3 Month		X			X			X			X	
S037	E-Generator Cooling Water Temp Alarm	3 Month		X			X			X			X	
S038	E-Generator LO Low Pressure Alarm	3 Month		X			X			X			X	
S039	MSB 440V Low Insulation Alarm	3 Month		X			X			X			X	
S040	MSB 220V Low Insulation Alarm	3 Month		X			X			X			X	
CO2 SYSTEM														
S041	All Hose Connection - Check	12 Month											X	
S042	Blow Thru Flood Line	12 Month											X	

PROPOSED BY:

APPROVED BY:



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CHIEF ENGINEER

ASSISTANT TECHNICAL MANAGER

SHIP PARTICULAR

Vessel name : **FRONTEK**
 IMO No. : 9537214
 Call Sign : **9V9856**
 Class : **RINA**
 Flag : Singapore
 SB No. : **742Z**
 MMSI : 566824000
 GRT : **1589**
 NRT : 560
 LOA : 68.40 m
 LBP : 62.98 m
 Molded Beam : 12.60 m
 Molded Depth : 5.60 m
 Summer Draft : 4.80 m
 Summer Displacement : 3045.4 MT
 Summer DWT : 2103 MT
 Cargo Capacity98 % : 1823 MT
 C.O.T. : #1 P/S - #2P/S - #3P/S - #4PS
 Keel – Must : 23.80 M
 Air Draft : **22.23M (Light)**
 Air Draft : 19.0M (Summer Displacement)
 Bow to Bridge : 50.73M
 Bow to Manifold : 33.80M
 Bridge to Stern : 17.45M
 Propulsion : Twins Screws
 Power : 540 kw X 2 (Chong Qing WEICHAJ)
 Built : 2012 CHINA LIANYUNGGANG
 Owner : **SINGFAR TANKER PTE.LTD**

24 & 26 Sam Leong Road

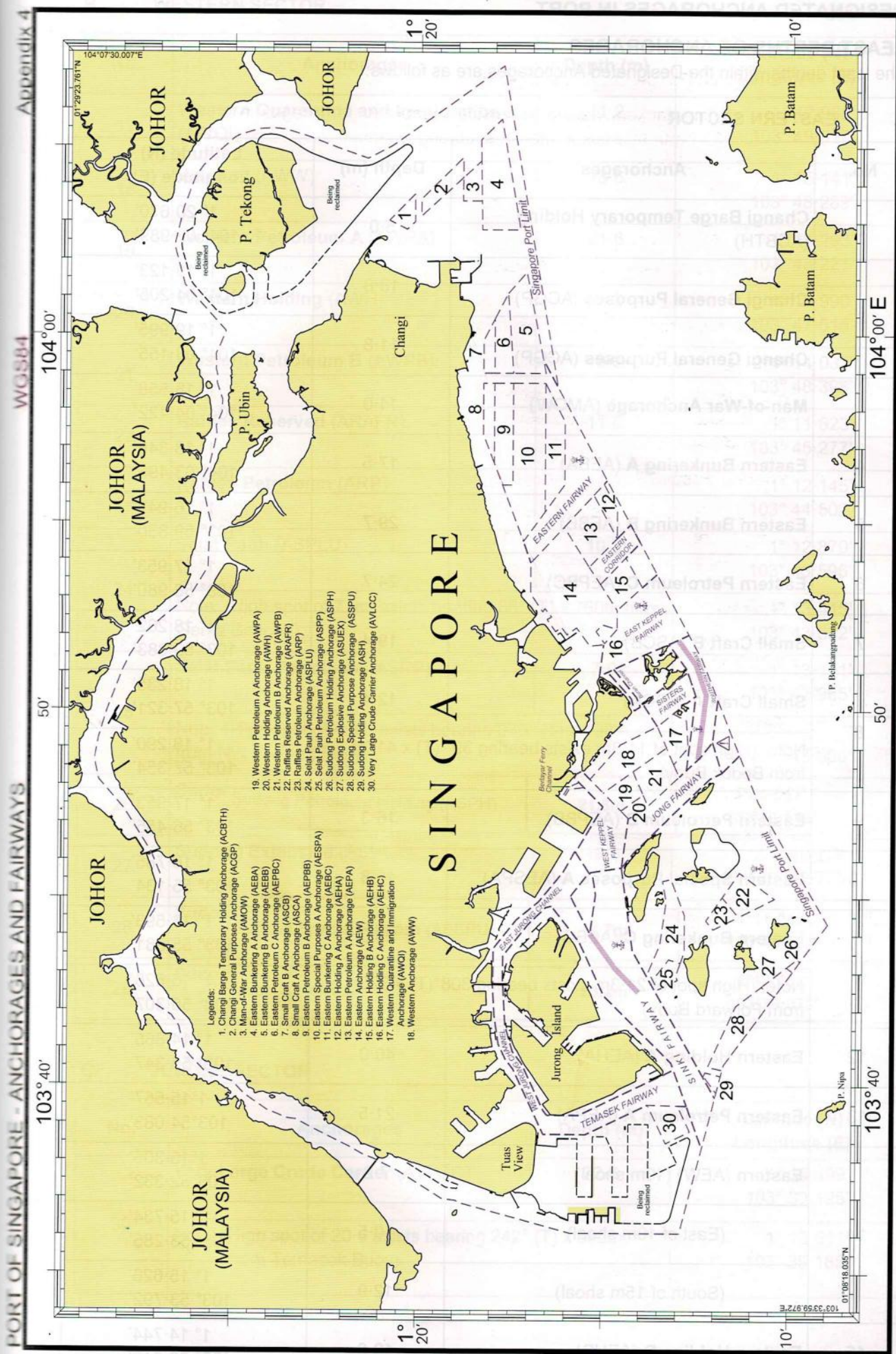
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DESIGNATED ANCHORAGES IN PORT**LEAST DEPTHS OF ANCHORAGES**

