THE COMMONWEALTH OF THE BAHAMAS

"M.V. Mozu Arrow"

IMO Number: 8918227
Official Number: 726183

Report on the investigation into the fatal injuries which were sustained by a crew man during an enclosed space rescue drill on the 26th January 2013.

The Bahamas Maritime Authority investigates accidents at sea for the sole purpose of discovering any lessons which may be learned with a view to preventing any repetition. It is not the purpose of the investigation to establish liability or to apportion blame, except in so far as emerges as part of the process of investigating that accident.

It should be noted that the Bahamas Merchant Shipping Act, Para 170 (2) requires officers of a ship involved in an accident to answer an Inspector's questions fully and truly. If the contents of a report were subsequently submitted as evidence in court proceedings relating to an accident this could offend the principle that a person cannot be required to give evidence against himself. The Bahamas Maritime Authority makes this report available to any interested parties on the strict understanding that it will not be used as evidence in any court proceedings anywhere in the world

Date of Issue: 12th September 2013
Bahamas Maritime Authority
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List of Appendices:

1 SUMMARY

1.1 On the afternoon of the 26th January 2013, whilst on passage between Portocel, Brazil and Baltimore, USA, the Bosun on board the forest products carrier *Mozu Arrow* fell some eleven metres to the bottom of the Number 4 Port Ballast Tank, sustaining fatal injuries.

1.2 At the time of the accident, the ship's crew were participating in a routine drill and exercise entailing the simulated rescue of a crew member from within an enclosed space, as required under the M.S (Entry into Dangerous Spaces) Regulations 1988. . As part of the exercise, the Bosun and Third Officer were assigned duties inside Number 4 Port Ballast Tank to prepare the simulated casualty, in this case a dummy, for stretcher evacuation.

1.3 Once the drill briefing had been conducted with the Chief Officer, the Bosun and Third Officer entered the tank and successfully managed to locate the simulated casualty on the first stringer platform.

1.4 With a number of openings in the deck plating and no guard rails or fall barriers in place to protect the crew members involved however, this platform presented serious risk to the planned operation.

1.5 Whilst attempting to secure the dummy on to the ship's stretcher, the Bosun fell backwards into an opening in the platform plating.

1.6 The investigation found that the tank had been prepared and well ventilated, both naturally and forced, to enable an internal inspection of the space earlier that morning. The atmosphere had also been tested by the Chief Officer using a calibrated test meter both before and during the course of the exercise and was found to be suitable for entry.

1.7 A risk assessment had been completed for the planned entry into the ballast tank which identified that the height of the tank stringer platforms posed a hazard to safety. The use of a safety harness was therefore implemented as the most appropriate control measure to prevent injury. At the time of the accident during the enclosed space rescue exercise however, neither the Bosun nor Third Officer was wearing a safety harness.

1.8 The ordinary practice on board for enclosed space rescue exercises was to conduct them within a juice tank void where working platforms are much larger. A secondary risk assessment had therefore not been completed for the planned emergency drill within this ballast tank space.

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2 PARTICULARS OF VESSEL

2.1 The M.V Mozu Arrow is an all welded, totally enclosed forest products carrier with ten cargo holds. The ship was constructed in 1992 in the Mitsui ship yard in Tamano, Japan and was later modified in 2009 with the installation of six refrigerated Juice tanks.

2.2 The following principal particulars were noted:

FLAG/PORT OF REGISTRY:	Bahamas / Nassau
IMO No:	8918227
OFFICIAL No.	726183
BUILD:	1992, Mitsui Shipyard. Tamano, Japan
REGISTERED OWNER:	Gearbulk Shipping, Bermuda
MANAGERS:	Gearbulk Norway
CLASSIFICATION SOCIETY:	Det Norske Veritas
GROSS TONNAGE:	28157
NET TONNAGE:	8841
LENGTH OVERALL:	185.2 Metres
BREADTH:	30.0 Metres
SUMMER DRAFT:	12.218 Metres
SUMMER D.W.T.:	41006.9
MINIMUM SAFE MANNING:	14

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3 NARRATIVE OF EVENTS

3.1 All times are given in Ships Local Time (UTC -4)

3.2 The accident involving the Bosun on board the *Mozu Arrow* occurred at approximately 1535 on the 26th January 2013 whilst the vessel was on passage between Portocel, Brazil and Baltimore, USA. The recorded position of the vessel at this time was given as Latitude 13 07.185'N Longitude 051 25.984'W.

