BUMIARMADA

Ballast Water Management Plan

To meet the recommendations of the

INTERNATIONAL MARITIME ORGANIZATION

ASSEMBLY RESOLUTION A.868(20)

GUIDELINES FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER TO MINIMISE THE TRANSFER OF HARMFUL AQUATIC ORGANISMS AND PATHOGENS

OPS-MALT-ALM-MAR-PLN-0001

This document provides guidance to the Master and crew of the Armada FSU Mediterrana in the operation of the ballast water exchange system.

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TABLE OF CONTENTS

ABBREVIATIONS

BWE	Ballast Water Exchange
BWM	Ballast Water Management
BV	Bureau Veritas
FSU	Floating Storage Unit
GM	Metacentric Height
IMO	International Maritime Organization
KG	Keel to Centre of Gravity
nm	nautical miles
NOBOB	No Ballast On Board
RO	Recognized Organization
WHO	World Health Organization

1.0 PURPOSE

This *Ballast Water Management Plan* has been developed to provide guidance to the Master and crew of the **Armada LNG Mediterrana** in the operation of the ballast water exchange system & in complying with the relevant regulations of the *International Convention for the Control & Management of Ship's Ballast Water and Sediments, as well as* other quarantine measures intended to minimize the risk of transfer of harmful aquatic organisms and pathogens from marine ballast water & associated sediments into local waters.

In addition, advice regarding the uptake of ballast water, step-by-step procedures, sequences for ballast water exchange, and any operational restrictions have been included.

The ballast water management plan aims to assist governments & appropriate authorities, operators, owners, port authorities as well as other interested parties, in preventing, minimising and ultimately eliminating the risk of introducing harmful aquatic organisms and pathogens from ships' ballast water and associated sediments while protecting ships' safety.

The Plan provides guidance on the methods to be used for safe exchange of ballast water, preferably carried out in as deep waters as possible. The selected methods of ballast water management take into account the need to ensure that Ballast Water Management practices adopted in order to comply with the Convention do not cause greater harm to environment, human health, property or resources of any State, as well as the safety of the ship.

As part of this purpose, the *Ballast Water Management (BWM) Plan* provides information to quarantine officers who wish to:

- Learn about a ship's ballast handling system; or to
- Confirm that ballast management has been effectively planned.

Good record keeping is critical to the success of a sound ballast water management program. The appointed ballast water management officer is responsible for ensuring the maintenance of appropriate records and that the ballast water management and treatment procedures are followed and recorded.

This Plan has been written in accordance with the requirements of Regulation B-1 of the *International Convention for the Control & Management of Ships' Ballast Water and Sediments* (the Convention), and associated guidelines.

It is the owners/managers or Master's responsibility to regularly review the plan and ensure that the information contained therein is accurate and updated.

New IMO Ballast Water Management Convention

A new Ballast Water Convention was adopted and will enter into force when 30 States representing 35% of the world's gross tonnage become signatory.

All ships including submersibles, floating craft/platforms, FSUs and FPSOs are to manage their ballast water in accordance with an approved Ballast Water Management Plan and record such management in a Ballast Water Record Book in accordance with the provisions of the Convention.

2.0 SCOPE

The scope of the Plan is to meet the requirements for the control and management of ship's ballast water and sediments in accordance with the *Guidelines for Ballast Water Management and the Development of Ballast Water Management Plans as contained in Resolution*

MEPC.127 (53). The Plan provides standard operational guidance for the planning and management of ballast water and sediments via Ballast Water Exchange (BWE), and the procedures to be followed.

This Plan has been approved by Malta Maritime Authority or the appointed Classification society, Bureau Veritas (BV) for classification purposes (where the BWE notation has been assigned) and statutory certification (where appointed Classification society, Bureau Veritas (BV), is acting as a Recognized Organization (RO)).

IMPORTANT: *No alteration or revision may be made to any part of this document without the approval of* Bureau Veritas (BV).

The following items have been included in this plan:-

1. Detailed safety procedures for the ship and crew associated with BWE procedures.
2. A detailed description of the actions to be taken to implement the BWE procedures
3. Detailed procedures for the disposal of sediments at sea and to shore;
4. Procedures for coordinating the discharge of exchanged ballast water with the port state authorities;
5. The designation of a Ballast Water Management Officer, who is responsible for the implementation of the Ballast Water Management Plan; and
6. The reporting/recording requirements provided for in the Convention.

The owners/ Operators and/or Master shall review this plan on a regular basis and can confirm that the information contained herein is accurate and current.

3.0 REFERENCES

3.1 EXTERNAL REFERENCES

The following references are attached at the end of BWM plan for easy access.

MAJOR:

International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended
International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and by the Protocol of 1997(MARPOL)
International Convention on Standards of Training, Certification and Watch keeping for Seafarers (STCW) as amended, including the 1995 and 2010 Manila Amendments
International Convention for the Control and Management of Ship's Ballast Water and Sediments
IMO Resolution MEPC.169 (57) Procedure for Approval of Ballast Water Management systems that Make Use of Active Substances (G9), adopted 4 Apr 2008.
IMO Resolution MEPC.127 (53) Guidelines for Ballast Water Management and Development of Ballast Water Management Plans (G4), adopted 22 Jul 2005.
IMO Resolution MEPC.150 (55) Guidelines on Design and Construction to Facilitate Sediment Control on Ships (G12), adopted 13 Oct 2006
IMO Resolution MEPC.173(58) Guidelines for Ballast Water Sampling (G2), adopted 10 Oct 2008

OTHER IMPORTANT RESOLUTIONS:

Note: *Always refer to the most recent edition of the reference works listed above.*

3.2 INTERNAL REFERENCES

1.	Operations Management Standard

Note: *Always refer to the most recent edition of the reference works listed above.*

4.0 DEFINITIONS

Ballast Water	Means water with its suspended matter taken on board a ship to control trim, list, draught, stability or stress of the ship.
Ballast Water Management (BWM)	Means mechanical, physical, chemical and biological processes, either singularly or in combination, to remove, render harmless, or avoid the uptake or discharge of Harmful Aquatic Organisms and Pathogens within Ballast Water and sediments.
Company	BUMIARMADA
Convention	Means the International Convention for the Control and Management of Ship's Ballast Water and Sediments adopted at IMO in February 2004.
Harmful aquatic organisms & pathogens	Means aquatic organisms or pathogens which, if introduced into the sea including estuaries, or into fresh water courses, may create hazards to the environment, human health, property or resources, impair biological diversity or interfere with other legitimate uses of such areas.

Sediments	Means matter settled out of ballast water within a ship.

5.0 RESPONSIBILITIES

Appointed Ballast Water Management Officer : **[CHIEF OFFICER]**

The *Ballast Water Management Plan* nominates key personnel to undertake ballast water exchange at sea. The appointed Ballast Water Management Officer, the Chief Officer will be assisted by the Second Officer, Third Officer and the Engineer on duty, along with a required number of deck crew members as decided by the Ballast Water Management Officer.

Position / Role / Competency Profile	Responsibility
Ballast Water Management Officer	▪ Control ballast water intake at the discharge port to reduce uptake of harmful aquatic organisms and pathogens. ▪ Obtain information on ballast water requirements of the next port or ports of call. Once voyage plan is made consult with the Master and decide on a place and time for the exchange of ballast. ▪ Supervise and ensure that the ballast water exchange follows the ballast water exchange sequence and the requirements of the *BWM Plan*. **Note**: *From time to time, removal of sediment from the ballast tanks will be carried out in the normal course of FSU operations.* ▪ Keep the Master advised on the progress of the plan from time to time. Should there be any doubt or if the ballast water management plan does not keep to the schedule, the Master should be advised. ▪ Make proper log entries in the log book and prepare the ballast water declaration form. For port states which have their own format of declaration, the appropriate form must be filled. ▪ Be available to assist the port state control or quarantine officers for any sampling that may need to be undertaken. ▪ Maintain the *Ballast Water Register*, ensuring that it up to date and ready for inspection by the port state or quarantine authorities. ▪ Perform familiarization and training of crew associated with ballast water handling. ▪ Ensure that the ship is ready for surveys as applicable, which are required by the Convention.

6.0 COMPLIANCE STATEMENTS

This *BWM Plan* meets the requirements of the *International Convention for the Control and Management of Ship's Ballast Water and Sediments, 2004*.

Note[3]: *The Plan may be inspected on request by an authorized authority.*

The responsibility for the content and maintenance of the *BWM Plan* lies with BUMIARMADA – hereinafter referred to as the "Company".

The Company understands that the ballast water exchange steps contained herein should only be carried out within defined operational limits. Failure to observe this restriction may result in damage to the ship's structure, therefore, various options have been provided for in this plan with respect to ballast water exchange.

Only those options for handling ballast, which are suitable and known to be safe for use, are detailed within the Plan. The overall responsibility for the execution of the *BWM Plan* lies with the Master.

7.0 INTRODUCTION

Ballast water is essential to control trim, list, draught, stability, or stresses of the ship. However, ballast water may contain aquatic organisms or pathogens which, if introduced into the sea including estuaries, or into fresh water courses, may create hazards to the environment, human health, property or resources, impair biological diversity or interfere with other legitimate uses of such areas.

This plan is written in accordance with the requirements of Regulation B-1 of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (the Convention) and the associated Guidelines.

The purpose of the plan is to meet the requirements for the control and management of ship's ballast water and sediments in accordance with the Guidelines for Ballast Water Management and the Development of Ballast Water Management Plans resolution MEPC.127(53) (The Guidelines). It provides standard operational guidance for the planning and management of ships' ballast water and sediments and describes safe procedures to be followed.

The selection of appropriate methods of Ballast Water Management should take into account the need to ensure that Ballast Water Management practices used to comply with the Convention do not cause greater harm than they prevent to the environment, human health, property or resources of any States and the safety of ships.

This plan has been approved by the Malta Maritime Authority or appointed Classification society, Bureau Veritas (BV) and no alteration or revision shall be made to any part of it without the prior approval of Malta Maritime Authority or Bureau Veritas (BV).

This plan may be inspected on request by an authorized authority.

The Plan could be divided into two parts: Part A and Part B

Part A - Plan for ship's personnel and owner/operator:-

The sections in this Part, provide information about the ballast water arrangement on the ship and the operational requirements for carrying out ballast water exchange at sea. This Part also provides various methods for compliance with the said Convention on ballast water exchange, procedures to be adopted for reporting and record keeping of activities performed.

Part B - National and International Guidance:-

This Part provides the regulations governing quarantine requirements of various port states and the necessary compliance with regard to discharge of ballast water from ships in their territorial waters.

8.0 FSU PARTICULARS

Ship Name	Armada LNG Mediterrana
Ship Type	FSU
Port of Registry	**VALLETTA**
Flag	**MALTA**
Gross Tonnage (gt)	102511 T
Deadweight (DWT)	69846 T
IMO No.	**8125868**
Length Overall	283.00 m
Length between perpendiculars	270.00 m
Beam	44.80 m
International Call Sign	**9HA4196**
Summer Draft	11.521 m
Total ballast capacity of the ship in cubic meter and other units)	55629.9 m3, 57,022 mt @1.025 s.g.
Total number of ballast tanks and holds	27
Number of ballast tanks	22
Number of holds	5
Classification	Bureau Veritas (BV)
Ballast Water Exchange Method(s)	Flow through and/or sequential subject to ship stresses and stability criteria.
Identification (rank) of the Appointed Ballast Water Management Officer(s)	CHIEF OFFICER

9.0 THE NEED FOR BALLAST WATER MANAGEMENT

9.1 BACKGROUND

Studies carried out on the effects of ballast water have shown that many micro-organisms, including species of bacteria, plants & animals survive, in a viable form in the ballast water and sediment carried in ships for several weeks' duration. The discharge of ballast water or sediment into other local waters may therefore result in the establishment of colonies of harmful species that can change existing ecological balance, and affect human health & the economy. Though other means exist by which organisms are transferred between separated sea areas, natural barriers restrict such transfers. Hence, ballast water discharge from ships is considered to be a significant cause.

The International Maritime Organization (IMO) and the World Health Organization (WHO) have recognized the potential of ballast water discharge to cause harm.

9.2 REQUIREMENTS

Some states have already established controls on the discharge of ship's ballast water, whilst exchange of ballast water in deep seas is deemed an acceptable method to reduce the spreading of harmful organisms. Deep ocean water contains few organisms that are unlikely to survive transfer to coastal & freshwater environments. Accordingly, countries most concerned have promulgated advice to ships for ballast water management, together with a request for their co-operation in applying the techniques voluntarily. Procedures have subsequently been developed and accepted by quarantine authorities to achieve the level of acceptability desired by the port state. Some countries have made it mandatory to follow these procedures.

The IMO, under Resolution A.868 (20), introduced *Guidelines for the Control & Management of Ship's Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms & Pathogens*. Furthermore, the IMO adopted the *International Convention for the Control & Management of Ship's Ballast Water & Sediments*, thereby introducing new regulations for the management of ship ballast water.

If the *Ballast Water Management Plan* is correctly applied, it will help to minimize the risk of transferring unwanted organisms associated with ballast water discharge as well as the safety aspects of the ballast water exchange.

9.3 SAFETY CONSIDERATIONS

Unless applied carefully, some of the measures being urged for ballast water management can affect a ship's safety, through the stress and stability aspect of the ship. It was this concern that prompted IMO to become involved in what would otherwise be a purely quarantine matter. It has been recognized by governments and the shipping industry that individual countries' needs should be harmonized with the greater need to ensure the safety of ships, their crews and passengers.

The new regulations require that each ship should therefore be provided with a *ballast water management plan*, detailing the way in which ballast water management can be affected so as to ensure compliance with the relevant regulations. All concerned with the operation and safe passage of the ship can thereby be assured that they are both protecting the marine environment and ensuring the safety of the ship and crew.

9.4 RECORDS REQUIRED

To be able to demonstrate at the arrival port that the correct measures have been complied with, it is necessary to maintain a full and accurate ballast log, in the form of a *Ballast Water Reporting form*. A port state may require the record to be maintained in its own form.

9.5 REPORTING TO PORT STATES

Several countries have become aware of the problems, through discharge of ship's ballast water for the transfer into their coastal areas of what are found to be harmful aquatic organisms. Governments have recognized that, before devising mandatory controls on ships, it is necessary to know the scale of what has, until very recently, been an unrecorded procedure.

Concerned countries have therefore introduced requirements which, though often differing in detail, generally call for ships to report in advance, to the national monitoring authority. In most cases it is mandatory to make the report, for the ballast water exchange in mid-ocean or any other management procedure used.

10.0 BALLAST WATER ARRANGEMENTS

The following documents & drawings, as provided on board the ship, illustrate the ballast water system arrangements and ship's capabilities:

- General Arrangement Diagram
- Capacity Plan
- Pumping and Piping Diagrams of Ballast System
- Ballast Water Sampling Points Diagram

These are to be used to assist personnel in understanding and following the *BMW Plan*.

11.0 BALLAST WATER SAMPLING POINTS

Separate ballast water sampling points are provided on the ship. The usual procedure for obtaining samples is to obtain them through the vapour locks, man holes & tank domes of the individual tanks. The sampling points are located on the main deck over each individual tank.

Pipeline samples during de-ballasting or ballasting should be taken from the cock on the inlet side of the ballast pump in the Pump Room. For sediment samples from ballast tanks, access to the concerned tanks is from the respective tank dome.

Note[6]: *Quarantine or Authorized Officers shall be advised of all safety procedures to be observed when entering enclosed spaces.*

A) <u>Ballast Water Sampling Points (Sounding pipes and/or Air pipes Arrangement)</u>

Note: Refer Appendix G

B) <u>Sediment Sample Points from Ballast Water Tanks (Manholes Arrangement)</u>

Note: Refer Appendix H

12.0 BALLAST WATER PLANNING

12.1 WHEN TO EXCHANGE BALLAST WATER

The need and extent of exchange of ballast water will be decided by the requirements of the next port(s) of arrival.

IMPORTANT: *Due regard shall be given to the safety considerations prior and during such exchange.*

12.2 WARNINGS CONCERNING BALLAST WATER UPTAKES

Certain port states may notify the ship of areas under their jurisdiction, where the ships should not uptake ballast water due to known conditions which may result in the uptake of harmful aquatic organisms and pathogens. The Master and/or the Ballast Water Management Officer shall clearly receive the co-ordinates of such areas.

The uptake of ballast water should be minimized and, where practicable, avoided in areas and situations such as:

- Areas identified by the port state in connection with advice as mentioned above.
- In darkness when bottom-dwelling organisms may rise up in the water column;
- In very shallow water; or
- The water is stirred up by propellers or dredging.
- Near sewage outfalls.
- Areas where toxic algae blooms are occurring.

In case ballast has been taken up under such circumstances, the Master shall ensure that this ballast is exchanged as far away from nearest land as possible and in as deep waters as possible. An area with a large sea water temperature difference should be preferred.

12.3 BALLAST WATER EXCHANGE AT SEA

While there is more than one method of treating ballast water to minimize the transfer of harmful aquatic organisms, at present, the most economical method for the treatment of ballast water that complies with the relevant regulations of the Convention, is the exchange of ballast water at sea.

There are three methods of carrying out ballast water exchange at sea:

- Sequential method: Ballast tanks are pumped out and then refilled with water;
- Flow-through method: Ballast tanks are over-flowed by pumping in additional water to dilute the original water; and the
- Dilution method: Water is pumped in one end and removed from the other end.

Where practicable, a ship should conduct ballast exchange in deep waters, in open-ocean and as far as possible from shore.

The ship is required to carry out exchange of ballast as follows:

- When using the *Sequential* method for ballast water exchange, the ballast water in the tanks should be pumped out till the pumps lose suction. In no case shall the efficiency be less than 95 per cent volumetric exchange of ballast water in each tank.
- When using the *Flow-Through* method and/or the *Dilution* method, replacement of ballast water by at least three times the volume of each ballast tank shall be carried out.
- At least 200 nm from the nearest land and in 200 m water depth;

- In the event throughout the intended route the sea area does not afford the above characteristics, in a sea area designated by the port State.
- All ships ≥ 400gt (except floating platforms, FSUs and FPSOs) are to be surveyed (initial, annual intermediate, and renewal) and certificated (not exceeding 5 years).
- States may establish additional ballast water management measures for ships to meet based on Guidelines, which remain to be developed.
- The MEPC shall undertake a review of the Ballast Water Standards no later than 2006 and is to include an assessment of the technologies available that achieve the standard.
- It must be appreciated that the parameters mentioned in the above paragraphs are the minimum limits set out for depth and distance. Therefore, it is left best to the professional judgment of the Master and the Ballast Water Management Officer as to when and where the ship's ballast water is exchanged, provided the ship complies with the minimum requirements of the distance and depth.
- If for any clear reason, the ship is unable to conduct ballast water exchange as required by above paragraphs, such ballast water exchange shall be conducted as far away from nearest land as possible, but in all cases at least 50 nm away from the nearest land and in as deep waters as possible, but at least 200 m in depth.
- If for any clear reason, the requirements of above paragraphs cannot be met, the Master shall convey the ship's inability to carry out ballast water exchange to the port state. Certain port state authorities may allow the ship to conduct ballast water exchange in designated areas under its jurisdiction under prescribed conditions. Under such permission, the Master may carry out the required ballast water exchange. Proper notifications, as required by the port state authorities are to be carried out.
- If the ship is returning to the port/region of origin of the ballast, provided that the ballast is not mixed with ballast of which the origin is elsewhere, the Master must contact the port state authorities prior conducting the de-ballasting operation, in case he does not intend to carry out the ballast water exchange and obtain permission for discharge of the ballast water within the regulated limits without carrying out ballast water exchange.
- All available pumps and lines must be used for the ballast water exchange to ensure that these are properly flushed of their previous contents. The lines and pumps should not be drained out.
- The ship, therefore, is not required to deviate from its intended voyage or delay the voyage in order to comply with the requirements of the above paragraphs. The Master may use the options as specified above.
- Should any local requirements of a port state require the ship to have a higher standard of ballast water exchange, the Master shall ensure the relevant requirements are complied with, provided the ship is capable of such compliance without hampering the safety of the ship, her cargo and the persons on board and without any damage or loss to the ship, her machinery and equipment.
- The Coastal State should be contacted if necessary for the specific *ballast water discharge* requirement and reporting prior to the ship's arrival in the port state's waters. The Master will thus obtain all information in good time and prepare the ship accordingly. If the Coastal State has specific procedures for ballast water discharge, the following action shall be taken:

  - Follow agreed procedures;

- Contact the ship's agent and owners/managers/operators to ascertain the latest information on ballast discharge in the port state;
- Ensure that the plan for the required actions is appropriate with regard to its effectiveness and safety of the ship and her staff;
- Maintain the relevant records;
- Though this part does not concern ballast water, all lines containing sea water (e.g. cooling lines, fire lines etc.) must be re-circulated with mid ocean water to replace the water in the lines;

12.4 NON-COMPLIANCE WITH …

The ship shall not be required to comply with the ballast water exchange requirements as mentioned in the above paragraphs as appropriate, if the Master clearly and reasonably decides that such exchange would threaten the safety and/or stability of the ship, the people on board the ship or her cargo.

An appropriate entry shall be made in the *Ballast Water Register* stating the reasons for such non-compliance and also in the ship's log book. The concerned port state authorities shall be notified accordingly.

The Master shall consider the following prior making the decision:

- Weather conditions.
- Any special design or feature of the ship.
- Machinery failure or inappropriate performance of the machinery.
- Equipment failure.
- Any other extraordinary condition.

12.5 DISCHARGE OF BALLAST WATER TO SHORE RECEPTION FACILITY

Where due to circumstances mentioned in the above Section, ballast water exchange could not be carried out, ballast water may need to be discharged to a shore reception facility, where and if available, as per the requirements of the local port authorities.

13.0 SEDIMENT MANAGEMENT

Some species survive in the sediment of ballast water tanks. This may result in some port states not permitting stripping of tanks even though mid ocean ballast water exchange was carried out.

Where practical, removal of sediment should be carried out in the normal course of residual life. During annual tank inspections if sediment accumulation is observed to be excessive, it may be hosed down and stripped and if possible de-mucked.

It should be kept in mind that removal of sediment from a ballast tank carries all the risks of working in an enclosed space and that enclosed space entry and work procedures as laid down in the Company's manuals are to be followed along with the *Confined Space Entry Checklist*. Additionally, it must be kept in mind that when the sediment is stirred up in the course of removal, it may give off toxic gases that may cause asphyxiation and the appropriate measures must be taken to protect the personnel carrying out the task.

More thorough removal should be left for dry dockings or during lay ups.

Sediments may be removed from spaces designated for carriage of ballast water or from spaces, other than spaces containing oil or which contained oil, where ballast water was carried for any special purpose as follows:

- Prior surveys of tanks.
- Prior or during dry-docking
- As required by the Company.
- If necessarily required by port authorities. The Master is required to consult the Ship Superintendent with regard to such requirement before carrying out the sediment removal.
- Any other reason as deemed necessary by the Master in consultation with the Ship Superintendent or by the Company office.

The sediments shall be disposed of in compliance with the requirements of the above Section of this Plan, when the ship is at sea. The required entries shall be made the ship's logbook and in any other reporting form as required by the port state.

If the ship is in a dry-dock or at a cargo berth or a repair berth or an anchorage or any other facility within a port, and the sediments need to be discharged, the sediments shall be landed to the concerned facility for further disposal or to a shore reception facility as appropriate only, on obtaining an approval of the Ship Superintendent. A receipt/certificate regarding such disposal shall be obtained from the facility and the required entries shall be made in the ship's log book and in any other form as required by the port state.

If for any reason, ballast was carried in spaces designated for other purposes (e.g. oil/fuel tank, fresh water tank, etc.), due regard shall be given to the original contents of the tank. The disposal of the sediments shall depend upon the final mixture. In certain cases, such as when carried in bunker oil tanks, this Plan does not apply and more stringent requirements shall be applicable. Disposal of sediments from such spaces shall be carried out after consultation with the Ship Superintendent.

14.0 PROCEDURES FOR BALLAST WATER EXCHANGE

14.1 METHODS OF BALLAST WATER EXCHANGE

There are three (3) methods of ballast water exchange namely:

1. Sequential method
2. Flow-through method
3. Dilution method

Before carrying out ballast water exchange by any of the above-mentioned methods, reference must be made to the various safety considerations mentioned in Section 16 of this Plan. The approved step-by-step sequences for normal and heavy ballast conditions are provided in Appendices A and B (the requirement for which would be on a case by case basis depending upon the ship's stability, stresses, weather and forecasted weather prognosis).

At each step of the sequence, the current situation should be assessed taking into account the ship's position, weather forecast, and crew fatigue, before proceeding to the next step.

14.2 INFORMING SHORE MANAGEMENT

Administration are encouraged to maintain and exchange information relevant to these Guidelines through the Organization. Accordingly, administration are encouraged to provide the Organization with the following:

1. Information on severe outbreaks or infestation of harmful aquatic organisms which may pose a risk.

2. Copies of domestic laws and regulations.

3. Technical and research information.

4. Education materials (such as audio and video tapes) and printed materials.

5. Location and terms of use of alternative exchange zones, contingency strategies, availability of shore reception facilities, fees etc.

Member states, applying ballast water and sediment discharge procedures, should notify the Organization of specific requirements and provide to the Organization, for the information of other Member States and non-governmental Organizations, copies of any regulations, standards, exemptions or guidelines being applied. Verification and detailed information concerning port State requirements should be obtained by the ship prior to arrival.

Port States authorities should provide the widest possible distribution of information on ballast water and sediment management and treatment requirements that are being applied to shipping. Failure to do so may lead to unnecessary delays for ships seeking entry to port States.

1. Details of their requirements concerning ballast water management.

2. Location and terms of use of alternative exchange zones.

3. Any other port contingency arrangement.

4. The availability, location, capacities of and applicable fees relevant to reception facilities that are being provided for the environmentally safe disposal of ballast water and associated sediment.

14.3 SEDIMENT REMOVAL OR REDUCTION

1. Where practical, cleaning of the ballast tanks to remove sediments should be undertaken.

2. Clean the ballast tank in mid-ocean waters or under controlled arrangement in port or dock.

3. Disposed sediments in accordance with port state regulation.

14.4 RETENTION OF BALLAST ON BOARD

Retain the ballast water on board the vessel:

1. If suitable new emergent treatments and technologies prove viable, these may substitute for, or be used in conjunction with current options. Such treatments could include thermal methods, filtration, disinfection including ultraviolet light and other means acceptable to the port state.

2. If reception facilities for ballast water and/or sediments are provided by a port State, they should, where appropriate, be utilized.

14.5 WATER TREATMENT

The Company and the master is responsible for collecting information on ballast water and sediment treatment. If Marine Section is charge of collecting information through IMO circular and deliver it to Head of Ship Management Department.

14.6 EXCHANGE AT SEA

In the absence of a more scientifically based means of control, exchange of ballast water in deep ocean areas or open seas currently offers a means of limiting the probability that fresh water or coastal aquatic species will be transferred in ballast water. Two methods of carrying out ballast water exchange at sea have been identified.

1. The sequential method, in which ballast tanks are pumped out and refilled with clean water.
2. The flow-through method, in which ballast tanks are simultaneously filled and discharged by pumping in clean water.

The Master and/or the Person in Charge should exchange ballast water outside the EEZ (Exclusive Economic Zone – normally 200nm) and in waters greater than 200 meters deep, prior entry into waters of the Port State.

In cases, where the ship is unable to conduct ballast water exchange as above, this should be as far from the nearest land as possible, and in all cases at least 50nm from the nearest land and in water at least 200 meters in depth. When this requirement cannot be met, the Port State may designate areas where ships can conduct ballast water exchange.

14.6.1 Sequential Method

The ballast tanks shall be sounded and then de-ballasted until the main pumps lose suction. Tank shall be sounded to ascertain less than 5% volume of the ballast is remaining in the tank. These tanks are then to be refilled to at least the original sounding. It is absolutely essential to replace at least 95% of the original volume of ballast water in all ballast tanks, which are to be de-ballasted in ballast water regulated regions, as per the requirements of Section 16 of this Plan.

In calculating and checking shear forces and bending moments, it is important to remember that the stresses experienced during such ballast water exchange, and the sea going conditions for bending moments and shearing forces shall be considered.

The de-ballasting and ballasting sequence for sequential exchange is followed in steps. After every pair of steps the original condition must be restored, and before proceeding further with ballast exchange, environmental & other conditions must be re-assessed with a decision taken whether to proceed with the exchange or suspend or halt the operation.

The times and soundings of starting and stopping the process for each tank must be logged to provide proof of compliance with the requirements.

14.6.2 Flow-through Method

This method involves flushing out old ballast by simultaneous pumping in of mid-ocean ballast water at the bottom of the tank and continuously overflowing the tank from the top till the original water in the tank is replaced through dilution to an acceptable level.

It has been established that it is necessary to pump in three times the volume of the tank to achieve a 95% change of water.

When carrying out exchange by this method, ballast in tanks that are longitudinally away from each other shall not be exchanged as the quantity of exchange in these will be different and hence there is a possibility of non-compliance with the requirements.

The air-pipes of the ballast tanks are not of a sufficient size to allow continuous pumping of water into the tank without dangerously over-pressurizing the tank. The tanks in which the ballast water exchange is to be carried out by this method must therefore have its main deck manholes opened to allow the water to overflow without pressurizing the tank. Since the peak tanks have the manholes under deck, they cannot be used for ballast exchange using the *flow-through method*.

Before commencing the ballast water exchange using the *flow-through* method, the Ballast Water Management Officer must draw up the sequence in which the tanks are to be processed including the time required to process the particular tank as per the table illustrated in Section 15 of this Plan.

14.6.3 Dilution Method

The *dilution method* is a process by which the replacement ballast water is filled through the top or side of the ballast tank with simultaneous discharge of ballast from the bottom or opposite side at the same flow rate and maintaining constant level in the tanks throughout the ballast exchange operation to achieve at least 95% volumetric exchange of ballast water. At least three times the tank volume must be pumped through the tank to achieve the mentioned results.

Commonly two ballast pumps are used simultaneously, where one is acting as a filling pump and the other as a suction pump.

IMPORTANT: *As it is essential to keep the level in the tank constant, a very good control on the pumped volume of both pumps is to be ensured.*

15.0 BALLAST WATER EXCHANGE OPERATON SPREADSHEET

A spreadsheet or computer-based means to document the exchange sequences for the ballast water exchange method(s) selected is incorporated into this section of the *BWM Plan*.

This spreadsheet provides detail of the various steps required to complete the exchange (e.g.: Step 1: Tank(s) 1 & 4 are to be pumped out using ballast pump number #. Percentage of tank volume exchanged, etc.). Each ballast water tank (including fore & aft peaks) is to be identified by tank designation and the volume in each tank is to be measured and recorded.

In addition, the forward and aft drafts, trim, bending moments, shear force, propeller immersion, and time required for each sequence or step are to be recorded. Any additional notes regarding the BWE operations, for example sea states or bridge visibility, are to be annotated.

ESTABLISHED DRAUGHT		GM											
FP	TRIM	1P	1S	2P	2S	3P	3S	4P	4S	5P	5S	2P	FWD	AFT

Key: F = FULL
E = EMPTY
CB = CLEAN BALLAST

Figure 15.1 Ballast Water Exchange Sequence Spreadsheet

15.1 ON LOCATION AFTER HOOK-UP

The Armada LNG Mediterrana shall operate in the Malta alongside Jetty as a FSU. The complete ballast exchange should be carried out when vessel is enroute from Singapore to Malta and prior alongside jetty at Malta considering the requirements mentioned in section 14.6.

The FSU shall assess the following and change of ballast will be case-by-case, depending upon the following criteria:

- Present draft / stress / stability criteria
- On-board stock / cargo inventory
- Scheduled production rates forecast
- Next scheduled offload
- Weather forecast (especially during monsoons).

Generally exchange of ballast would not be warranted at the specified FSU location however all ballasting / de-ballasting operations shall be properly documented so as to have a clear picture of the ship's history of carriage of ballast and with regard to the sediment control.

