



MARINE ACCIDENT REPORT
DIVISION FOR INVESTIGATION OF MARITIME ACCIDENTS

TORM CAMILLA
Accident to seafarer 11 November 2009
Fall in fore peak tank

SØFARTSSTYRELSEN, Vermundsgade 38 C, 2100 København Ø.*
Tlf. 39 17 44 00, Fax: 39 17 44 16 CVR-nr.: 29 83 16 10
E-Mail: oke@dma.dk - www.sofartsstyrelsen.dk

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The picture on the front page shows TORM CAMILLA at the roads of Freeport. Picture by the Division for Investigation of Maritime Accidents.

The casualty report is available on our homepage: www.dma.dk at the following link:
<http://www.dma.dk/Investigation/Sider/Mainpage.aspx>

The Division for Investigation of Maritime Accidents

The Division for Investigation of Maritime Accidents is responsible for investigating accidents and serious occupational accidents on Danish merchant and fishing vessels. The Division also investigates accidents at sea on foreign ships in Danish waters.

Purpose

The purpose of the investigation is to clarify the actual sequence of events leading to the accident. With this information in hand, others can take measures to prevent similar accidents in the future.

The aim of the investigations is not to establish legal or economic liability.

The Division's work is separated from other functions and activities of the Danish Maritime Authority.

Reporting obligation

When a Danish merchant or fishing vessel has been involved in a serious accident at sea, the Division for Investigation of Maritime Accidents must be informed immediately.

Phone: +45 39 17 44 00
Fax: +45 39 17 44 16
E-mail: oke@dma.dk

Cell-phone: +45 2334 2301 (24 hours a day).

Contents

1	Summary	4
2	Conclusions	4
3	Preventive measures	4
4	Recommendations	5
5	The investigation.....	5
6	Factual Information	5
6.1	Accident data	5
6.2	Navigation Data.....	5
6.3	Ship Data	6
6.4	Vejrdata.....	6
6.5	The Crew.....	6
6.6	Narrative.....	7
6.7	Scene of the accident – The fore peak tank.....	7
6.8	Preparation, entry and accident.....	7
6.8.1	<i>Preparations before entering the tank</i>	8
6.8.2	<i>Entering the tank</i>	8
6.8.3	<i>The Accident</i>	9
6.9	Work/rest hours	10
6.10	Safety on board.....	10
6.11	Health treatment / evacuation / consequences	11
6.12	Port State Control.....	11
7	Analysis	12
7.1	Immediate causes	12
7.2	Contributory causes.....	12
8	Appendixes	14
8.1	Appendix A. Risk assessment for Working inside Tank	14
8.2	Appendix B. Points from took box meeting	15

1 Summary

ALL TIMES ARE IN LOCAL TIMES (GMT – 5)

TORM CAMILLA was on voyage from Houston to Bahamas with a cargo of 140,000 barrels of reformat. The ship left Houston on 9 November bound for Freeport.

On the voyage a replacement of the speed log transducer was to take place. The transducer is situated in the fore peak tank, and in order to carry out the replacement two teams were to enter the tank. It was decided to carry out the repair on 11 November 2009.

When entering the fore peak tank a fitter fell from the lowest platform in the tank to the bottom of the tank. A fall of 1.8 metres. The fitter suffered severe injuries and was on arrival Freeport brought ashore and hospitalized in Miami.

2 Conclusions

Immediate causes (7.1)

Unsafe actions:

- The Division of Investigation of Maritime Accident estimates that the risk of falling to a lower level in the tank has not been thoroughly assessed and no arrangement had therefore been made to prevent a fall.

Unsafe surroundings:

- The Division of Investigation of Maritime Accident estimates that the lack of sufficient handles and railing on the 3rd platform brought along a potential danger of falling.
- The Division of Investigation of Maritime Accident estimates that the circular holes in the platforms involve a potential danger of stumbling.
- The Division of Investigation of Maritime Accident estimates that the thin edges of the floor increases the injuries to a person falling on them.

The safety system (7.2)

- The Division of Investigation of Maritime Accident estimates that the type of safety helmet guarding against falling object does not offer sufficient protection against an impact to the head caused by a fall.

3 Preventive measures

- The TORM A/S has issued a report about the accident. This report is distributed to all ships in the company's fleet and is to be discussed at safety committee meetings.
- A railing or a protection plate is to be fitted to the bracket in the forepeak tank. All sister ships in the fleet have received the same order.

- A general cargo- and ballast tank safe access review will be initiated on board all vessels as a job order within the planned maintenance system and to be completed latest at next dry-dock.