The least depths within the Designated Anchorages are as follows:

A EASTERN SECTOR

No.	Anchorages	Depth (m)	Latitude (N) Longitude (E)
1	Changi Barge Temporary Holding (ACBTH)	5.0	1° 20.670' 104° 02.989'
2	Changi General Purposes (ACGP)	18.8	1° 19.123' 104° 04.205'
	Changi General Purposes (ACGP)	11.8	1° 19.995' 104° 03.155'
3	Man-of-War Anchorage (AMOW)	14.0	1° 18.558' 104° 04.422'
4	Eastern Bunkering A (AEBA)	17.5	1° 18.346' 104° 03.496'
5	Eastern Bunkering B (AEBB)	29.7	1° 16.947' 103° 59.850'
6	Eastern Petroleum C (AEPBC)	24.7	1° 17.953' 103° 58.980'
7	Small Craft B (ASCB)	19.4	1° 18.262' 103° 59.883'
8	Small Craft A (ASCA)	12.4	1° 18.235' 103° 57.321'
	Note: (High spot of 11.3m exists bearing 39° (T) x 417m from Bedok Buoy)		1° 18.290' 103° 57.354'
9	Eastern Petroleum B (AEPBB)	16.3	1° 17.953' 103° 56.455'
10	Eastern Special Purposes A (AESPA)	15.8	1° 16.785' 103° 55.134'
11	Eastern Bunkering C (AEBC)	23.0	1° 16.593' 103° 55.581'
	Note: (High spot of 21.3m exists bearing 308°(T) x 390m from Forward Buoy)		1° 16.628' 103° 55.307'
12	Eastern Holding A (AEHA)	40.0	1° 14.865' 103° 55.347'
13	Eastern Petroleum A (AEPA)	21.5	1° 15.557' 103° 54.083'
14	Eastern (AEW) (10m shoal)	7.2	1° 15.305' 103° 52.332'
	(East of 10m shoal)	10.5	1° 15.734' 103° 53.285'
	(South of 15m shoal)	12.9	1° 15.626' 103° 53.792'
15	Eastern Holding B (AEHB)	18.0	1° 14.744' 103° 52.812'
16	Eastern Holding C (AEHC)	6.6	1° 14.974' 103° 51.950'