3.3 *Mozu Arrow* had previously loaded bulk paper in Portocel and Orange Juice in Santos, cargoes destined for discharge in Baltimore, Maryland and Tampa, Florida respectively.

3.4 The morning of the 26th January had been occupied by routine ballast tank inspections, led and supervised by the ship's Chief Officer. After lunch that day, a tank casualty recovery drill had been planned. Ordinarily this drill would have taken place in one of the several juice module access spaces however, having No.4 Port Ballast Tank opened and fully ventilated for the mornings routine inspection, the Chief Officer suggested to the Master that the drill take place inside this tank instead. The Master had agreed.

3.5 At approximately 1530, the No.4 Port Ballast Tank was entered by the Bosun and Third Officer, together with a stretcher attached to the winch wire which was in turn fitted to a recovery Tri-Pod. The dummy casualty was located on the First Stringer Platform to simulate a crew member that had collapsed inside the tank.

3.6 The rescue procedure that was followed involved the Bosun and Third Officer placing the dummy casualty onto the stretcher and kneeling down to secure the straps in preparation for winching to commence. As the securing process was close to completion however, the Bosun stood up with a momentary loss of balance and attempted to grab the stretcher before falling backwards into an opening in the platform plating that was located directly behind him.

3.7 The Bosun fell some eleven metres down to the bottom of the ballast tank and lay motionless between the first and second frames. The alarm was immediately raised by the Third Officer using his UHF radio and the General Alarm was sounded from the Bridge to mobilise the remainder of the crew.

3.8 In an attempt to administer correct and appropriate medical treatment, the Master made contact with a medical guidance facility ashore. Noting that the Bosun was not showing any vital signs however, a number of crew members attempted to administer CPR both inside the tank and after his subsequent recovery to the ships hospital. Tragically, all attempts at revival proved unsuccessful.

4 ANALYSIS

4.1 During the course of the investigation, there was no evidence to suggest that the effects of fatigue, drugs or alcohol contributed to this accident. The Post Mortem examination of the casualty found no evidence of recreational drugs or alcohol in the casualty's system that may have impaired his ability or balance in any way.

4.2 In terms of work experience, the Bosun had been employed within the marine sector for over twenty years. At the time of the accident he had served a total of forty three days of a nine month contract. The investigation found no evidence to suggest therefore, that the fall could be attributable to a lack of competency or inexperience.

4.3 The manning arrangement on board at the time of the accident was in full compliance with the Minimum Safe Manning Document as issued by the Bahamas Maritime Authority. In addition, nearly all crew members on board were Philippine nationals with a common working language of Tagalog. The investigation found no evidence to suggest therefore, that this accident could be attributed to any crewing or language issues on board.

4.4 The weather conditions and sea state at the time of the accident may have affected the safe footing of the crew members involved in this simulated casualty recovery exercise. Reported conditions at the time, as stipulated in the deck log book, were moderate to rough beam seas.

4.5 The decision to conduct this exercise inside No. 4 Port Ballast Tank however, was not considered to have been a contributing factor to this accident. Seafarer's, by virtue of their isolated working environment, need to be fully prepared for any emergency situation, regardless of location. It is entirely necessary therefore, to vary the type and location of drill scenarios to the greatest extent practicable while maintaining a high degree of safety.

4.6 The working area that was available on the first stringer platform inside No. 4 Ballast Tank was indeed restrictive and the lack of any guard rails or fall barriers made the location potentially more hazardous to the two crew members who were involved.