4 Recommendations

The Division of Investigation of Maritime Accident recommends:

1. The ship is recommended to evaluate all personal safety equipment to ensure that the equipment yields the necessary protection at any time. Special emphasis shall be given to hard hats/safety helmets.
2. The ship is recommended to evaluate and revise the work risk assessment focusing on the danger of falls.

5 The investigation

The Division for Investigation of Maritime Accident went on board TORM CAMILLA on 15 November to carry out investigation and examination of the scene of the accident. The ship was then lying on the roads to Freeport. At the investigation the site of the accident was rigged exactly as on the day of the accident, and the sequence of events was repeated by the crew members taking part in the operation leading to the accident.

Statements were taken from the master, the chief engineer, the chief officer, an AB and the trainee pump man. Furthermore information was received from the shipping company.

6 Factual Information

6.1 Accident data

Type of accident (the incident in details)	Fall in the forepeak tank to a lower level
Character of the accident	Severe injuries due to fall
Time and date of the accident	11 November 2009 at 0907
Position when the accident occurred	24°20' N - 084°31' W
Area of accident	The Mexican Gulf
Injured person	A fitter
Evacuation of the injured person	The injured fitter was brought by shore boat to Freeport and later hospitalized in Miami

6.2 Navigation Data

Port of departure	Houston
Stage of navigation	During transit
Port of arrival	Freeport, Bahamas

6.3 Ship Data

Name	TORM CAMILLA
Home port	Copenhagen
Call sign	OYZZZ
IMO No	9263693
Flag State	Denmark
Construction year	2003
Type of ship	Chemical/Products Tanker
Tonnage	30,024 GT
Classification Society	American Bureau of Shipping
Length	183.00 m
Engine power	8,185 kW at 121 rpm
Hull construction	Steel – double hull

6.4 Vejrdata

Wind – direction and speed	West – 8 m/s
Sea	1 m
Visibility	Good
Light/dark	Light

6.5 The Crew

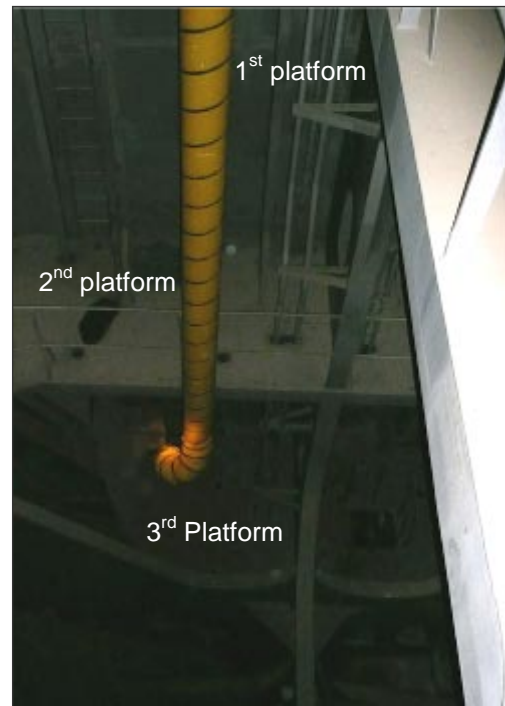
Number of crewmembers	23
Number of crewmembers certified to act as bridge watch	4
Watch on the bridge	3 shift
Occupation on board the ship at the time of the accident (crewmembers relevant to the accident)	Work experience
Master	Age 55. Has been serving as a master for 23 years. Prior to that he has been working as an officer and has served for a total of 35 years at sea. It was his first contract with TORM A/S and he signed on 13 October 2009. He is trained in disease treatment and disease prophylaxis on board ships.
Chief engineer	Age 36. Has been serving for 10 years at sea. Was assigned chief engineer 5 months ago. Joined TORM A/S in June 2007 and signed on TORM CAMILLA 11 September 2009.
Chief officer	Age 29. Has been serving for 10 years at sea. Joined TORM A/S 2½ years ago. Signed on TORM CAMILLA 11 September. He is trained in disease treatment and disease prophylaxis on board ships.
AB	Age 22. Has been serving for 2½ years at sea, of this 3 month on board TORM CAMILLA.
Trainee pump man	Age 25. Has been serving for 5 years at sea. Signed on board TORM CAMILLA 13 August 2009.
Fitter (The injured crew member)	Age 55. He was a skilled seafarer with at least 5½ years experience at sea. Signed on TORM CAMILLA 12 October 2009.