B WESTERN SECTOR

No.	Anchorage	Depth (m)	Latitude (N) Longitude (E)
17	Western Quarantine and Immigration (AWQI)	11.2	1° 12.988' 103° 49.817'
18	Western (AWW)	15.6	1° 15.141' 103° 48.289'
19	Western Petroleum A (AWPA)	21.6	1° 14.293' 103° 48.221'
20	Western Holding (AWH)	21.2	1° 13.990' 103° 47.515'
21	Western Petroleum B (AWPB)	19.2	1° 14.037' 103° 48.398'
22	Raffles Reserved (ARAFR)	11.6	1° 11.623' 103° 45.277'
23	Raffles Petroleum (ARP)	11.1	1° 12.145' 103° 44.502'
24	Selat Pauh (ASPLU)	10.3	1° 12.870' 103° 43.596'
	Note: (High spot of 7.9m exists bearing 86° (T) x 760m from Gerita Beacon)		1° 13.445' 103° 43.892'
25	Selat Pauh Petroleum (ASPP)	7.0	1° 13.191' 103° 42.965'
	Note: (High spot of 4.3m exists bearing 270° (T) x 108m from NW Sudong Buoy)		103° 43.000'
26	Sudong Petroleum Holding (ASPH)	21.8m	1°09.917' 103°43.112'
27	Sudong Explosive (ASUEX)	19.6	1° 10.204' 103° 42.770'
28	Sudong Special Purpose (ASSPU)	17.7m	1°11.040' 103°42.434'
29	Sudong Holding (ASH)	23.2m	1°12.051' 103°39.978'

C JURONG SECTOR

No.	Anchorage	Depth (m)	Latitude (N) Longitude (E)
30	Very Large Crude Carrier (AVLCC)	22.6	1° 13.499' 103° 39.125'
	Note: (High spot of 20.6 exists bearing 242° (T) x 662m from Temasek Buoy)		1° 13.611' 103° 39.185'

POSITION REFERENCE POINTS FOR ARRIVAL REPORT IN THE ANCHORAGE

NAMES OF ANCHORAGES	REFERENCE POINTS	REFERENCE MARKS	REFERENCE CENTRES	VHF CHANNELS
EAST JOHOR STRAIT	Lat 01°17.9'N Long 104°05.9'E	Eastern Buoy	Sembawang Control	21
Changi General Purpose Anchorage				
Changi Temporary Barge Holding Anchorage				
EASTERN SECTOR	Lat 01°17.9'N Long 103°54.3'E	Amber Beacon	East Control	12
Man-of-War Anchorage				
Eastern Bunkering A Anchorage				
Eastern Bunkering B Anchorage				
Eastern Petroleum C Anchorage				
Small Craft A Anchorage				
Small Craft B Anchorage				
Eastern Special Purpose A Anchorage				
Eastern Petroleum A Anchorage				
Eastern Petroleum B Anchorage				
Eastern Bunkering C Anchorage				
Eastern Anchorage				
Eastern Holding A Anchorage				
Eastern Holding B Anchorage				
Eastern Holding C Anchorage				
WESTERN SECTOR	Lat 01°15.5'N Long 103°48.4'E	Rimau Beacon	West Control	68
Western Quarantine and Immigration				
Western Anchorage				
Western Petroleum 'A' Anchorage				
Western Petroleum 'B' Anchorage				
Western Holding Anchorage				
Raffles Reserved Anchorage				
Raffles Petroleum Anchorage				
Selat Pauh Anchorage				
Selat Pauh Petroleum Anchorage				
Sudong Petroleum Holding Anchorage	Lat 01°14.4'N Long 103°38.9'E	Sultan Shoal Lt Ho		
Sudong Explosives Anchorage				
Sudong Special Purpose Anchorage				
Sudong Holding Anchorage				
WEST JURONG SECTOR	Lat 01°14.4'N Long 103°38.9'E	Sultan Shoal Lt Ho	Jurong Control	22
Very Large Crude Carrier Anchorage				