4.7 The No. 4 Port Ballast Tank was reportedly adequately illuminated to ensure maximum situational awareness. It was considered within the course of this investigation therefore, that the Bosun was indeed aware of his surroundings and the location of the deck plating opening which was directly behind him.

4.8 The lack of any specific risk assessment in preparation for the emergency rescue drill inside No.4 Port Ballast Tank prevented the prevailing hazards from being properly identified and in turn, the necessary precautionary measures from being taken to protect the crew members involved.

5 CONCLUSIONS

5.1 The fatality of the Bosun on board the *Mozu Arrow* on the afternoon of the 26th January 2013 was attributed to multiple injuries sustained from a fall of eleven metres inside the No.4 Port Ballast Tank.

5.2 At the time of the occurrence, the Bosun was at the beginning of a nine month contract. He was well rested having only started his shift a few hours before and had no traces of alcohol or recreational drugs in his system.

5.3 Although the weather conditions at the time of the accident were not ideal, they were not considered to have posed any serious risk to the planned operation.

5.4 In taking the opportunity to practice a casualty recovery from an unusual space as and when the opportunity permitted, the on board management team were effective in ensuring the full emergency preparedness of the ship's crew.

5.5 The decision to undertake the planned exercise inside Number 4 Port Ballast tank was taken on the basis that a tank inspection had been conducted earlier that morning. Although all necessary precautions had been taken in terms of properly ventilating the space and providing adequate illumination, there were no temporary guard rails or fall barriers put in place around the deck plate openings which were located close to where the exercise was to take place. This lack of preparation was considered a direct result of failing to complete a proper risk assessment for the planned drill.

5.6 The risk of falling from height within the Ballast tank space had been correctly identified during the risk assessment that was undertaken for the tank inspection earlier that day. There was however, no evidence of a permit to work being completed for working at height within the space. Such a critical oversight is considered attributable to the fact that the safety checks and documentation completed prior to commencing the operation were both checked and verified by the same individual, providing no opportunity for error crosscheck

5.7 In failing to ensure that the crew members who were involved in the operation were wearing the correct personal protective equipment (PPE), with particular reference to a safety harness, it is evident that the relevant company procedures were not properly followed.

5.8 The actions of the ship's crew in the immediate aftermath of this tragic accident however, are to be commended. A full level of preparedness and commitment was demonstrated at every level.

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6 RECOMMENDATIONS

Recommendations for the operator:

6.1 The operator should ensure that crew members undergo sufficient training with regards to the safe practice of enclosed space entry procedures and the proper identification of risk with a particular focus placed on the use of Permits to Work.

6.2 The operator should ensure that senior officers receive appropriate refresher training in the duties of the shipboard safety officer.

6.3 The operator should ensure that the safety precautions and checks conducted as part of the risk assessment/permit to work system on board are checked and correctly verified by two independent officers prior to commencing any hazardous activity.

6.4 The operator should ensure that crew members are fully familiar with all company and shipboard operating procedures including the completion of appropriate documentation as required.

6.5 The operator should ensure that full risk assessments are completed on board for any potentially hazardous working activity including emergency drills

6.6 Under the requirements of the M.S (Health and Safety – General Duties) Regulations 1984, the operator should ensure that appropriate fixed or temporary structural measures (e.g. railings, barriers etc.) are put in place to protect crew members working at height.

6.7 In accordance with the provisions set out under the M.S (Protective Clothing and Equipment) regulations 1985, the operator should ensure the proper and correct use of Personal Protective Equipment (PPE) as may be required by the operation

The Bahamas Maritime Authority notes that positive steps have been taken by the vessel managers in the aftermath of this accident to ensure a fleet wide awareness of the risks associated with enclosed space entry.