15.2 Overflow and Filling Line Data

Tank Name	No of Overflow Lines per Tank	Overflow Line Nominal Diameter (mm)	Overflow Lines Total Cross Sectional Area (mm^2)	Filling Line Nominal Dia. (mm)	Filling Line Total Cross Sectional Area (mm^2)	Ratio Of Overflow Filling Line Total Cross Sectional Area (mm^2)

15.3 TANK CAPACITIES

1) Cargo Tanks (S.G. = 0.480)

Tank Name	Position		Capacity		Center of Gravity	
			100% Full (-160 deg.C.) excluding dome	Full (-160 deg.C.) Including dome	100% Full	
	Side	Frame No.	(m3)	(m3)	LCG (m)	KG (m)
No1 LNG Cargo Tk.	-	84.3-91.7	20,568.6	20,629.9	-91.97	22.85
No2 LNG Cargo Tk	-	76.3-83.7	24,270.9	26,335.4	-53.33	21.00
No3 LNG Cargo Tk	-	68.3-75.7	26.265.2	26,319.2	-13.25	21.00
No4 LNG Cargo Tk	-	60.3-67.7	26,238.5	26,292.5	26.83	21.00
No5 LNG Cargo Tk	-	52.3-59.7	26,238.5	26,303.2	66.91	21.00
Total			125,582.0	125,877.2		

2) Water Ballast Tanks (S.G. = 1.025)

Tank Name	Position		Capacity		Center of Gravity		Moment of 'I' (Max.Free Surface)
			100% Full				
	Side	Frame No.	(m3)	S.W. (t)	LCG (m)	KG (m)	(m4)
FPK	-	96- F.E.	1647.9	1689	-130.34	12.32	10.407
No.1 Fore Wing WBT	P	88-92	1490.6	1528	-101.41	13.53	429
	S	88-92	1490.6	1528	-101.41	13.53	429
No.1 Aft Wing WBT	P	84-88	1541.3	1580	-82.95	11.85	660
	S	84-88	1541.3	1580	-82.95	11.85	660
No.2 Fore Wing WBT	P	80-84	1947.3	1996	-62.76	10.02	864
	S	80-84	1947.3	1996	-62.76	10.02	864
No.2 Aft Wing WBT	P	76-80	2461.2	2523	-43.1	8.62	2335
	S	76-80	2461.2	2523	-43.1	8.62	2335
No.3 Fore WBT	-	72-76	6387.8	6547.5	-24.37	7.63	142.542
No.3 Aft WBT	-	68-72	6415.3	6575.7	-2.10	7.61	143.068
No.4 Fore Wing WBT	P	64-68	2626.5	2692	16.81	8.19	3.033
	S	64-68	2626.5	2692	16.81	8.19	3.033
No.4 Aft Wing WBT	P	60-64	2594.3	2659	36.79	8.28	2.915
	S	60-64	2594.3	2659	36.79	8.28	2.915
No.5 Fore Wing WBT	P	56-60	2314.8	2373	56.51	8.93	1.806
	S	56-60	2314.8	2373	56.51	8.93	1.806
Apk WBT		AE-16	1120.1	1148	129.97	13.96	10.407
No.2 BTM WBT		76-85	4070.9	4173	-57.38	4.26	34.890
No.3 BTM WBT		68-76	904.2	927	-13.26	0.87	8.402
No.4 BTM WBT		60-68	3334.8	3418	26.83	3.97	23863
No.5 BTM WBT		53-60	1786.9	1842	54.08	3.77	11932
Total			59007.7	60482.9			

3) Fuel Oil Tanks (S.G. = 0.991)

Tank Name	Position		Capacity		Center of Gravity		Moment of 'I' (Max.Free Surface)
			100% Full	95% Full	100% Full		
	Side	Frame No.	(m3)	(m3)	LCG (m)	KG (m)	(m4)
Fwd Deep FO Tk	P	92-94	1751.2	1556	-113.74	15.96	3.670
	S	92-94	1716.5	1525	-113.79	16.02	3.583
No.5 Aft Wing F.O. Tk.	P	51-56	2378	2112	78.52	10.96	1013
	S	51-56	2378	2112	78.52	10.96	1013
F.O. Settling Tank		44-51	489.4	435	91.93	18.80	370
F.O. Overflow tk		43-51	131.4	117	92.73	1.22	423

4) Diesel Oil Tanks (S.G. = 0.920)

Tank Name	Position		Capacity		Center of Gravity		Moment of 'I' (Max.Free Surface)
			100% Full	90% Full	100% Full		
	Side	Frame No.	(m3)	(m3)	LCG (m)	KG (m)	(m4)
D.O. Tk		46-51	224.7	188	91.44	16.87	264
Kerosene Tk		43-46	124.3	104	95.34	16.91	136
Total							

5) Fresh Water Tanks (S.G. = 1.000)

Tank Name	Position		Capacity		Center of Gravity		Moment of 'I' (Max.Free Surface)
			100% Full				
	Side	Frame No.	(m3)	F.W. (t)	LCG (m)	KG (m)	(m4)
Fresh water Tank		36-43	277.6	277.6	100.09	17.22	260
Drinking Water Tk		28-36	240.4	240.4	107.24	17.37	178
No.1 Distilled Water Tank		36-42	234.6	234.6	100.60	17.23	217
No.2 Distilled Water Tank		28-36	240.5	240.5	107.24	17.37	179
Cooling water Tank			226.4	226.4	124.17	4.69	3

6) Other Tanks

Tank Name	Position		Capacity	Center of Gravity		Moment of 'I' (Max.Free Surface)
			100% Full			
	Side	Frame No.	(m3)	LCG (m)	KG (m)	(m4)
IGG FO tk		20-22	11.6	116.15	30.80	-
IGG FW tk		21-23	2.3	116.69	33.10	-

Ballast pump

1) No.1 & No.2 & NO.3 & NO.4 Ballast Pump (2 sets)

- Maker: SHINKO KINZOKU
- Classification: Electrical Vertical, Centifugal, CVF500

Particulars

- Capacity: 2700 m3/h x T25m
- Total Head: 25 kPa
- Suction Head: 25m
- Pumping Liquid: Seawater

- Liquid Temp.: 33 deg.C.
- Specific Gravity:1.025
- Rotation: Clockwise
- Hydraulic Test: 0.75 MPa G

Motor:

- Out Put: 280 kW
- Syn.Speed: 1200 r/m

Materials:

- Casing: Bronze
- Impeller: Phosphor Bronze PBC2A
- Imp. Shaft: Carbon Steel
- Mouth Ring: Bronze LBC4
- Sleeve: Stainless Steel SUS 316

Ballast pipeline

- Maker : Mitsui engg & shipbuilding Co.
- Materials: Welded steel pipe, Type-II, Galvanized
- Design conditions: 5 kg/cm2 (std design pressure)
- Max. Internal Working Pressure: 2.5 kg/cm2 (working pressure)
- Max Test Pressure: 3.75 Kg/cm2
- Working Temperature: Max 50 deg C.

Check List for Ballast Water Exchange

I BALLASTING OPERATION

For Reference

NO.	DESCRIPTION	YES	NO
1.1	Ballasting plan to be prepared		
1.2	Tanks venting system to be checked for operational		
1.3	Valves to designated tanks to be opened		
1.4	Sea suction valves to be opened for ballasting		
1.5	Ballasting to be commenced by gravity		
1.6	Tanks soundings to be taken and reported to ballast duty officer (Soundings to be taken during the ballasting period)		
1.7	Ballast Water to be checked for contamination		
1.8	Ballast Pumps to be started		
1.9	Drafts to be checked against restrictions		
1.10	Ballasting to be stopped in tank at required level in order to avoid overflow (unless it is necessary all ballast tanks will be stopped off at open sea)		
1.11	Ballast pumps to be stopped		
1.12	All ballast system and tank valves to be closed		
1.13	Ballast intake to be entered into the Ballast Water Reporting Form and Deck Log Book		

II DE-BALLASTING OPERATION

NO.	DESCRIPTION	YES	NO
2.1	De-ballasting plan to be prepared		
2.2	Tanks venting system to be checked for operational		
2.3	Valves to designated tanks to be opened		
2.4	Sea discharging valves to be opened for de-ballasting		
2.5	De-ballasting to be commenced by gravity		
2.6	Tanks soundings to be taken (Soundings to be taken during de-ballasting period)		
2.7	Overboard outlets to be checked for water contamination		
2.8	Ballast Pumps to be started		
2.9	Drafts to be checked against restrictions		
2.10	De-ballasting to be stopped when the tanks are empty		
2.11	Ballast pumps to be stopped		
2.12	All ballast system and tank valves to be closed		
2.13	De-ballasting to be entered into the Ballast Water Reporting Form and Deck Log Book		

During Ballasting and De-ballasting Operation the following items will be taken into account:

1. To be agreed who will be responsible for the ballasting / de-ballasting operation as duty officer / engineer, watch relieve must be informed,
2. Ballast Control Room will not be left unattended while the ballast pump(s)/stripping pump(s) are in use,
3. Agreed Communication system must be set up and known by the officers/engineers,
4. Duty engineer must be clear informed after completion ballasting / de-ballasting operations,
5. During the hold ballasting / de-ballasting additional manholes must be opened, together with hatch covers if it is permitted/practicable.

Chief Engineer	Chief Officer	Master
Signature	Signature	Signature

15.4 PIPELINE AND PUMPING ARRANGEMENTS

Refer Appendix F

15.5 PROFILE OF NORMAL BALLAST TANK ARRANGEMENT & CAPACITY PLAN

Refer Appendix E

15.6 PROFILE OF HEAVY WEATHER BALLAST ARRANGEMENT

Note[5]: *This is applicable to trading oil tankers whereby the cargo tanks are utilized for carriage of ballast during heavy weather. There is no requirement for this consideration with respect to the Armada LNG Mediterrana.*

16.0 SAFETY CONSIDERATIONS

The Master and Ballast Water Management Officer must bear in mind, notwithstanding the relevant regulations of the Convention and quarantine regulations of any port state, that the safety of the ship is paramount. The Master must be informed prior to any exchange of ballast water. The Ballast Water Management Officer shall, if in any kind of doubt with regard to the ballast water exchange, consult the Master. All dangers with regard to safety and environment protection of such exchange should be realized and precautions taken accordingly.

A list of circumstances in which ballast water exchange should not be undertaken.

- If wind/sea conditions is above force 5 of Beaufort scale.
- If there is heavy swell in any direction, wave height is more than 3m.
- If near storm, cyclones, typhoons, hurricanes and heavy freezing conditions, etc.,
- If excessive trim occurs,
- If Longitudinal stress values exceeded those permitted by classification society.
- Asymmetrical emptying and filling of tanks must never be carried out. This creates torsional stresses.
- Should at any time before or during the ballast water exchange it is observed that the Metacentric Height (GM) and Keel to Centre of Gravity (KG) of the ship may reach unsafe values.

16.1 SPECIFIC SAFETY CONSIDERATIONS

16.1.1 Sequential Method of Exchange

The *sequential exchange process* requires the removal of very large weights from the ship in a dynamic situation and their subsequent replacement. This involves considerable change in draft, trim and stress condition of the ship.

The following safety considerations shall have to be kept in mind:-

- At each step of the sequence the shearing force, bending moments, and torsional stress must be checked to see that it is within safe sea condition limits; namely:
  - before commencing of the step;
  - intermediate stage when tank is half full;
  - when tank is empty; and
  - completion of the step when original condition is restored.
- Checks must be made to ensure that the minimum intact stability requirement of the ship are met at every stage.
- The weather condition, namely sea state, swell and icing to be assessed before commencement and on completion of each step.

Note[8]: *Do not leave the tanks partly full as this would induce sloshing of the water within the tank increasing chances of structural damage. Ballast holds must never be slack between 20% & 90% full.*

Note[9]: *Increase in free surface may affect the intact stability of the ship. Free surface effects must be considered prior to commencement of each step, with respect to reduction of stability and sloshing.*

- Asymmetrical emptying or filling is to be avoided to prevent torsional forces.
- The steps within the sequence should meet the trim and draft requirements of bow, propeller and rudder immersion.
- Contingency procedures must be ready for situations which may affect the ballast water exchange at sea, including deteriorating weather conditions, pump failure, loss of power, etc.
- Time to complete the ballast water exchange or an appropriate sequence thereof must be taken into account such that at any time if the situation is threatening to get worse, the exchange can be terminated at the end of a sequence when the original condition has been restored.

16.1.2 Flow-through Method of Exchange

The *flow through method* must be assessed for each individual tank, for their effectiveness in removing harmful aquatic organism from the ballast water at the same time be acceptable in terms of structural strength and stability.

Air pipes are not designed for continuous ballast water overflow. The size of the tank exit must permit a flow rate in excess of the pump capacity, in order to avoid over-pressurization of the tank.

Tank lids, manhole covers that have to be opened prior commencement of the flow through sequence should be identified and specified in the plan. The authority and responsibility for such practice rests with the Master, and prudent seamanship will ensure a procedure for confirming that they are closed after the sequence is completed.

Large quantities of water cascading on to weather decks will cause serious safety risks for crew members. The working environment can become hazardous as spray from the overboard flow on the windward side will lead to wet and slippery decks.

Additionally, open tank openings can cause a serious safety risk if crew members are working nearby. It is further stressed that a portable or temporary barrier, preferably three

feet high, must be erected around the openings, which is easily visible and will act as a protection for personnel.

Continuous water cascading on deck and sea water spray flying all around can significantly increase corrosion of deck plating and fittings, aggravated by interruption of routine maintenance.

Due to the significantly long time periods used for ballast water exchange, consideration must be given towards crew fatigue and early wear-down.

In sub-zero temperatures, the cascading water on deck may freeze leading to severe ice – accretion, and consequent loss of stability and accessibility to fore parts of the ship.

16.1.3 Dilution Method of Exchange

Under pressurization or over pressurization may occur due to unequal rates of pumping in and pumping out, blockages in air pipes and excessive rates with respect to the ballast system. This may lead to damage of ballast water tanks.

17.0 CREW TRAINING & FAMILIARIZATION

The Company should provide training for master and crew as appropriate, including instruction on the application of ballast water and sediment management and treatment procedures, based on the information contained in these plans. Instruction should also be provided on the maintenance of appropriate log and record.

Training for ship's masters and crews as appropriate should include instruction on the application of ballast water and sediment management and treatment procedures, based upon the information contained in these Guidelines. Instruction should also be provided on the maintenance of appropriate records and logs.

Ship's officers and ratings engaged in ballast water exchange at sea should be trained in and familiarized with the following:-

1. **Reason for the need for exchange of ballast at sea.**

   Many coastal states have experienced damage to their marine fauna and flora due to the introduction of non-native species. These micro-organisms also affect human health and economy. These species have been known to be transported in ballast water from foreign lands and can survive journeys of several weeks in the ballast tanks. Once pumped out in geographical areas far removed from their origin, these organisms either die or flourish without check. Some of those which survive and flourish cause widespread damage to the ecosystem, ecological balance, human health and economy in that region.

   To counter check this, a ship is required to exchange ballast picked up in port or coastal waters with the more saline mid-ocean waters. These organisms are not expected to survive exposure to water of different salinity, deep waters or when the temperatures vary considerably from that of their original habitat.

2. **Regulations governing ballast water exchange.**

   The IMO has introduced the *International Convention for the Control & Management of Ship's Ballast Water and Sediments*. The Convention brings about a uniform regime for *ballast water management* throughout the world, since some port states had established unilateral controls on the discharge of ballast water of foreign origin into their coastal waters.

3. Safety precautions during exchange of ballast at sea.

Notwithstanding the regulations of the Convention and of any port state, the safety of the ship is of paramount importance and any exchange done at sea by whatever method must be done in a controlled and safe manner. The times and circumstances required to undertake the various ballast water exchange operations are to be discussed.

Reference to the safety considerations is made in Section 16 of this Plan.

4. Sediment removal.

Over a period of time the sediments in the ballast water accumulate and harden up to form deposits. The sediments are good breeding grounds for aquatic organisms. Hence from time to time these sediments should be reduced and removed. Methods to be employed for the reduction, removal and disposal of sediment are mentioned in Section 13 of this Plan. Proper procedures shall be followed for safe handling, packaging and storage, if required of the sediments.

IMPORTANT: *Precautions to be taken for entering the tanks (enclosed space) is of utmost importance.*

5. Recording and reporting procedures.

All ballast exchange done at sea must be recorded in the *Ballast Water Register* (refer Appendix C) and the *Ballast Water Reporting* form (refer Appendix D).

Some port states require reporting to be done in their specific forms. For others who do not require a specific format, the *Ballast Water Reporting* form can be used.

These port state regulations or controls require ships calling at the ports of these states to carry out a mid-ocean ballast water exchange and report the same.

6. Methods of exchanging ballast at sea.

For this ship, only three practical methods of exchanging ballast are used. These are as follows:

- Sequential method
- Flow-through method
- Dilution method

Details regarding the above mentioned methods are mentioned in Section 14 of this Plan.

7. Pumping Plan:

The officers and ratings engaged in ballast water exchange at sea should be familiar with the ship's pumping plan, positions of associated air and sounding pipes, positions of all compartments and tank suctions and pipelines connecting them to ship's ballast pumps, ballast sampling points and, in the case of use of the flow through method of ballast exchange, the openings used for release of water from the top of the tank together with overboard discharge arrangements.

They should also familiarize with methods of ensuring that sounding pipes are clear and that pipes and the non-return devices are in good order. They must be familiar with the pumps, their restrictions and (their capacities with time required to undertake the various ballast water exchange operations.

Most importantly, they must be fully familiar with the lining up of the ballast lines and valves and with the safety practices associated with the ballast water exchange operation.

8. Means of carrying out ballast management on board.

Loading and discharging of water ballast is carried out using the existing ballast system and pipeline provided on board the ship. Routine ballast operations are to be carried out as per established procedures laid down in the Company's manuals, checklists and the Ship Stability Booklet.

Training Record for Ballast Water Management Manual

Date	Name	Rank	Signature	Remarks	Verified By

18.0 REPORTING & RECORDING REQUIREMENTS

18.1 BALLAST WATER REPORTING FORM

The *Ballast Water Reporting* form shown in Appendix D, is similar to the one issued by IMO and is to be used when the concerned port state requires advance information and does not have its own specified reporting form.

Note[10]: *On the form, Part B: BALLAST WATER - TOTAL NUMBER OF BALLAST TANKS ON BOARD refers only to the total number of segregated ballast tanks.*

When the concerned state has its own reporting form then that should be used.

Many port states require details of the management of ballast water during the voyage to be reported by radio prior to arrival. The Master must confirm from the local agents the reporting requirements.

Note[11]: *It is important to note that in certain places of the world, the reporting still has to be done whether or not the ship has ballast on board (e.g. NOBOB – No Ballast On Board) or even if the ship does not require to de-ballast in the concerned areas.*

18.2 BALLAST WATER REGISTER

The *Ballast Water Register* is for recording the complete operation of ballast water management, which is often requested by quarantine officers who intend to confirm that the ship complies with the requirements of the convention.

The ship shall carry a *Ballast Water Register*. The explanations regarding how to fill the record book are provided in the book itself. In the event of any discharge of ballast, whether planned and in compliance with the Plan or accidental or under exceptional circumstances not covered by the Plan or regulations, an entry shall be made in the *record book* describing the circumstances of and the reasons for the discharge.

Even if a ship is not currently trading in an area where ballast water information is required to be reported, the ship must fill the record book. Each operation shall be fully recorded as required in the book without delay. Each entry shall be signed by the Ballast Water Management Officer and each completed page shall be signed by the Master. The *Ballast Water Register* shall be available for inspection by officers of port state authorities.

Note[12]: *They may be permitted to take a copy of any entry. If required by them, the Master will be required to sign this copy as a 'true copy'. In such a situation, the Master shall immediately contact the Ship's Superintendent for consultation, prior signing any such copies.*

18.3 RETENTION OF RECORDS

The *Ballast Water Register* & *Ballast Water Reporting* form must be retained on board for a period of two (2) years after the last entry is made. They must be sent to the onshore support office, which will then maintain these documents for a further period of at least three years.

In case of any problems encountered during the ballast exchange or in case of receipt of a 'show-cause' notice for non-compliance of ballast water management requirements from a port state authority, a copy of all such records must be sent to the office and a copy along with relevant correspondence shall be maintained on board permanently.

18.4 INFORMING MANAGEMENT

As required by the present regulations of the *International Convention for the Control and Management of Ship's Ballast Water and Sediments* and the various Port state quarantine regulations, ships must carry out the ballast water exchange as required by this *Ballast Water Management Plan*. A proper record of the ballast water exchange is to be maintained in the *Ballast Water Register* and on the relevant forms of the concerned port state authorities, a copy of which should be sent to the office along with rest of the port papers.

If for whatever reason, ballast water exchange cannot be carried out as per the Plan or the approved exchange sequence mentioned in the Plan cannot be followed, the Ship's Superintendent shall be contacted at the earliest opportunity for advice, stating the reason for the inability to comply.

19.0 RELATED DOCUMENTS

1.	Permit to Work System Manual
2.	Permit to Work Procedure
3.	Confined Space Entry Procedure
4.	Ballast Water Register
5.	Ballast Water Reporting form

APPENDIX A SEQUENCE OF BALLAST EXCHANGE

W.B Eductor : 1 x 300 m3/hr

SUMMARY TABLE OF SEQUENCE BY SEQUENTIAL METHOD

W.B Pumps: 2 x 2700 m3/hr		INITIAL STAGE		STAGE-1		STAGE-2		STAGE-3		STAGE-4		STAGE-5		STAGE-6		STAGE-7		STAGE-8		STAGE-9		STAGE-10		STAGE-11		FINAL COND.		
CARGO TANKS		Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	
No.1 Cargo T.	m3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
No.2 Cargo T.	m3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
No.3 Cargo T.	m3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
No.4 Cargo T.	m3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
No.5 Cargo T.	m3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
WATER BALLAST TANKS		Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	Sndg	Volume	
FPT	m3	19.1	1483	**13.7**	**824**	13.7	824	**0.6**	**25**	**11.3**	**660**	11.3	660	11.3	660	11.3	660	11.3	660	11.3	660	11.3	660	**8.32**	**494**	**11.3**	**660**	
No.1 F WBT (P)	m3	28.7	1416	28.7	1416	28.7	1416	28.7	1416	28.7	1416	28.7	1416	28.7	1416	28.7	1416	28.7	1416	**1.12**	**35**	**28.7**	**1416**	28.7	1416	28.7	1416	**96.20%**
No.1 F WBT (S)	m3	28.7	1416	28.7	1416	28.7	1416	28.7	1416	28.7	1416	28.7	1416	28.7	1416	28.7	1416	28.7	1416	**1.12**	**35**	**28.7**	**1416**	28.7	1416	28.7	1416	**97.50%**
No.1 A WBT (P)	m3	29.4	1464	29.4	1464	29.4	1464	29.4	1464	29.4	1464	29.4	1464	29.4	1464	**2.02**	**60**	**29.4**	**1464**	29.4	1464	29.4	1464	29.4	1464	29.4	1464	**97.50%**
No.1 A WBT (S)	m3	29.4	1464	29.4	1464	29.4	1464	29.4	1464	29.4	1464	29.4	1464	29.4	1464	**2.02**	**60**	**29.4**	**1464**	29.4	1464	29.4	1464	29.4	1464	29.4	1464	
No.2 F WBT (P)	m3	26.9	1850	26.9	1850	26.9	1850	26.9	1850	26.9	1850	**1.2**	**50**	**26.9**	**1850**	26.9	1850	26.9	1850	26.9	1850	26.9	1850	26.9	1850	26.9	1850	**95.90%**
No.2 F WBT (S)	m3	26.9	1850	26.9	1850	26.9	1850	26.9	1850	26.9	1850	**1.2**	**50**	**26.9**	**1850**	26.9	1850	26.9	1850	26.9	1850	26.9	1850	26.9	1850	26.9	1850	**95.90%**
No.2 A WBT (P)	m3	23.3	2338	23.3	2338	23.3	2338	23.3	2338	23.3	2338	23.3	2338	23.3	2338	23.3	2338	23.3	2338	23.3	2338	**0.53**	**80**	0.53	80	**23.3**	**2338**	**97.30%**
No.2 A WBT (S)	m3	23.3	2338	23.3	2338	23.3	2338	23.3	2338	23.3	2338	23.3	2338	23.3	2338	23.3	2338	23.3	2338	23.3	2338	**0.53**	**80**	**16.2**	**1969**	**23.3**	**2338**	**97.30%**
No.3 WBT F	m3	22.3	6068	22.3	6068	22.3	6068	22.3	6068	22.3	6068	22.3	6068	**0.6**	**249**	**22.3**	**6068**	22.3	6068	22.3	6068	22.3	6068	22.3	6068	22.3	6068	**96.60%**
No.3 WBT A	m3	24.2	6287	24.2	6287	24.2	6287	24.2	6287	24.2	6287	24.2	6287	24.2	6287	24.2	6287	**0.6**	**250**	**24.2**	**6287**	24.2	6287	24.2	6287	24.2	6287	**96.60%**
No.4 F WBT (P)	m3	24.5	2574	24.5	2574	24.5	2574	24.5	2574	24.5	2574	24.5	2574	24.5	2574	**0.4**	**86**	**24.4**	**2574**	24.4	2574	24.4	2574	24.4	2574	24.4	2574	**95.90%**
No.4 F WBT (S)	m3	24.5	2574	24.5	2574	24.5	2574	24.5	2574	24.5	2574	24.5	2574	24.5	2574	**0.4**	**86**	**24.4**	**2574**	24.4	2574	24.4	2574	24.4	2574	24.4	2574	**96.00%**
No.4 A WBT (P)	m3	24.9	2542	24.9	2542	24.9	2542	24.9	2542	24.9	2542	**0.46**	**90**	**24.9**	**2542**	24.9	2542	24.9	2542	24.9	2542	24.9	2542	24.9	2542	24.9	2542	**96.70%**
No.4 A WBT (S)	m3	25.2	2542	25.2	2542	25.2	2542	25.2	2542	25.2	2542	**0.46**	**90**	**24.9**	**2542**	24.9	2542	24.9	2542	24.9	2542	24.9	2542	24.9	2542	24.9	2542	**96.70%**
No.5 F WBT (P)	m3	2.7	350	2.7	350	2.7	350	2.7	350	2.7	350	2.7	350	2.7	350	2.7	350	2.7	350	2.7	350	**0.1**	**20**	0.1	20	**2.7**	**350**	**96.50%**
No.5 A WBT (S)	m3	25.3	2199	25.3	2199	25.3	2199	25.3	2199	25.3	2199	25.3	2199	25.3	2199	25.3	2199	25.3	2199	25.3	2199	**20.9**	**1968**	**0.38**	**80**	**20.9**	**1968**	**96.50%**
2 BTM	m3	0	0	0	0	**3.14**	**1221**	3.14	1221	**9.8**	**3949**	9.8	3949	9.8	3949	9.8	3949	9.8	3949	9.8	3949	9.8	3949	9.8	3949	9.8	3949	**94.30%**
3 BTM	m3	0	0	0	0	**1.5**	**678**	1.5	678	**2.3**	**877**	2.3	877	2.3	877	2.3	877	2.3	877	2.3	877	2.3	877	2.3	877	2.3	877	**95.90%**
4 BTM	m3	0	0	0	0	**7.3**	**2501**	7.3	2501	**9.8**	**3235**	9.8	3235	9.8	3235	9.8	3235	9.8	3235	9.8	3235	9.8	3235	9.8	3235	9.8	3235	**NA NA**
5 BTM	m3	9.19	1707	9.19	1707	9.19	1707	**0.2**	**80**	**9.5**	**1743**	9.5	1743	9.5	1743	9.5	1743	9.5	1743	9.5	1743	9.5	1743	9.5	1743	9.5	1743	**NA**
APT	m3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL BALLAST (M3)	m3	**42462**		**41803**		**46203**		**43777**		**49736**		**41232**		**43917**		**41952**		**43699**		**46974**		**44659**		**44494**		**49505**		**95.90%**
Load/Disc Quantity	m3	-		659		4400		2426		5959		8504		8504	5819	5819	7784	7784	6037	6037	2762	2762	5077	1889	2054	5011		**NA NA**
Draft Fore (Calc.)	M	9.07		8.68		9.18		8.86		9.99		8.94		8.85		8.62		9.32		8.67		8.85		9.46		9.99		**NA**
Draft Aft (Calc.)	M	9.47		9.73		10.19		9.98		10.13		9.34		10.02		9.82		9.49		10.88		10.18		9.52		10.13		**95.40%**
Draft Mean (Calc.)	M	9.27		9.21		9.68		9.42		10.06		9.14		9.44		9.22		9.41		9.77		9.52		9.49		10.06		**NA**
TRIM	M	0.4		1.05		1.01		1.12		0.14		0.4		1.17		1.2		0.17		2.21		1.33		0.06		0.14		
Max SF	Sea	79 @ 51		76 @ 51		69 @ 51		72 @ 51		68 @ 51		80 @ 51		72 @ 51		75 @ 51		78 @ 51		61 @ 51		70 @ 51		77 @ 51		68 @ 51		
Max BM	Sea	55 @ 63		51 @ 61		42 @ 57		45 @ 57		41 @ 56		58 @ 61		60 @ 73		53 @ 64		70 @ 69		35 @ 56		42 @ 57		49 @ 57		41 @ 57		
GoM	M	8.92		9.08		8.73		8.83		8.47		8.81		9.15		8.82		9.19		8.74		8.64		8.68		8.47		
Propeller Immersion	%	64.80%		68.00%		73.80%		71.30%		72.90%		63.20%		71.70%		69.20%		65.00%		82.40%		73.70%		65.40%		73.00%		
Visibility/ Blind Distance																												

Vol Exch.

Following are assumptions taken (close to vessel departure from Singapore) :

Tank		Level	Metric Ton	Cub. Meter	%	S.G.	L.C.G.	V.C.G.
FWD DEEP. F.O.T.(P)	Ulg	25.460	0	0	0	0.9350	-113.81	0.40
FWD DEEP. F.O.T.(S)	Ulg	25.450	0	0	0	0.9350	-114.04	0.40
NO.5 A.WG. F.O.T.(P)	Ulg	2.596	2,112	2,259	95	0.9350	78.46	10.29
NO.5 A.WG. F.O.T.(S)	Ulg	23.280	238	238	10	1.0000	77.82	1.39
F.O. SETT. T.(P)	Ulg	1.409	435	465	95	0.9350	91.98	18.51
D. O. T.(S)	Sdg	5.724	188	213	95	0.8800	91.44	16.73
KEROSENE T.(S)	Sdg	5.733	104	118	95	0.8800	95.34	16.76
DRINK W.T.(P)	Sdg	6.388	236	236	98	1.0000	107.23	17.31
FRESH W.T.(P)	Sdg	6.380	272	272	98	1.0000	100.09	17.16
NO.1 DIST.W.T.(S)	Sdg	6.380	230	230	98	1.0000	100.60	17.17
NO.2 DIST.W.T.(S)	Sdg	6.392	236	236	98	1.0000	107.23	17.31

1. Both Fwd deep tanks are de-commissioned.
2. No. 5 A.WG. F.O.T has been converted to Sewage tank. As per C/E, Max 10% can be considered for planning purpo
3. Rest all tanks are 95 % related to bunkers and 98 % related to water
4. Constant of 500 MT was considered.

Following requirements as per Trim & Stability Booklet complied at every stage:-

1. Maximum trim : by Fwd - 1.00 m & by Aft - 3.00 m
2. Minimum draft forward - 8.52 m
3. For Stability Requirements of LNG tank strength - Min allowed mean draft : 9.10 m
4. For Stability Requirements of LNG tank strength - Max allowed GoM: 10.5 m
5. SF/BM below maximum allowed values
6. Rest Intact stability requirements as shown in Loadicator printout.

BW Sequential Stability Calculations as per Ships LOADICATOR from Singapore to Malta.

Armada FSU Mediterrana **1. Initial Stage** Input Details

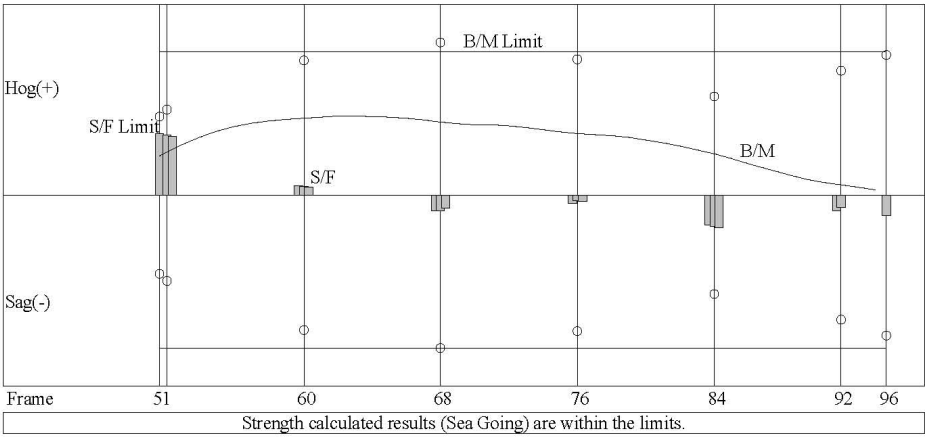
Remark								
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
LIGHT WEIGHT		30,044	12.78	383,962	15.75	473,193		
OTHERS		500	100.22	50,110	13.27	6,635		118
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
DRINK W.T.(P)	98	236	107.23	25,306	17.31	4,085	1.0000	178
FRESH W.T.(P)	98	272	100.09	27,224	17.16	4,668	1.0000	259
NO.1 DIST.W.T.(S)	98	230	100.60	23,138	17.17	3,949	1.0000	216
NO.2 DIST.W.T.(S)	98	236	107.23	25,306	17.31	4,085	1.0000	179
F.W. TOTAL		974		100,975		16,787		832
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
D. O. T.(S)	95	188	91.44	17,191	16.73	3,145	0.8800	227
KEROSENE T.(S)	95	104	95.34	9,915	16.76	1,743	0.8800	116
D.O. Total		292		27,106		4,888		343
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
FWD DEEP. F.O.T.(P)	0	0	-113.81	0	0.40	0	0.9350	0
FWD DEEP. F.O.T.(S)	0	0	-114.04	0	0.40	0	0.9350	0
NO.5 A.WG. F.O.T.(P)	95	2,112	78.46	165,708	10.29	21,732	0.9350	172
NO.5 A.WG. F.O.T.(S)	10	238	77.82	18,521	1.39	331	1.0000	922
F.O. SETT. T.(P)	95	435	91.98	40,011	18.51	8,052	0.9350	247
F.O. Total		2,785		224,240		30,115		1,341
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 F.WG. W.B.T.(P)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 F.WG. W.B.T.(S)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 A.WG. W.B.T.(P)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.1 A.WG. W.B.T.(S)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.2 F.WG. W.B.T.(P)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 F.WG. W.B.T.(S)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 A.WG. W.B.T.(P)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.2 A.WG. W.B.T.(S)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.3 F. W.B.T.	95	6,220	-24.43	-151,955	6.80	42,296	1.0250	48,258
NO.3 A. W.B.T.	98	6,444	-2.07	-13,339	7.27	46,848	1.0250	48,258
NO.4 F.WG. W.B.T.(P)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 F.WG. W.B.T.(S)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 A.WG. W.B.T.(P)	98	2,606	36.79	95,875	7.95	20,718	1.0250	32
NO.4 A.WG. W.B.T.(S)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.5 F.WG. W.B.T.(P)	15	359	55.93	20,079	1.23	442	1.0250	1,501
NO.5 F.WG. W.B.T.(S)	95	2,254	56.49	127,328	8.14	18,348	1.0250	32
NO.2 BTM. W.B.T.	0	0	-53.33	0	0.02	0	1.0250	0
NO.3 BTM. W.B.T.	0	0	-13.25	0	0.02	0	1.0250	0
NO.4 BTM. W.B.T.	0	0	26.83	0	0.02	0	1.0250	0
NO.5 BTM. W.B.T.	95	1,750	54.30	95,025	3.53	6,178	1.0250	11,642
FORE PEAK T.	90	1,520	-130.46	-198,299	11.49	17,465	1.0250	3,711
AFT. PEAK T.	0	0	124.50	0	8.64	0	1.0250	0
W.B. Total		43,525		-828,221		358,714		114,563
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 L.N.G. T.	0	0	-91.97	0	5.80	0	0.4690	0
NO.2 L.N.G. T.	0	0	-53.33	0	2.50	0	0.4690	0
NO.3 L.N.G. T.	0	0	-13.25	0	2.50	0	0.4690	0
NO.4 L.N.G. T.	0	0	26.83	0	2.50	0	0.4690	0
NO.5 L.N.G. T.	0	0	66.91	0	2.50	0	0.4690	0
Cargo Total		0		0		0		0

Cargo	mt	0	Draft at C.F.	m	9.27	KM	m	21.82
Ballast	mt	43,525	Fore Draft	m	9.07	KG	m	11.40
Fuel	mt	2,785	Aft. Draft	m	9.47	GM	m	10.42
Diesel	mt	292	Mean Draft	m	9.27	GGo	m	1.50
F.Water	mt	974	Trim	m	0.40	GoM	m	8.92
Others	mt	500	Prop. Im.	%	64.8	KGo	m	12.90
D.W.T.	mt	48,076	S.G.		1.0250	L.C.G.	m	-0.54
L.W.T.	mt	30,044	T.P.C.	mt	93.98	L.C.B.	m	-1.22
Displacemnt	mt	78,120	M.T.C.	mt-m	1334.1	L.C.F.	m	-1.70

Armada FSU Mediterrana **1. Initial Stage** Input Summary

Remark	

Cargo	mt	0	Draft at C.F.	m	9.27	KM	m	21.82
Ballast	mt	43,525	Fore Draft	m	9.07	KG	m	11.40
Fuel	mt	2,785	Aft. Draft	m	9.47	GM	m	10.42
Diesel	mt	292	Mean Draft	m	9.27	GGo	m	1.50
F.Water	mt	974	Trim	m	0.40	GoM	m	8.92
Others	mt	500	Prop. Im.	%	64.8	KGo	m	12.90
D.W.T.	mt	48,076	S.G.		1.0250	L.C.G.	m	-0.54
L.W.T.	mt	30,044	T.P.C.	mt	93.98	L.C.B.	m	-1.22
Displacemnt	mt	78,120	M.T.C.	mt-m	1334.1	L.C.F.	m	-1.70

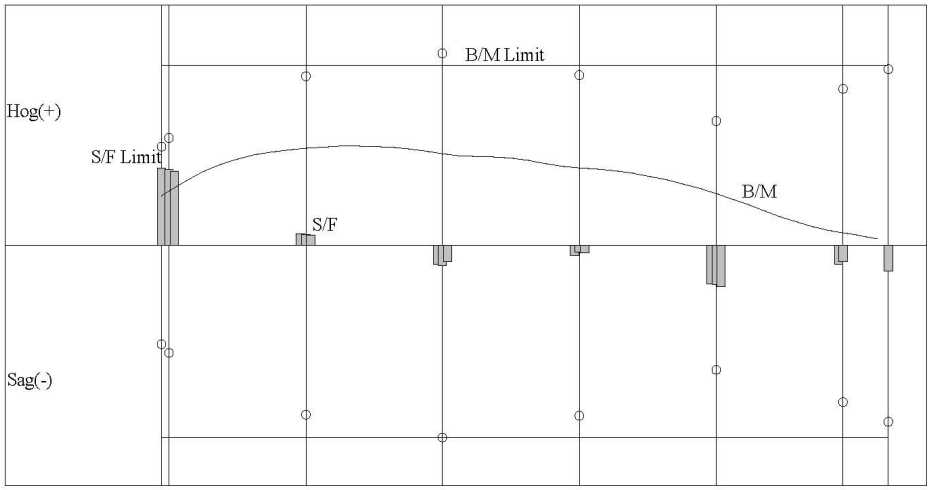


Strength calculated results (Sea Going) are within the limits.