REPORTING PROCEDURES FOR VESSELS MANOEUVRING IN PORT

Appendix 4

REPORTING POINTS FOR UNDERWAY REPORT

LOCATIONS	REPORTING POINTS	POSITIONS		LOCATIONS	REPORTING POINTS	POSITIONS	
Changi Naval Base Corridor	Airway Buoy	01°17'·65' N	104°01'·09' E	East Jurong Channel	Cyrene Beacon E Cyrene Buoy Pusing Buoy	01°15'·30' N 01°15'·61' N 01°17'·15' N	103°45'·54' E 103°45'·89' E 103°44'·19' E
Ferry Corridor	Padang Buoy	01°17'·49' N	103°58'·98' E	Sinki Fairway/ Banyan Basin	Serebut Beacon Sawa Buoy Salu Buoy	01°14'·83' N 01°15'·35' N 01°12'·22' N	103°42'·09' E 103°44'·05' E 103°40'·66' E
Eastern Fairway/ Eastern Corridor	Forward Buoy NE Corridor Buoy	01°16'·50' N 01°15'·43' N	103°55'·47' E 103°53'·81' E	Temasek Fairway	Temasek Buoy	01°13'·78' N	103°39'·50' E
East Keppel Fairway	Ro-Ro Buoy Main Fairway Buoy Outer Shoal Beacon	01°15'·91' N 01°14'·44' N 01°15'·02' N	103°51'·45' E 103°51'·93' E 103°51'·81' E	Pesek Basin	Anak Pulau Buoy	01°17'·61' N	103°41'·95' E
Buran Channel	E Buran Buoy W Buran Buoy	01°14'·64' N 01°14'·05' N	103°50'·96' E 103°50'·10' E	West Jurong Channel	Triton Buoy	01°16'·49' N	103°39'·22' E
Southern Fairway	Tembakul Beacon	01°13'·34' N	103°51'·76' E	Tuas Channel	Tuas Beacon	01°16'·96' N	103°39'·35' E
Sisters Fairway	Palawan Beacon Selegi Beacon	01°14'·97' N 01°13'·58' N	103°48'·89' E 103°49'·59' E	Raffles Reserved Anchorage	Senang Buoy	01°10'·41' N	103°44'·99' E
Jong Fairway	Sisters Buoy Sebarok Beacon	01°12'·42' N 01°11'·87' N	103°48'·77' E 103°48'·43' E	East Johor Strait	Eastern Buoy Angler Buoy Punggol Buoy	01°17'·87' N 01°21'·09' N 01°25'·33' N	104°05'·89' E 104°03'·01' E 103°54'·69' E
West Keppel Fairway	Rimau Beacon	01°15'·59' N	103°48'·39' E				

Note: Buoys and beacons in close proximity of anchorages or berths are used as reporting points.