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II. **Completed Risk Assessment for inspection of No. 4 Port Ballast Tank.**

III. **SMS Extract – Enclosed Space Entry Procedures – Gearbulk**

IV. **SMS Extract – Working Aloft – Gearbulk**

V. **SMS Extract – Conducting Risk Assessments – Gearbulk**

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Appendix I: No. 4 Port Ballast Tank 1st Stringer Platform
(*Note: Location of simulated casualty and proximity to plate opening)*

Appendix II: Completed Risk Assessment for Inspection of No.4 Port Ballast Tank

(Note: Correct Identification of working aloft hazard)

GEARBULK

Mozu Arrow		Risk Assessment	
Report Title	WATER BALLAST TANKS INSPECTION	Report ID	MOZ-00093
Report Date	25/01/2013	Current Status	Approver
Vessel/site Name	Mozu Arrow	Current responsible	Mozcap
Vessel Group	Gearbulk	Created By	mozco
IMO no	8918227	Observer	mozco
Risk Type	Personnel	Activity	Deck maintenance
Area	BALLAST TANKS	Location	Ocean Voyage

Details

No.	Description of the initial activity and hazard	Risk Rating	Control measure to reduse hazard	Residual Risk Rating
1	**Activity:** Inspection tanks compartments **Description of hazard:** working aloft **Existing control measures:** Enclosed space checklist and general safety procedures and existing fixed lighting system **Event type:** Exposure to health hazards / FALL	9	Wearing of safety harness provide communication equiptment	1
2	**Activity:** **Description of hazard:** lack of oxygen possible presence of nitrogen. **Existing control measures:** Enclosed space checklist and general safety procedures and existing fixed lighting system **Event type:** Exposure to health hazards	9	Checking of atmosphere condition prior entering proper ventilation use of breathing apparatus and carrying of oxygen meter.	1

Risk Assessment verified and accepted (date): 25/01/2013

Officer in Charge:

Safety Officer:

Other:

Attachments:

Appendix III: SMS Extract – Procedure for Enclosed Space Entry - Gearbulk

GEARBULK

Enclosed Space entry and Work - Non Tank

Doc. No.: 0307.22
Revision No.: 01
Rev. date: 25.05.2012
Appr. by:

General procedure	In order to evaluate the safety risk related to entry and work in enclosed spaces, a Safe Job Analysis (SJA) shall be performed. A signed and approved SJA shall serve as a basis for the issuance of enclosed space entry permit A separate Work Permit shall be issued for Cold/ Hot Work.	SJA
Guidance Ballast Tanks	No one shall enter a ballast tank before the atmosphere has been checked for Oxygen content. For safe entry and work: **The Oxygen content shall be about 21% for entrance without Breathing Apparatus.** If there is reason to believe that oil or other toxic substances have contaminated ballast water, additional checking must be carried out. During work in ballast tanks, CO and toxic gases may contaminate the atmosphere and Oxygen may be reduced due to insufficient ventilation. This must be taken into consideration when issuing Work Permit (Duration of Work Permit)	Enclosed entry permit
Guidance Bunker Tanks	No one shall enter a bunkers tank before the atmosphere has been checked for Oxygen content. For safe entry and work: **The Oxygen content shall be about 21% for entrance without Breathing Apparatus.** For entrance and work additional safety risks will be Hydrocarbon Gases and possible other toxic substances in Bunkers Oil, such as Hydrogen Sulfide (H2S). For safe entry and work (hot and cold) a reading of **no more than 1% LEL must be obtained on a combustible gas indicator.** Sufficient equipment for adequate measuring of suspected toxic gases must be onboard.	Enclosed entry permit
Guidance Cargo Holds	No one shall enter a cargo hold or adjacent spaces which have been closed for some time before the atmosphere has been checked for Oxygen content. For safe entry and work: **The Oxygen content shall be about 21% for entrance without Breathing Apparatus.**, If there is reason to believe that there could be toxic gases present due to but not limited to carbon monoxide emission from forest products or remnants of fumigation gases additional checking of the atmosphere must be done. Sufficient equipment for adequate measuring of suspected toxic gases must be onboard.	Enclosed entry permit Emission of Toxic Gases from Cargo - GB Vessels Fumigation of Cargoes - GB Vessels Dangerous goods certificate - Gearbulk
Marking of hold access hatches and doors	The following sign shall be marked on all access points to enclosed spaces including cargo holds that have been closed for some time and cargo holds where one suspect presence toxic gases: **DANGER LACK OF OXYGEN,** Do not enter without permit	Warning Signs Enclosed Entry Permit

Appendix III Cont.