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.92	Ok
Angle of GZ Max. >= 25 degree	49.0	Ok
Max. GZ (Angle>=30) >= 0.2 meter	5.99	Ok
Area (0-30degree) >= 0.055 m-rad.	1.201	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.107	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.906	Ok

Armada FSU Mediterrana **1. Initial Stage** Strength Calculated Result

Remark



Strength calculated results (Sea Going) are within the limits.

Cargo	mt	0	Draft at C.F.	m	9.27	KM	m	21.82
Ballast	mt	43,525	Fore Draft	m	9.07	KG	m	11.40
Fuel	mt	2,785	Aft. Draft	m	9.47	GM	m	10.42
Diesel	mt	292	Mean Draft	m	9.27	GGo	m	1.50
F.Water	mt	974	Trim	m	0.40	GoM	m	8.92
Others	mt	500	Prop. Im.	%	64.8	KGo	m	12.90
D.W.T.	mt	48,076	S.G.		1.0250	L.C.G.	m	-0.54
L.W.T.	mt	30,044	T.P.C.	mt	93.98	L.C.B.	m	-1.22
Displacemnt	mt	78,120	M.T.C.	mt-m	1334.1	L.C.F.	m	-1.70

<< Strength Calculated Result (Sea Going) >>

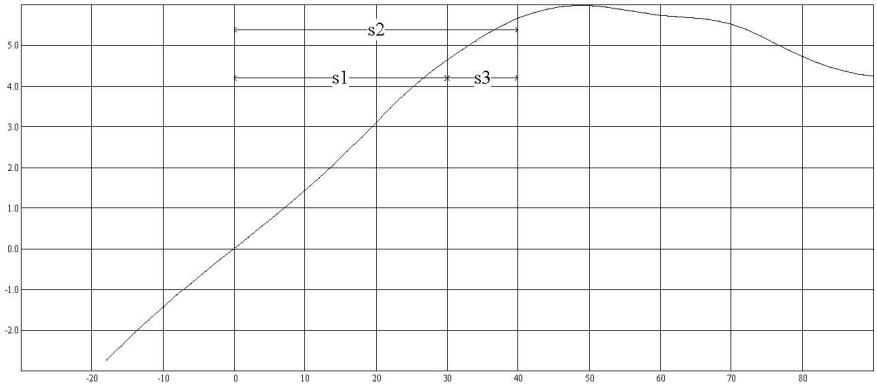
		Shearing Force				Bending Moment			
Frame	Dist. from A.P.	mt	Max.Lmt	Min.Lmt	%	mt-m	Max.Lmt	Min.Lmt	%
51.0	45.950	3,890	4,955	-4,955	78.5	88,384	320,920	-342,110	27.5
52.0	48.050	3,801	5,400	-5,400	70.4	96,465	320,920	-342,110	30.1
60.0	88.130	560	8,500	-8,500	6.6	172,808	320,920	-342,110	53.8
68.0	128.210	-1,005	9,645	-9,645	10.4	163,418	320,920	-342,110	50.9
76.0	168.290	-336	8,560	-8,560	3.9	138,372	320,920	-342,110	43.1
84.0	208.370	-1,978	6,235	-6,235	31.7	92,669	320,920	-342,110	28.9
92.0	245.570	-806	7,860	-7,860	10.3	22,724	320,920	-342,110	7.1
96.0	258.770	-1,280	8,860	-8,860	14.5	7,790	320,920	-342,110	2.4

Maximum Value (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,890	4,955	78.5
B.M	62.868	176,974	320,920	55.1

Maximum Percent of the Limit (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,890	4,955	78.5
B.M.	62.868	176,974	320,920	55.1

Armada FSU Mediterrana **1. Initial Stage** Intact Stability Result

REMARK	



Displacement	mt	78120.0
GoM	m	8.92
Flooding Angle	deg.	68.4
Angle at GZ Max.	deg.	49.0
GZ Max. (Ang.>30)	m	5.99
Area s1 (0-30 degree)	m-rad	1.201
Area s2 (0-40orθf)	m-rad	2.107
Area s3 (30-40orθf)	m-rad	0.906

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.92	Ok
Angle of GZ Max. >= 25 degree	49.0	Ok
Max. GZ (Angle>=30) >= 0.2 meter	5.99	Ok
Area (0-30degree) >= 0.055 m-rad.	1.201	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.107	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.906	Ok

Armada FSU Mediterrana **1st Stage** Input Details

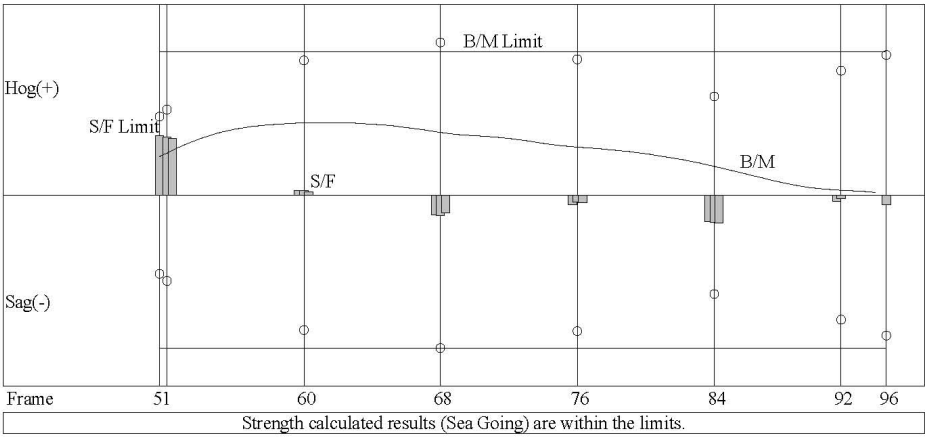
Remark								
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
LIGHT WEIGHT		30,044	12.78	383,962	15.75	473,193		
OTHERS		500	100.22	50,110	13.27	6,635		118
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
DRINK W.T.(P)	98	236	107.23	25,306	17.31	4,085	1.0000	178
FRESH W.T.(P)	98	272	100.09	27,224	17.16	4,668	1.0000	259
NO.1 DIST.W.T.(S)	98	230	100.60	23,138	17.17	3,949	1.0000	216
NO.2 DIST.W.T.(S)	98	236	107.23	25,306	17.31	4,085	1.0000	179
F.W. TOTAL		974		100,975		16,787		832
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
D. O. T.(S)	95	188	91.44	17,191	16.73	3,145	0.8800	227
KEROSENE T.(S)	95	104	95.34	9,915	16.76	1,743	0.8800	116
D.O. Total		292		27,106		4,888		343
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
FWD DEEP. F.O.T.(P)	0	0	-113.81	0	0.40	0	0.9350	0
FWD DEEP. F.O.T.(S)	0	0	-114.04	0	0.40	0	0.9350	0
NO.5 A.WG. F.O.T.(P)	95	2,112	78.46	165,708	10.29	21,732	0.9350	172
NO.5 A.WG. F.O.T.(S)	10	238	77.82	18,521	1.39	331	1.0000	922
F.O. SETT. T.(P)	95	435	91.98	40,011	18.51	8,052	0.9350	247
F.O. Total		2,785		224,240		30,115		1,341
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 F.WG. W.B.T.(P)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 F.WG. W.B.T.(S)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 A.WG. W.B.T.(P)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.1 A.WG. W.B.T.(S)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.2 F.WG. W.B.T.(P)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 F.WG. W.B.T.(S)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 A.WG. W.B.T.(P)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.2 A.WG. W.B.T.(S)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.3 F. W.B.T.	95	6,220	-24.43	-151,955	6.80	42,296	1.0250	48,258
NO.3 A. W.B.T.	98	6,444	-2.07	-13,339	7.27	46,848	1.0250	48,258
NO.4 F.WG. W.B.T.(P)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 F.WG. W.B.T.(S)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 A.WG. W.B.T.(P)	98	2,606	36.79	95,875	7.95	20,718	1.0250	32
NO.4 A.WG. W.B.T.(S)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.5 F.WG. W.B.T.(P)	15	359	55.93	20,079	1.23	442	1.0250	1,501
NO.5 F.WG. W.B.T.(S)	95	2,254	56.49	127,328	8.14	18,348	1.0250	32
NO.2 BTM. W.B.T.	0	0	-53.33	0	0.02	0	1.0250	0
NO.3 BTM. W.B.T.	0	0	-13.25	0	0.02	0	1.0250	0
NO.4 BTM. W.B.T.	0	0	26.83	0	0.02	0	1.0250	0
NO.5 BTM. W.B.T.	95	1,750	54.30	95,025	3.53	6,178	1.0250	11,642
FORE PEAK T.	50	845	-131.94	-111,489	7.06	5,966	1.0250	591
AFT. PEAK T.	0	0	124.50	0	8.64	0	1.0250	0
W.B. Total		42,850		-741,411		347,215		111,442
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 L.N.G. T.	0	0	-91.97	0	5.80	0	0.4690	0
NO.2 L.N.G. T.	0	0	-53.33	0	2.50	0	0.4690	0
NO.3 L.N.G. T.	0	0	-13.25	0	2.50	0	0.4690	0
NO.4 L.N.G. T.	0	0	26.83	0	2.50	0	0.4690	0
NO.5 L.N.G. T.	0	0	66.91	0	2.50	0	0.4690	0
Cargo Total		0		0		0		0

Cargo	mt	0	Draft at C.F.	m	9.20	KM	m	21.90
Ballast	mt	42,850	Fore Draft	m	8.68	KG	m	11.35
Fuel	mt	2,785	Aft. Draft	m	9.73	GM	m	10.55
Diesel	mt	292	Mean Draft	m	9.21	GGo	m	1.47
F.Water	mt	974	Trim	m	1.05	GoM	m	9.08
Others	mt	500	Prop. Im.	%	68.0	KGo	m	12.82
D.W.T.	mt	47,401	S.G.		1.0250	L.C.G.	m	0.58
L.W.T.	mt	30,044	T.P.C.	mt	93.90	L.C.B.	m	-1.22
Displacemnt	mt	77,445	M.T.C.	mt-m	1330.1	L.C.F.	m	-1.71

Armada FSU Mediterrana **1st Stage** Input Summary

Remark	

Cargo	mt	0	Draft at C.F.	m	9.20	KM	m	21.90
Ballast	mt	42,850	Fore Draft	m	8.68	KG	m	11.35
Fuel	mt	2,785	Aft. Draft	m	9.73	GM	m	10.55
Diesel	mt	292	Mean Draft	m	9.21	GGo	m	1.47
F.Water	mt	974	Trim	m	1.05	GoM	m	9.08
Others	mt	500	Prop. Im.	%	68.0	KGo	m	12.82
D.W.T.	mt	47,401	S.G.		1.0250	L.C.G.	m	0.58
L.W.T.	mt	30,044	T.P.C.	mt	93.90	L.C.B.	m	-1.22
Displacemnt	mt	77,445	M.T.C.	mt-m	1330.1	L.C.F.	m	-1.71

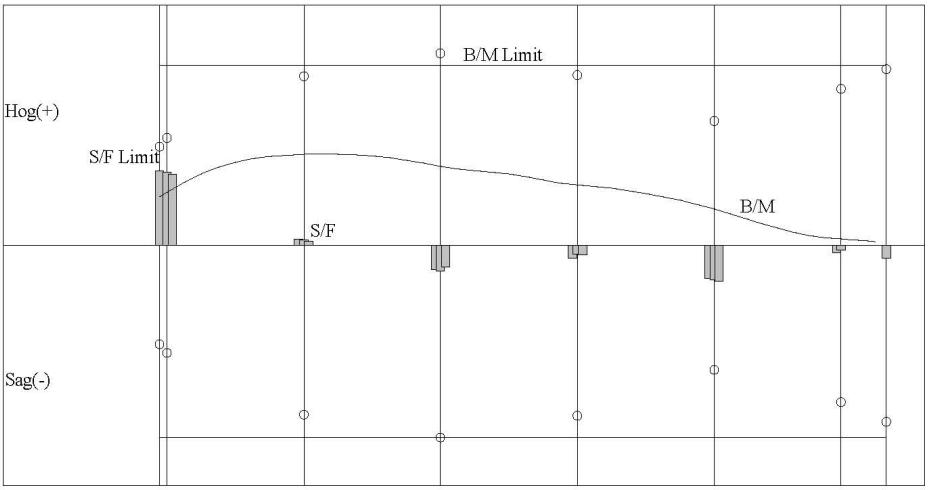


Strength calculated results (Sea Going) are within the limits.

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	9.08	Ok
Angle of GZ Max. >= 25 degree	49.2	Ok
Max. GZ (Angle>=30) >= 0.2 meter	6.06	Ok
Area (0-30degree) >= 0.055 m-rad.	1.218	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.133	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.915	Ok

Armada FSU Mediterrana **1st Stage** Strength Calculated Result

Remark



Strength calculated results (Sea Going) are within the limits.

Cargo	mt	0	Draft at C.F.	m	9.20	KM	m	21.90
Ballast	mt	42,850	Fore Draft	m	8.68	KG	m	11.35
Fuel	mt	2,785	Aft. Draft	m	9.73	GM	m	10.55
Diesel	mt	292	Mean Draft	m	9.21	GGo	m	1.47
F.Water	mt	974	Trim	m	1.05	GoM	m	9.08
Others	mt	500	Prop. Im.	%	68.0	KGo	m	12.82
D.W.T.	mt	47,401	S.G.		1.0250	L.C.G.	m	0.58
L.W.T.	mt	30,044	T.P.C.	mt	93.90	L.C.B.	m	-1.22
Displacemnt	mt	77,445	M.T.C.	mt-m	1330.1	L.C.F.	m	-1.71

<< Strength Calculated Result (Sea Going) >>

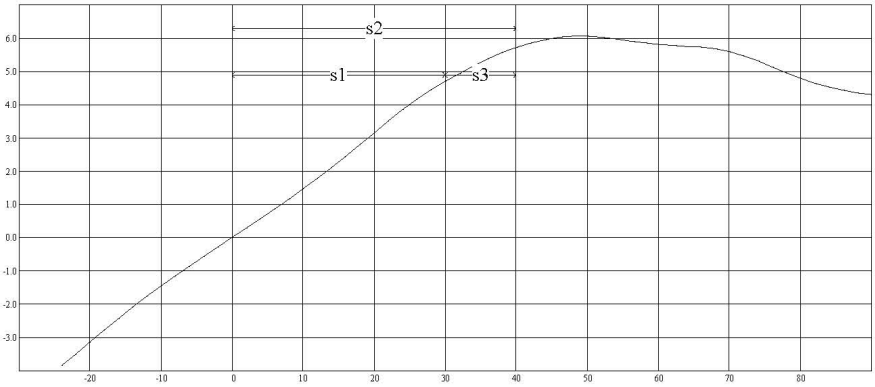
		Shearing Force				Bending Moment			
Frame	Dist. from A.P.	mt	Max.Lmt	Min.Lmt	%	mt-m	Max.Lmt	Min.Lmt	%
51.0	45.950	3,767	4,955	-4,955	76.0	86,629	320,920	-342,110	27.0
52.0	48.050	3,668	5,400	-5,400	67.9	94,440	320,920	-342,110	29.4
60.0	88.130	273	8,500	-8,500	3.2	161,932	320,920	-342,110	50.5
68.0	128.210	-1,283	9,645	-9,645	13.3	140,643	320,920	-342,110	43.8
76.0	168.290	-428	8,560	-8,560	5.0	107,596	320,920	-342,110	33.5
84.0	208.370	-1,715	6,235	-6,235	27.5	64,810	320,920	-342,110	20.2
92.0	245.570	-213	7,860	-7,860	2.7	11,245	320,920	-342,110	3.5
96.0	258.770	-624	8,860	-8,860	7.0	4,599	320,920	-342,110	1.4

Maximum Value (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,767	4,955	76.0
B.M	61.415	162,877	320,920	50.8

Maximum Percent of the Limit (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,767	4,955	76.0
B.M.	61.415	162,877	320,920	50.8

Armada FSU Mediterrana **1st Stage** Intact Stability Result

REMARK	



Displacement	mt	77445.0
GoM	m	9.08
Flooding Angle	deg.	68.7
Angle at GZ Max.	deg.	49.2
GZ Max. (Ang.>30)	m	6.06
Area s1 (0-30 degree)	m-rad	1.218
Area s2 (0-40orθf)	m-rad	2.133
Area s3 (30-40orθf)	m-rad	0.915

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	9.08	Ok
Angle of GZ Max. >= 25 degree	49.2	Ok
Max. GZ (Angle>=30) >= 0.2 meter	6.06	Ok
Area (0-30degree) >= 0.055 m-rad.	1.218	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.133	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.915	Ok

Armada FSU Mediterrana **2nd Stage** Input Details

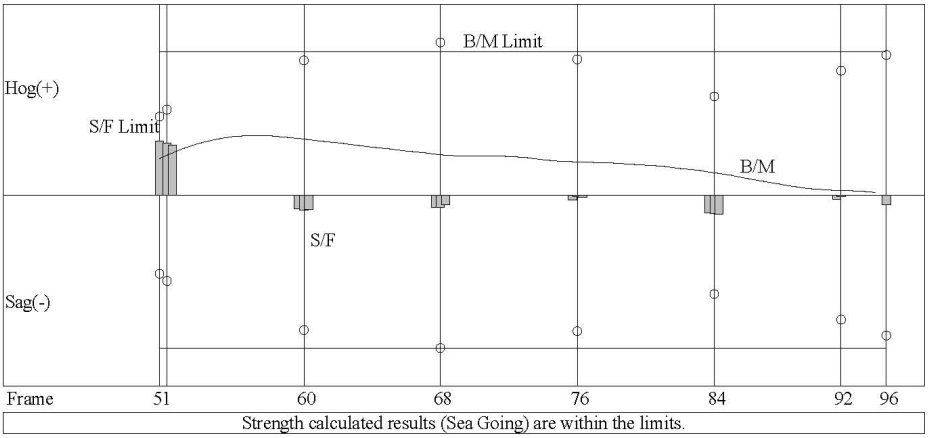
Remark								
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
LIGHT WEIGHT		30,044	12.78	383,962	15.75	473,193		
OTHERS		500	100.22	50,110	13.27	6,635		118
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
DRINK W.T.(P)	98	236	107.23	25,306	17.31	4,085	1.0000	178
FRESH W.T.(P)	98	272	100.09	27,224	17.16	4,668	1.0000	259
NO.1 DIST.W.T.(S)	98	230	100.60	23,138	17.17	3,949	1.0000	216
NO.2 DIST.W.T.(S)	98	236	107.23	25,306	17.31	4,085	1.0000	179
F.W. TOTAL		974		100,975		16,787		832
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
D. O. T.(S)	95	188	91.44	17,191	16.73	3,145	0.8800	227
KEROSENE T.(S)	95	104	95.34	9,915	16.76	1,743	0.8800	116
D.O. Total		292		27,106		4,888		343
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
FWD DEEP. F.O.T.(P)	0	0	-113.81	0	0.40	0	0.9350	0
FWD DEEP. F.O.T.(S)	0	0	-114.04	0	0.40	0	0.9350	0
NO.5 A.WG. F.O.T.(P)	95	2,112	78.46	165,708	10.29	21,732	0.9350	172
NO.5 A.WG. F.O.T.(S)	10	238	77.82	18,521	1.39	331	1.0000	922
F.O. SETT. T.(P)	95	435	91.98	40,011	18.51	8,052	0.9350	247
F.O. Total		2,785		224,240		30,115		1,341
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 F.WG. W.B.T.(P)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 F.WG. W.B.T.(S)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 A.WG. W.B.T.(P)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.1 A.WG. W.B.T.(S)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.2 F.WG. W.B.T.(P)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 F.WG. W.B.T.(S)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 A.WG. W.B.T.(P)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.2 A.WG. W.B.T.(S)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.3 F. W.B.T.	95	6,220	-24.43	-151,955	6.80	42,296	1.0250	48,258
NO.3 A. W.B.T.	98	6,444	-2.07	-13,339	7.27	46,848	1.0250	48,258
NO.4 F.WG. W.B.T.(P)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 F.WG. W.B.T.(S)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 A.WG. W.B.T.(P)	98	2,606	36.79	95,875	7.95	20,718	1.0250	32
NO.4 A.WG. W.B.T.(S)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.5 F.WG. W.B.T.(P)	15	359	55.93	20,079	1.23	442	1.0250	1,501
NO.5 F.WG. W.B.T.(S)	95	2,254	56.49	127,328	8.14	18,348	1.0250	32
NO.2 BTM. W.B.T.	30	1,252	-54.42	-68,134	1.20	1,502	1.0250	8,649
NO.3 BTM. W.B.T.	75	695	-13.26	-9,216	0.64	445	1.0250	8,609
NO.4 BTM. W.B.T.	75	2,564	26.83	68,792	2.87	7,359	1.0250	22,068
NO.5 BTM. W.B.T.	95	1,750	54.30	95,025	3.53	6,178	1.0250	11,642
FORE PEAK T.	50	845	-131.94	-111,489	7.06	5,966	1.0250	591
AFT. PEAK T.	0	0	124.50	0	8.64	0	1.0250	0
W.B. Total		47,361		-749,968		356,521		150,768
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 L.N.G. T.	0	0	-91.97	0	5.80	0	0.4690	0
NO.2 L.N.G. T.	0	0	-53.33	0	2.50	0	0.4690	0
NO.3 L.N.G. T.	0	0	-13.25	0	2.50	0	0.4690	0
NO.4 L.N.G. T.	0	0	26.83	0	2.50	0	0.4690	0
NO.5 L.N.G. T.	0	0	66.91	0	2.50	0	0.4690	0
Cargo Total		0		0		0		0

Cargo	mt	0	Draft at C.F.	m	9.68	KM	m	21.44
Ballast	mt	47,361	Fore Draft	m	9.18	KG	m	10.84
Fuel	mt	2,785	Aft. Draft	m	10.19	GM	m	10.61
Diesel	mt	292	Mean Draft	m	9.68	GGo	m	1.87
F.Water	mt	974	Trim	m	1.01	GoM	m	8.73
Others	mt	500	Prop. Im.	%	73.8	KGo	m	12.71
D.W.T.	mt	51,912	S.G.		1.0250	L.C.G.	m	0.44
L.W.T.	mt	30,044	T.P.C.	mt	94.78	L.C.B.	m	-1.24
Displacemnt	mt	81,956	M.T.C.	mt-m	1359.8	L.C.F.	m	-1.63

Armada FSU Mediterrana **2nd Stage** Input Summary

Remark	

Cargo	mt	0	Draft at C.F.	m	9.68	KM	m	21.44
Ballast	mt	47,361	Fore Draft	m	9.18	KG	m	10.84
Fuel	mt	2,785	Aft. Draft	m	10.19	GM	m	10.61
Diesel	mt	292	Mean Draft	m	9.68	GGo	m	1.87
F.Water	mt	974	Trim	m	1.01	GoM	m	8.73
Others	mt	500	Prop. Im.	%	73.8	KGo	m	12.71
D.W.T.	mt	51,912	S.G.		1.0250	L.C.G.	m	0.44
L.W.T.	mt	30,044	T.P.C.	mt	94.78	L.C.B.	m	-1.24
Displacemnt	mt	81,956	M.T.C.	mt-m	1359.8	L.C.F.	m	-1.63

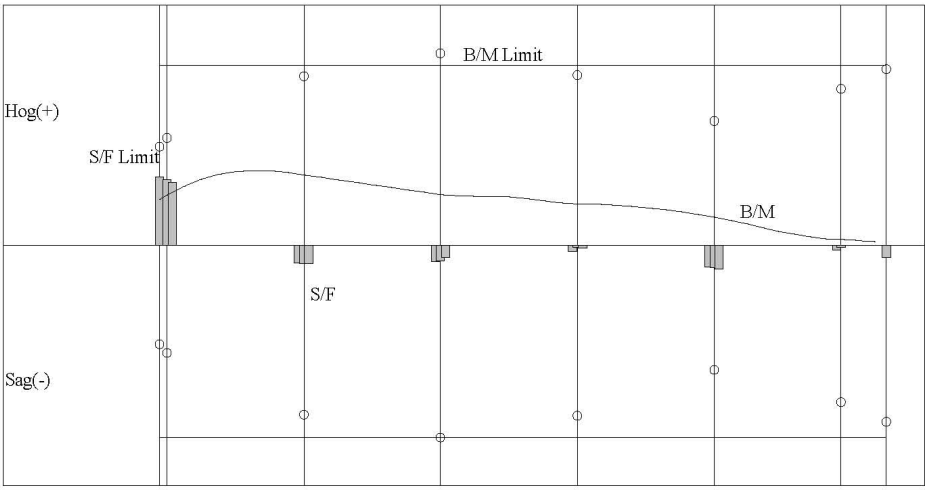


Strength calculated results (Sea Going) are within the limits.

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.73	Ok
Angle of GZ Max. >= 25 degree	49.2	Ok
Max. GZ (Angle>=30) >= 0.2 meter	6.05	Ok
Area (0-30degree) >= 0.055 m-rad.	1.190	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.105	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.915	Ok

Armada FSU Mediterrana **2nd Stage** Strength Calculated Result

Remark



Strength calculated results (Sea Going) are within the limits.

Cargo	mt	0	Draft at C.F.	m	9.68	KM	m	21.44
Ballast	mt	47,361	Fore Draft	m	9.18	KG	m	10.84
Fuel	mt	2,785	Aft. Draft	m	10.19	GM	m	10.61
Diesel	mt	292	Mean Draft	m	9.68	GGo	m	1.87
F.Water	mt	974	Trim	m	1.01	GoM	m	8.73
Others	mt	500	Prop. Im.	%	73.8	KGo	m	12.71
D.W.T.	mt	51,912	S.G.		1.0250	L.C.G.	m	0.44
L.W.T.	mt	30,044	T.P.C.	mt	94.78	L.C.B.	m	-1.24
Displacemnt	mt	81,956	M.T.C.	mt-m	1359.8	L.C.F.	m	-1.63

<< Strength Calculated Result (Sea Going) >>

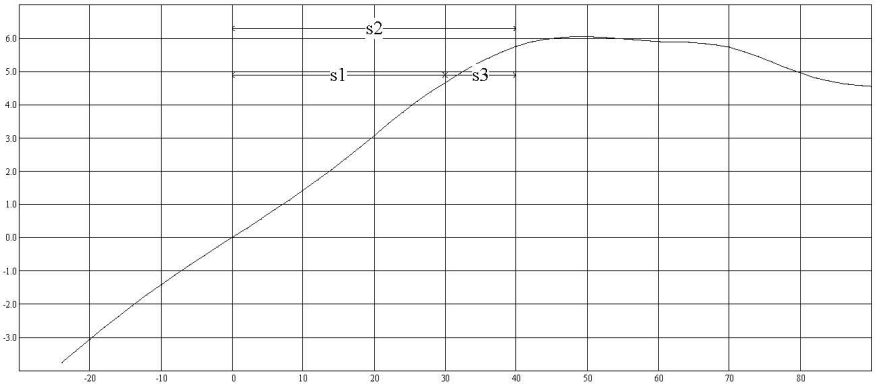
		Shearing Force				Bending Moment			
Frame	Dist. from A.P.	mt	Max.Lmt	Min.Lmt	%	mt-m	Max.Lmt	Min.Lmt	%
51.0	45.950	3,425	4,955	-4,955	69.1	82,040	320,920	-342,110	25.6
52.0	48.050	3,291	5,400	-5,400	60.9	89,097	320,920	-342,110	27.8
60.0	88.130	-916	8,500	-8,500	10.8	125,833	320,920	-342,110	39.2
68.0	128.210	-779	9,645	-9,645	8.1	90,842	320,920	-342,110	28.3
76.0	168.290	-111	8,560	-8,560	1.3	74,281	320,920	-342,110	23.1
84.0	208.370	-1,135	6,235	-6,235	18.2	50,434	320,920	-342,110	15.7
92.0	245.570	-98	7,860	-7,860	1.2	10,296	320,920	-342,110	3.2
96.0	258.770	-599	8,860	-8,860	6.8	4,515	320,920	-342,110	1.4

Maximum Value (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,425	4,955	69.1
B.M	57.245	133,483	320,920	41.6

Maximum Percent of the Limit (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,425	4,955	69.1
B.M.	57.245	133,483	320,920	41.6

Armada FSU Mediterrana **2nd Stage** Intact Stability Result

REMARK	



Displacement	mt	81956.0
GoM	m	8.73
Flooding Angle	deg.	66.7
Angle at GZ Max.	deg.	49.2
GZ Max. (Ang.>30)	m	6.05
Area s1 (0-30 degree)	m-rad	1.190
Area s2 (0-40orθf)	m-rad	2.105
Area s3 (30-40orθf)	m-rad	0.915

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.73	Ok
Angle of GZ Max. >= 25 degree	49.2	Ok
Max. GZ (Angle>=30) >= 0.2 meter	6.05	Ok
Area (0-30degree) >= 0.055 m-rad.	1.190	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.105	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.915	Ok