REPORTING PROCEDURES FOR VESSELS MANOEUVRING IN PORT

Appendix 5

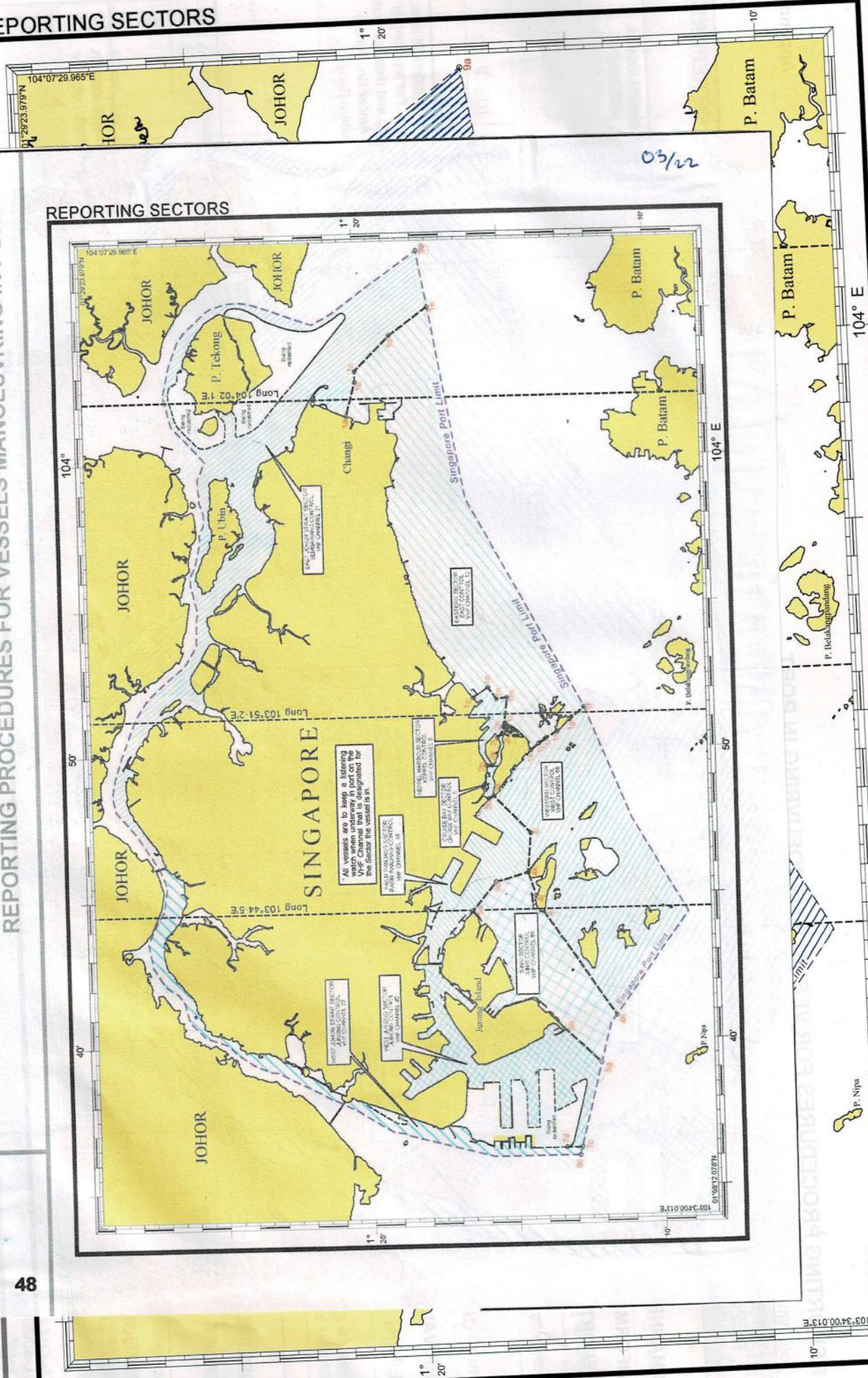
TYPES OF REPORTS	CATEGORIES OF VESSELS REQUIRED TO REPORT	REPORTING POINTS	CONTROL STATIONS	DESIGNATED VHF CHANNELS	INFORMATION TO BE REPORTED
CHANNEL INFORMATION REPORT	Passenger vessel	Arriving vessels prior to entering the port or a vessel intending to move within or leave the port	East Control	VHF Ch 12	Name of vessel or callsign, present location, destination in port, next port, draft, height, remarks if any.
	Vessel of 300 GT and above		Keppel Control	VHF Ch 5	
ARRIVAL REPORT	Tug engaged in towing or pushing if combined GT of tug/tow is 300 GT and above Vessel of 30m or more in length or 30m or more in height	When a vessel has arrived at the destination in port.	Cruise Bay Control	VHF Ch 5	Name of vessel or callsign, arrival date and time, name of the berth or anchorage. For reporting of anchorage position the bearing and distance from one of the reference points: Amber Bn, Rimau Bn, Sultan Shoal Lt Ho or Eastern Buoy.
			Pasir Panjang Control	VHF Ch 18	
			Sinki Control	VHF Ch 68	
			Jurong Control	VHF Ch 22	
			West Control	VHF Ch 68	
			Sembawang Control	VHF Ch 21	
			East Control	VHF Ch 12	
			Keppel Control	VHF Ch 5	
UNDERWAY REPORT		When a vessel enters is underway in a channel after leaving an anchorage or a berth, as well as when it passes abeam	Cruise Bay Control	VHF Ch 5	Name of vessel or callsign, present location.
			Pasir Panjang Control	VHF Ch 18	
			Sinki Control	VHF Ch 68	
			Jurong Control	VHF Ch 22	
			West Control	VHF Ch 68	
WEST JOHOR STRAIT SECTOR REPORT	All vessel regardless of GT	When a vessel enters or leaves the West Johor Strait reporting sector	Sembawang Control	VHF Ch 21	Name of vessel or callsign, present location, destination in port, next port, draft, height, remarks if any.
			To the appropriate Control Station (see para 3 of Annex A of this circular for details)	On the designated VHF Channel for that sector	
WEST JOHOR STRAIT SECTOR REPORT			Jurong Control Station	VHF channel 22 or if VHF is not available onboard, report is to made via telephone to the Port Operations Control Centre at +65 6325 2493/4.	

Port Circular No. 6 of 2021 dated 1 Feb 2021

REPORTING PROCEDURES FOR VESSELS MANOEUVRING IN PORT

REPORTING PROCEDURES FOR VESSELS MANOEUVRING IN PORT

REPORTING SECTORS



GUIDE TO VHF COMMUNICATION IN PORT AND SINGAPORE STRAIT

Below is a list of VHF radio shore stations in the Port of Singapore operating in the bands between 156 MHz and 174 MHz for communication with ship stations:

Part A COMMUNICATION CHANNELS FOR MPA AND OTHER AGENCIES

a) NAVIGATIONAL REPORTING (See Chartlet)