GEARBULK

Enclosed Space entry and Work - Non Tank

Doc. No.: 0307.22
Revision No.: 01
Rev. date: 25.05.2012
Appr. by:

	The warning sign shall for ballast and bunkers tanks be welded & painted clearly visible next to the entrance. For cargo holds be placed clearly visible next to the entrance if hold has been closed for some time or one suspect lack of oxygen or toxic gases. The Entry Permit shall be displayed by the access when the atmosphere has been found safe for entry. The validity of the entry shall always be stated on the sign. **Oxygen content shall be about 21 %** **Hydrocarbon gas content shall be maximum 1% of LEL** For more detailed information ref. ‖ Code of Safe Practice for Solid Bulk Cargoes‖ (BC Code).	
Guidance For Measuring Atmosphere In Enclosed Spaces	Instruments used for measuring must be properly calibrated in accordance with manufacturer instructions. **OXYGEN MEASURING:** When tanks/ compartments shall be entered from top, the measurements shall be carried out through hose down to the bottom, and measured at 3 levels, and result entered into the form. If there is reason to believe that ventilation is not effective, the enclosed space to be evacuated, and all work to be stopped. When the ventilation has been restored, new measurements must be taken at various positions in the tank. If a job is scheduled / expected to take more than one working day, a new entry procedure and issuance of entry permit to be done every subsequent day. **HYDROCARBON GAS MEASURING:** Before entry, measuring of hydrocarbon gas shall be taken from around the tank and also close to the worksite. For other tanks/ compartments, measurements for Hydrocarbon gases shall be carried out if there is a risk that hydrocarbon gas may be present. **TOXIC GASES MEASURING:** *If there is suspicion of other toxic gases, breathing* apparatus shall be used or proper measuring instruments obtained.	Emission of Toxic Gases from Cargo - GB Vessels Fumigation of Cargoes - GB Vessels Dangerous goods certificate - Gearbulk
Safety Equipment	The following equipment shall be readily available and ready for immediate use: One self contained breathing apparatus	Enclosed entry permit

Appendix III Cont.

GEARBULK

Enclosed Space entry and Work - Non Tank

Doc. No.: 0307.22
Revision No.: 01
Rev. date: 25.05.2012
Appr. by:

	One resuscitation equipment One emergency breathing apparatus One rescue harness complete with lifeline At least one safety torch (ex proof), fully charged Personal measuring instrument, measuring O2, HC, H2S and CO shall be carried by one of the personnel entering an enclosed space even when an entry permit is issued.	
Control of enclosed space entries	One signal man to be present at the point of entry at any time. The OOW to be informed by the signal man about all personnel entering and leaving the enclosed space. A record of personnel entering and leaving the enclosed space shall be kept by the OOW. This list to be filed together with the entry permit after completion of the work. In addition to the signal man, at least one person entering an enclosed space shall carry a radio	Enclosed entry permit List of personnel entering & leaving
Multiple entry permit	One entry permit to be issued for each enclosed space intended to be entered. It is not allowed to enter more than one space pr permit.	
Filing of Entry Permit	Enclosed space entry form shall be filed together with all relevant documentation for the actual job. (I.e SJA and List of personnel entering / leaving)	

- enclosed space entry.pdf

- Work Permit - Deck and Cranes - GB1.doc

Appendix IV: SMS Extract – Working Aloft (Gearbulk)

Purpose

The purpose of this procedure is to ensure that proper precautions are taken with regard to personal safety when working aloft or outboard.