6.6 Narrative

TORM CAMILLA, a chemical/products tanker loaded with 140,000 barrels reformat, departed Houston on 9 November bound for Freeport, Bahamas. A change of a defect transducer for the Doppler speed log was planned to take place after departure from Houston. The transducer is situated in the fore peak tank. The ship received the spare parts on 4 November. Due to bad weather it was not possible to carry out the repair for the first two days of the voyage. In the evening of 10 November the weather was better and the ships management decided to replace the transducer to the following day. The replacement was planned to be carried out in daylight during normal working hours. A work risk assessment had been made by the chief engineer and had been discussed with the master and chief officer.

6.7 Scene of the accident – The fore peak tank

The fore peak tank consists of 3 platforms, 1st, 2nd and 3rd, connected by vertical steel ladders of an approximate length of 6 metres each. The platforms are staggered to prevent a fall of more than the height between the platforms. The platforms are fitted with railings and handles for safe traffic. The vertical steel ladders are not fitted with fall arrest fixing systems.



The lower platform is approximately 2 by 2 metres and has an entrance in the middle giving access to the bottom of the ship. On the platform there is a manhole to the well where the speed log is situated. On the port side of the platform there is a longitudinal bracket sloping from the transverse bulkhead on the aft part of the tank

and ahead. In the fore half of the platform the bracket flushes with the platform. There is an approximate height from the platform to the bottom of the tank of 1.8 metres.

All platforms in the fore peak tank has small circular openings to enable water to flow freely and to avoid sediment to settle on the platforms.

At the time of investigating the tank it was found dry and not slippery. Statements indicate that this also was the case at the time of the accident.

6.8 Preparation, entry and accident

6.8.1 Preparations before entering the tank

As the weather the next day was fair as expected the crew members taking part in the repair turned on at 0630 in order to make the fore peak tank ready for entry at 0800. The wind and the waves came in aft on the starboard quarter. This resulted in practically no movements of the ship. The repair was estimated to take between 6 and 8 hours. Crew members involved was the chief officer, the fitter, the trainee pump man and two AB's. At 0645 the manhole cover to the tank was removed and mechanical ventilation was commenced.

At 0800 the crew members gathered at the opening to the fore peak tank. Gas readings were taken and the oxygen level was measured to 20.9 %. No hydrocarbons were detected. The atmosphere in the tank was measured with a sample-line starting at the bottom and at various heights. 15 minutes prior to the measurements the ventilation had been stopped. A safe entry permit was signed off at 0800.

Approximately 20 minutes before entering the tank each crew member was informed by the chief engineer on the safety issues identified in relation to the replacement of the transducer. The crew members were told to work slowly and with great care as the work space on the 3rd platform was very cramped. The safety issues at this tool box meeting had been identified in a risk assessment made by the chief engineer. (Re.: appendix 2).

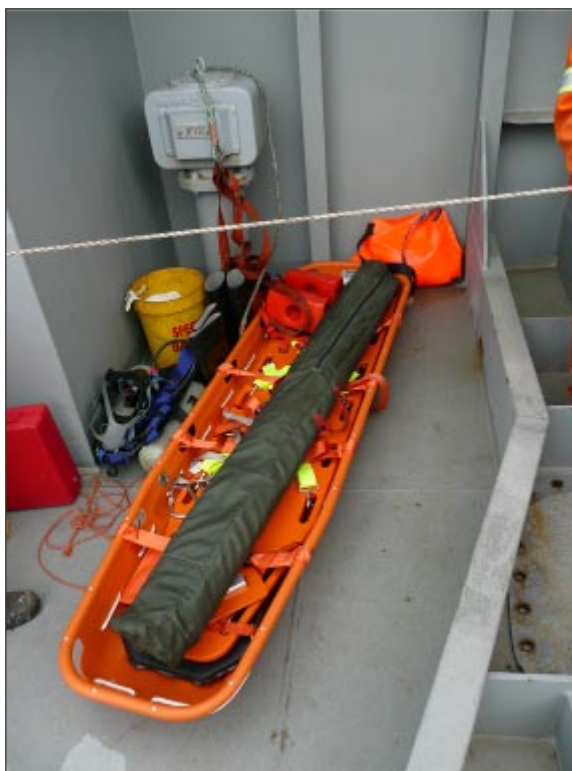
The fitter, who was injured in the tank, had been briefed personally about the job and risks related to it by the chief engineer in the engine room prior to the operation.

At the entrance to the tank safety equipment was placed. The equipment consisted of safety harness and life line for emergency evacuation, a stretcher, a resuscitation pack, emergency escape breathing device, emergency self contained breathing apparatus and first aid kit.