VHF CHANNELS FOR NAVIGATIONAL REPORTING			
STATIONS	CHANNEL	FREQUENCY (MHZ)	USAGE
VTIS EAST	10	156.500	Reporting confirmation of arrival by vessels when abeam of Horsburgh, Karang Galang Light, and Eastern Buoy. Reporting and listening as required under the Mandatory Ship Reporting System (STRAITREP), by vessels in Sector 9 (area between Long. 104°02.1'E and 104°23.0'E). Provision of traffic information in Singapore Strait.
VTIS CENTRAL	14	156.700	Reporting and listening as required under the Mandatory Ship Reporting System (STRAITREP), by vessels in Sector 8 (area between Long. 103°44.5'E and 104°02.1'E). Provision of traffic information in Singapore Strait.
VTIS WEST	73	156.675	Reporting confirmation of arrival by vessels when abeam Pulau Iyu Kecil, Pulau Jangkat Beacon. Reporting and listening as required under the Mandatory Ship Reporting System (STRAITREP), by vessels in Sector 7 (area between the line joining T Piai and Pulau Karimun Kecil and Long 103°44.5'E). Provision of traffic information in Singapore Strait.

VHF CHANNELS FOR NAVIGATIONAL REPORTING			
CONTROL CENTRES	CHANNEL	FREQUENCY (MHZ)	USAGE
EAST CONTROL	12	156.600	<p>Reporting by vessels when underway in the port area east of Long 103°51'2"E. All vessels within this area are to maintain a listening watch on this channel.</p> <p>Requesting for clearance by vessels before moving within East Sector.</p> <p>Reporting arrival and anchored positions by vessels in East Sector.</p> <p>Provision of port traffic information.</p>
KEPPEL CONTROL	05	156.900 161.500	Requesting for clearance by vessels to enter, move within, or leave Keppel Sector.
CRUISE BAY CONTROL	05	156.250 160.850	Requesting for clearance by vessels to enter, move within, or leave Cruise Bay Sector.
PASIR PANJANG CONTROL	18	157.250 161.850	<p>Requesting for clearance by vessels before moving within East and West Jurong Sector.</p> <p>Reporting arrival and anchored position by vessels in East and West Jurong Strait Sector.</p>
SINKI CONTROL	68	156.425	<p>Reporting by vessels when underway in the Sinki Sector. All vessels within this area are to maintain a listening watch on this channel.</p> <p>Provision of port traffic information.</p>
JURONG CONTROL	22	157.100 161.700	<p>Requesting for clearance by vessels before moving within West Jurong and West Johor Sectors.</p> <p>Reporting arrival and anchored position by vessels in West Jurong and West Johor Strait Sectors.</p>
WEST CONTROL	68	156.425	<p>Reporting by vessels when underway in the port area west of Long 103°51'2"E. All vessels within this area are to maintain a listening watch on this channel.</p> <p>Provision of port traffic information.</p>
SEMBAWANG CONTROL	21	157.050 161.650	<p>Requesting for clearance by vessels before moving within the East Johor Strait Sector.</p> <p>Reporting arrival and anchored position by vessels in the East Johor Strait Sector.</p>

b) SAFETY AND EMERGENCIES

VHF CHANNELS FOR SAFETY AND EMERGENCIES			
CONTROL CENTRES	CHANNEL	FREQUENCY (MHZ)	USAGE
SINGAPORE PORT OPERATIONS CONTROL	16	156.800	Distress, urgency and safety communication.
	09	156.450	Broadcast relating to all maritime safety information such as navigational and meteorological warnings and other urgent safety related messages.
PORT MARINE SAFETY	07	156.350 160.950	Co-ordinating marine emergencies by MPA.
POLICE COAST GUARD	07	156.350 160.950	Requesting for assistance from Police Coast Guard.
MARITIME SECURITY	26	157.300 161.900	Security Matters.

c) IMMIGRATION AND PORT HEALTH CLEARANCE

VHF CHANNELS FOR IMMIGRATION/PORT HEALTH CLEARANCE			
CONTROL CENTRES	CHANNEL	FREQUENCY (MHZ)	USAGE
IMMIGRATION	74	156.700	Requesting for Immigration clearance.
PORT HEALTH OFFICE	14	156.700	Requesting for Port Health clearance.