Procedure

KEYWORD	ACTIVITY	DOCUMENT
General Procedure	• Working aloft is defined as working in a height of 2 meter and above • In order to evaluate the safety risk related to work aloft and work outboard, a Safe Job Analysis (SJA) shall be performed. • A signed and approved SJA shall serve as a basis for the approval for work aloft or outboard	
Responsible	Chief Officer is responsible for safe rigging of equipment such as Stages, bosun's chair, ladders, ropes, wires, nets, safety harness with lifeline, planks, tools etc. The Ch. Off can not delegate this responsibility. Personnel involved has a individual responsibility to use personal protective equipment (PPE)	
Work Aloft	All personnel working aloft shall wear Safety Harness with lifeline attached to a proper strong point. Stages, bosun's chair, ladders etc. used for the work shall be properly secured. All equipment such as Stages, bosun's chair, ladders, ropes, wires, nets, safety harness with lifeline, planks, tools etc., shall be checked for any damage or defects. Ropes may be weakened due to chemicals, oil, greases, etc. If any doubt regarding the condition, use new equipment. Inform bridge, if maintenance on or in vicinity of radar, whistle or antenna system. Proper warning sign shall be displayed at operator's panel / starting switches	

Appendix IV: Cont.

Work Outboard	Work outboard is normally prohibited while vessel is underway or during cargo operation. • Certain work tasks such as rigging of gangway while the vessel is underway must be approved by the Master. • Personnel shall wear Safety Harness and inflatable Life Jackets during such work. Work outboard shall always be approved by the Master. • All personnel working outboard shall wear Safety Harness with lifeline attached to a proper strong point onboard, and an inflatable life jacket to be used. • A life buoy with line properly secured onboard shall float on the water downstream of work site. • Personnel working outboard shall be in communication with or be attended by personnel onboard. • Stages, bosun's chair etc. used for work shall be properly secured All equipment such as Stages, bosun's chair, ladders, ropes, wires, nets, safety harness with lifeline/fall arrestor, planks, tools etc., shall be checked for any damage or defects. Ropes may be weakened due to chemicals, oil, greases, etc. If any doubt regarding the condition, use new equipment. Any damaged gear shall be removed and disposed off in a proper Way	

Appendix V: SMS Extract – Risk Assessments (Gearbulk)

General
This document is to establish a common procedures for conducting a Risk Assessment at the vessel level for vessels managed by GBN.

The objective is to reduce frequency and consequence of accidents and incidents in vessel operations or tasks undertaken through higher risk awareness.

Risk assessment (RA)
Risk assessment is a systematic approach to review and evaluate all hazards and potential hazards prior to a given work activity, operation or task. Identifying hazards then allows actions or safeguards to be implemented reduce, control or eliminate identified hazards during preparation and execution of the task, thereby reducing the risk to health and safety of the seafarers involved or to the safety of the vessel, cargo or environment.

In this context, the term hazard is defined as follows: *A physical situation with the potential for causing harm to people, property or the environment.*

Definitions
The following definitions shall be used for all risk assessment work, incident investigation and documentation in GBN.

Incident-Loss	An undesired event which results in harm to people or damage to property or environment. Included in this definition are crew injuries (in GISS IR reporting also illness/disease), pollution, cargo damage, vessel casualties (including breakdown of machinery/ equipment etc)
ALARP	As Low As Reasonable Practicable
Hazard	A physical situation with the potential for causing harm to people, property or the environment.
Incident - No Loss	An undesired event with no consequences or loss
Risk	Risk is the change of something adverse happening. Risk is the product of frequency (likelihood, probability) and the consequence of a specified hazardous event. Risk = Frequency x Consequence
Risk Analysis	A systematic use of available information to identify hazards and to estimate the risk
Risk Assessment	The overall process of risk analysis and risk evaluation
Risk Management	A systematic application of GBN management policies, procedures and practices to the tasks of analysing, evaluating and controlling risk
Safety	Freedom from danger (risk), or the situation where the overall risk is judged to be As Low As Reasonable Practicable (ALARP)

When to do a risk assessment
A risk assessment / safe job analysis is required whenever any hazards or risks are present or may arise associated with the actual work or operation to be undertaken, that are not sufficiently identified and controlled through existing relevant procedures in GISS.