Armada FSU Mediterrana **3rd Stage** Input Details

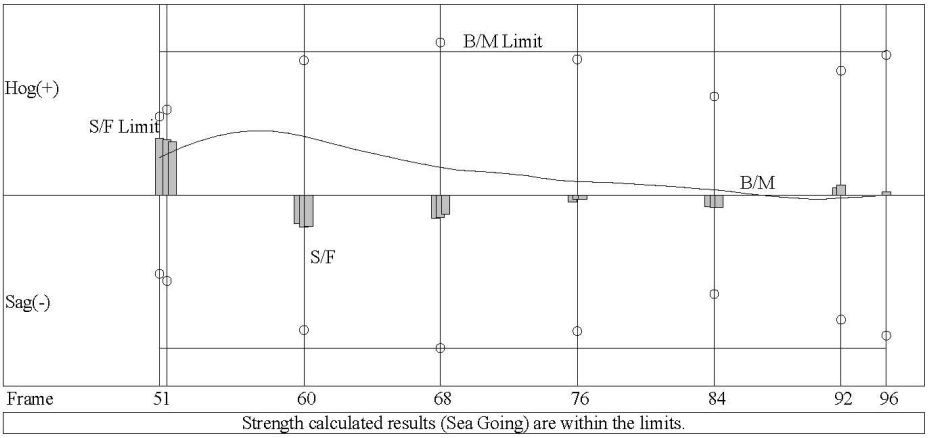
Remark								
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
LIGHT WEIGHT		30,044	12.78	383,962	15.75	473,193		
OTHERS		500	100.22	50,110	13.27	6,635		118
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
DRINK W.T.(P)	98	236	107.23	25,306	17.31	4,085	1.0000	178
FRESH W.T.(P)	98	272	100.09	27,224	17.16	4,668	1.0000	259
NO.1 DIST.W.T.(S)	98	230	100.60	23,138	17.17	3,949	1.0000	216
NO.2 DIST.W.T.(S)	98	236	107.23	25,306	17.31	4,085	1.0000	179
F.W. TOTAL		974		100,975		16,787		832
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
D. O. T.(S)	95	188	91.44	17,191	16.73	3,145	0.8800	227
KEROSENE T.(S)	95	104	95.34	9,915	16.76	1,743	0.8800	116
D.O. Total		292		27,106		4,888		343
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
FWD DEEP. F.O.T.(P)	0	0	-113.81	0	0.40	0	0.9350	0
FWD DEEP. F.O.T.(S)	0	0	-114.04	0	0.40	0	0.9350	0
NO.5 A.WG. F.O.T.(P)	95	2,112	78.46	165,708	10.29	21,732	0.9350	172
NO.5 A.WG. F.O.T.(S)	10	238	77.82	18,521	1.39	331	1.0000	922
F.O. SETT. T.(P)	95	435	91.98	40,011	18.51	8,052	0.9350	247
F.O. Total		2,785		224,240		30,115		1,341
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 F.WG. W.B.T.(P)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 F.WG. W.B.T.(S)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 A.WG. W.B.T.(P)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.1 A.WG. W.B.T.(S)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.2 F.WG. W.B.T.(P)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 F.WG. W.B.T.(S)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 A.WG. W.B.T.(P)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.2 A.WG. W.B.T.(S)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.3 F. W.B.T.	95	6,220	-24.43	-151,955	6.80	42,296	1.0250	48,258
NO.3 A. W.B.T.	98	6,444	-2.07	-13,339	7.27	46,848	1.0250	48,258
NO.4 F.WG. W.B.T.(P)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 F.WG. W.B.T.(S)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 A.WG. W.B.T.(P)	98	2,606	36.79	95,875	7.95	20,718	1.0250	32
NO.4 A.WG. W.B.T.(S)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.5 F.WG. W.B.T.(P)	15	359	55.93	20,079	1.23	442	1.0250	1,501
NO.5 F.WG. W.B.T.(S)	95	2,254	56.49	127,328	8.14	18,348	1.0250	32
NO.2 BTM. W.B.T.	30	1,252	-54.42	-68,134	1.20	1,502	1.0250	8,649
NO.3 BTM. W.B.T.	75	695	-13.26	-9,216	0.64	445	1.0250	8,609
NO.4 BTM. W.B.T.	75	2,564	26.83	68,792	2.87	7,359	1.0250	22,068
NO.5 BTM. W.B.T.	4	82	60.61	4,970	0.11	9	1.0250	4,570
FORE PEAK T.	2	26	-134.18	-3,489	0.50	13	1.0250	85
AFT. PEAK T.	0	0	124.50	0	8.64	0	1.0250	0
W.B. Total		44,874		-732,022		344,400		143,191
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 L.N.G. T.	0	0	-91.97	0	5.80	0	0.4690	0
NO.2 L.N.G. T.	0	0	-53.33	0	2.50	0	0.4690	0
NO.3 L.N.G. T.	0	0	-13.25	0	2.50	0	0.4690	0
NO.4 L.N.G. T.	0	0	26.83	0	2.50	0	0.4690	0
NO.5 L.N.G. T.	0	0	66.91	0	2.50	0	0.4690	0
Cargo Total		0		0		0		0

Cargo	mt	0	Draft at C.F.	m	9.41	KM	m	21.69
Ballast	mt	44,874	Fore Draft	m	8.86	KG	m	11.02
Fuel	mt	2,785	Aft. Draft	m	9.99	GM	m	10.66
Diesel	mt	292	Mean Draft	m	9.42	GGo	m	1.83
F.Water	mt	974	Trim	m	1.13	GoM	m	8.83
Others	mt	500	Prop. Im.	%	71.3	KGo	m	12.86
D.W.T.	mt	49,425	S.G.		1.0250	L.C.G.	m	0.68
L.W.T.	mt	30,044	T.P.C.	mt	94.26	L.C.B.	m	-1.23
Displacemnt	mt	79,469	M.T.C.	mt-m	1342.7	L.C.F.	m	-1.69

Armada FSU Mediterrana **3rd Stage** Input Summary

Remark	

Cargo	mt	0	Draft at C.F.	m	9.41	KM	m	21.69
Ballast	mt	44,874	Fore Draft	m	8.86	KG	m	11.02
Fuel	mt	2,785	Aft. Draft	m	9.99	GM	m	10.66
Diesel	mt	292	Mean Draft	m	9.42	GGo	m	1.83
F.Water	mt	974	Trim	m	1.13	GoM	m	8.83
Others	mt	500	Prop. Im.	%	71.3	KGo	m	12.86
D.W.T.	mt	49,425	S.G.		1.0250	L.C.G.	m	0.68
L.W.T.	mt	30,044	T.P.C.	mt	94.26	L.C.B.	m	-1.23
Displacemnt	mt	79,469	M.T.C.	mt-m	1342.7	L.C.F.	m	-1.69



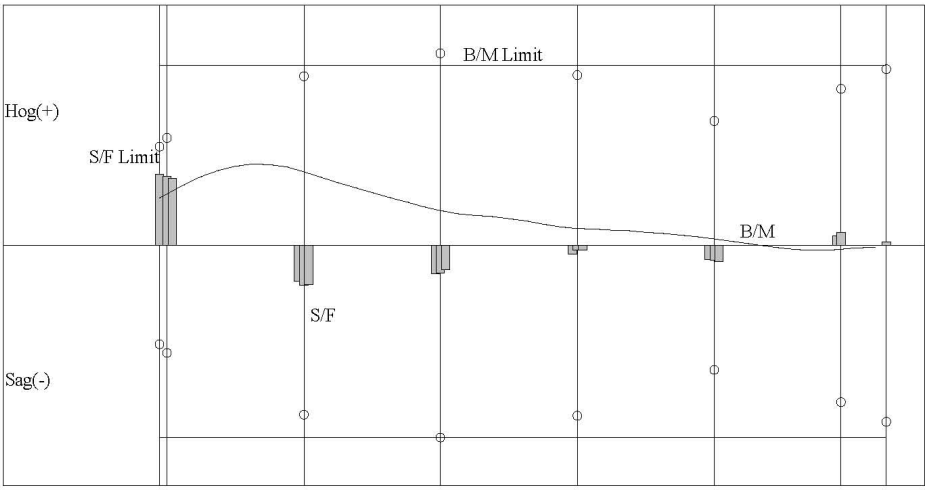
Strength calculated results (Sea Going) are within the limits.

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.83	Ok
Angle of GZ Max. >= 25 degree	49.0	Ok
Max. GZ (Angle>=30) >= 0.2 meter	5.99	Ok
Area (0-30degree) >= 0.055 m-rad.	1.193	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.099	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.907	Ok

Armada FSU Mediterrana **3rd Stage**

Strength Calculated Result

Remark



Strength calculated results (Sea Going) are within the limits.

Cargo	mt	0	Draft at C.F.	m	9.41	KM	m	21.69
Ballast	mt	44,874	Fore Draft	m	8.86	KG	m	11.02
Fuel	mt	2,785	Aft. Draft	m	9.99	GM	m	10.66
Diesel	mt	292	Mean Draft	m	9.42	GGo	m	1.83
F.Water	mt	974	Trim	m	1.13	GoM	m	8.83
Others	mt	500	Prop. Im.	%	71.3	KGo	m	12.86
D.W.T.	mt	49,425	S.G.		1.0250	L.C.G.	m	0.68
L.W.T.	mt	30,044	T.P.C.	mt	94.26	L.C.B.	m	-1.23
Displacemnt	mt	79,469	M.T.C.	mt-m	1342.7	L.C.F.	m	-1.69

<< Strength Calculated Result (Sea Going) >>

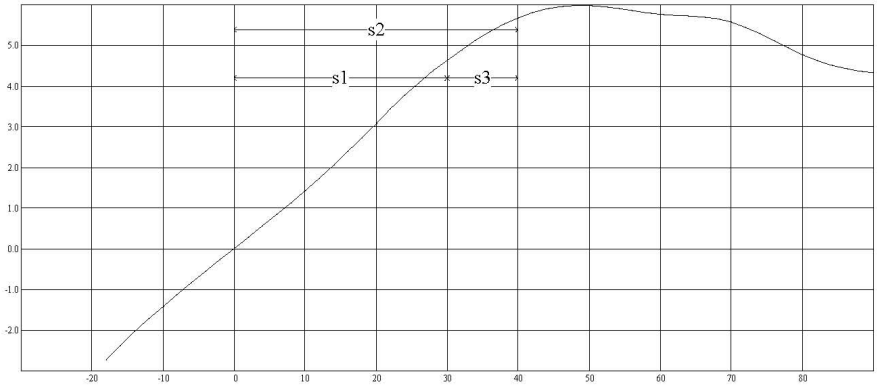
		Shearing Force				Bending Moment			
Frame	Dist. from A.P.	mt	Max.Lmt	Min.Lmt	%	mt-m	Max.Lmt	Min.Lmt	%
51.0	45.950	3,588	4,955	-4,955	72.4	84,229	320,920	-342,110	26.2
52.0	48.050	3,471	5,400	-5,400	64.3	91,647	320,920	-342,110	28.6
60.0	88.130	-1,999	8,500	-8,500	23.5	131,441	320,920	-342,110	41.0
68.0	128.210	-1,402	9,645	-9,645	14.5	62,157	320,920	-342,110	19.4
76.0	168.290	-241	8,560	-8,560	2.8	30,406	320,920	-342,110	9.5
84.0	208.370	-747	6,235	-6,235	12.0	11,747	320,920	-342,110	3.7
92.0	245.570	647	7,860	-7,860	8.2	-6,545	320,920	-342,110	1.9
96.0	258.770	204	8,860	-8,860	2.3	-2,073	320,920	-342,110	0.6

Maximum Value (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,588	4,955	72.4
B.M	57.399	144,648	320,920	45.1

Maximum Percent of the Limit (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,588	4,955	72.4
B.M.	57.399	144,648	320,920	45.1

Armada FSU Mediterrana **3rd Stage** Intact Stability Result

REMARK	



Displacement	mt	79469.0
GoM	m	8.83
Flooding Angle	deg.	67.8
Angle at GZ Max.	deg.	49.0
GZ Max. (Ang.>30)	m	5.99
Area s1 (0-30 degree)	m-rad	1.193
Area s2 (0-40orθf)	m-rad	2.099
Area s3 (30-40orθf)	m-rad	0.907

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.83	Ok
Angle of GZ Max. >= 25 degree	49.0	Ok
Max. GZ (Angle>=30) >= 0.2 meter	5.99	Ok
Area (0-30degree) >= 0.055 m-rad.	1.193	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.099	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.907	Ok

Armada FSU Mediterrana **4th Stage**

Input Details

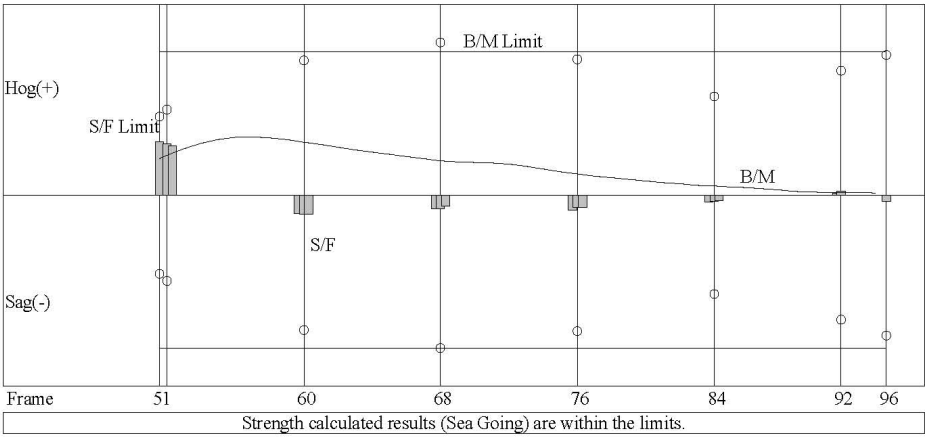
Remark								
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
LIGHT WEIGHT		30,044	12.78	383,962	15.75	473,193		
OTHERS		500	100.22	50,110	13.27	6,635		118
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
DRINK W.T.(P)	98	236	107.23	25,306	17.31	4,085	1.0000	178
FRESH W.T.(P)	98	272	100.09	27,224	17.16	4,668	1.0000	259
NO.1 DIST.W.T.(S)	98	230	100.60	23,138	17.17	3,949	1.0000	216
NO.2 DIST.W.T.(S)	98	236	107.23	25,306	17.31	4,085	1.0000	179
F.W. TOTAL		974		100,975		16,787		832
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
D. O. T.(S)	95	188	91.44	17,191	16.73	3,145	0.8800	227
KEROSENE T.(S)	95	104	95.34	9,915	16.76	1,743	0.8800	116
D.O. Total		292		27,106		4,888		343
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
FWD DEEP. F.O.T.(P)	0	0	-113.81	0	0.40	0	0.9350	0
FWD DEEP. F.O.T.(S)	0	0	-114.04	0	0.40	0	0.9350	0
NO.5 A.WG. F.O.T.(P)	95	2,112	78.46	165,708	10.29	21,732	0.9350	172
NO.5 A.WG. F.O.T.(S)	10	238	77.82	18,521	1.39	331	1.0000	922
F.O. SETT. T.(P)	95	435	91.98	40,011	18.51	8,052	0.9350	247
F.O. Total		2,785		224,240		30,115		1,341
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 F.WG. W.B.T.(P)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 F.WG. W.B.T.(S)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 A.WG. W.B.T.(P)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.1 A.WG. W.B.T.(S)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.2 F.WG. W.B.T.(P)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 F.WG. W.B.T.(S)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 A.WG. W.B.T.(P)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.2 A.WG. W.B.T.(S)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.3 F. W.B.T.	95	6,220	-24.43	-151,955	6.80	42,296	1.0250	48,258
NO.3 A. W.B.T.	98	6,444	-2.07	-13,339	7.27	46,848	1.0250	48,258
NO.4 F.WG. W.B.T.(P)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 F.WG. W.B.T.(S)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 A.WG. W.B.T.(P)	98	2,606	36.79	95,875	7.95	20,718	1.0250	32
NO.4 A.WG. W.B.T.(S)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.5 F.WG. W.B.T.(P)	15	359	55.93	20,079	1.23	442	1.0250	1,501
NO.5 F.WG. W.B.T.(S)	95	2,254	56.49	127,328	8.14	18,348	1.0250	32
NO.2 BTM. W.B.T.	97	4,048	-57.28	-231,869	4.13	16,718	1.0250	34,811
NO.3 BTM. W.B.T.	97	899	-13.26	-11,921	0.84	755	1.0250	4,184
NO.4 BTM. W.B.T.	97	3,316	26.83	88,968	3.84	12,733	1.0250	23,842
NO.5 BTM. W.B.T.	97	1,787	54.21	96,873	3.63	6,487	1.0250	11,369
FORE PEAK T.	40	677	-133.00	-90,041	5.61	3,798	1.0250	306
AFT. PEAK T.	0	0	124.50	0	8.64	0	1.0250	0
W.B. Total		50,982		-872,936		375,564		173,721
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 L.N.G. T.	0	0	-91.97	0	5.80	0	0.4690	0
NO.2 L.N.G. T.	0	0	-53.33	0	2.50	0	0.4690	0
NO.3 L.N.G. T.	0	0	-13.25	0	2.50	0	0.4690	0
NO.4 L.N.G. T.	0	0	26.83	0	2.50	0	0.4690	0
NO.5 L.N.G. T.	0	0	66.91	0	2.50	0	0.4690	0
Cargo Total		0		0		0		0

Cargo	mt	0	Draft at C.F.	m	10.06	KM	m	21.13
Ballast	mt	50,982	Fore Draft	m	9.99	KG	m	10.60
Fuel	mt	2,785	Aft. Draft	m	10.13	GM	m	10.53
Diesel	mt	292	Mean Draft	m	10.06	GGo	m	2.06
F.Water	mt	974	Trim	m	0.14	GoM	m	8.47
Others	mt	500	Prop. Im.	%	73.0	KGo	m	12.66
D.W.T.	mt	55,533	S.G.		1.0250	L.C.G.	m	-1.01
L.W.T.	mt	30,044	T.P.C.	mt	95.58	L.C.B.	m	-1.24
Displacemnt	mt	85,577	M.T.C.	mt-m	1390.2	L.C.F.	m	-1.42

Armada FSU Mediterrana **4th Stage** Input Summary

Remark	

Cargo	mt	0	Draft at C.F.	m	10.06	KM	m	21.13
Ballast	mt	50,982	Fore Draft	m	9.99	KG	m	10.60
Fuel	mt	2,785	Aft. Draft	m	10.13	GM	m	10.53
Diesel	mt	292	Mean Draft	m	10.06	GGo	m	2.06
F.Water	mt	974	Trim	m	0.14	GoM	m	8.47
Others	mt	500	Prop. Im.	%	73.0	KGo	m	12.66
D.W.T.	mt	55,533	S.G.		1.0250	L.C.G.	m	-1.01
L.W.T.	mt	30,044	T.P.C.	mt	95.58	L.C.B.	m	-1.24
Displacemnt	mt	85,577	M.T.C.	mt-m	1390.2	L.C.F.	m	-1.42

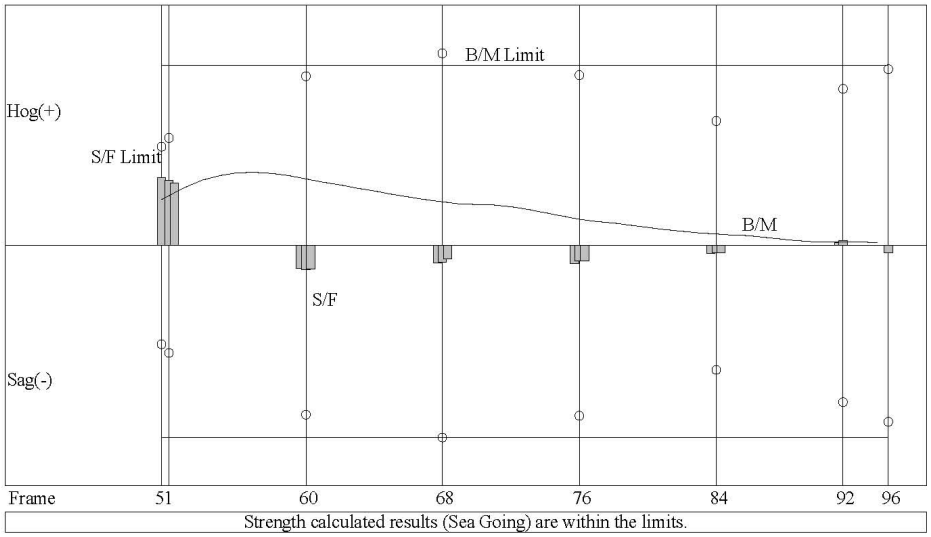


Strength calculated results (Sea Going) are within the limits.

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.47	Ok
Angle of GZ Max. >= 25 degree	49.9	Ok
Max. GZ (Angle>=30) >= 0.2 meter	6.00	Ok
Area (0-30degree) >= 0.055 m-rad.	1.166	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.078	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.912	Ok

Armada FSU Mediterrana **4th Stage** Strength Calculated Result

Remark



Strength calculated results (Sea Going) are within the limits.

Cargo	mt	0	Draft at C.F.	m	10.06	KM	m	21.13
Ballast	mt	50,982	Fore Draft	m	9.99	KG	m	10.60
Fuel	mt	2,785	Aft. Draft	m	10.13	GM	m	10.53
Diesel	mt	292	Mean Draft	m	10.06	GGo	m	2.06
F.Water	mt	974	Trim	m	0.14	GoM	m	8.47
Others	mt	500	Prop. Im.	%	73.0	KGo	m	12.66
D.W.T.	mt	55,533	S.G.		1.0250	L.C.G.	m	-1.01
L.W.T.	mt	30,044	T.P.C.	mt	95.58	L.C.B.	m	-1.24
Displacemnt	mt	85,577	M.T.C.	mt-m	1390.2	L.C.F.	m	-1.42

<< Strength Calculated Result (Sea Going) >>

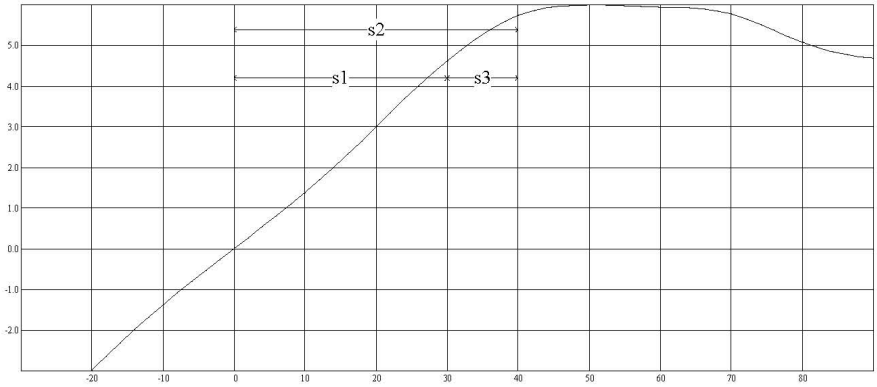
		Shearing Force				Bending Moment			
Frame	Dist. from A.P.	mt	Max.Lmt	Min.Lmt	%	mt-m	Max.Lmt	Min.Lmt	%
51.0	45.950	3,389	4,955	-4,955	68.4	81,753	320,920	-342,110	25.5
52.0	48.050	3,247	5,400	-5,400	60.1	88,726	320,920	-342,110	27.6
60.0	88.130	-1,210	8,500	-8,500	14.2	118,981	320,920	-342,110	37.1
68.0	128.210	-857	9,645	-9,645	8.9	77,321	320,920	-342,110	24.1
76.0	168.290	-756	8,560	-8,560	8.8	47,056	320,920	-342,110	14.7
84.0	208.370	-373	6,235	-6,235	6.0	20,316	320,920	-342,110	6.3
92.0	245.570	255	7,860	-7,860	3.2	5,898	320,920	-342,110	1.8
96.0	258.770	-390	8,860	-8,860	4.4	3,719	320,920	-342,110	1.2

Maximum Value (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,389	4,955	68.4
B.M	56.867	130,245	320,920	40.6

Maximum Percent of the Limit (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,389	4,955	68.4
B.M.	56.867	130,245	320,920	40.6

Armada FSU Mediterrana **4th Stage** Intact Stability Result

REMARK	



Displacement	mt	85577.0
GoM	m	8.47
Flooding Angle	deg.	65.2
Angle at GZ Max.	deg.	49.9
GZ Max. (Ang.>30)	m	6.00
Area s1 (0-30 degree)	m-rad	1.166
Area s2 (0-40orθf)	m-rad	2.078
Area s3 (30-40orθf)	m-rad	0.912

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.47	Ok
Angle of GZ Max. >= 25 degree	49.9	Ok
Max. GZ (Angle>=30) >= 0.2 meter	6.00	Ok
Area (0-30degree) >= 0.055 m-rad.	1.166	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.078	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.912	Ok

Armada FSU Mediterrana **5th Stage** Input Details

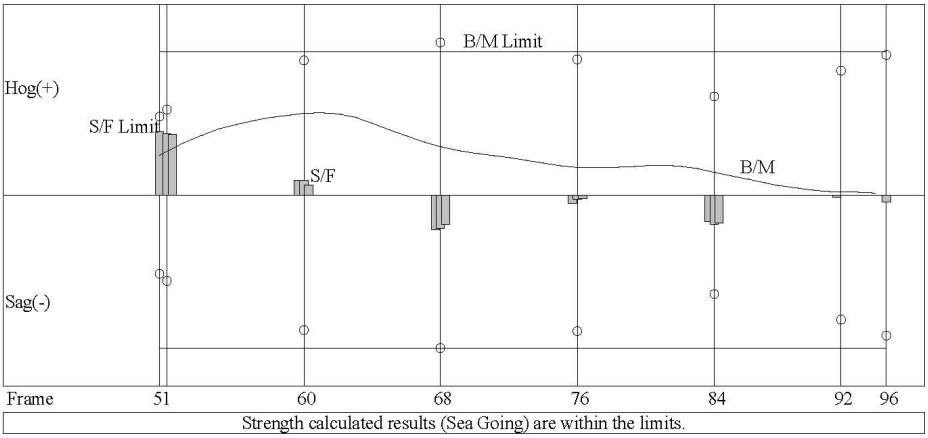
Remark								
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
LIGHT WEIGHT		30,044	12.78	383,962	15.75	473,193		
OTHERS		500	100.22	50,110	13.27	6,635		118
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
DRINK W.T.(P)	98	236	107.23	25,306	17.31	4,085	1.0000	178
FRESH W.T.(P)	98	272	100.09	27,224	17.16	4,668	1.0000	259
NO.1 DIST.W.T.(S)	98	230	100.60	23,138	17.17	3,949	1.0000	216
NO.2 DIST.W.T.(S)	98	236	107.23	25,306	17.31	4,085	1.0000	179
F.W. TOTAL		974		100,975		16,787		832
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
D. O. T.(S)	95	188	91.44	17,191	16.73	3,145	0.8800	227
KEROSENE T.(S)	95	104	95.34	9,915	16.76	1,743	0.8800	116
D.O. Total		292		27,106		4,888		343
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
FWD DEEP. F.O.T.(P)	0	0	-113.81	0	0.40	0	0.9350	0
FWD DEEP. F.O.T.(S)	0	0	-114.04	0	0.40	0	0.9350	0
NO.5 A.WG. F.O.T.(P)	95	2,112	78.46	165,708	10.29	21,732	0.9350	172
NO.5 A.WG. F.O.T.(S)	10	238	77.82	18,521	1.39	331	1.0000	922
F.O. SETT. T.(P)	95	435	91.98	40,011	18.51	8,052	0.9350	247
F.O. Total		2,785		224,240		30,115		1,341
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 F.WG. W.B.T.(P)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 F.WG. W.B.T.(S)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 A.WG. W.B.T.(P)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.1 A.WG. W.B.T.(S)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.2 F.WG. W.B.T.(P)	3	51	-59.91	-3,055	0.56	29	1.0250	206
NO.2 F.WG. W.B.T.(S)	3	51	-59.91	-3,055	0.56	29	1.0250	206
NO.2 A.WG. W.B.T.(P)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.2 A.WG. W.B.T.(S)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.3 F. W.B.T.	95	6,220	-24.43	-151,955	6.80	42,296	1.0250	48,258
NO.3 A. W.B.T.	98	6,444	-2.07	-13,339	7.27	46,848	1.0250	48,258
NO.4 F.WG. W.B.T.(P)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 F.WG. W.B.T.(S)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 A.WG. W.B.T.(P)	3	92	36.50	3,358	0.23	21	1.0250	1,667
NO.4 A.WG. W.B.T.(S)	3	92	36.49	3,357	0.23	21	1.0250	1,671
NO.5 F.WG. W.B.T.(P)	15	359	55.93	20,079	1.23	442	1.0250	1,501
NO.5 F.WG. W.B.T.(S)	95	2,254	56.49	127,328	8.14	18,348	1.0250	32
NO.2 BTM. W.B.T.	97	4,047	-57.28	-231,812	4.13	16,714	1.0250	34,810
NO.3 BTM. W.B.T.	97	899	-13.26	-11,921	0.84	755	1.0250	4,179
NO.4 BTM. W.B.T.	97	3,316	26.83	88,968	3.84	12,733	1.0250	23,843
NO.5 BTM. W.B.T.	97	1,787	54.21	96,873	3.63	6,487	1.0250	11,370
FORE PEAK T.	40	677	-133.00	-90,041	5.61	3,798	1.0250	306
AFT. PEAK T.	0	0	124.50	0	8.64	0	1.0250	0
W.B. Total		42,263		-826,114		299,022		177,341
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 L.N.G. T.	0	0	-91.97	0	5.80	0	0.4690	0
NO.2 L.N.G. T.	0	0	-53.33	0	2.50	0	0.4690	0
NO.3 L.N.G. T.	0	0	-13.25	0	2.50	0	0.4690	0
NO.4 L.N.G. T.	0	0	26.83	0	2.50	0	0.4690	0
NO.5 L.N.G. T.	0	0	66.91	0	2.50	0	0.4690	0
Cargo Total		0		0		0		0

Cargo	mt	0	Draft at C.F.	m	9.14	KM	m	21.96
Ballast	mt	42,263	Fore Draft	m	8.94	KG	m	10.81
Fuel	mt	2,785	Aft. Draft	m	9.34	GM	m	11.16
Diesel	mt	292	Mean Draft	m	9.14	GGo	m	2.34
F.Water	mt	974	Trim	m	0.40	GoM	m	8.81
Others	mt	500	Prop. Im.	%	63.2	KGo	m	13.15
D.W.T.	mt	46,814	S.G.		1.0250	L.C.G.	m	-0.52
L.W.T.	mt	30,044	T.P.C.	mt	93.80	L.C.B.	m	-1.22
Displacemnt	mt	76,858	M.T.C.	mt-m	1326.6	L.C.F.	m	-1.71

Armada FSU Mediterrana **5th Stage** Input Summary

Remark	

Cargo	mt	0	Draft at C.F.	m	9.14	KM	m	21.96
Ballast	mt	42,263	Fore Draft	m	8.94	KG	m	10.81
Fuel	mt	2,785	Aft. Draft	m	9.34	GM	m	11.16
Diesel	mt	292	Mean Draft	m	9.14	GGo	m	2.34
F.Water	mt	974	Trim	m	0.40	GoM	m	8.81
Others	mt	500	Prop. Im.	%	63.2	KGo	m	13.15
D.W.T.	mt	46,814	S.G.		1.0250	L.C.G.	m	-0.52
L.W.T.	mt	30,044	T.P.C.	mt	93.80	L.C.B.	m	-1.22
Displacemnt	mt	76,858	M.T.C.	mt-m	1326.6	L.C.F.	m	-1.71

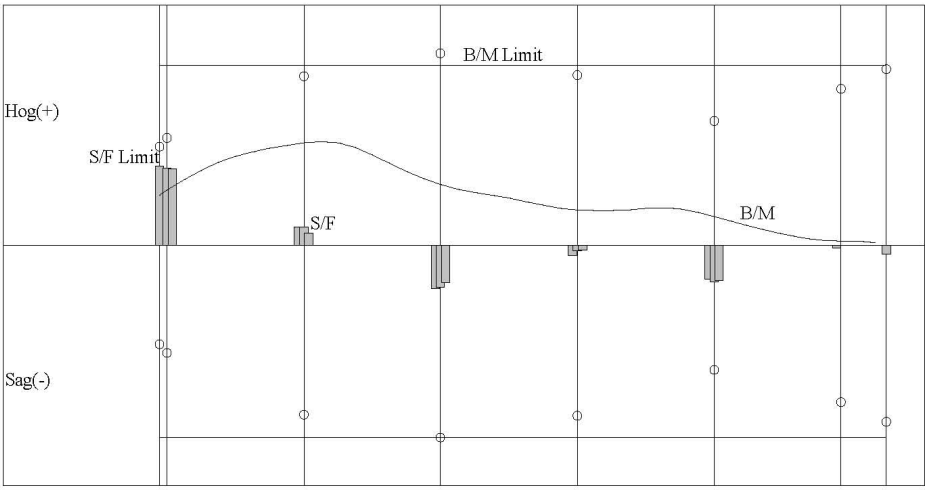


Strength calculated results (Sea Going) are within the limits.

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.81	Ok
Angle of GZ Max. >= 25 degree	48.8	Ok
Max. GZ (Angle>=30) >= 0.2 meter	5.83	Ok
Area (0-30degree) >= 0.055 m-rad.	1.180	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.064	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.884	Ok

Armada FSU Mediterrana **5th Stage** Strength Calculated Result

Remark



Strength calculated results (Sea Going) are within the limits.