Part B COMMUNICATION CHANNELS FOR PILOTAGE, TOWAGE AND WATERBOATS SERVICES AND OIL TERMINALS

a) PILOTAGE, TOWAGE AND WATER

VHF CHANNELS FOR PILOTAGE, TUG AND WATERBOATS SERVICES			
CONTROL CENTRES	CHANNEL	FREQUENCY (MHZ)	USAGE
SINGAPORE PILOTS	20	157.000 161.600	Requesting for pilotage service and pilotage information.
TUG DEPLOYMENT/ WATERBOATS	17	156.850	Requesting for tug service, and supply of water to vessels at anchor.
	61	156.075 160.675	

b) OIL TERMINALS

VHF CHANNELS FOR OIL TERMINALS			
CONTROL CENTRES	CHANNEL	FREQUENCY (MHZ)	USAGE
BUKOM OPERATIONS	19	156.950 161.550	Requesting for information for vessels berthing/unberthing at Pulau Bukom and Shell SBM.
PULAU AYER CHAWAN OPERATIONS	05	156.250 160.850	Requesting for information for vessels berthing/unberthing at Pulau Ayer Chawan and VLCC berths.
SINGAPORE REFINERY CENTRE	05	156.250 160.850	Requesting for information for vessels berthing/unberthing at Pulau Merlimau.



W&M Restamping Report

Report Number:..MMV/JO/2023/060/RS

Customer Information:

MGM SHIP MANAGEMENT PTE LTD

180 Raffles Road

City Square Mall

#08-07/08/09

Singapore 208539

Person in charge :

Mr Yong Feng

Bunker Tanker / SB Number : FRONTEK / 0742 Z
 Country : SINGAPORE
 Location : Gulf Asia-Pacific Pte Ltd

W&M New Seal No: 301372

W&M Old Seal No: 301150

Renew Of New Seal Date & Time: 23/05/2023 & 1145hrs

Breaking Of Seal Date & Time: 23/05/2023 & 1140hrs

Meter Verification Date : 23/5/2023
 Stamping Date : 23/5/2023
 Manufacturer : Endress + Hauser
 Meter Model : Promass 84F
 Transmitter Serial No : N7131502000
 Date of Calibration : 18/12/2018
 FlowCal Factor : 0.90024
 Min Cal Flow Rate (Fwd) : 29.959 t/h
 Max Cal Flow Rate (Fwd) : 407.853 t/h
 Min Cal Flow Rate (Rev) : 29.910 t/h
 Max Cal Flow Rate (Rev) : 408.039 t/h
 Verification Officer : Brian
 W&M QR Code : 2214650

Remarks / comments :.

The MFM is inspected, tested and stamped with W&M verification seal by Metcore (AV36). It was verified to not exceed 0.3% maximum permissible error(MPE) prescribed in Technical Reference (TR) 80 for meter verification, and required by W&M, Enterprise Singapore (ESG).

Reference SOP's used :

W-OPN-2 Zero Verification
 W-OPN-3 MFM System Sealing
 W-OPN-5 Coriolis Mass Master Meter Proving

Metcore Authorised Representative

DAFTAR ISTILAH

<i>Agen</i>	:	Adalah perwakilan instansi untuk pengurusan kegiatan perkapalan
<i>Anchorage</i>	:	Adalah wilayah laut tempat kapal berlabuh jangkar
<i>Bunkering</i>	:	Adalah proses memasukkan dan mengeluarkan <i>Cargo</i> yang digunakan entah untuk di gunakan sendiri maupun <i>Cargo</i> yang ditransportasikan
<i>Cargo Pump</i>	:	Adalah suatu pompa yang digunakan untuk membongkar muatan dimana terdapat 1 (satu) unit di setiap tangki muatan.
<i>Cargo hose</i>	:	Selang yang digunakan untuk mentransfer minyak pada bongkar muat
<i>Delay</i>	:	adalah hambatan yang terjadi yang disebabkan oleh sesuatu sehingga adanya jeda waktu.
<i>Discharge valve</i>	:	Adalah kran atau perangkat yang mengatur atau mengontrol aliran liquid untuk keluar dari tanki
<i>Gasket/ seals</i>	:	Adalah komponen karet untuk menjaga sambungan dari kebocoran
<i>Manifold</i>	:	Adalah pipa muat di kapal tempat disambungkannya loading arm.

Over flow : Adalah tumpahan minyak dari tanki karena kelebihan muatan

Programmer : Adalah seseorang di kantor yang bertugas sebagai koordinator kegiatan bongkar muat kapal

PMS : Adalah (*Planned Maintenance System*) yang merupakan Jadwal kegiatan perawatan yang sudah direncanakan untuk dilaksanakan di atas kapal

Ship to ship : Adalah Kegiatan pemindahan langsung muatan gas, cair, ataupun padat dari suatu kapal ke kapal lainnya

Tanker : Adalah Sebuah kapal yang dirancang untuk mengangkut muatan minyak bumi atau turunannya.