The chief officer established two working teams, one consisting of the trainee pump man and an AB. The other team was the fitter and an AB. The chief officer and the chief engineer were assigned to supervise the work inside the tank and an AB was standby at the tank entrance.

At 0830 the chief engineer completed a tool-box talk with all team members.

Ay 0805 the atmosphere was controlled again. Oxygen level was OK, and no hydrocarbons were detected.



Safety equipment at the entrance to the tank

The chief engineer personally controlled, that all team members were wearing safety helmets with the chin strap closed.

Two pneumatic lights were standby to be lowered in the tank in order to illuminate it.

6.8.2 Entering the tank

At 0855 the two AB's and the trainee pump man entered the tank to prepare for the work by removing the cover to the well containing the transducer. The new transducer was lowered to the uppermost platform (1st platform). An AB and the trainee pump man continued down to the 3rd platform in order to receive the tools and the transducer. Pneumatic lights were positioned at the 2nd and at the 3rd platform. The second AB situated on the 2nd platform to lower the tools and transducer to the 3rd platform. All persons to enter the tank were equipped with powerful torches strapped around the shoulders.

After 10 minutes the fitter entered the tank as last team member and went without stopping directly to the 3rd platform. The chief officer entered immediately after the fitter but at a lower speed. The chief engineer entered the tank as the last man. The Chief officer and chief engineer were to supervise the work. The crew members had been told to wait for the chief officer and chief engineer before starting the repair work.

6.8.3 The Accident

At 0906 the fitter reached the 3rd platform. The AB and the trainee pump man were positioned on the left side of the platform relative to the steel ladder. In order to provide a good illumination for the fitter they were directing their torches at the platform beneath the ladder.

After reaching the platform the AB and the trainee pump man observed that the fitter turned to his right and moving his torch light as to orientate himself. The AB and the trainee pump man advised the fitter about his steps. Suddenly the fitter first took a small succeeded by a large step forward. He lost his balance and fell to his left over the sloping bracket and down to the bottom of the tank. The height of the fall was approximately 1.8 metres. In the fall his head hits a floor knocking his safety helmet off. He landed on his back.

The AB on the 3rd platform immediately informed about the accident on the VHF. The chief engineer ordered the general alarm to be activated to muster all crew. Rushing to the bridge the master was informed by the OOW about the accident and ordered the OOW to announce it on the PA-system. Next the chief officer entered the fore peak tank bringing an emergency escape breathing device. From the 2nd platform he observed the fitter lying unconscious at the bottom of the tank. His head and



How the fitter hit the bottom



legs were resting against the floors with the body sagging in the space between the floors. Later the fitter rested lying on his back between two floors. Reaching the bottom of the tank the chief officer applied the emergency escape breathing device to the fitter. When the emergency self contained breathing apparatus was brought down it was applied to the fitter who quickly regained consciousness and he tried to remove the breathing device.

He seemed clear enough and was determined to climb to the platform by himself. To enable the entry to the platform a small portable ladder was lowered to the bottom of the tank and the fitter climbed to the platform.

On his own free will the fitter climbed to the weather deck. To make a safe exit from the tank he was fitted with a safety harness with a lifeline attached. He was also given his safety helmet on. He was given water and rest on the platforms on his way up. At 0950 the fitter was out of the tank.

Reaching the weather deck the fitter was brought to the ships hospital on a stretcher.

6.9 Work/rest hours

Records of hours of rest show, that all crew members were well rested on the day of the accident and on the days before the accident.

According to the Letter of Assignment the injured fitter had 8 hours of work every day from Monday to Friday - a total of 40 hours of work every week.

6.10 Safety on board

The risk assessment for replacing the transducer had specifically been drafted for this task. The assessment was made by means of the software program "Seahealth 2006" covering topics as "Instruction", "Accidents and injuries", "Illness", "Prevention", "Protection" and "Aids". (Re: Appendix A) Special attentions were given to the safe and secure moving around in the tank with focus on the possibility of slippery surfaces and areas with poor illumination.

All tools and the new transducer were all to be lowered down in buckets / straps. No persons were allowed to carry any tool by hand.

It is custom practice to use personal safety equipment on board. In relation to the task in the fore peak tank all participants in the operation were wearing boiler suits, safety shoes, gloves, safety goggles, hard hats with chin straps and torches. Each member in each working team was equipped with a personal gas detector and a gas detector was positioned on the deck with a sampling line continuously monitoring the lowest point in the tank. Additionally the team members as well as the chief officer and chief engineer were equipped with portable VHF's. During the operation in the tank it was agreed to give notification from the tank by VHF every 10 minutes. A tank entry log was kept at the entrance to the tank.