Cargo	mt	0	Draft at C.F.	m	9.14	KM	m	21.96
Ballast	mt	42,263	Fore Draft	m	8.94	KG	m	10.81
Fuel	mt	2,785	Aft. Draft	m	9.34	GM	m	11.16
Diesel	mt	292	Mean Draft	m	9.14	GGo	m	2.34
F.Water	mt	974	Trim	m	0.40	GoM	m	8.81
Others	mt	500	Prop. Im.	%	63.2	KGo	m	13.15
D.W.T.	mt	46,814	S.G.		1.0250	L.C.G.	m	-0.52
L.W.T.	mt	30,044	T.P.C.	mt	93.80	L.C.B.	m	-1.22
Displacemnt	mt	76,858	M.T.C.	mt-m	1326.6	L.C.F.	m	-1.71

<< Strength Calculated Result (Sea Going) >>

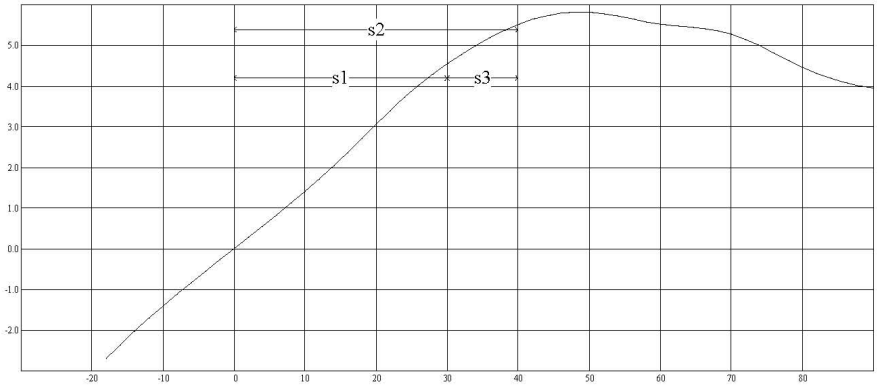
		Shearing Force				Bending Moment			
Frame	Dist. from A.P.	mt	Max.Lmt	Min.Lmt	%	mt-m	Max.Lmt	Min.Lmt	%
51.0	45.950	3,983	4,955	-4,955	80.4	89,583	320,920	-342,110	27.9
52.0	48.050	3,904	5,400	-5,400	72.3	97,869	320,920	-342,110	30.5
60.0	88.130	930	8,500	-8,500	10.9	182,854	320,920	-342,110	57.0
68.0	128.210	-2,101	9,645	-9,645	21.8	108,785	320,920	-342,110	33.9
76.0	168.290	-285	8,560	-8,560	3.3	62,787	320,920	-342,110	19.6
84.0	208.370	-1,827	6,235	-6,235	29.3	51,439	320,920	-342,110	16.0
92.0	245.570	5	7,860	-7,860	0.1	7,927	320,920	-342,110	2.5
96.0	258.770	-444	8,860	-8,860	5.0	3,891	320,920	-342,110	1.2

Maximum Value (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,983	4,955	80.4
B.M	60.951	185,039	320,920	57.7

Maximum Percent of the Limit (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,983	4,955	80.4
B.M.	60.951	185,039	320,920	57.7

Armada FSU Mediterrana **5th Stage** Intact Stability Result

REMARK	



Displacement	mt	76858.0
GoM	m	8.81
Flooding Angle	deg.	68.9
Angle at GZ Max.	deg.	48.8
GZ Max. (Ang.>30)	m	5.83
Area s1 (0-30 degree)	m-rad	1.180
Area s2 (0-40orθf)	m-rad	2.064
Area s3 (30-40orθf)	m-rad	0.884

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.81	Ok
Angle of GZ Max. >= 25 degree	48.8	Ok
Max. GZ (Angle>=30) >= 0.2 meter	5.83	Ok
Area (0-30degree) >= 0.055 m-rad.	1.180	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.064	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.884	Ok

Armada FSU Mediterrana **6th Stage**

Input Details

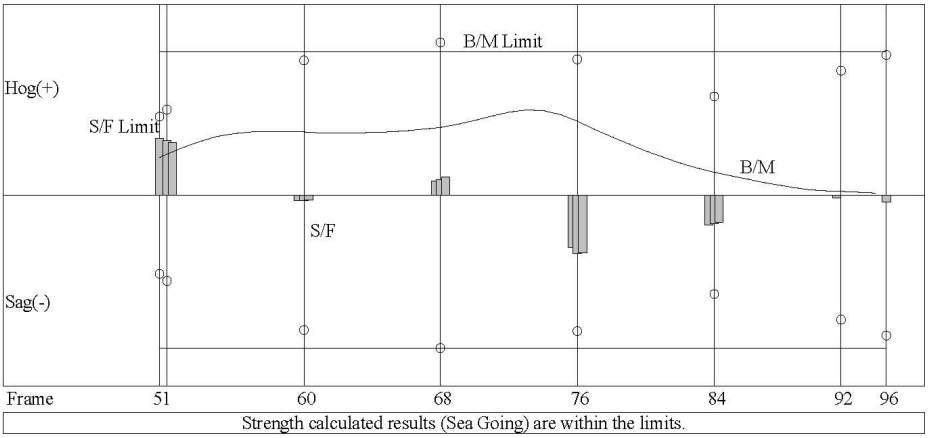
Remark								
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
LIGHT WEIGHT		30,044	12.78	383,962	15.75	473,193		
OTHERS		500	100.22	50,110	13.27	6,635		118
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
DRINK W.T.(P)	98	236	107.23	25,306	17.31	4,085	1.0000	178
FRESH W.T.(P)	98	272	100.09	27,224	17.16	4,668	1.0000	259
NO.1 DIST.W.T.(S)	98	230	100.60	23,138	17.17	3,949	1.0000	216
NO.2 DIST.W.T.(S)	98	236	107.23	25,306	17.31	4,085	1.0000	179
F.W. TOTAL		974		100,975		16,787		832
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
D. O. T.(S)	95	188	91.44	17,191	16.73	3,145	0.8800	227
KEROSENE T.(S)	95	104	95.34	9,915	16.76	1,743	0.8800	116
D.O. Total		292		27,106		4,888		343
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
FWD DEEP. F.O.T.(P)	0	0	-113.81	0	0.40	0	0.9350	0
FWD DEEP. F.O.T.(S)	0	0	-114.04	0	0.40	0	0.9350	0
NO.5 A.WG. F.O.T.(P)	95	2,112	78.46	165,708	10.29	21,732	0.9350	172
NO.5 A.WG. F.O.T.(S)	10	238	77.82	18,521	1.39	331	1.0000	922
F.O. SETT. T.(P)	95	435	91.98	40,011	18.51	8,052	0.9350	247
F.O. Total		2,785		224,240		30,115		1,341
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 F.WG. W.B.T.(P)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 F.WG. W.B.T.(S)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 A.WG. W.B.T.(P)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.1 A.WG. W.B.T.(S)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.2 F.WG. W.B.T.(P)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 F.WG. W.B.T.(S)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 A.WG. W.B.T.(P)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.2 A.WG. W.B.T.(S)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.3 F. W.B.T.	4	255	-23.11	-5,893	0.31	79	1.0250	4,046
NO.3 A. W.B.T.	98	6,444	-2.07	-13,339	7.27	46,848	1.0250	48,258
NO.4 F.WG. W.B.T.(P)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 F.WG. W.B.T.(S)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 A.WG. W.B.T.(P)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.4 A.WG. W.B.T.(S)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.5 F.WG. W.B.T.(P)	15	359	55.93	20,079	1.23	442	1.0250	1,501
NO.5 F.WG. W.B.T.(S)	95	2,254	56.49	127,328	8.14	18,348	1.0250	32
NO.2 BTM. W.B.T.	97	4,047	-57.28	-231,812	4.13	16,714	1.0250	34,810
NO.3 BTM. W.B.T.	97	899	-13.26	-11,921	0.84	755	1.0250	4,179
NO.4 BTM. W.B.T.	97	3,316	26.83	88,968	3.84	12,733	1.0250	23,843
NO.5 BTM. W.B.T.	97	1,787	54.21	96,873	3.63	6,487	1.0250	11,370
FORE PEAK T.	40	677	-133.00	-90,041	5.61	3,798	1.0250	306
AFT. PEAK T.	0	0	124.50	0	8.64	0	1.0250	0
W.B. Total		45,016		-726,817		333,317		129,506
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 L.N.G. T.	0	0	-91.97	0	5.80	0	0.4690	0
NO.2 L.N.G. T.	0	0	-53.33	0	2.50	0	0.4690	0
NO.3 L.N.G. T.	0	0	-13.25	0	2.50	0	0.4690	0
NO.4 L.N.G. T.	0	0	26.83	0	2.50	0	0.4690	0
NO.5 L.N.G. T.	0	0	66.91	0	2.50	0	0.4690	0
Cargo Total		0		0		0		0

Cargo	mt	0	Draft at C.F.	m	9.43	KM	m	21.67
Ballast	mt	45,016	Fore Draft	m	8.85	KG	m	10.86
Fuel	mt	2,785	Aft. Draft	m	10.02	GM	m	10.81
Diesel	mt	292	Mean Draft	m	9.44	GGo	m	1.66
F.Water	mt	974	Trim	m	1.17	GoM	m	9.15
Others	mt	500	Prop. Im.	%	71.7	KGo	m	12.52
D.W.T.	mt	49,567	S.G.		1.0250	L.C.G.	m	0.75
L.W.T.	mt	30,044	T.P.C.	mt	94.30	L.C.B.	m	-1.23
Displacemnt	mt	79,611	M.T.C.	mt-m	1343.6	L.C.F.	m	-1.69

Armada FSU Mediterrana **6th Stage** Input Summary

Remark	

Cargo	mt	0	Draft at C.F.	m	9.43	KM	m	21.67
Ballast	mt	45,016	Fore Draft	m	8.85	KG	m	10.86
Fuel	mt	2,785	Aft. Draft	m	10.02	GM	m	10.81
Diesel	mt	292	Mean Draft	m	9.44	GGo	m	1.66
F.Water	mt	974	Trim	m	1.17	GoM	m	9.15
Others	mt	500	Prop. Im.	%	71.7	KGo	m	12.52
D.W.T.	mt	49,567	S.G.		1.0250	L.C.G.	m	0.75
L.W.T.	mt	30,044	T.P.C.	mt	94.30	L.C.B.	m	-1.23
Displacemnt	mt	79,611	M.T.C.	mt-m	1343.6	L.C.F.	m	-1.69



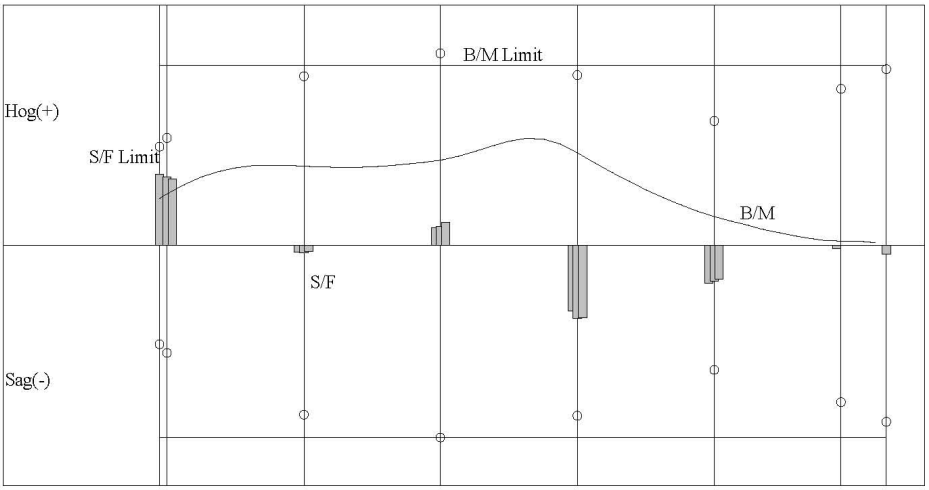
Strength calculated results (Sea Going) are within the limits.

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	9.15	Ok
Angle of GZ Max. >= 25 degree	49.6	Ok
Max. GZ (Angle>=30) >= 0.2 meter	6.24	Ok
Area (0-30degree) >= 0.055 m-rad.	1.236	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.176	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.940	Ok

Armada FSU Mediterrana **6th Stage**

Strength Calculated Result

Remark



Strength calculated results (Sea Going) are within the limits.

Cargo	mt	0	Draft at C.F.	m	9.43	KM	m	21.67
Ballast	mt	45,016	Fore Draft	m	8.85	KG	m	10.86
Fuel	mt	2,785	Aft. Draft	m	10.02	GM	m	10.81
Diesel	mt	292	Mean Draft	m	9.44	GGo	m	1.66
F.Water	mt	974	Trim	m	1.17	GoM	m	9.15
Others	mt	500	Prop. Im.	%	71.7	KGo	m	12.52
D.W.T.	mt	49,567	S.G.		1.0250	L.C.G.	m	0.75
L.W.T.	mt	30,044	T.P.C.	mt	94.30	L.C.B.	m	-1.23
Displacemnt	mt	79,611	M.T.C.	mt-m	1343.6	L.C.F.	m	-1.69

<< Strength Calculated Result (Sea Going) >>

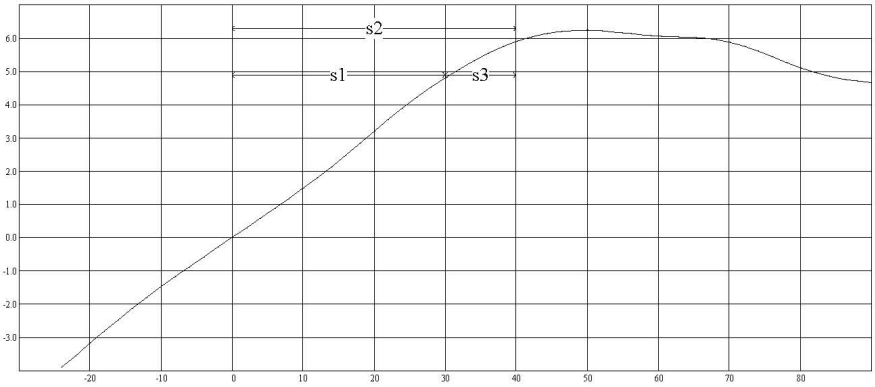
		Shearing Force				Bending Moment			
Frame	Dist. from A.P.	mt	Max.Lmt	Min.Lmt	%	mt-m	Max.Lmt	Min.Lmt	%
51.0	45.950	3,566	4,955	-4,955	72.0	83,923	320,920	-342,110	26.2
52.0	48.050	3,447	5,400	-5,400	63.8	91,292	320,920	-342,110	28.4
60.0	88.130	-361	8,500	-8,500	4.2	141,253	320,920	-342,110	44.0
68.0	128.210	952	9,645	-9,645	9.9	151,931	320,920	-342,110	47.3
76.0	168.290	-3,671	8,560	-8,560	42.9	165,594	320,920	-342,110	51.6
84.0	208.370	-1,787	6,235	-6,235	28.7	51,442	320,920	-342,110	16.0
92.0	245.570	-4	7,860	-7,860	0.1	8,028	320,920	-342,110	2.5
96.0	258.770	-447	8,860	-8,860	5.0	3,905	320,920	-342,110	1.2

Maximum Value (Absolute)				
	Frame	Value	Limit	%
S.F.	76.000	-3,671	-8,560	42.9
B.M	73.230	191,166	320,920	59.6

Maximum Percent of the Limit (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,566	4,955	72.0
B.M.	73.230	191,166	320,920	59.6

Armada FSU Mediterrana **6th Stage** Intact Stability Result

REMARK	



Displacement	mt	79611.0
GoM	m	9.15
Flooding Angle	deg.	67.7
Angle at GZ Max.	deg.	49.6
GZ Max. (Ang.>30)	m	6.24
Area s1 (0-30 degree)	m-rad	1.236
Area s2 (0-40orθf)	m-rad	2.176
Area s3 (30-40orθf)	m-rad	0.940

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	9.15	Ok
Angle of GZ Max. >= 25 degree	49.6	Ok
Max. GZ (Angle>=30) >= 0.2 meter	6.24	Ok
Area (0-30degree) >= 0.055 m-rad.	1.236	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.176	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.940	Ok

Armada FSU Mediterrana **7th Stage**

Input Details

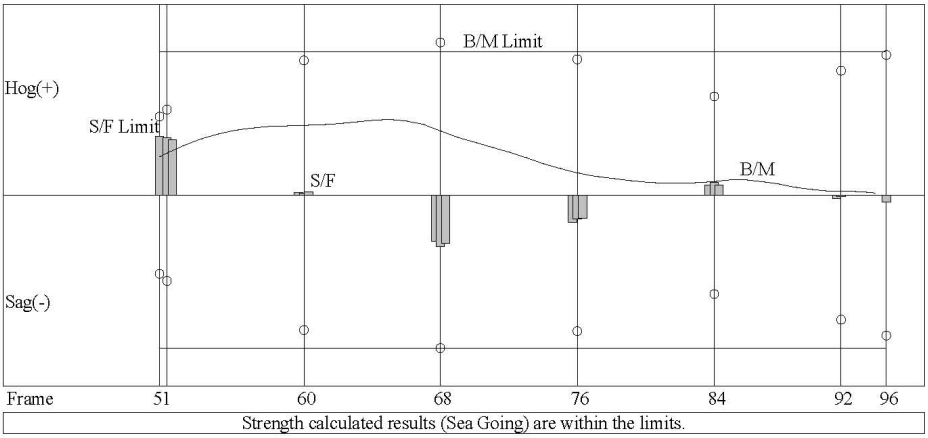
Remark								
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
LIGHT WEIGHT		30,044	12.78	383,962	15.75	473,193		
OTHERS		500	100.22	50,110	13.27	6,635		118
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
DRINK W.T.(P)	98	236	107.23	25,306	17.31	4,085	1.0000	178
FRESH W.T.(P)	98	272	100.09	27,224	17.16	4,668	1.0000	259
NO.1 DIST.W.T.(S)	98	230	100.60	23,138	17.17	3,949	1.0000	216
NO.2 DIST.W.T.(S)	98	236	107.23	25,306	17.31	4,085	1.0000	179
F.W. TOTAL		974		100,975		16,787		832
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
D. O. T.(S)	95	188	91.44	17,191	16.73	3,145	0.8800	227
KEROSENE T.(S)	95	104	95.34	9,915	16.76	1,743	0.8800	116
D.O. Total		292		27,106		4,888		343
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
FWD DEEP. F.O.T.(P)	0	0	-113.81	0	0.40	0	0.9350	0
FWD DEEP. F.O.T.(S)	0	0	-114.04	0	0.40	0	0.9350	0
NO.5 A.WG. F.O.T.(P)	95	2,112	78.46	165,708	10.29	21,732	0.9350	172
NO.5 A.WG. F.O.T.(S)	10	222	77.82	17,276	1.39	309	0.9350	862
F.O. SETT. T.(P)	95	435	91.98	40,011	18.51	8,052	0.9350	247
F.O. Total		2,769		222,995		30,093		1,280
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 F.WG. W.B.T.(P)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 F.WG. W.B.T.(S)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 A.WG. W.B.T.(P)	4	62	-85.93	-5,328	0.95	59	1.0250	475
NO.1 A.WG. W.B.T.(S)	4	62	-85.93	-5,328	0.95	59	1.0250	475
NO.2 F.WG. W.B.T.(P)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 F.WG. W.B.T.(S)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 A.WG. W.B.T.(P)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.2 A.WG. W.B.T.(S)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.3 F. W.B.T.	95	6,220	-24.43	-151,955	6.80	42,296	1.0250	48,258
NO.3 A. W.B.T.	98	6,444	-2.07	-13,339	7.27	46,848	1.0250	48,258
NO.4 F.WG. W.B.T.(P)	3	88	16.81	1,479	0.21	18	1.0250	1,934
NO.4 F.WG. W.B.T.(S)	3	88	16.81	1,479	0.21	18	1.0250	1,934
NO.4 A.WG. W.B.T.(P)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.4 A.WG. W.B.T.(S)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.5 F.WG. W.B.T.(P)	15	359	55.93	20,079	1.23	442	1.0250	1,501
NO.5 F.WG. W.B.T.(S)	95	2,254	56.49	127,328	8.14	18,348	1.0250	32
NO.2 BTM. W.B.T.	97	4,047	-57.28	-231,812	4.13	16,714	1.0250	34,810
NO.3 BTM. W.B.T.	97	899	-13.26	-11,921	0.84	755	1.0250	4,179
NO.4 BTM. W.B.T.	97	3,316	26.83	88,968	3.84	12,733	1.0250	23,843
NO.5 BTM. W.B.T.	97	1,787	54.21	96,873	3.63	6,487	1.0250	11,370
FORE PEAK T.	40	677	-133.00	-90,041	5.61	3,798	1.0250	306
AFT. PEAK T.	0	0	124.50	0	8.64	0	1.0250	0
W.B. Total		43,003		-720,309		300,227		178,322
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 L.N.G. T.	0	0	-91.97	0	5.80	0	0.4690	0
NO.2 L.N.G. T.	0	0	-53.33	0	2.50	0	0.4690	0
NO.3 L.N.G. T.	0	0	-13.25	0	2.50	0	0.4690	0
NO.4 L.N.G. T.	0	0	26.83	0	2.50	0	0.4690	0
NO.5 L.N.G. T.	0	0	66.91	0	2.50	0	0.4690	0
Cargo Total		0		0		0		0

Cargo	mt	0	Draft at C.F.	m	9.21	KM	m	21.88
Ballast	mt	43,003	Fore Draft	m	8.62	KG	m	10.72
Fuel	mt	2,769	Aft. Draft	m	9.82	GM	m	11.15
Diesel	mt	292	Mean Draft	m	9.22	GGo	m	2.33
F.Water	mt	974	Trim	m	1.20	GoM	m	8.82
Others	mt	500	Prop. Im.	%	69.2	KGo	m	13.05
D.W.T.	mt	47,538	S.G.		1.0250	L.C.G.	m	0.84
L.W.T.	mt	30,044	T.P.C.	mt	93.91	L.C.B.	m	-1.22
Displacemnt	mt	77,582	M.T.C.	mt-m	1330.9	L.C.F.	m	-1.70

Armada FSU Mediterrana **7th Stage** Input Summary

Remark	

Cargo	mt	0	Draft at C.F.	m	9.21	KM	m	21.88
Ballast	mt	43,003	Fore Draft	m	8.62	KG	m	10.72
Fuel	mt	2,769	Aft. Draft	m	9.82	GM	m	11.15
Diesel	mt	292	Mean Draft	m	9.22	GGo	m	2.33
F.Water	mt	974	Trim	m	1.20	GoM	m	8.82
Others	mt	500	Prop. Im.	%	69.2	KGo	m	13.05
D.W.T.	mt	47,538	S.G.		1.0250	L.C.G.	m	0.84
L.W.T.	mt	30,044	T.P.C.	mt	93.91	L.C.B.	m	-1.22
Displacemnt	mt	77,582	M.T.C.	mt-m	1330.9	L.C.F.	m	-1.70

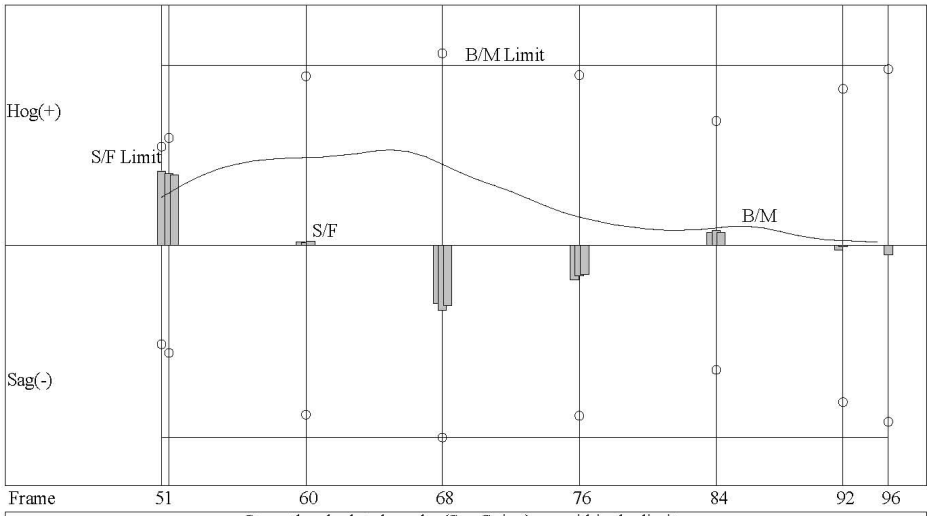


Strength calculated results (Sea Going) are within the limits.

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.82	Ok
Angle of GZ Max. >= 25 degree	48.8	Ok
Max. GZ (Angle>=30) >= 0.2 meter	5.89	Ok
Area (0-30degree) >= 0.055 m-rad.	1.185	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.077	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.891	Ok

Armada FSU Mediterrana **7th Stage** Strength Calculated Result

Remark



Strength calculated results (Sea Going) are within the limits.

Cargo	mt	0	Draft at C.F.	m	9.21	KM	m	21.88
Ballast	mt	43,003	Fore Draft	m	8.62	KG	m	10.72
Fuel	mt	2,769	Aft. Draft	m	9.82	GM	m	11.15
Diesel	mt	292	Mean Draft	m	9.22	GGo	m	2.33
F.Water	mt	974	Trim	m	1.20	GoM	m	8.82
Others	mt	500	Prop. Im.	%	69.2	KGo	m	13.05
D.W.T.	mt	47,538	S.G.		1.0250	L.C.G.	m	0.84
L.W.T.	mt	30,044	T.P.C.	mt	93.91	L.C.B.	m	-1.22
Displacemnt	mt	77,582	M.T.C.	mt-m	1330.9	L.C.F.	m	-1.70

<< Strength Calculated Result (Sea Going) >>

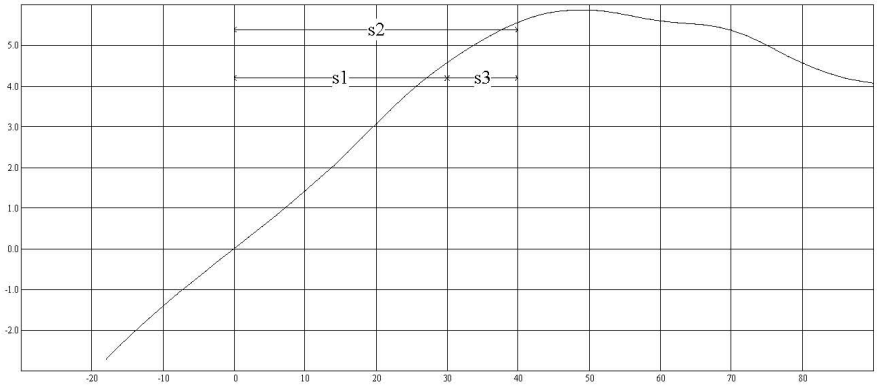
		Shearing Force				Bending Moment			
Frame	Dist. from A.P.	mt	Max.Lmt	Min.Lmt	%	mt-m	Max.Lmt	Min.Lmt	%
51.0	45.950	3,716	4,955	-4,955	75.0	85,919	320,920	-342,110	26.8
52.0	48.050	3,611	5,400	-5,400	66.9	93,617	320,920	-342,110	29.2
60.0	88.130	150	8,500	-8,500	1.8	156,662	320,920	-342,110	48.8
68.0	128.210	-3,247	9,645	-9,645	33.7	144,504	320,920	-342,110	45.0
76.0	168.290	-1,508	8,560	-8,560	17.6	50,317	320,920	-342,110	15.7
84.0	208.370	777	6,235	-6,235	12.5	30,973	320,920	-342,110	9.7
92.0	245.570	-57	7,860	-7,860	0.7	8,472	320,920	-342,110	2.6
96.0	258.770	-459	8,860	-8,860	5.2	3,954	320,920	-342,110	1.2

Maximum Value (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,716	4,955	75.0
B.M	64.909	170,063	320,920	53.0

Maximum Percent of the Limit (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,716	4,955	75.0
B.M.	64.909	170,063	320,920	53.0

Armada FSU Mediterrana **7th Stage** Intact Stability Result

REMARK	



Displacement	mt	77582.0
GoM	m	8.82
Flooding Angle	deg.	68.6
Angle at GZ Max.	deg.	48.8
GZ Max. (Ang.>30)	m	5.89
Area s1 (0-30 degree)	m-rad	1.185
Area s2 (0-40orθf)	m-rad	2.077
Area s3 (30-40orθf)	m-rad	0.891

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.82	Ok
Angle of GZ Max. >= 25 degree	48.8	Ok
Max. GZ (Angle>=30) >= 0.2 meter	5.89	Ok
Area (0-30degree) >= 0.055 m-rad.	1.185	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.077	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.891	Ok

Armada FSU Mediterrana **8th Stage** Input Details

Remark								
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
LIGHT WEIGHT		30,044	12.78	383,962	15.75	473,193		
OTHERS		500	100.22	50,110	13.27	6,635		118
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
DRINK W.T.(P)	98	236	107.23	25,306	17.31	4,085	1.0000	178
FRESH W.T.(P)	98	272	100.09	27,224	17.16	4,668	1.0000	259
NO.1 DIST.W.T.(S)	98	230	100.60	23,138	17.17	3,949	1.0000	216
NO.2 DIST.W.T.(S)	98	236	107.23	25,306	17.31	4,085	1.0000	179
F.W. TOTAL		974		100,975		16,787		832
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
D. O. T.(S)	95	188	91.44	17,191	16.73	3,145	0.8800	227
KEROSENE T.(S)	95	104	95.34	9,915	16.76	1,743	0.8800	116
D.O. Total		292		27,106		4,888		343
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
FWD DEEP. F.O.T.(P)	0	0	-113.81	0	0.40	0	0.9350	0
FWD DEEP. F.O.T.(S)	0	0	-114.04	0	0.40	0	0.9350	0
NO.5 A.WG. F.O.T.(P)	95	2,112	78.46	165,708	10.29	21,732	0.9350	172
NO.5 A.WG. F.O.T.(S)	10	222	77.82	17,276	1.39	309	0.9350	862
F.O. SETT. T.(P)	95	435	91.98	40,011	18.51	8,052	0.9350	247
F.O. Total		2,769		222,995		30,093		1,280
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 F.WG. W.B.T.(P)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 F.WG. W.B.T.(S)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 A.WG. W.B.T.(P)	95	1,501	-82.93	-124,478	11.19	16,796	1.0250	41
NO.1 A.WG. W.B.T.(S)	95	1,501	-82.93	-124,478	11.19	16,796	1.0250	41
NO.2 F.WG. W.B.T.(P)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 F.WG. W.B.T.(S)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 A.WG. W.B.T.(P)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.2 A.WG. W.B.T.(S)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.3 F. W.B.T.	95	6,220	-24.43	-151,955	6.80	42,296	1.0250	48,258
NO.3 A. W.B.T.	4	256	-3.23	-827	0.31	79	1.0250	4,236
NO.4 F.WG. W.B.T.(P)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 F.WG. W.B.T.(S)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 A.WG. W.B.T.(P)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.4 A.WG. W.B.T.(S)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.5 F.WG. W.B.T.(P)	15	359	55.93	20,079	1.23	442	1.0250	1,501
NO.5 F.WG. W.B.T.(S)	95	2,254	56.49	127,328	8.14	18,348	1.0250	32
NO.2 BTM. W.B.T.	97	4,047	-57.28	-231,812	4.13	16,714	1.0250	34,810
NO.3 BTM. W.B.T.	97	899	-13.26	-11,921	0.84	755	1.0250	4,179
NO.4 BTM. W.B.T.	97	3,316	26.83	88,968	3.84	12,733	1.0250	23,843
NO.5 BTM. W.B.T.	97	1,787	54.21	96,873	3.63	6,487	1.0250	11,370
FORE PEAK T.	40	677	-133.00	-90,041	5.61	3,798	1.0250	306
AFT. PEAK T.	0	0	124.50	0	8.64	0	1.0250	0
W.B. Total		44,793		-860,367		328,735		129,696
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 L.N.G. T.	0	0	-91.97	0	5.80	0	0.4690	0
NO.2 L.N.G. T.	0	0	-53.33	0	2.50	0	0.4690	0
NO.3 L.N.G. T.	0	0	-13.25	0	2.50	0	0.4690	0
NO.4 L.N.G. T.	0	0	26.83	0	2.50	0	0.4690	0
NO.5 L.N.G. T.	0	0	66.91	0	2.50	0	0.4690	0
Cargo Total		0		0		0		0

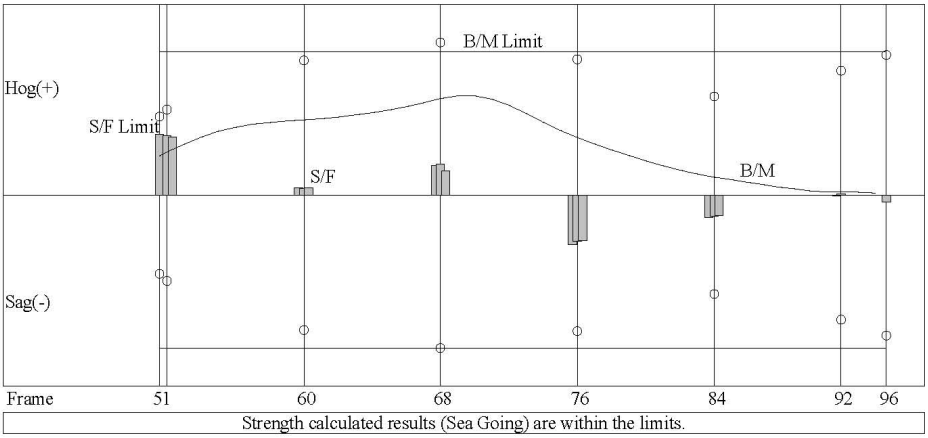
Cargo	mt	0	Draft at C.F.	m	9.40	KM	m	21.70
Ballast	mt	44,793	Fore Draft	m	9.32	KG	m	10.84
Fuel	mt	2,769	Aft. Draft	m	9.49	GM	m	10.86
Diesel	mt	292	Mean Draft	m	9.41	GGo	m	1.67
F.Water	mt	974	Trim	m	0.17	GoM	m	9.19
Others	mt	500	Prop. Im.	%	65.0	KGo	m	12.51
D.W.T.	mt	49,328	S.G.		1.0250	L.C.G.	m	-0.95
L.W.T.	mt	30,044	T.P.C.	mt	94.18	L.C.B.	m	-1.23
Displacemnt	mt	79,372	M.T.C.	mt-m	1342.1	L.C.F.	m	-1.69

Armada FSU Mediterrana **8th Stage**

Input Summary

Remark	

Cargo	mt	0	Draft at C.F.	m	9.40	KM	m	21.70
Ballast	mt	44,793	Fore Draft	m	9.32	KG	m	10.84
Fuel	mt	2,769	Aft. Draft	m	9.49	GM	m	10.86
Diesel	mt	292	Mean Draft	m	9.41	GGo	m	1.67
F.Water	mt	974	Trim	m	0.17	GoM	m	9.19
Others	mt	500	Prop. Im.	%	65.0	KGo	m	12.51
D.W.T.	mt	49,328	S.G.		1.0250	L.C.G.	m	-0.95
L.W.T.	mt	30,044	T.P.C.	mt	94.18	L.C.B.	m	-1.23
Displacemnt	mt	79,372	M.T.C.	mt-m	1342.1	L.C.F.	m	-1.69



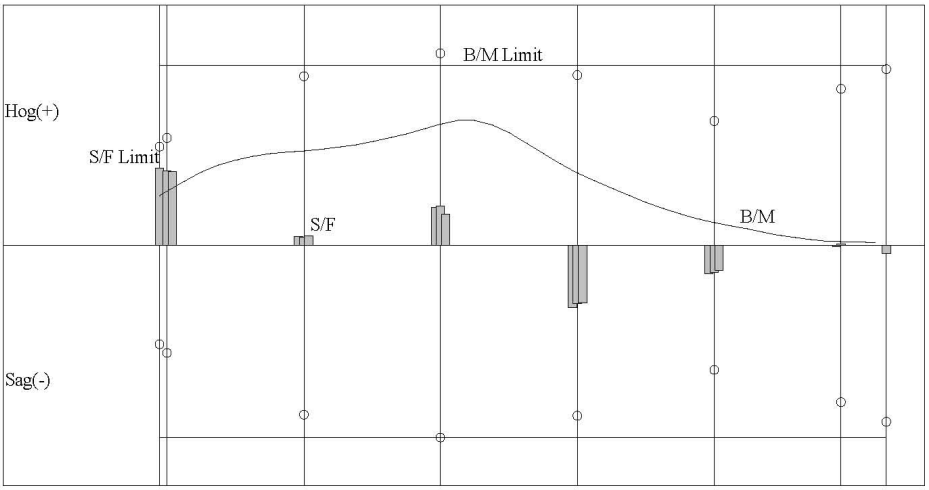
Strength calculated results (Sea Going) are within the limits.