What this means is;
- If there is a procedure in place for the operation or task follow the procedure.
- If the procedure does not cover all hazards and risks do a risk assessment.
- If there is no procedure in place do a risk assessment.

Risk assessment group on board
To carry out a risk assessment, a group of the relevant personnel on board should be established, composition based upon the task or operation to be undertaken, however all

Appendix V: Cont.

personnel actively involved in the preparation and execution of the work or operation should be participants in the risk assessment group.

The group should have good knowledge of all the procedures and technical issues connected with the task or operation and should consist of key crew members, operational and management level Officers as appropriate. The group should preferably not be larger than 7 persons (but should be at least 3) .and should be chaired by either the relevant Head of Department or the Master.

It is important that all participants in the group have the opportunity to provide input and that the analysis is understood by all the involved seafarers.

Factors to be taken into account when evaluating the need for risk assessment

- Is the work or operation to be carried out described in procedures?
- Are all hazards/ risk factors identified and controlled in associated procedures?
- Are the circumstances different from previous operations/jobs?
- If any of the above factors are answered with no, a risk assessment should be carried out.
- Any relevant health and safety statistical information provided by the management
- Any health and safety statistical information provided by Flag State

Evaluating risk

The following process is to be used to further evaluate risk;

- Has this type of work or operation been prone to incidents/ accidents?
- Is the work or operation considered risky, complex or does it involve several disciplines or departments?
- Are new types of equipment or methods used that are not covered by procedures or routines?
- Are the personnel involved inexperienced with the actual work or operation?
- Are there any changes of normal and safe working environment?
- Is the planned work or operation posing a hazard to health or safety, such as;

o The use of high pressure equipment
o The use of equipment producing dust
o The use of equipment producing excessive temperature (high or low)
o The use of equipment producing excessive vibration
o The use of equipment producing excessive noise
o The use of equipment producing electromagnetic radiation
o Exposure to chemicals and biological agents
o Work in an enclosed space
o Working aloft or over the side
o Working with systems that have or may have contained heated media
o Working with systems that have or may have contained a pressurised media
o Electric current
o Adverse weather conditions
o Working with or lifting heavy objects
o Bunkering
o Mooring/anchoring lines and chains
o Dangerous cargo or ballast
o Cargo operations that have not been conducted before
o Loading and unloading of equipment or stores
o The use of lifting equipment, including ship's cranes if appropriate
o The use of any other equipment or machinery that may have associated health or safety risks
o Any other harmful ambient factors such as, emissions, smoke, asbestos etc

Appendix V: Cont.

If any of the above factors are answered with yes, a risk assessment should be done.

If the same work or operations have been carried out previously and a risk assessment was undertaken before, the previous risk assessment can be used for guidance. In such cases previous risk assessments are to be revalidated by the risk assessment group. Revalidation is to include evaluation of all current conditions that will or may pose hazards and any mitigating factors to reduce or eliminate the risk.

How to conduct a risk assessment

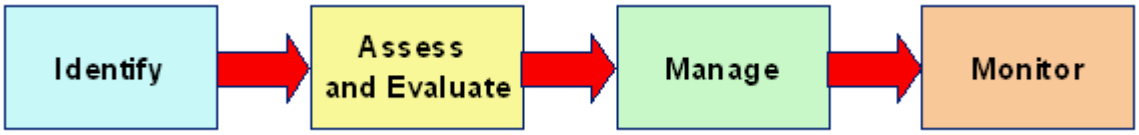
The following steps are guidance as to how a risk assessment should be undertaken;

I. Break the work down into basic steps allowing each step and the sequence of the work to be understood by the involved personnel.
II. Identify the hazards and risks of each step
III. Evaluate the likelihood and severity of the consequences, i.e. the risk in each step.
IV. Identify measures that eliminate or control the hazards and risks
V. Evaluate the remaining risk
VI. Document the results of the risk assessment in GISS IR, including identified risk reduction measures.
VII. Manage the risks
VIII. Monitor the task or operation

Participants in the risk assessment group have to use their knowledge and experience to make sound evaluations in terms of risk and actions to reduce risk.