PENGAJUAN SINOPSIS MAKALAH

NAMA : HARYOKO
NIS : 02860/N-1
BIDANG KEAHLIAN : NAUTIKA
PROGRAM DIKLAT : DIKLAT PELAUT- I

Mengajukan Sinopsis Makalah sebagai berikut

A. Judul

OPTIMALISASI KEGIATAN *BUNKERING* MFO (*MARINE FUEL OIL*) DARI
MT. FRONTEK KE KAPAL LAIN DI PERAIRAN SINGAPURA

B. Masalah Pokok

1. Sering terjadinya keterlambatan dalam proses *bunkering* MFO (*Marine Fuel Oil*) dari MT. Frontek ke kapal lain.
2. Seringnya terjadi kerusakan peralatan bunker pada saat proses pelaksanaan bunker.
3. Masih rendah ketrampilan anak buah kapal (ABK) dalam pelaksanaan bunker.

C. Pendekatan Pemecahan Masalah

1. Melakukan koordinasi dengan keagenan dalam update kedatangan kapal.
2. Melakukan perawatan peralatan secara terjadwal.
3. Meningkatkan ketrampilan ABK dalam pelaksanaan bunker.

Menyetujui :

Jakarta, 05 Mei 2023

Dosen Pembimbing I

Dosen Pembimbing II

Penulis


Dr. April Gunawan Malau, MM

Penata Tingkat. I (III/d)

NIP. 19720413 199803 1 005


Capt. Sajim Budi Setiawan, MM


Penata Tingkat. I (III/d)

NIP. 19690616 199903 1 001


Haryoko

NIS : 02860/N-1

Ketua Jurusan Nautika


Meilinasari N.H, S.Si.T., M.MTr

Penata Tk.I (III/d)







NIP. 19810503 200212 2 001

SEKOLAH TINGGI ILMU PELAYARAN
DIVISI PENGEMBANGAN USAHA
PROGRAM DIKLAT PELAUT - I

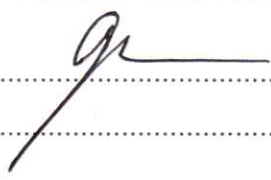
Judul Makalah : OPTIMALISASI KEGIATAN *BUNKERING* MFO (*MARINE FUEL OIL*) DARI MT. FRONTEK KE KAPAL LAIN DI PERAIRAN SINGAPURA

Dosen Pembimbing I : DR. April Gunawan Malau, MM

Bimbingan I :

No.	Tanggal	Uraian	Tanda Tangan Pembimbing
1	05 Mei 2023	Acc Sinopsis Judul	
2	16 Mei 2023	Bab I Pendahuluan	
3	25 Mei 2023	Bab II Kanvasan Teori	
4	02 Mei 2023	Bab III Analisa & Pembahasan	
5	09 Mei 2023	Bab IV Revisi Kesimpulan	
6	12 Mei 2023	Acc & Seminarakan	

Catatan :


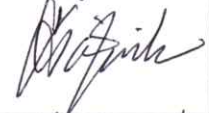
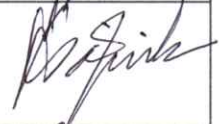
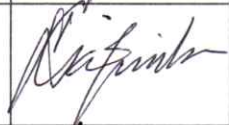

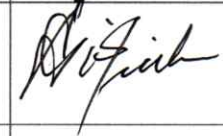
Acc & Seminarakan 

SEKOLAH TINGGI ILMU PELAYARAN
DIVISI PENGEMBANGAN USAHA
PROGRAM DIKLAT PELAUT - I

Judul Makalah : OPTIMALISASI KEGIATAN *BUNKERING* MFO (*MARINE FUEL OIL*) DARI MT. FRONTEK KE KAPAL LAIN DI PERAIRAN SINGAPURA

Dosen Pembimbing II : Capt. Sajim Setiawan, MM

Bimbingan II :

No.	Tanggal	Uraian	Tanda Tangan Pembimbing
1	09-05-2023	Pusetyman Simposis	
2	20-05-2023	Pembahasan Bab I. Keirisi Htg. <i>thn thony</i> .	
3	20-05-2023	Keirisi Bab I, <i>de</i>	
4	31-05-2023	Pembahasan Bab II, <i>de</i> .	
5	06-06-2023	Pembahasan bab III, <i>de</i> .	
6	13-06-2023	Pembahasan Bab IV, <i>de</i>	

Catatan :

Makalah ini siap utk dihidangkan