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	9.19	Ok
Angle of GZ Max. >= 25 degree	49.6	Ok
Max. GZ (Angle>=30) >= 0.2 meter	6.26	Ok
Area (0-30degree) >= 0.055 m-rad.	1.241	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.183	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.942	Ok

Armada FSU Mediterrana **8th Stage**

Strength Calculated Result

Remark



Strength calculated results (Sea Going) are within the limits.

Cargo	mt	0	Draft at C.F.	m	9.40	KM	m	21.70
Ballast	mt	44,793	Fore Draft	m	9.32	KG	m	10.84
Fuel	mt	2,769	Aft. Draft	m	9.49	GM	m	10.86
Diesel	mt	292	Mean Draft	m	9.41	GGo	m	1.67
F.Water	mt	974	Trim	m	0.17	GoM	m	9.19
Others	mt	500	Prop. Im.	%	65.0	KGo	m	12.51
D.W.T.	mt	49,328	S.G.		1.0250	L.C.G.	m	-0.95
L.W.T.	mt	30,044	T.P.C.	mt	94.18	L.C.B.	m	-1.23
Displacemnt	mt	79,372	M.T.C.	mt-m	1342.1	L.C.F.	m	-1.69

<< Strength Calculated Result (Sea Going) >>

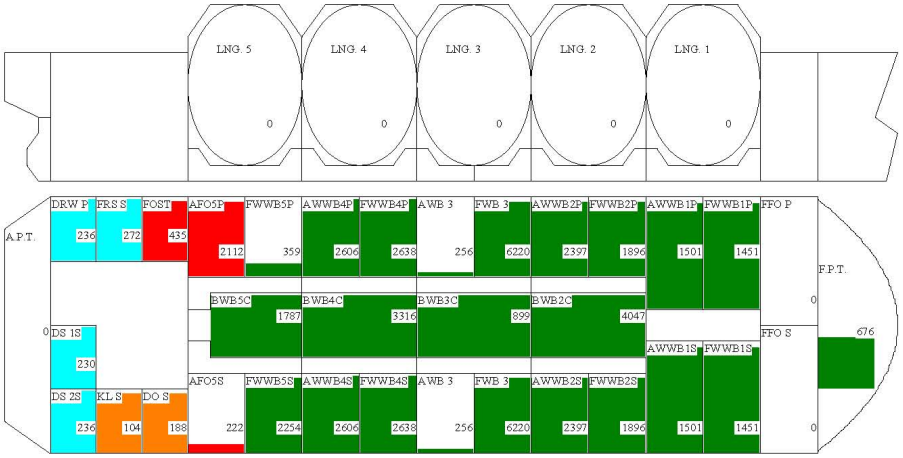
		Shearing Force				Bending Moment			
Frame	Dist. from A.P.	mt	Max.Lmt	Min.Lmt	%	mt-m	Max.Lmt	Min.Lmt	%
51.0	45.950	3,861	4,955	-4,955	77.9	88,045	320,920	-342,110	27.4
52.0	48.050	3,766	5,400	-5,400	69.7	96,058	320,920	-342,110	29.9
60.0	88.130	420	8,500	-8,500	4.9	168,412	320,920	-342,110	52.5
68.0	128.210	1,970	9,645	-9,645	20.4	216,048	320,920	-342,110	67.3
76.0	168.290	-2,913	8,560	-8,560	34.0	129,724	320,920	-342,110	40.4
84.0	208.370	-1,333	6,235	-6,235	21.4	40,715	320,920	-342,110	12.7
92.0	245.570	93	7,860	-7,860	1.2	7,215	320,920	-342,110	2.2
96.0	258.770	-424	8,860	-8,860	4.8	3,838	320,920	-342,110	1.2

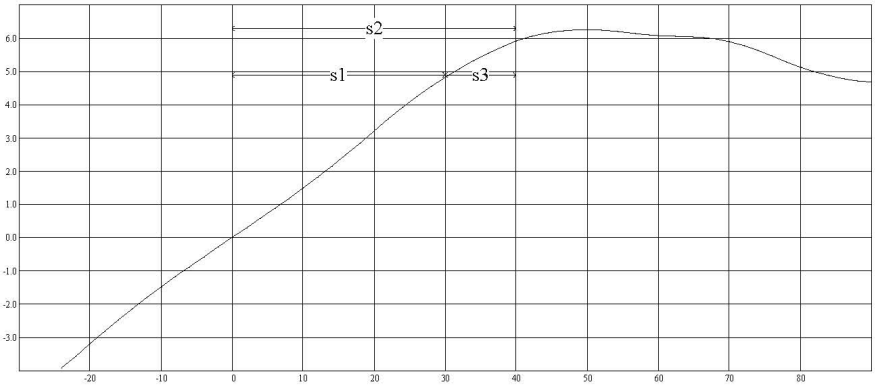
Maximum Value (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,861	4,955	77.9
B.M	69.450	223,213	320,920	69.6

Maximum Percent of the Limit (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,861	4,955	77.9
B.M.	69.450	223,213	320,920	69.6

Armada FSU Mediterrana **8th Stage** Intact Stability Result

REMARK	





Displacement	mt	79372.0
GoM	m	9.19
Flooding Angle	deg.	67.8
Angle at GZ Max.	deg.	49.6
GZ Max. (Ang.>30)	m	6.26
Area s1 (0-30 degree)	m-rad	1.241
Area s2 (0-40orθf)	m-rad	2.183
Area s3 (30-40orθf)	m-rad	0.942

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	9.19	Ok
Angle of GZ Max. >= 25 degree	49.6	Ok
Max. GZ (Angle>=30) >= 0.2 meter	6.26	Ok
Area (0-30degree) >= 0.055 m-rad.	1.241	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.183	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.942	Ok

Armada FSU Mediterrana **9th Stage** Input Details

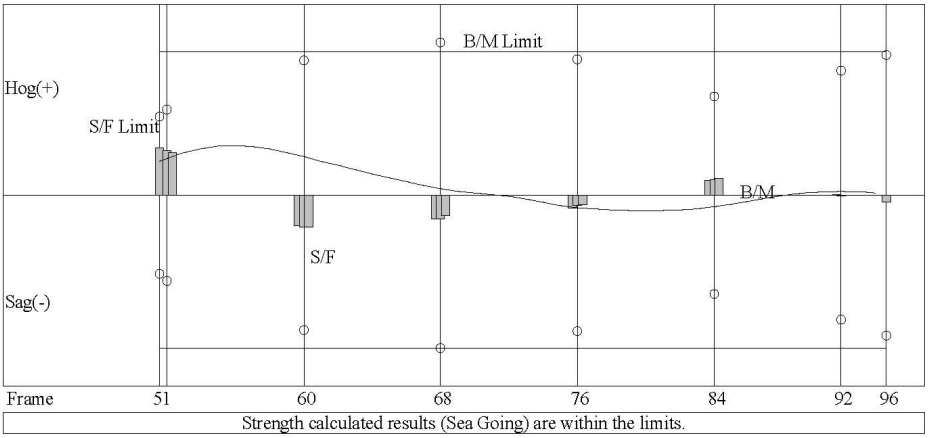
Remark								
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
LIGHT WEIGHT		30,044	12.78	383,962	15.75	473,193		
OTHERS		500	100.22	50,110	13.27	6,635		118
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
DRINK W.T.(P)	98	236	107.23	25,306	17.31	4,085	1.0000	178
FRESH W.T.(P)	98	272	100.09	27,224	17.16	4,668	1.0000	259
NO.1 DIST.W.T.(S)	98	230	100.60	23,138	17.17	3,949	1.0000	216
NO.2 DIST.W.T.(S)	98	236	107.23	25,306	17.31	4,085	1.0000	179
F.W. TOTAL		974		100,975		16,787		832
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
D. O. T.(S)	95	188	91.44	17,191	16.73	3,145	0.8800	227
KEROSENE T.(S)	95	104	95.34	9,915	16.76	1,743	0.8800	116
D.O. Total		292		27,106		4,888		343
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
FWD DEEP. F.O.T.(P)	0	0	-113.81	0	0.40	0	0.9350	0
FWD DEEP. F.O.T.(S)	0	0	-114.04	0	0.40	0	0.9350	0
NO.5 A.WG. F.O.T.(P)	95	2,112	78.46	165,708	10.29	21,732	0.9350	172
NO.5 A.WG. F.O.T.(S)	10	222	77.82	17,276	1.39	309	0.9350	862
F.O. SETT. T.(P)	95	435	91.98	40,011	18.51	8,052	0.9350	247
F.O. Total		2,769		222,995		30,093		1,280
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 F.WG. W.B.T.(P)	2	36	-97.59	-3,513	1.07	39	1.0250	58
NO.1 F.WG. W.B.T.(S)	2	36	-97.59	-3,513	1.07	39	1.0250	58
NO.1 A.WG. W.B.T.(P)	95	1,501	-82.93	-124,478	11.19	16,796	1.0250	41
NO.1 A.WG. W.B.T.(S)	95	1,501	-82.93	-124,478	11.19	16,796	1.0250	41
NO.2 F.WG. W.B.T.(P)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 F.WG. W.B.T.(S)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 A.WG. W.B.T.(P)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.2 A.WG. W.B.T.(S)	95	2,397	-43.09	-103,287	7.82	18,745	1.0250	32
NO.3 F. W.B.T.	95	6,220	-24.43	-151,955	6.80	42,296	1.0250	48,258
NO.3 A. W.B.T.	98	6,444	-2.07	-13,339	7.27	46,848	1.0250	48,258
NO.4 F.WG. W.B.T.(P)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 F.WG. W.B.T.(S)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 A.WG. W.B.T.(P)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.4 A.WG. W.B.T.(S)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.5 F.WG. W.B.T.(P)	15	359	55.93	20,079	1.23	442	1.0250	1,501
NO.5 F.WG. W.B.T.(S)	95	2,254	56.49	127,328	8.14	18,348	1.0250	32
NO.2 BTM. W.B.T.	97	4,047	-57.28	-231,812	4.13	16,714	1.0250	34,810
NO.3 BTM. W.B.T.	97	899	-13.26	-11,921	0.84	755	1.0250	4,179
NO.4 BTM. W.B.T.	97	3,316	26.83	88,968	3.84	12,733	1.0250	23,843
NO.5 BTM. W.B.T.	97	1,787	54.21	96,873	3.63	6,487	1.0250	11,370
FORE PEAK T.	40	677	-133.00	-90,041	5.61	3,798	1.0250	306
AFT. PEAK T.	0	0	124.50	0	8.64	0	1.0250	0
W.B. Total		48,151		-585,846		338,029		173,079
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 L.N.G. T.	0	0	-91.97	0	5.80	0	0.4690	0
NO.2 L.N.G. T.	0	0	-53.33	0	2.50	0	0.4690	0
NO.3 L.N.G. T.	0	0	-13.25	0	2.50	0	0.4690	0
NO.4 L.N.G. T.	0	0	26.83	0	2.50	0	0.4690	0
NO.5 L.N.G. T.	0	0	66.91	0	2.50	0	0.4690	0
Cargo Total		0		0		0		0

Cargo	mt	0	Draft at C.F.	m	9.76	KM	m	21.37
Ballast	mt	48,151	Fore Draft	m	8.67	KG	m	10.51
Fuel	mt	2,769	Aft. Draft	m	10.88	GM	m	10.86
Diesel	mt	292	Mean Draft	m	9.77	GGo	m	2.12
F.Water	mt	974	Trim	m	2.21	GoM	m	8.74
Others	mt	500	Prop. Im.	%	82.4	KGo	m	12.63
D.W.T.	mt	52,686	S.G.		1.0250	L.C.G.	m	2.41
L.W.T.	mt	30,044	T.P.C.	mt	94.90	L.C.B.	m	-1.24
Displacemnt	mt	82,730	M.T.C.	mt-m	1365.7	L.C.F.	m	-1.60

Armada FSU Mediterrana **9th Stage** Input Summary

Remark	

Cargo	mt	0	Draft at C.F.	m	9.76	KM	m	21.37
Ballast	mt	48,151	Fore Draft	m	8.67	KG	m	10.51
Fuel	mt	2,769	Aft. Draft	m	10.88	GM	m	10.86
Diesel	mt	292	Mean Draft	m	9.77	GGo	m	2.12
F.Water	mt	974	Trim	m	2.21	GoM	m	8.74
Others	mt	500	Prop. Im.	%	82.4	KGo	m	12.63
D.W.T.	mt	52,686	S.G.		1.0250	L.C.G.	m	2.41
L.W.T.	mt	30,044	T.P.C.	mt	94.90	L.C.B.	m	-1.24
Displacemnt	mt	82,730	M.T.C.	mt-m	1365.7	L.C.F.	m	-1.60

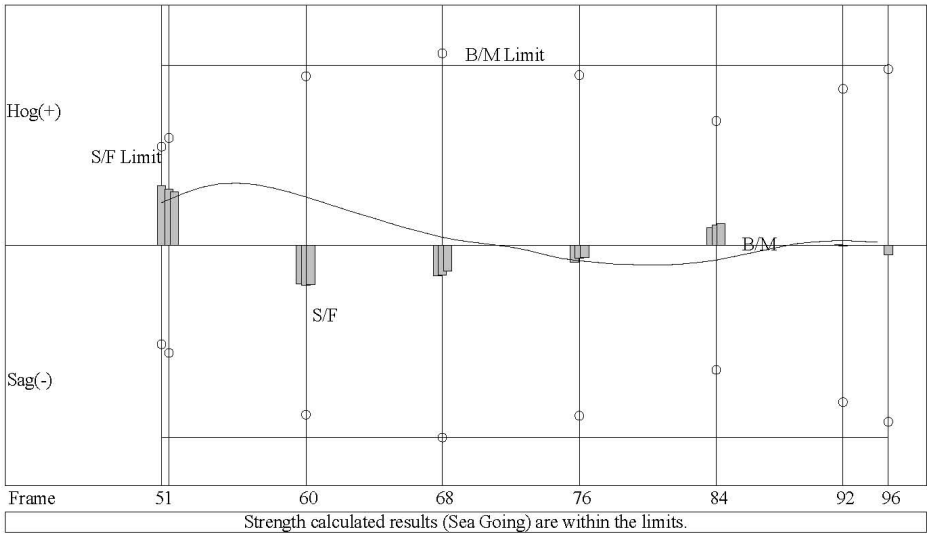


Strength calculated results (Sea Going) are within the limits.

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.74	Ok
Angle of GZ Max. >= 25 degree	49.4	Ok
Max. GZ (Angle>=30) >= 0.2 meter	6.08	Ok
Area (0-30degree) >= 0.055 m-rad.	1.193	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.114	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.921	Ok

Armada FSU Mediterrana **9th Stage** Strength Calculated Result

Remark



Strength calculated results (Sea Going) are within the limits.

Cargo	mt	0	Draft at C.F.	m	9.76	KM	m	21.37
Ballast	mt	48,151	Fore Draft	m	8.67	KG	m	10.51
Fuel	mt	2,769	Aft. Draft	m	10.88	GM	m	10.86
Diesel	mt	292	Mean Draft	m	9.77	GGo	m	2.12
F.Water	mt	974	Trim	m	2.21	GoM	m	8.74
Others	mt	500	Prop. Im.	%	82.4	KGo	m	12.63
D.W.T.	mt	52,686	S.G.		1.0250	L.C.G.	m	2.41
L.W.T.	mt	30,044	T.P.C.	mt	94.90	L.C.B.	m	-1.24
Displacemnt	mt	82,730	M.T.C.	mt-m	1365.7	L.C.F.	m	-1.60

<< Strength Calculated Result (Sea Going) >>

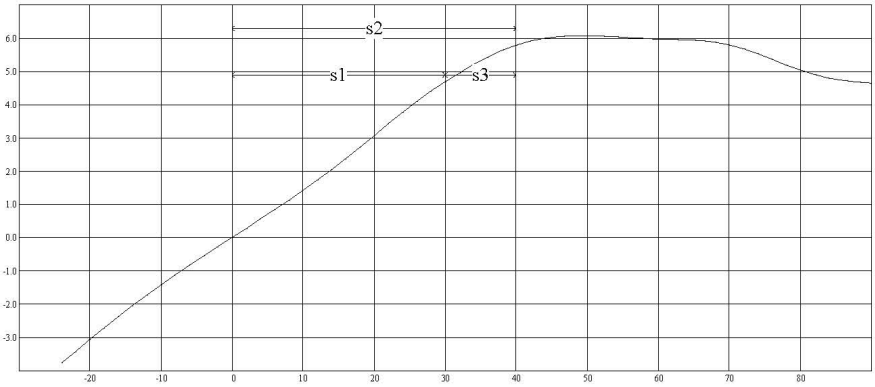
		Shearing Force				Bending Moment			
Frame	Dist. from A.P.	mt	Max.Lmt	Min.Lmt	%	mt-m	Max.Lmt	Min.Lmt	%
51.0	45.950	3,000	4,955	-4,955	60.5	75,659	320,920	-342,110	23.6
52.0	48.050	2,829	5,400	-5,400	52.4	81,785	320,920	-342,110	25.5
60.0	88.130	-1,998	8,500	-8,500	23.5	86,242	320,920	-342,110	26.9
68.0	128.210	-1,473	9,645	-9,645	15.3	14,586	320,920	-342,110	4.5
76.0	168.290	-644	8,560	-8,560	7.5	-27,626	320,920	-342,110	8.1
84.0	208.370	1,007	6,235	-6,235	16.2	-26,060	320,920	-342,110	7.6
92.0	245.570	-32	7,860	-7,860	0.4	8,301	320,920	-342,110	2.6
96.0	258.770	-455	8,860	-8,860	5.1	3,951	320,920	-342,110	1.2

Maximum Value (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,000	4,955	60.5
B.M	55.800	111,192	320,920	34.6

Maximum Percent of the Limit (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,000	4,955	60.5
B.M.	55.800	111,192	320,920	34.6

Armada FSU Mediterrana **9th Stage** Intact Stability Result

REMARK	



Displacement	mt	82730.0
GoM	m	8.74
Flooding Angle	deg.	66.4
Angle at GZ Max.	deg.	49.4
GZ Max. (Ang.>30)	m	6.08
Area s1 (0-30 degree)	m-rad	1.193
Area s2 (0-40orθf)	m-rad	2.114
Area s3 (30-40orθf)	m-rad	0.921

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.74	Ok
Angle of GZ Max. >= 25 degree	49.4	Ok
Max. GZ (Angle>=30) >= 0.2 meter	6.08	Ok
Area (0-30degree) >= 0.055 m-rad.	1.193	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.114	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.921	Ok

Armada FSU Mediterrana **10th Stage** Input Details

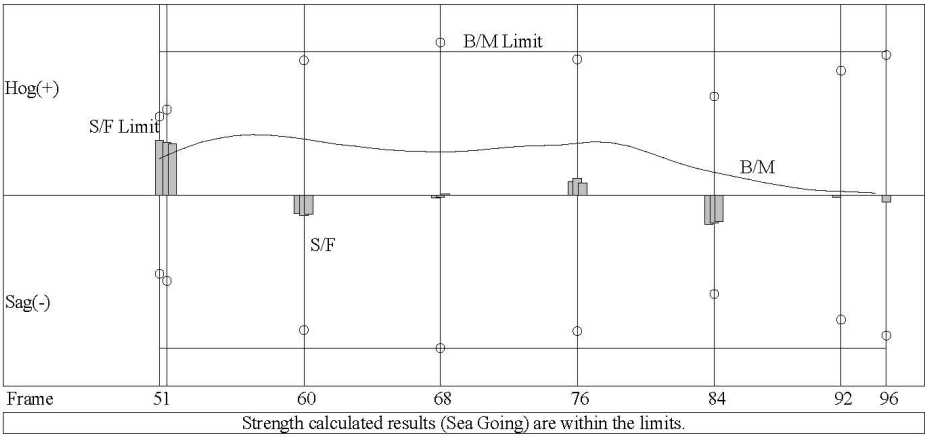
Remark								
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
LIGHT WEIGHT		30,044	12.78	383,962	15.75	473,193		
OTHERS		500	100.22	50,110	13.27	6,635		118
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
DRINK W.T.(P)	98	236	107.23	25,306	17.31	4,085	1.0000	178
FRESH W.T.(P)	98	272	100.09	27,224	17.16	4,668	1.0000	259
NO.1 DIST.W.T.(S)	98	230	100.60	23,138	17.17	3,949	1.0000	216
NO.2 DIST.W.T.(S)	98	236	107.23	25,306	17.31	4,085	1.0000	179
F.W. TOTAL		974		100,975		16,787		832
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
D. O. T.(S)	95	188	91.44	17,191	16.73	3,145	0.8800	227
KEROSENE T.(S)	95	104	95.34	9,915	16.76	1,743	0.8800	116
D.O. Total		292		27,106		4,888		343
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
FWD DEEP. F.O.T.(P)	0	0	-113.81	0	0.40	0	0.9350	0
FWD DEEP. F.O.T.(S)	0	0	-114.04	0	0.40	0	0.9350	0
NO.5 A.WG. F.O.T.(P)	95	2,112	78.46	165,708	10.29	21,732	0.9350	172
NO.5 A.WG. F.O.T.(S)	10	238	77.82	18,521	1.39	331	1.0000	922
F.O. SETT. T.(P)	95	435	91.98	40,011	18.51	8,052	0.9350	247
F.O. Total		2,785		224,240		30,115		1,341
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 F.WG. W.B.T.(P)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 F.WG. W.B.T.(S)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 A.WG. W.B.T.(P)	95	1,501	-82.93	-124,478	11.19	16,796	1.0250	41
NO.1 A.WG. W.B.T.(S)	95	1,501	-82.93	-124,478	11.19	16,796	1.0250	41
NO.2 F.WG. W.B.T.(P)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 F.WG. W.B.T.(S)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 A.WG. W.B.T.(P)	3	82	-42.07	-3,450	0.28	23	1.0250	941
NO.2 A.WG. W.B.T.(S)	3	82	-42.07	-3,450	0.28	23	1.0250	941
NO.3 F. W.B.T.	95	6,220	-24.43	-151,955	6.80	42,296	1.0250	48,258
NO.3 A. W.B.T.	98	6,444	-2.07	-13,339	7.27	46,848	1.0250	48,258
NO.4 F.WG. W.B.T.(P)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 F.WG. W.B.T.(S)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 A.WG. W.B.T.(P)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.4 A.WG. W.B.T.(S)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.5 F.WG. W.B.T.(P)	1	21	55.34	1,162	0.20	4	1.0250	0
NO.5 F.WG. W.B.T.(S)	85	2,017	56.44	113,839	6.67	13,453	1.0250	32
NO.2 BTM. W.B.T.	97	4,047	-57.28	-231,812	4.13	16,714	1.0250	34,810
NO.3 BTM. W.B.T.	97	899	-13.26	-11,921	0.84	755	1.0250	4,179
NO.4 BTM. W.B.T.	97	3,316	26.83	88,968	3.84	12,733	1.0250	23,843
NO.5 BTM. W.B.T.	97	1,787	54.21	96,873	3.63	6,487	1.0250	11,370
FORE PEAK T.	40	677	-133.00	-90,041	5.61	3,798	1.0250	306
AFT. PEAK T.	0	0	124.50	0	8.64	0	1.0250	0
W.B. Total		45,776		-705,610		332,729		174,035
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 L.N.G. T.	0	0	-91.97	0	5.80	0	0.4690	0
NO.2 L.N.G. T.	0	0	-53.33	0	2.50	0	0.4690	0
NO.3 L.N.G. T.	0	0	-13.25	0	2.50	0	0.4690	0
NO.4 L.N.G. T.	0	0	26.83	0	2.50	0	0.4690	0
NO.5 L.N.G. T.	0	0	66.91	0	2.50	0	0.4690	0
Cargo Total		0		0		0		0

Cargo	mt	0	Draft at C.F.	m	9.51	KM	m	21.59
Ballast	mt	45,776	Fore Draft	m	8.85	KG	m	10.75
Fuel	mt	2,785	Aft. Draft	m	10.18	GM	m	10.84
Diesel	mt	292	Mean Draft	m	9.52	GGo	m	2.20
F.Water	mt	974	Trim	m	1.33	GoM	m	8.64
Others	mt	500	Prop. Im.	%	73.7	KGo	m	12.95
D.W.T.	mt	50,327	S.G.		1.0250	L.C.G.	m	1.01
L.W.T.	mt	30,044	T.P.C.	mt	94.40	L.C.B.	m	-1.23
Displacemnt	mt	80,371	M.T.C.	mt-m	1348.6	L.C.F.	m	-1.67

Armada FSU Mediterrana **10th Stage** Input Summary

Remark	

Cargo	mt	0	Draft at C.F.	m	9.51	KM	m	21.59
Ballast	mt	45,776	Fore Draft	m	8.85	KG	m	10.75
Fuel	mt	2,785	Aft. Draft	m	10.18	GM	m	10.84
Diesel	mt	292	Mean Draft	m	9.52	GGo	m	2.20
F.Water	mt	974	Trim	m	1.33	GoM	m	8.64
Others	mt	500	Prop. Im.	%	73.7	KGo	m	12.95
D.W.T.	mt	50,327	S.G.		1.0250	L.C.G.	m	1.01
L.W.T.	mt	30,044	T.P.C.	mt	94.40	L.C.B.	m	-1.23
Displacemnt	mt	80,371	M.T.C.	mt-m	1348.6	L.C.F.	m	-1.67

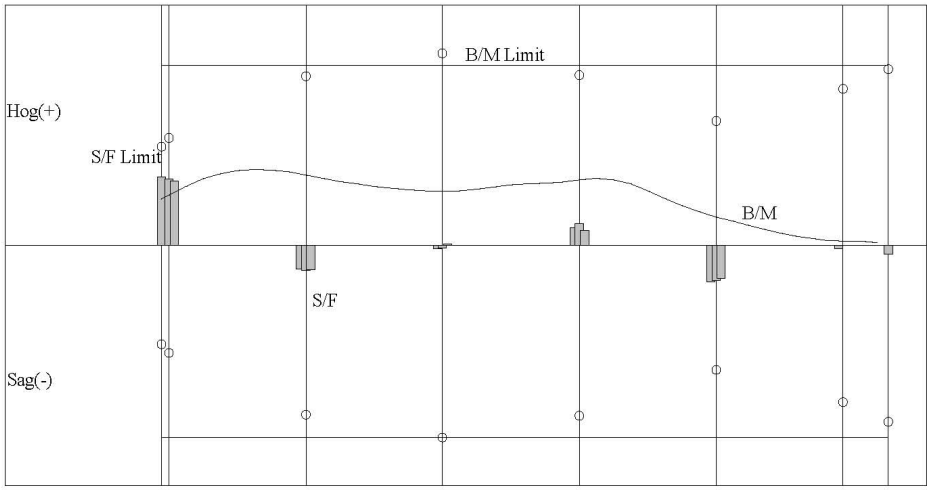


Strength calculated results (Sea Going) are within the limits.

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.64	Ok
Angle of GZ Max. >= 25 degree	48.8	Ok
Max. GZ (Angle>=30) >= 0.2 meter	5.90	Ok
Area (0-30degree) >= 0.055 m-rad.	1.172	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.066	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.895	Ok

Armada FSU Mediterrana **10th Stage** Strength Calculated Result

Remark



Strength calculated results (Sea Going) are within the limits.

Cargo	mt	0	Draft at C.F.	m	9.51	KM	m	21.59
Ballast	mt	45,776	Fore Draft	m	8.85	KG	m	10.75
Fuel	mt	2,785	Aft. Draft	m	10.18	GM	m	10.84
Diesel	mt	292	Mean Draft	m	9.52	GGo	m	2.20
F.Water	mt	974	Trim	m	1.33	GoM	m	8.64
Others	mt	500	Prop. Im.	%	73.7	KGo	m	12.95
D.W.T.	mt	50,327	S.G.		1.0250	L.C.G.	m	1.01
L.W.T.	mt	30,044	T.P.C.	mt	94.40	L.C.B.	m	-1.23
Displacemnt	mt	80,371	M.T.C.	mt-m	1348.6	L.C.F.	m	-1.67

<< Strength Calculated Result (Sea Going) >>

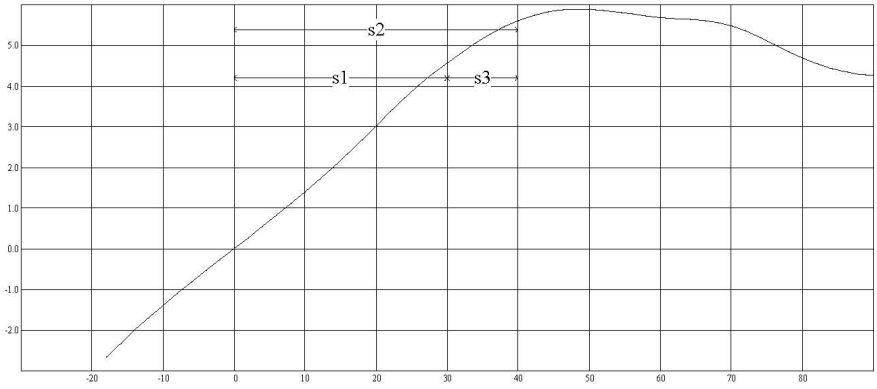
		Shearing Force				Bending Moment			
Frame	Dist. from A.P.	mt	Max.Lmt	Min.Lmt	%	mt-m	Max.Lmt	Min.Lmt	%
51.0	45.950	3,460	4,955	-4,955	69.8	82,441	320,920	-342,110	25.7
52.0	48.050	3,331	5,400	-5,400	61.7	89,577	320,920	-342,110	27.9
60.0	88.130	-1,260	8,500	-8,500	14.8	125,283	320,920	-342,110	39.0
68.0	128.210	-124	9,645	-9,645	1.3	96,227	320,920	-342,110	30.0
76.0	168.290	1,083	8,560	-8,560	12.7	116,435	320,920	-342,110	36.3
84.0	208.370	-1,752	6,235	-6,235	28.1	50,883	320,920	-342,110	15.9
92.0	245.570	-2	7,860	-7,860	0.0	8,030	320,920	-342,110	2.5
96.0	258.770	-447	8,860	-8,860	5.0	3,924	320,920	-342,110	1.2

Maximum Value (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,460	4,955	69.8
B.M	57.193	135,465	320,920	42.2

Maximum Percent of the Limit (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,460	4,955	69.8
B.M.	57.193	135,465	320,920	42.2

Armada FSU Mediterrana **10th Stage** Intact Stability Result

REMARK	



Displacement	mt	80371.0
GoM	m	8.64
Flooding Angle	deg.	67.4
Angle at GZ Max.	deg.	48.8
GZ Max. (Ang.>30)	m	5.90
Area s1 (0-30 degree)	m-rad	1.172
Area s2 (0-40orθf)	m-rad	2.066
Area s3 (30-40orθf)	m-rad	0.895

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.64	Ok
Angle of GZ Max. >= 25 degree	48.8	Ok
Max. GZ (Angle>=30) >= 0.2 meter	5.90	Ok
Area (0-30degree) >= 0.055 m-rad.	1.172	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.066	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.895	Ok

Armada FSU Mediterrana **11th Stage**

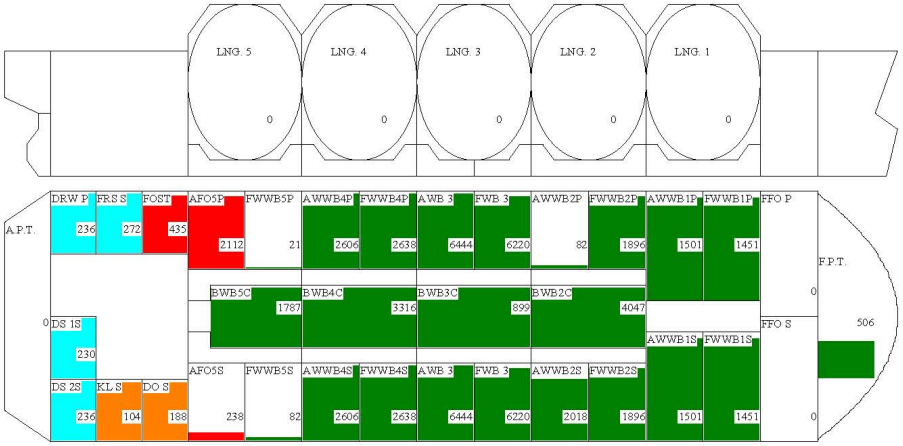
Input Details

Remark								
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
LIGHT WEIGHT		30,044	12.78	383,962	15.75	473,193		
OTHERS		500	100.22	50,110	13.27	6,635		118
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
DRINK W.T.(P)	98	236	107.23	25,306	17.31	4,085	1.0000	178
FRESH W.T.(P)	98	272	100.09	27,224	17.16	4,668	1.0000	259
NO.1 DIST.W.T.(S)	98	230	100.60	23,138	17.17	3,949	1.0000	216
NO.2 DIST.W.T.(S)	98	236	107.23	25,306	17.31	4,085	1.0000	179
F.W. TOTAL		974		100,975		16,787		832
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
D. O. T.(S)	95	188	91.44	17,191	16.73	3,145	0.8800	227
KEROSENE T.(S)	95	104	95.34	9,915	16.76	1,743	0.8800	116
D.O. Total		292		27,106		4,888		343
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
FWD DEEP. F.O.T.(P)	0	0	-113.81	0	0.40	0	0.9350	0
FWD DEEP. F.O.T.(S)	0	0	-114.04	0	0.40	0	0.9350	0
NO.5 A.WG. F.O.T.(P)	95	2,112	78.46	165,708	10.29	21,732	0.9350	172
NO.5 A.WG. F.O.T.(S)	10	238	77.82	18,521	1.39	331	1.0000	922
F.O. SETT. T.(P)	95	435	91.98	40,011	18.51	8,052	0.9350	247
F.O. Total		2,785		224,240		30,115		1,341
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 F.WG. W.B.T.(P)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 F.WG. W.B.T.(S)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 A.WG. W.B.T.(P)	95	1,501	-82.93	-124,478	11.19	16,796	1.0250	41
NO.1 A.WG. W.B.T.(S)	95	1,501	-82.93	-124,478	11.19	16,796	1.0250	41
NO.2 F.WG. W.B.T.(P)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 F.WG. W.B.T.(S)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 A.WG. W.B.T.(P)	3	82	-42.07	-3,450	0.28	23	1.0250	941
NO.2 A.WG. W.B.T.(S)	80	2,018	-43.05	-86,875	5.68	11,462	1.0250	32
NO.3 F. W.B.T.	95	6,220	-24.43	-151,955	6.80	42,296	1.0250	48,258
NO.3 A. W.B.T.	98	6,444	-2.07	-13,339	7.27	46,848	1.0250	48,258
NO.4 F.WG. W.B.T.(P)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 F.WG. W.B.T.(S)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 A.WG. W.B.T.(P)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.4 A.WG. W.B.T.(S)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.5 F.WG. W.B.T.(P)	1	21	55.34	1,162	0.20	4	1.0250	0
NO.5 F.WG. W.B.T.(S)	3	82	55.47	4,549	0.33	27	1.0250	710
NO.2 BTM. W.B.T.	97	4,047	-57.28	-231,812	4.13	16,714	1.0250	34,810
NO.3 BTM. W.B.T.	97	899	-13.26	-11,921	0.84	755	1.0250	4,179
NO.4 BTM. W.B.T.	97	3,316	26.83	88,968	3.84	12,733	1.0250	23,843
NO.5 BTM. W.B.T.	97	1,787	54.21	96,873	3.63	6,487	1.0250	11,370
FORE PEAK T.	30	506	-134.75	-68,184	4.07	2,059	1.0250	30
AFT. PEAK T.	0	0	124.50	0	8.64	0	1.0250	0
W.B. Total		45,606		-876,469		329,003		173,528
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 L.N.G. T.	0	0	-91.97	0	5.80	0	0.4690	0
NO.2 L.N.G. T.	0	0	-53.33	0	2.50	0	0.4690	0
NO.3 L.N.G. T.	0	0	-13.25	0	2.50	0	0.4690	0
NO.4 L.N.G. T.	0	0	26.83	0	2.50	0	0.4690	0
NO.5 L.N.G. T.	0	0	66.91	0	2.50	0	0.4690	0
Cargo Total		0		0		0		0