Finally the risk assessment group are to make a complete evaluation of the work and draw a conclusion as to whether the work can be carried out or not. The risk assessment is to be approved by the risk assessment group and the Master.

The below simple diagram shows the steps;



Risk assessment points

The person responsible for the risk assessment is to ensure that the following are included;

- The actual work to be done.
- Regulations, guidelines, procedures and best practices concerning the work
- Available and relevant preparatory material.
- Evaluate the need for a work site inspection. In many cases it will be necessary to carry out an inspection on the work site as part of the risk assessment.
- The need for any specific equipment training.
- The need for written instructions.
- The need to consult the equipment makers manual.
- The tools to be used and that they are are in good condition and all safe guards are in place
- Proper personal protective equipment (PPE) is available, in an acceptable condition and that those undertaking the task or operation know that it is to be used and how to use it.
- What applicable safety measures are required, who will ensure they are in place & how they will ensure all is in place prior commencing the task or operation.
- Who will supervise the task or operation.

Appendix V: Cont.

When considering the above points the following areas where applicable should be incorporated into the risk assessment when evaluating actions to reduce any risks;

- General basic safety provisions and understanding
- Structural features of the ship
- Fire prevention and fire fighting
- Physical occupational health risks
- Manual handling of loads
- Noise
- Vibration
- Chemical and biological health effects
- Mental health effects
- Fatigue

Documentation and approvals

Risk assessments should be completed and filed in GISS IR.

If approval is required by the vessel's Superintendent any supporting documentation should be included in the GISS IR report.

If the residual risk after after control measures remains 8 or above the vessel's Superintendent is to be contacted for approval prior commencing the work or operation.

Qualifications and training

No formal qualifications or certification is required to perform a risk assessment, however it is important that all seafarers involved in the risk assessment process understand what is required and why.

This may mean Senior Officers on board training other seafarers with respect to the company requirements and the risk assessment process, starting by ensuring all those involved have read and understood this procedure.

Managing and monitoring

Once the risk assessment is complete and approved, the task can be undertaken, ensuring all the identified actions and safeguards are in place.

It is the responsibility of the person supervising the task or operation to monitor the work until completion. This person should be fully familiar with the risk assessment and the actions required to reduce any hazards and risks to an acceptable level.

Should circumstances change during the task or operation that could affect health and safety it may be necessary to stop the task or operation and re-evaluate or to put in place additional controls to bring any hazards or risks back to an acceptable level..

Appendix VI: Gearbulk – Permit to Work Format

Work Permit

(For Hot Work/Cold Work in enclosed spaces or Work on deck during gantry crane operations)
Original of Permit to be handed to person in charge of Work.
One copy to be filed in "File for Safety Check Lists".

LOCATION:		**TYPE OF WORK** Hot work / Cold Work / Work on deck during gantry crane operations (*)
No:	Permission valid max. ..... hours (at Master's discretion)	Date:
Work starts at:		Permission ends at:
Description of planned work:		
Equipment to be used:		
Special conditions:		

Based on the enclosed completed Check List, I hereby give permission to perform Hot Work/Cold Work/ Work on deck during gantry crane operations (*). The duration and condition for the work described in the permit shall be adhered to.
Date Master
I am aware of and accept the condition for the Hot Work /Cold Work/Work on deck during gantry crane operations (*) permit.
Date Signature of person in charge of work(*)

(*) Delete as appropriate