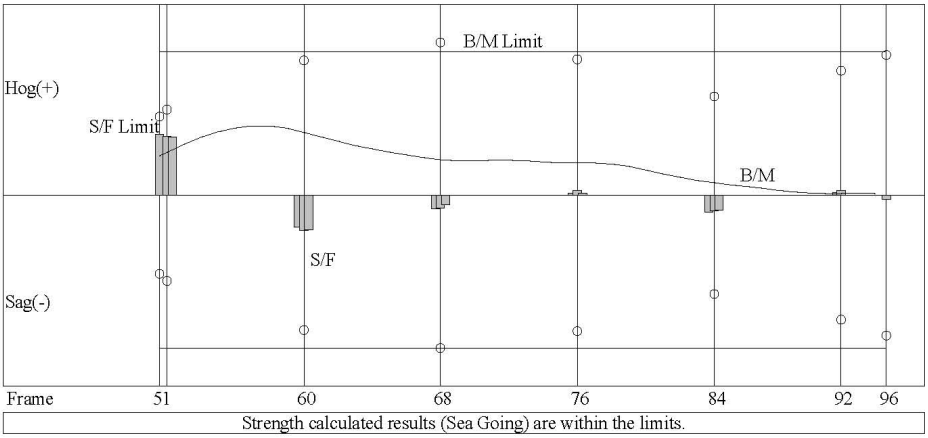
Cargo	mt	0	Draft at C.F.	m	9.49	KM	m	21.61
Ballast	mt	45,606	Fore Draft	m	9.46	KG	m	10.73
Fuel	mt	2,785	Aft. Draft	m	9.52	GM	m	10.88
Diesel	mt	292	Mean Draft	m	9.49	GGo	m	2.20
F.Water	mt	974	Trim	m	0.06	GoM	m	8.68
Others	mt	500	Prop. Im.	%	65.5	KGo	m	12.93
D.W.T.	mt	50,157	S.G.		1.0250	L.C.G.	m	-1.12
L.W.T.	mt	30,044	T.P.C.	mt	94.40	L.C.B.	m	-1.23
Displacemnt	mt	80,201	M.T.C.	mt-m	1347.5	L.C.F.	m	-1.68

Armada FSU Mediterrana **11th Stage** Input Summary

Remark	



Cargo	mt	0	Draft at C.F.	m	9.49	KM	m	21.61
Ballast	mt	45,606	Fore Draft	m	9.46	KG	m	10.73
Fuel	mt	2,785	Aft. Draft	m	9.52	GM	m	10.88
Diesel	mt	292	Mean Draft	m	9.49	GGo	m	2.20
F.Water	mt	974	Trim	m	0.06	GoM	m	8.68
Others	mt	500	Prop. Im.	%	65.5	KGo	m	12.93
D.W.T.	mt	50,157	S.G.		1.0250	L.C.G.	m	-1.12
L.W.T.	mt	30,044	T.P.C.	mt	94.40	L.C.B.	m	-1.23
Displacemnt	mt	80,201	M.T.C.	mt-m	1347.5	L.C.F.	m	-1.68

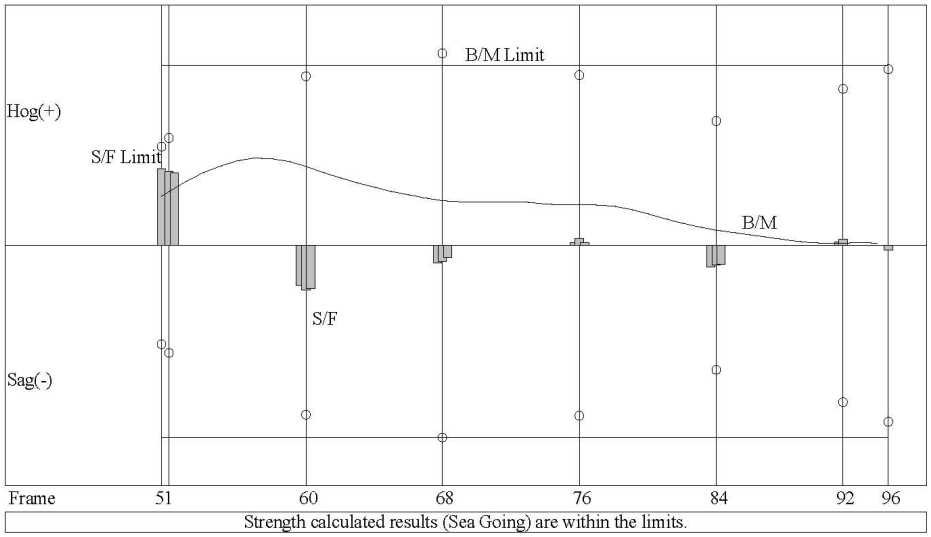


Strength calculated results (Sea Going) are within the limits.

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.68	Ok
Angle of GZ Max. >= 25 degree	48.8	Ok
Max. GZ (Angle>=30) >= 0.2 meter	5.92	Ok
Area (0-30degree) >= 0.055 m-rad.	1.177	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.074	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.898	Ok

Armada FSU Mediterrana **11th Stage** Strength Calculated Result

Remark



Strength calculated results (Sea Going) are within the limits.

Cargo	mt	0	Draft at C.F.	m	9.49	KM	m	21.61
Ballast	mt	45,606	Fore Draft	m	9.46	KG	m	10.73
Fuel	mt	2,785	Aft. Draft	m	9.52	GM	m	10.88
Diesel	mt	292	Mean Draft	m	9.49	GGo	m	2.20
F.Water	mt	974	Trim	m	0.06	GoM	m	8.68
Others	mt	500	Prop. Im.	%	65.5	KGo	m	12.93
D.W.T.	mt	50,157	S.G.		1.0250	L.C.G.	m	-1.12
L.W.T.	mt	30,044	T.P.C.	mt	94.40	L.C.B.	m	-1.23
Displacemnt	mt	80,201	M.T.C.	mt-m	1347.5	L.C.F.	m	-1.68

<< Strength Calculated Result (Sea Going) >>

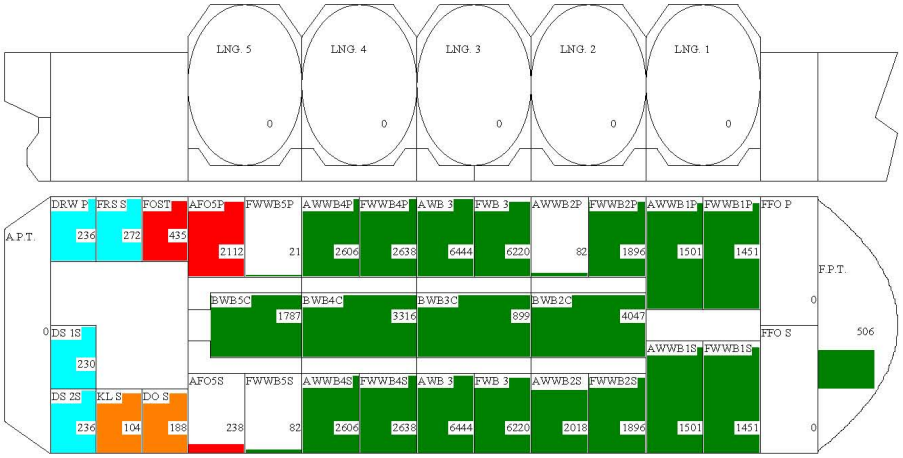
		Shearing Force				Bending Moment			
Frame	Dist. from A.P.	mt	Max.Lmt	Min.Lmt	%	mt-m	Max.Lmt	Min.Lmt	%
51.0	45.950	3,826	4,955	-4,955	77.2	87,620	320,920	-342,110	27.3
52.0	48.050	3,729	5,400	-5,400	69.1	95,558	320,920	-342,110	29.8
60.0	88.130	-2,221	8,500	-8,500	26.1	140,816	320,920	-342,110	43.9
68.0	128.210	-812	9,645	-9,645	8.4	79,862	320,920	-342,110	24.9
76.0	168.290	322	8,560	-8,560	3.8	72,178	320,920	-342,110	22.5
84.0	208.370	-986	6,235	-6,235	15.8	27,594	320,920	-342,110	8.6
92.0	245.570	295	7,860	-7,860	3.8	4,022	320,920	-342,110	1.3
96.0	258.770	-247	8,860	-8,860	2.8	3,129	320,920	-342,110	1.0

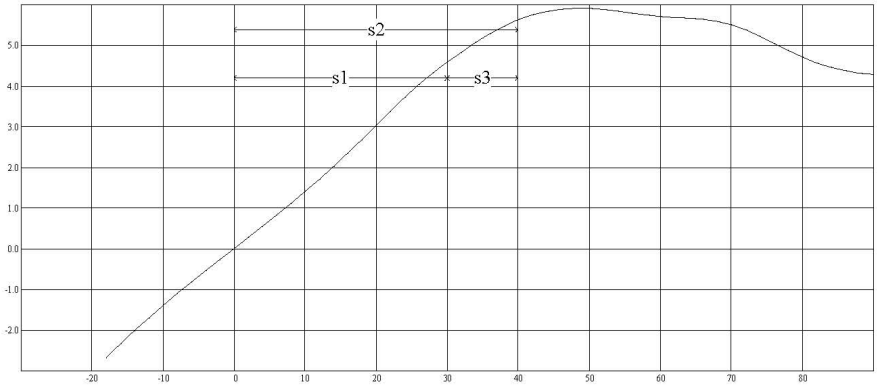
Maximum Value (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,826	4,955	77.2
B.M	57.464	155,701	320,920	48.5

Maximum Percent of the Limit (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,826	4,955	77.2
B.M.	57.464	155,701	320,920	48.5

Armada FSU Mediterrana **11th Stage** Intact Stability Result

REMARK	





Displacement	mt	80201.0
GoM	m	8.68
Flooding Angle	deg.	67.4
Angle at GZ Max.	deg.	48.8
GZ Max. (Ang.>30)	m	5.92
Area s1 (0-30 degree)	m-rad	1.177
Area s2 (0-40orθf)	m-rad	2.074
Area s3 (30-40orθf)	m-rad	0.898

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.68	Ok
Angle of GZ Max. >= 25 degree	48.8	Ok
Max. GZ (Angle>=30) >= 0.2 meter	5.92	Ok
Area (0-30degree) >= 0.055 m-rad.	1.177	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.074	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.898	Ok

Armada FSU Mediterrana **Final Stage** Input Details

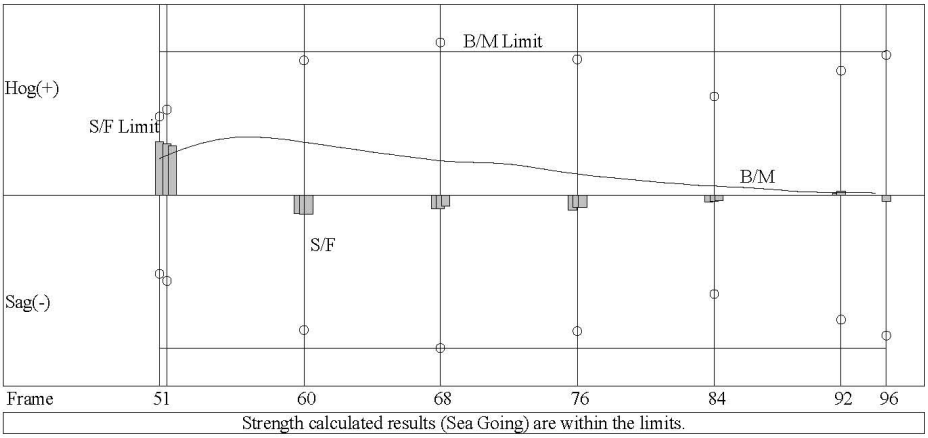
Remark								
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
LIGHT WEIGHT		30,044	12.78	383,962	15.75	473,193		
OTHERS		500	100.22	50,110	13.27	6,635		118
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
DRINK W.T.(P)	98	236	107.23	25,306	17.31	4,085	1.0000	178
FRESH W.T.(P)	98	272	100.09	27,224	17.16	4,668	1.0000	259
NO.1 DIST.W.T.(S)	98	230	100.60	23,138	17.17	3,949	1.0000	216
NO.2 DIST.W.T.(S)	98	236	107.23	25,306	17.31	4,085	1.0000	179
F.W. TOTAL		974		100,975		16,787		832
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
D. O. T.(S)	95	188	91.44	17,191	16.73	3,145	0.8800	227
KEROSENE T.(S)	95	104	95.34	9,915	16.76	1,743	0.8800	116
D.O. Total		292		27,106		4,888		343
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
FWD DEEP. F.O.T.(P)	0	0	-113.81	0	0.40	0	0.9350	0
FWD DEEP. F.O.T.(S)	0	0	-114.04	0	0.40	0	0.9350	0
NO.5 A.WG. F.O.T.(P)	95	2,112	78.46	165,708	10.29	21,732	0.9350	172
NO.5 A.WG. F.O.T.(S)	10	238	77.82	18,521	1.39	331	1.0000	922
F.O. SETT. T.(P)	95	435	91.98	40,011	18.51	8,052	0.9350	247
F.O. Total		2,785		224,240		30,115		1,341
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 F.WG. W.B.T.(P)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 F.WG. W.B.T.(S)	95	1,451	-101.33	-147,030	12.94	18,776	1.0250	378
NO.1 A.WG. W.B.T.(P)	95	1,501	-82.93	-124,478	11.20	16,811	1.0250	41
NO.1 A.WG. W.B.T.(S)	95	1,501	-82.93	-124,478	11.19	16,796	1.0250	41
NO.2 F.WG. W.B.T.(P)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 F.WG. W.B.T.(S)	95	1,896	-62.74	-118,955	9.29	17,614	1.0250	32
NO.2 A.WG. W.B.T.(P)	95	2,396	-43.09	-103,244	7.81	18,713	1.0250	32
NO.2 A.WG. W.B.T.(S)	95	2,396	-43.09	-103,244	7.81	18,713	1.0250	32
NO.3 F. W.B.T.	95	6,220	-24.43	-151,955	6.80	42,296	1.0250	48,258
NO.3 A. W.B.T.	98	6,444	-2.07	-13,339	7.27	46,848	1.0250	48,258
NO.4 F.WG. W.B.T.(P)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 F.WG. W.B.T.(S)	98	2,638	16.81	44,345	7.93	20,919	1.0250	66
NO.4 A.WG. W.B.T.(P)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.4 A.WG. W.B.T.(S)	98	2,606	36.79	95,875	7.94	20,692	1.0250	32
NO.5 F.WG. W.B.T.(P)	15	359	55.93	20,079	1.23	442	1.0250	1,501
NO.5 F.WG. W.B.T.(S)	95	2,254	56.49	127,328	8.14	18,348	1.0250	32
NO.2 BTM. W.B.T.	97	4,047	-57.28	-231,812	4.13	16,714	1.0250	34,810
NO.3 BTM. W.B.T.	97	899	-13.26	-11,921	0.84	755	1.0250	4,179
NO.4 BTM. W.B.T.	97	3,316	26.83	88,968	3.84	12,733	1.0250	23,843
NO.5 BTM. W.B.T.	97	1,787	54.21	96,873	3.63	6,487	1.0250	11,370
FORE PEAK T.	40	677	-133.00	-90,041	5.61	3,798	1.0250	306
AFT. PEAK T.	0	0	124.50	0	8.64	0	1.0250	0
W.B. Total		50,979		-872,793		375,455		173,718
Item		Weight	L.C.G.	L.M.T.	V.C.G.	V.M.T.	S.G.	Inertia
	%	mt	m	mt-m	m	mt-m		mt-m
NO.1 L.N.G. T.	0	0	-91.97	0	5.80	0	0.4690	0
NO.2 L.N.G. T.	0	0	-53.33	0	2.50	0	0.4690	0
NO.3 L.N.G. T.	0	0	-13.25	0	2.50	0	0.4690	0
NO.4 L.N.G. T.	0	0	26.83	0	2.50	0	0.4690	0
NO.5 L.N.G. T.	0	0	66.91	0	2.50	0	0.4690	0
Cargo Total		0		0		0		0

Cargo	mt	0	Draft at C.F.	m	10.06	KM	m	21.13
Ballast	mt	50,979	Fore Draft	m	9.99	KG	m	10.60
Fuel	mt	2,785	Aft. Draft	m	10.13	GM	m	10.53
Diesel	mt	292	Mean Draft	m	10.06	GGo	m	2.06
F.Water	mt	974	Trim	m	0.14	GoM	m	8.47
Others	mt	500	Prop. Im.	%	73.0	KGo	m	12.66
D.W.T.	mt	55,530	S.G.		1.0250	L.C.G.	m	-1.01
L.W.T.	mt	30,044	T.P.C.	mt	95.58	L.C.B.	m	-1.24
Displacemnt	mt	85,574	M.T.C.	mt-m	1390.1	L.C.F.	m	-1.42

Armada FSU Mediterrana **Final Stage** Input Summary

Remark	

Cargo	mt	0	Draft at C.F.	m	10.06	KM	m	21.13
Ballast	mt	50,979	Fore Draft	m	9.99	KG	m	10.60
Fuel	mt	2,785	Aft. Draft	m	10.13	GM	m	10.53
Diesel	mt	292	Mean Draft	m	10.06	GGo	m	2.06
F.Water	mt	974	Trim	m	0.14	GoM	m	8.47
Others	mt	500	Prop. Im.	%	73.0	KGo	m	12.66
D.W.T.	mt	55,530	S.G.		1.0250	L.C.G.	m	-1.01
L.W.T.	mt	30,044	T.P.C.	mt	95.58	L.C.B.	m	-1.24
Displacemnt	mt	85,574	M.T.C.	mt-m	1390.1	L.C.F.	m	-1.42

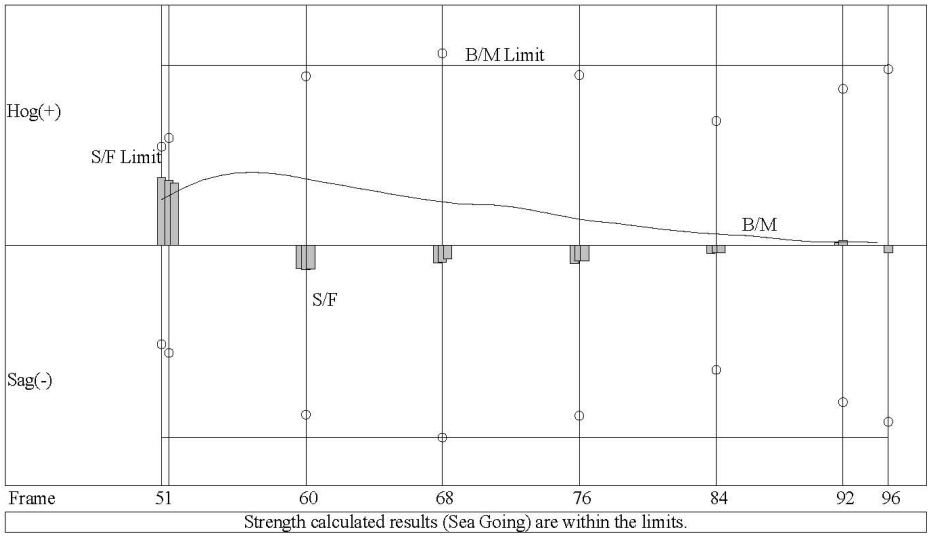


Strength calculated results (Sea Going) are within the limits.

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.47	Ok
Angle of GZ Max. >= 25 degree	49.9	Ok
Max. GZ (Angle>=30) >= 0.2 meter	6.00	Ok
Area (0-30degree) >= 0.055 m-rad.	1.166	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.078	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.912	Ok

Armada FSU Mediterrana **Final Stage** Strength Calculated Result

Remark



Strength calculated results (Sea Going) are within the limits.

Cargo	mt	0	Draft at C.F.	m	10.06	KM	m	21.13
Ballast	mt	50,979	Fore Draft	m	9.99	KG	m	10.60
Fuel	mt	2,785	Aft. Draft	m	10.13	GM	m	10.53
Diesel	mt	292	Mean Draft	m	10.06	GGo	m	2.06
F.Water	mt	974	Trim	m	0.14	GoM	m	8.47
Others	mt	500	Prop. Im.	%	73.0	KGo	m	12.66
D.W.T.	mt	55,530	S.G.		1.0250	L.C.G.	m	-1.01
L.W.T.	mt	30,044	T.P.C.	mt	95.58	L.C.B.	m	-1.24
Displacemnt	mt	85,574	M.T.C.	mt-m	1390.1	L.C.F.	m	-1.42

<< Strength Calculated Result (Sea Going) >>

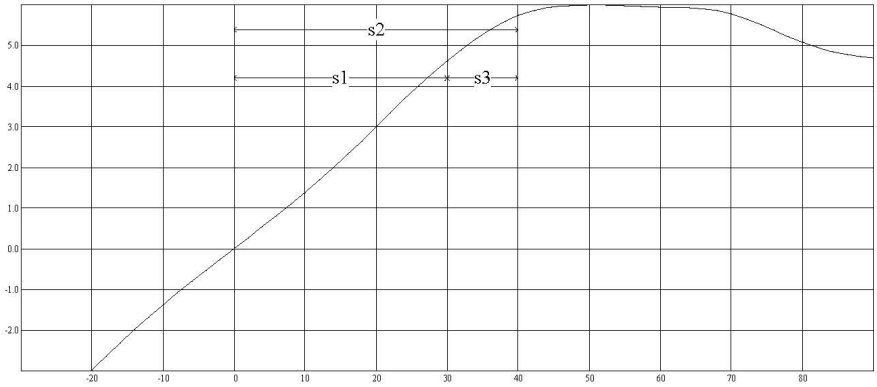
		Shearing Force				Bending Moment			
Frame	Dist. from A.P.	mt	Max.Lmt	Min.Lmt	%	mt-m	Max.Lmt	Min.Lmt	%
51.0	45.950	3,389	4,955	-4,955	68.4	81,755	320,920	-342,110	25.5
52.0	48.050	3,248	5,400	-5,400	60.1	88,728	320,920	-342,110	27.6
60.0	88.130	-1,210	8,500	-8,500	14.2	118,995	320,920	-342,110	37.1
68.0	128.210	-857	9,645	-9,645	8.9	77,332	320,920	-342,110	24.1
76.0	168.290	-756	8,560	-8,560	8.8	47,066	320,920	-342,110	14.7
84.0	208.370	-373	6,235	-6,235	6.0	20,319	320,920	-342,110	6.3
92.0	245.570	255	7,860	-7,860	3.2	5,898	320,920	-342,110	1.8
96.0	258.770	-390	8,860	-8,860	4.4	3,718	320,920	-342,110	1.2

Maximum Value (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,389	4,955	68.4
B.M	56.868	130,253	320,920	40.6

Maximum Percent of the Limit (Absolute)				
	Frame	Value	Limit	%
S.F.	51.000	3,389	4,955	68.4
B.M.	56.868	130,253	320,920	40.6

Armada FSU Mediterrana **Final Stage** Intact Stability Result

REMARK	



Displacement	mt	85574.0
GoM	m	8.47
Flooding Angle	deg.	65.2
Angle at GZ Max.	deg.	49.9
GZ Max. (Ang.>30)	m	6.00
Area s1 (0-30 degree)	m-rad	1.166
Area s2 (0-40orθf)	m-rad	2.078
Area s3 (30-40orθf)	m-rad	0.912

Stability Evaluation		
Criteria	Calculated Value	Judgement
Corrected GM (GoM) >= 0.15 meter	8.47	Ok
Angle of GZ Max. >= 25 degree	49.9	Ok
Max. GZ (Angle>=30) >= 0.2 meter	6.00	Ok
Area (0-30degree) >= 0.055 m-rad.	1.166	Ok
Area (0-40 or Flood. Angle) >= 0.090 m-rad.	2.078	Ok
Area (30-40 or Flood. Angle) >= 0.030 m-rad.	0.912	Ok

APPENDIX B PART A. BALLAST WATER REGISTER

BALLAST WATER REGISTER

BUMIARMADA

INSTALLATION (SHIP'S) NAME:			
PORT OF REGISTRY:		IMO NUMBER:	

RECORD OF BALLAST WATER MANAGEMENT ON BOARD

TANK LOCATION	DATE	INITIAL CONTENT (tonnes)	FINAL CONTENT (tonnes)	GEOGRAPHIC LOCATION OF SHIP (Port of Lat. & Long.)	PUMPS USED, or GRAVITATE	DURRATION OF OPERATION	SALINITY	SIGNATURE OF OFFICER IN CHARGE	RANK

APPENDIX C PART B. BALLAST WATER REGISTER

BALLAST WATER REGISTER				BUMIARMADA
INSTALLATION (SHIP'S) NAME:				
PORT OF REGISTRY:		IMO NUMBER:		

RECORD OF BALLAST WATER MANAGEMENT ON BOARD

Record here events which are relevant to ballast management, and which will be of interest to quarantine officers, such as sediment removal during drydock, or tank flushing at sea. Each entry should be completed with the signature and rank of the officer making the entry.

Date	Activity	Comments

APPENDIX D BALLAST WATER REPORTING FORM

BALLAST WATER REPORTING	BUMIARMADA

1. SHIP INFORAMTION

Ship's Name:	Type:	IMO Number:
Owner:	Gross Tonnage:	Call Sign:
Flag:	Arrival Date:	Agent:
Last Port and Country:		Arrival Port:
Next Port and Country:		

2. BALLAST WATER

Specify Units: M^3, MT, LT, ST
Total Ballast Water on Board:
Total Ballast Water Capacity:

3. BALLAST WATER TANKS Ballast Water Management Plan on board? YES NO Management Plan Implemented? YES NO

Total number of ballast tanks on board: _____ No. of tanks in ballast: _____ IF NON IN BALLAST GO TO No.5

No. of tanks exchanged:_____ No. of tanks not exchanged:_____

4. BALLAST WATER HISTORY: RECORD ALL TANKS THAT WILL BE DEBALLASTED IN PORT STATE OF ARRIVAL; IF NONE GO TO No.5

Tanks/ Holds	BALLAST WATER SOURCE	BALLAST WATER EXCHANGE Circle on: Empty/Refill or Flow Through	BALLAST WATER DISCHARGE

List multiple sources per tank separately	DATE DDMMYY	Port or Lat/Long	Volume (units)	Temperature (Units)	DATE DDMMYY	Endpoint Lat/Long	Volume (units)	% Exchange	Sea Height(m)	DATE DDMMYY	Port or Lat/Long	Volume (units)	Salinity (units)

Ballast Water Tank Codes : Forepeak = FP ; Aftpeak = AP ; Double Bottom = DB ; Wing = WT ; Topside = TS ; Cargo Hold = CH ; Other = O

IF EXCHANGES WERE NOT CONDUCTED, STATE OTHER CONTROL ACTION(S) TAKEN : _____

IF NON STATE REASON WHY NOT : _____

5. IMO BALLAST WATER GUIDELINES ON BOARD (RESOLUTION A.868(20))? YES NO

RESPONSIBLE OFFICER'S NAME AND TITLE (PRINTED) AND SIGNATURE: _____

GUIDELINES FOR COMPLETING THE BALLAST WATER REPORTING FORM

SECTION 1: SHIP INFORMATION

Ship's Name: Print the name of the ship.

Owner: The registered owners or operators of the ship.

Flag: Country of the port of registry.

Last Port and Country: Last port and country at which the ship called before arrival in the current port - no abbreviations, please.

Next Port and Country: Next port and country at which the ship will call, upon departure from the current port - no abbreviations, please.

Type: List specific ship type, write out or use the following abbreviations: bulk(bc); roro (rr); container (cs); tanker(ts); passenger (pa); oil/bulk ore (ob); general cargo (gc). Write out any additional ship types.

GT: Gross tonnage.

Arrival Date: Arrival date at current port. Please use the European date format (DDMMYY)

IMO Number: Identification Number of the ship used by the International Maritime Organization.

Call Sign: Official call sign.

Agent: Agent used for this voyage.

Arrival Port: This is the current port. No abbreviations, please.

SECTION 2: BALLAST WATER

(Note: Segregated ballast water = clean, non-oily ballast)

Total ballast water on board: Total segregated ballast water upon arrival at current port - with units.

Total ballast water capacity: Total volume of all ballastable tanks or holds - with units.

SECTION 3: BALLAST WATER TANKS

Count all tanks and holds separately (e.g. port and starboard tanks should be counted separately). Total No. of Tanks on board: Count all tanks and holds that can carry segregated ballast water. Ballast Water Management Plan on board?: Do you have a ballast water management plan, specific to your ship, onboard? Circle Yes or No. Management Plan Implemented?: Do you follow the above plan? Circle Yes or No.

No. of Tanks in Ballast: Number of segregated ballast water tanks and holds with ballast at the start of the voyage to the current port. If you have no ballast water on board, go to section 5. No. of Tanks Exchanged: This refers only to tanks and holds with ballast at the start of the voyage to the current port. No. of Tanks Not Exchanged: This refers only to tanks and holds with ballast at the start of the voyage to the current port.

SECTION 4: BALLAST WATER HISTORY

BW Source: Please list all tanks and holds that you have discharged or plan to discharge in this port. Carefully write out, or use codes listed below the table.

Follow each tank across the page, listing all source(s), exchange events, and/or discharge events separately.

If the ballast water history is identical (i.e. the same source, exchange and discharge dates and locations), sets of tanks can be combined (example: wing tank 1 with wing tank 2, both water from Belgium, exchanged 02.11.97, mid ocean).

Please use an additional page if you need, being careful to include the arrival date, ship's name and IMO number at the top.

Date: Date of ballast water uptake. Use European format (DDMMYY).

Port or Latitude/Longitude: Location of ballast water uptake.

Volume: Volume of ballast water uptake, with units.

Temperature: Water temperature at time of ballast water uptake, in degrees centigrade (Celsius).

BW Exchange: Indicate Exchange Method: Circle empty/refill or flow through.

Date: Date of ballast water exchange. Use European format (DDMMYY).

Endpoint or Latitude/Longitude: Location of ballast water exchange. If it occurred over an extended distance, list the end point latitude and longitude.

Volume: Volume of ballast water exchanged, with units.

Percentage exchanged: Percentage of ballast water exchanged. Calculate this by dividing the number of units of water exchanged by the original volume of ballast water in the tank. If necessary, estimate this based on pump rate. (Note: For effective flow-through exchange this value should be at least 300%).

Sea Height (m): Record the sea height in metres at the time of the ballast exchange

(Note: this is the combined height of the wind seas and swell, measured from crest to trough. It does not refer to the depth).

BW Discharge:

Date: Date of ballast water discharge. Use European format (DDMMYY).

Port or Latitude/Longitude: Location of ballast water discharge, no abbreviations for ports.

Volume: Volume of ballast water discharged, with units.

Salinity: Record salinity of ballast water at the time of discharge, with units, (i.e. specific gravity (sg) or parts per thousand (ppt)).

If exchanges were not conducted, state other control action(s) taken: If exchanges were not made on all tanks and holds to be discharged, what other actions were taken?

E.g. transfer of water to a land-based holding facility, or other approved treatment.

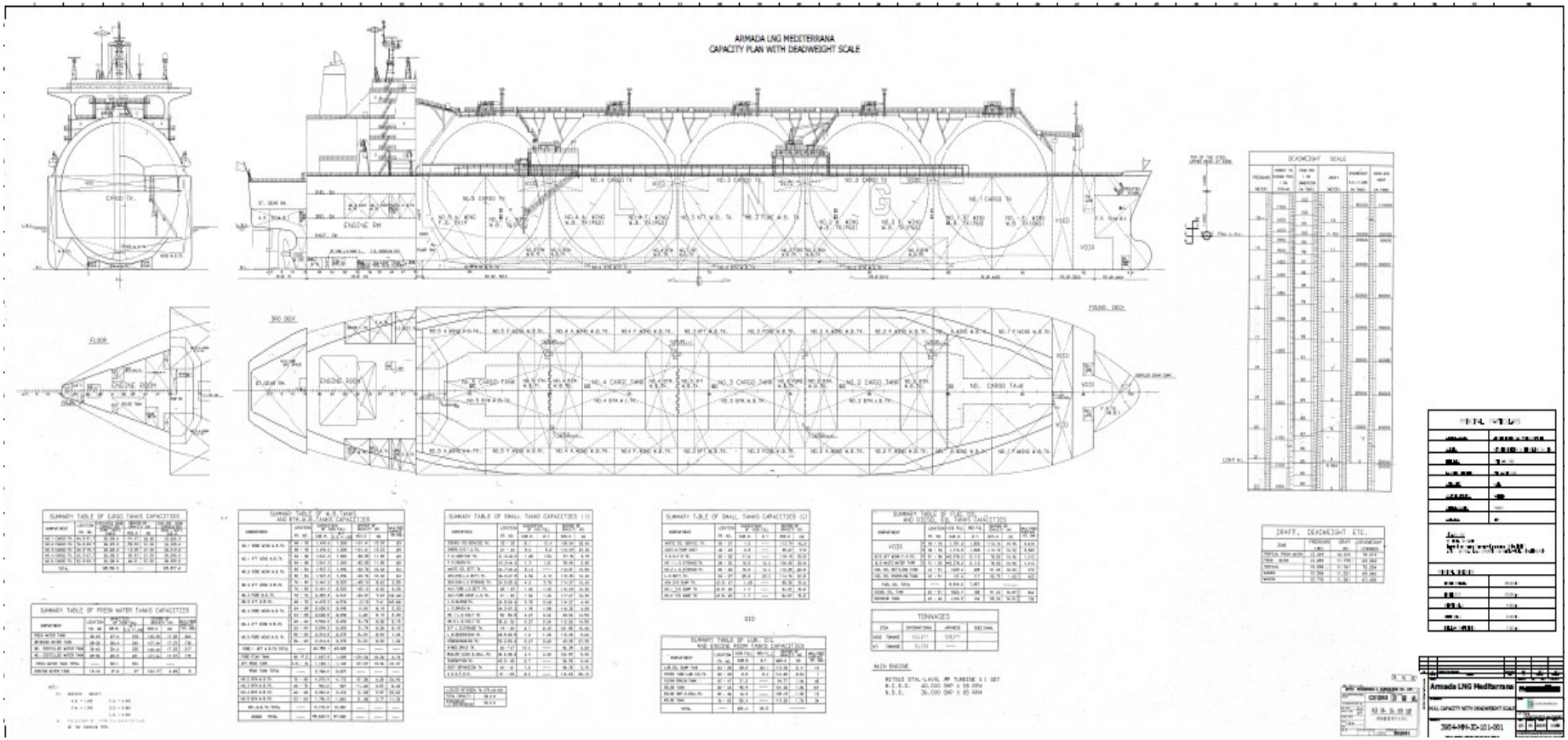
If none, state reasons why not: List specific reasons why ballast exchange was not done. This applies to all tanks and holds being discharged.

SECTION 5:

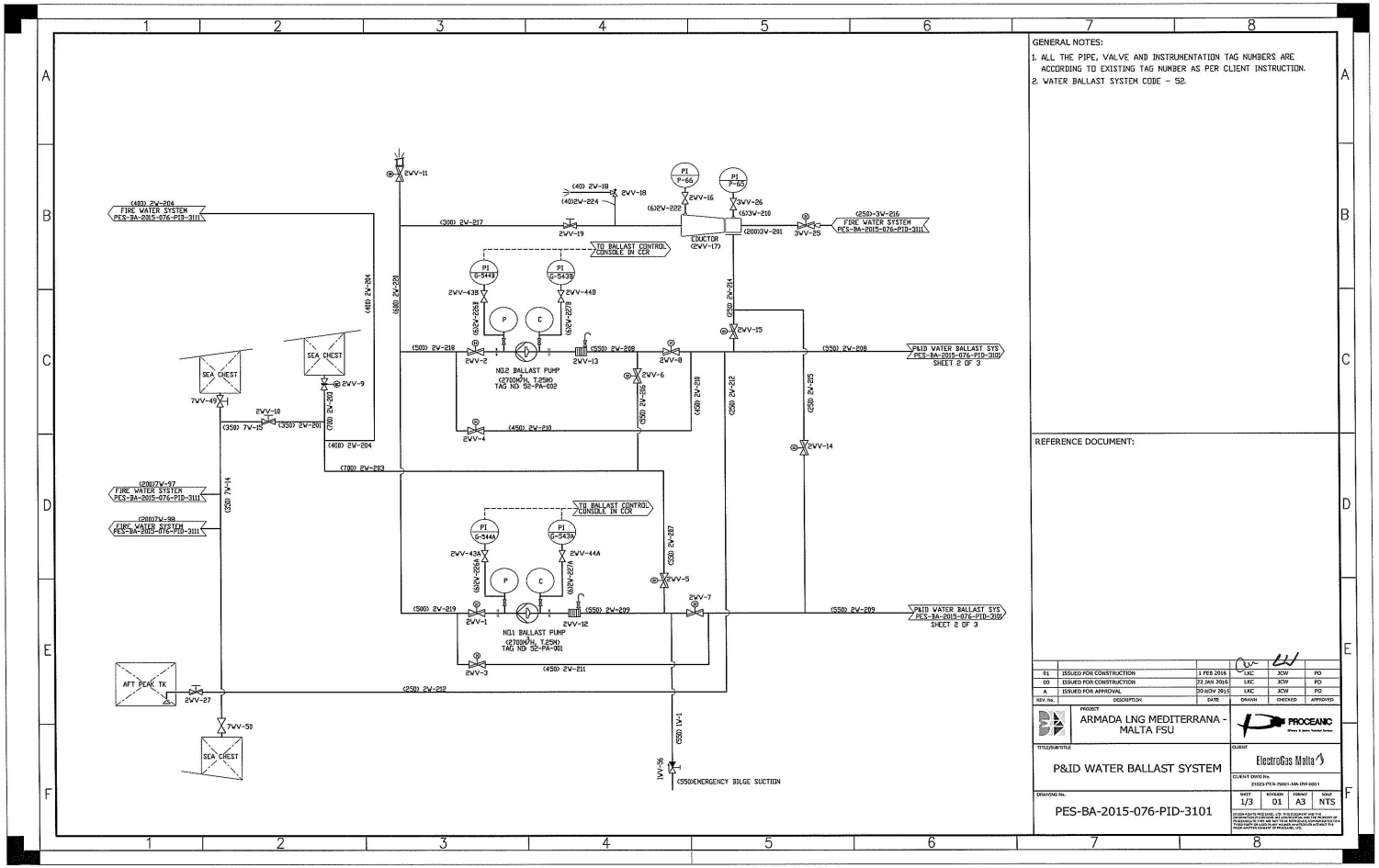
IMO Ballast Water Guidelines On Board?: Do you have IMO Resolution A.868(20) on board your ship? Circle Yes or No.

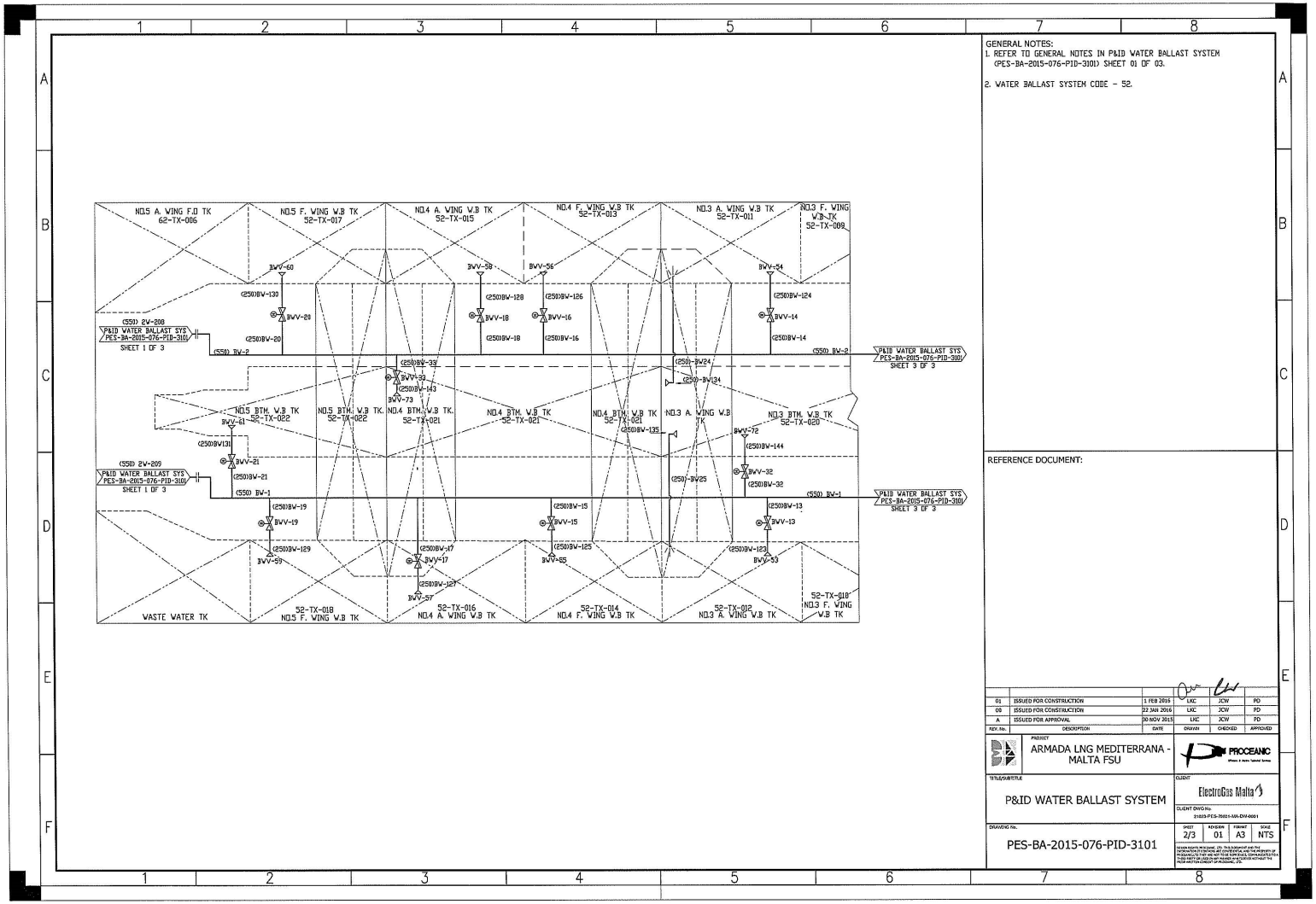
Responsible Officer's name and title (Printed) and signature: e.g. the First Mate, Captain, or Chief Engineer must print his name and title and sign the for

APPENDIX E BALLAST TANK ARRANGEMENT & CAPACITY PLAN.



APPENDIX F BALLAST WATER PIPING & PUMPING ARRANGEMENT



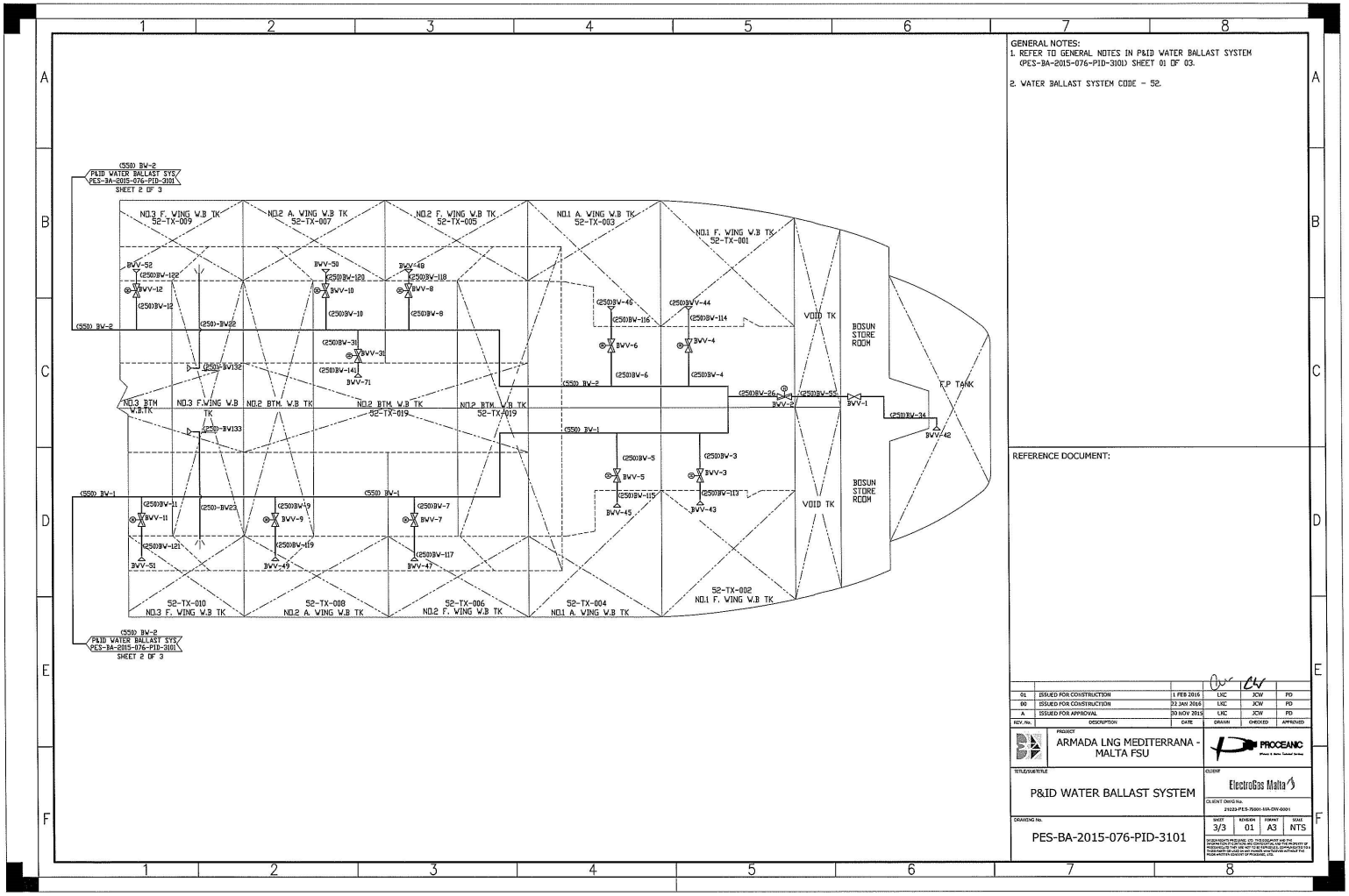


GENERAL NOTES:
1. REFER TO GENERAL NOTES IN P&ID WATER BALLAST SYSTEM (PES-BA-2015-076-PID-3101) SHEET 01 OF 03.
2. WATER BALLAST SYSTEM CODE – 52.

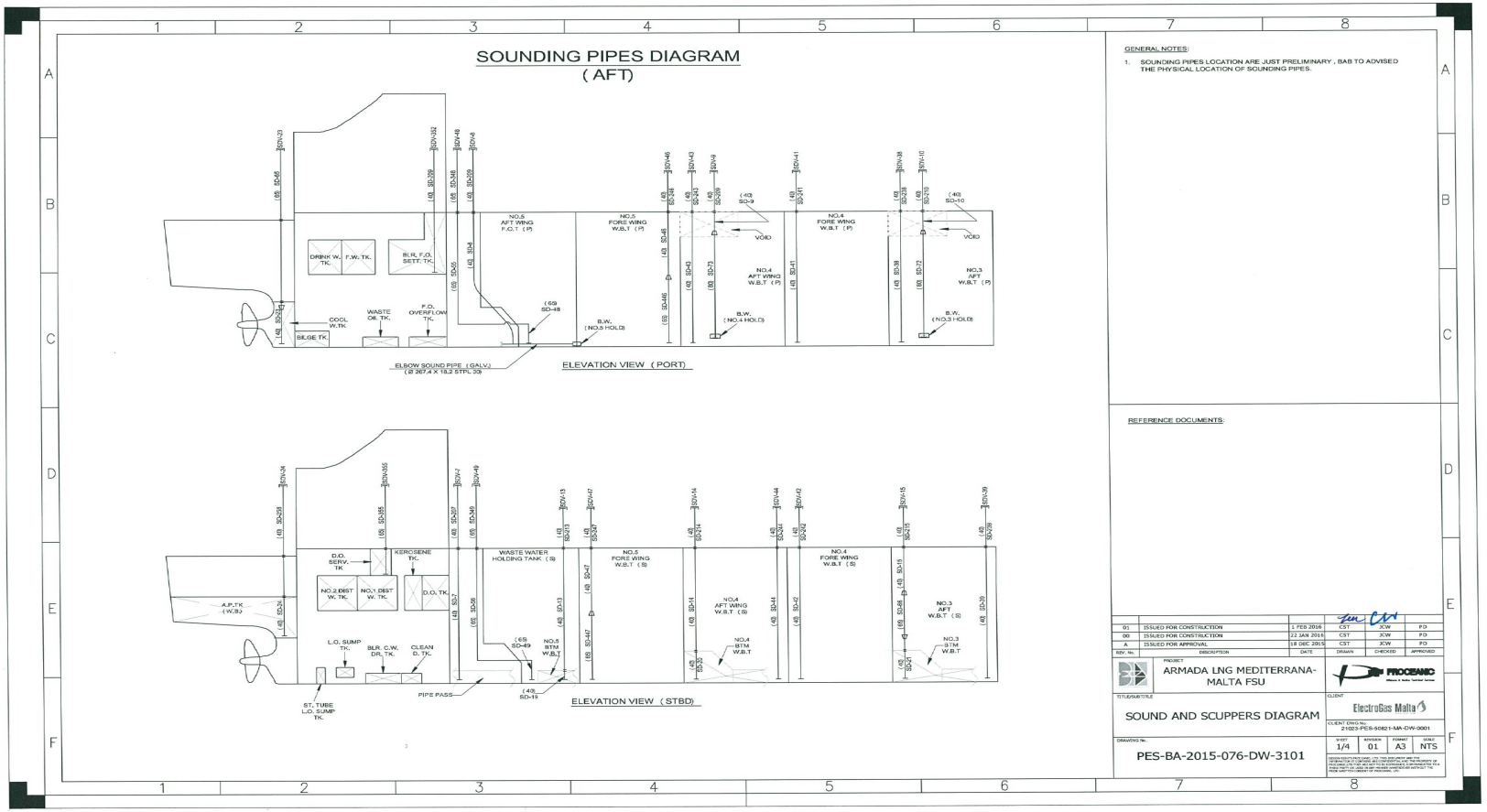
REFERENCE DOCUMENT:

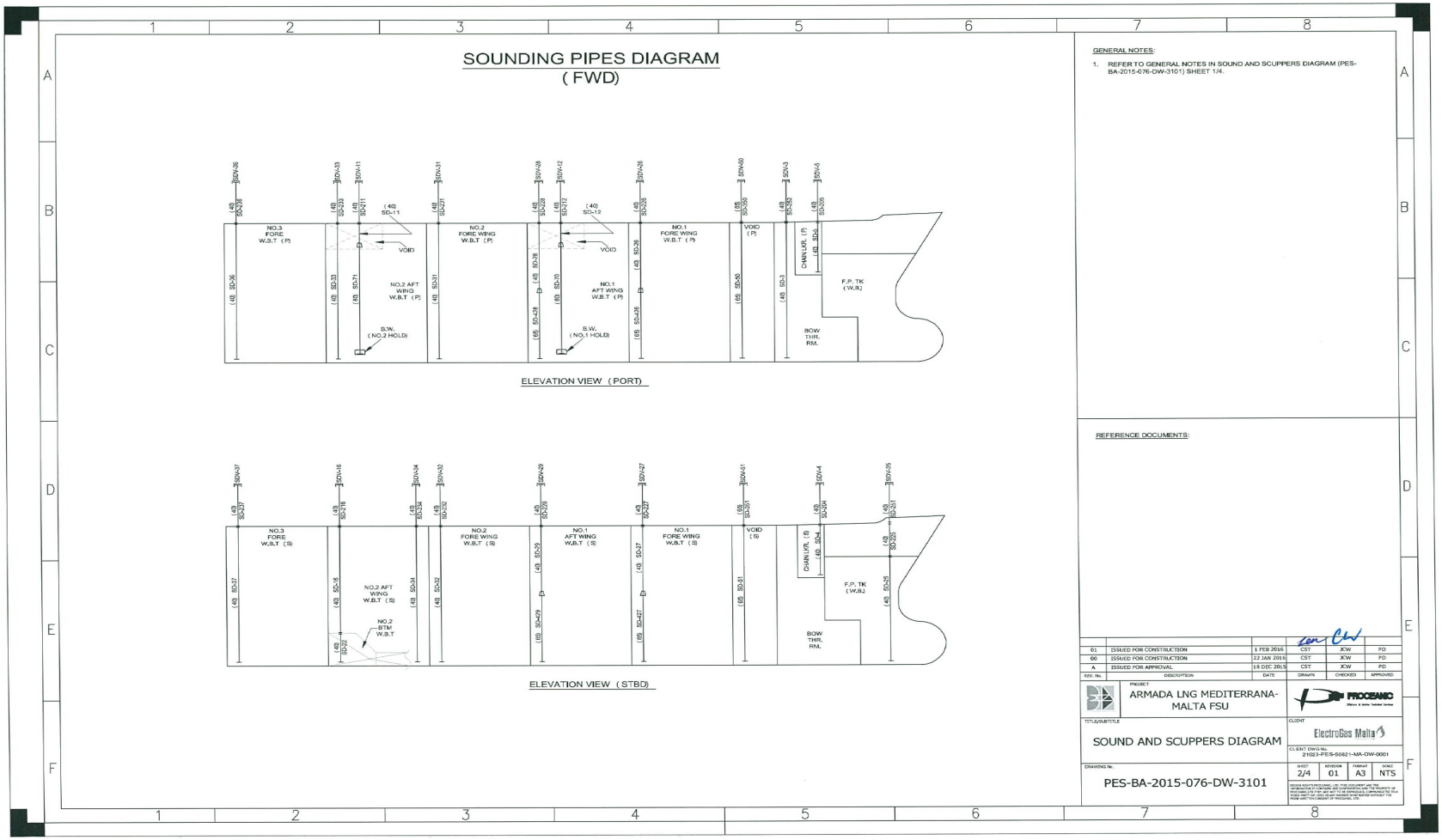
REV. No.	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED
01	ISSUED FOR CONSTRUCTION	1 FEB 2016	LKC	JCW	PD
00	ISSUED FOR CONSTRUCTION	22 JAN 2016	LKC	JCW	PD
A	ISSUED FOR APPROVAL	30 NOV 2015	LKC	JCW	PD

PROJECT: ARMADA LNG MEDITERRANA - MALTA FSU
PROCEANIC
TITLE/SUBTITLE: P&ID WATER BALLAST SYSTEM
CLIENT: ElectroGas Malta
CLIENT DWG No. 21023-PES-70001-MA-DW-0001
DRAWING No.: PES-BA-2015-076-PID-3101
SHEET 2/3 | REVISION 01 | FORMAT A3 | SCALE NTS

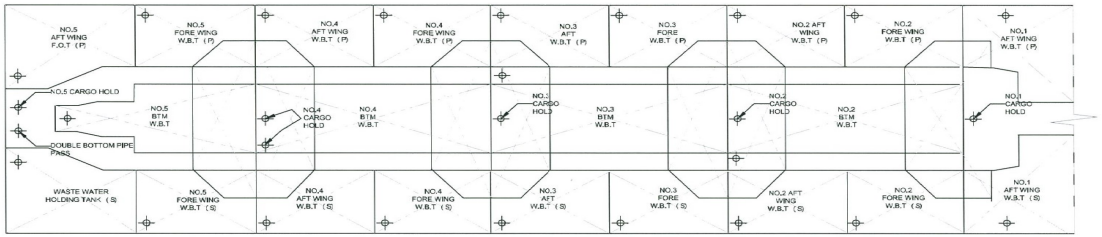


APPENDIX G SOUNDING PIPES ARRANGEMENTS.

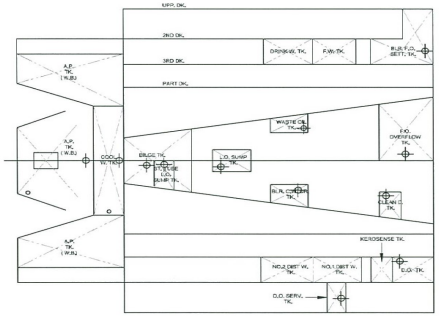




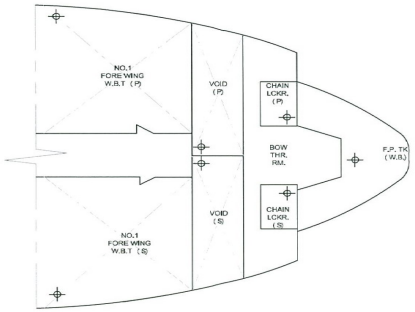
SOUNDING PIPES ARRANGEMENT



SOUNDING PIPES ARRANGEMENT (AFT)



SOUNDING PIPES ARRANGEMENT (FWD)



GENERAL NOTES:

1. REFER TO GENERAL NOTES IN SOUND AND SCUPPERS DIAGRAM (PES-BA-2015-076-DW-3101) SHEET 1/4.
2. MARK "-⊕-" SHOWS PRELIMINARY LOCATION OF SOUNDING PIPES.
3. NO SOUNDING PIPE FOR NO.1 & NO.2 DISTILLATE WATER TANK, KEROSENE TANK, DRINKING WATER TANK, AND FRESH WATER TANK, ONLY FLOAT OR LIQUID TYPE LEVEL SIDE GLASS IS USED FOR TANKS LEVEL MEASURING.

REFERENCE DOCUMENTS:

REV. No.	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED
01	ISSUED FOR CONSTRUCTION	12 FEB 2016	CST	JCW	PD
00	ISSUED FOR CONSTRUCTION	22 JAN 2016	CST	JCW	PD
A	ISSUED FOR APPROVAL	18 DEC 2015	CST	JCW	PD

PROJECT: ARMADA LNG MEDITERRANA-MALTA FSU

PROCEANIC

TITLE/SUBTITLE: SOUND AND SCUPPERS DIAGRAM

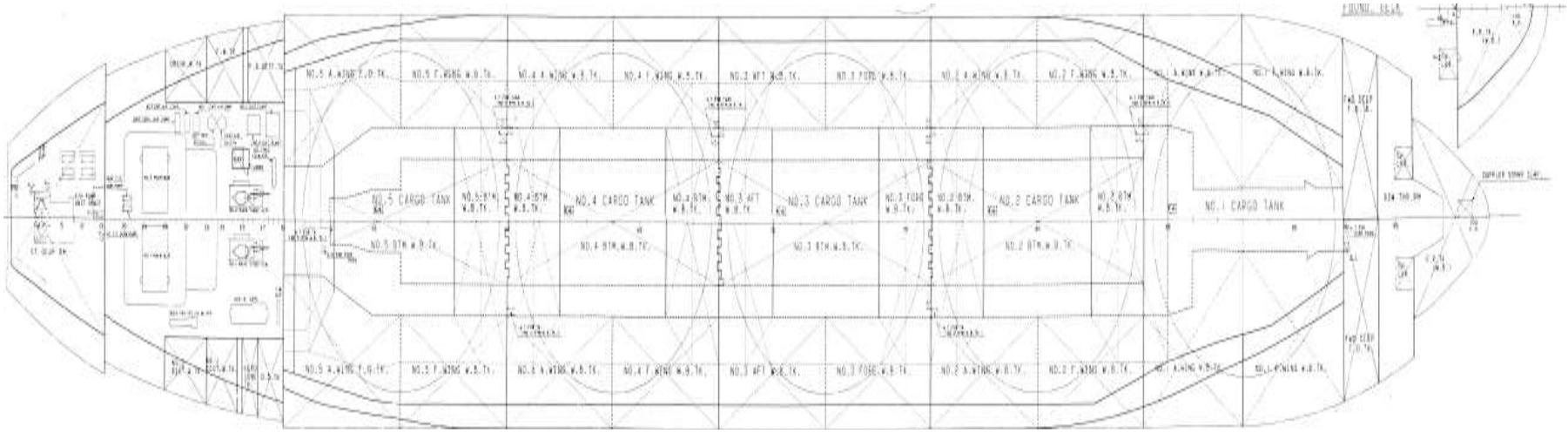
CLIENT: ElectroGas Malta

CLIENT DWG No.: 21003-PES-50821-MA-DW-0001

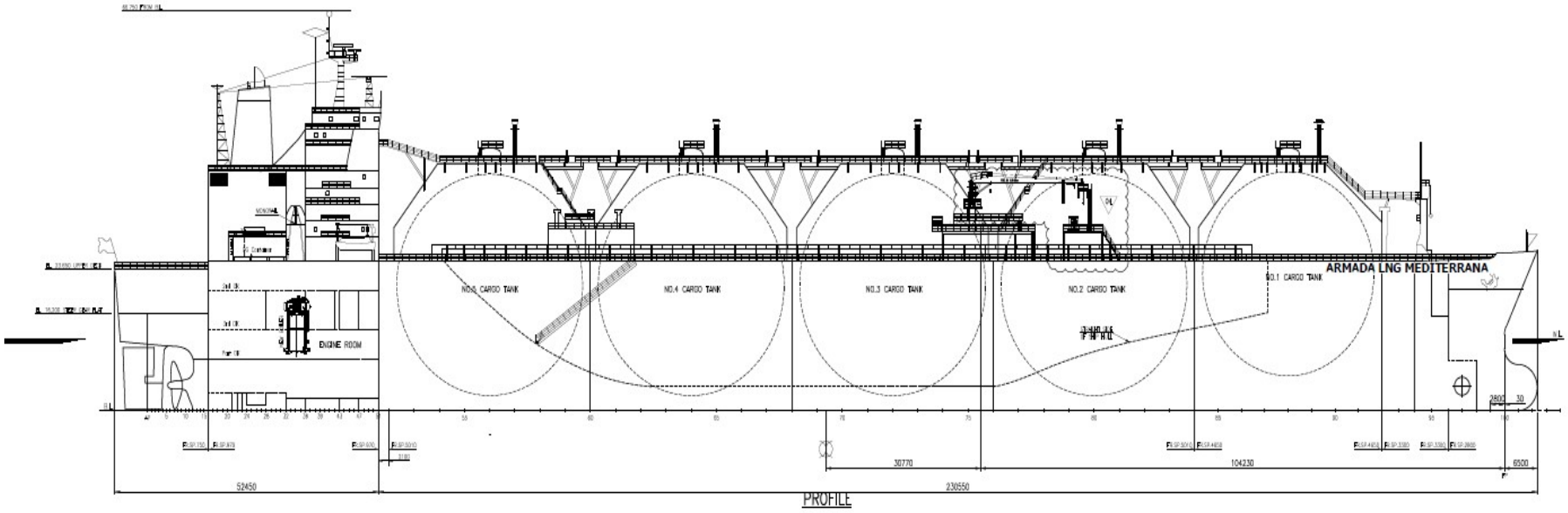
DRAWING No.: PES-BA-2015-076-DW-3101

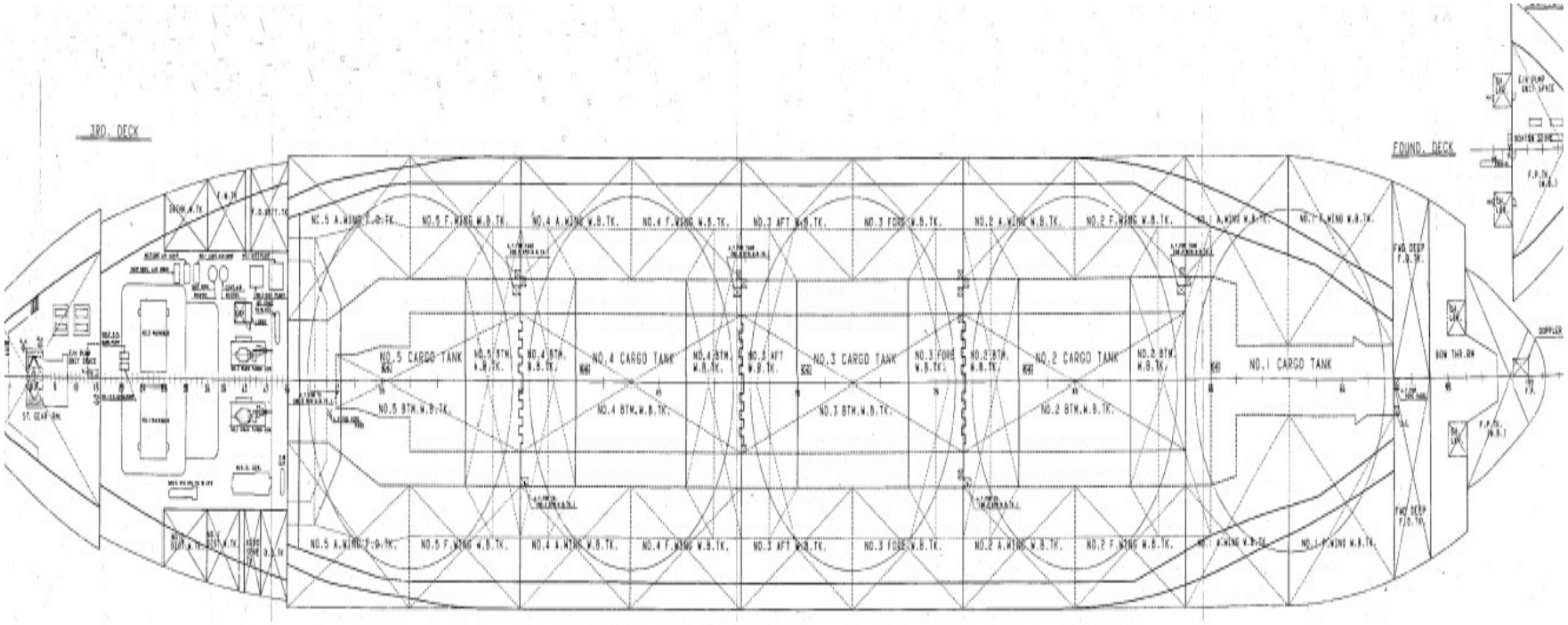
SHEET	REVISION	FORMAT	SCALE
3/4	01	A3	NTS

APPENDIX H SEDIMENT SAMPLE POINTS FROM BALLAST WATER TANKS



APPENDIX I SCHEMATIC DRAWING OF THE BALLAST ARRANGENT.





APPENDIX J AIR PIPES & VENT HEADS