All new crew members are given familiarization rounds on the ship when signing on. They are shown all muster stations and their part and responsibility in the different rolls are explained to them. Check lists are used to ensure and document this familiarization. Crew members are also introduced to the work risk assessments. Copies of relevant works risk assessments are placed on strategic spot around the ship.

Before performing tasks on board work risk assessments are drafted and discussed. It is a standing order to any crew member immediately to stop any work if it feels unsafe. The chief officer explained that the crew members respond in a very positive manner to safety on board.

All crew members have their own personal safety equipment consisting of working clothes, safety shoes, gloves and safety helmet. Harnesses, VHF's and gas detectors and other safety equipment are available whenever necessary.

On the day of the accident the master initiated an extraordinary safety committee meeting at 1430 in order to clarify the circumstances of the accident. Crew members participating in the meeting were those who had been present in the forepeak tank when the accident happened. After an hour the meeting was closed.

A couple of days later a safety meeting was held with all the crew.

6.11 Health treatment / evacuation / consequences

After being given first aid in the fore peak tank the fitter was brought to the ships hospital where he was examined by the master. Both master and chief officer hold certificates in disease treatment and disease prophylaxis on board ships. Abrasion on the back of the head and right shoulder, heavy swelling on the right side of the forehead and stiffness and pain in back and back were observed. To test the level of conscious the fitter was asked basic questions which he answered. He had no recollection about the accident. The fitter felt nausea and vomited twice.

Radio Medical was contacted and briefed about the accident. Radio Medical advised cold pack for the swelling and to monitor the patient taking pulse- and blood pressure on a regular basis on the way to Freeport. A crew member was told to stay at the hospital to attend the fitter.

At 1400 Radio Medical was contacted again and given feed back on the fitter's health. Radio Medical advised some painkillers.

At 1800 the master was called to the ships hospital. The fitter had vomited again, the vomit containing blood. The master tried to have a conversation with the fitter but he was in general very drowsy and sleepy but responded to his name. Radio Medical was once again contacted and the master received the information that a blow to the head could cause drowsiness and sleepiness. The fitter was monitored during the night and a log was kept.

Radio Medical was again consulted at 1915 who informed the master that the symptoms observed were to be expected and that the fitter should be monitored closely. Radio Medical also advised the master to send the fitter ashore on arrival for medical check.

In the morning of 12 November the master again checked the fitter finding him feeling much better. The fitter ate well at breakfast and at arrival to the roads of Freeport he was sent ashore at 1112 hours by means of a shore boat. At the hospital he was thoroughly examined and a severe skull fracture with brain haemorrhage was diagnosed. He was put into medical coma and transferred to a hospital in Miami for treatment and recovery.

6.12 Port State Control

At 11 September 2009 TORM CAMILLA was subject to a Port State Control in Daesan, Korea.

At the control the Doppler speed log was found to be out of order. The Doppler speed log was ordered to be repaired not later the 10 December 2009.

No deficiencies in relation to the accident were found.

7 Analysis

7.1 Immediate causes

Unsafe surroundings

The fore peak tank was equipped with railing and handles to hold on to on the 1st and 2nd platform. However, on the 3rd platform in the tank there were not sufficient arrangements to prevent a fall to the bottom of the tank.

The Division of Investigation of Maritime Accident estimates that the lack of sufficient handles and railing on the 3rd platform brought along a potential danger of falling.



On all the platforms in the fore peak tank there are small circular openings to enable water to flow freely and to avoid sediment to settle on the platforms. These holes are large enough to enable the tip or heel of a shoe to get caught causing a person to stumble.



Holes in the platform where a shoe may be tripped

The Division of Investigation of Maritime Accident estimates that the circular holes in the platform bring along a potential danger of stumbling.

On the bottom of the tank there are floors with thin edges.

The Division of Investigation of Maritime Accident estimates that the thin edges of the floors increase the injuries to a person falling on them.

7.2 Contributory causes

The safety system

In general there is an efficient and well-run safety system and organisation on board. In relation to the repair in the forepeak tank a works risk assessment had been drawn up giving a lot of safety points to a tool box meeting. However, in the work risk assessment there had not been adequate focus on the risk of falling to a lower level in the tank thus recognising the danger of a fall.

The Division of Investigation of Maritime Accident estimates that the risk of falling to a lower level in the tank not has been thoroughly assessed and no arrangement had therefore been made to prevent a fall.

The ship was well equipped with personal safety equipment. At the accident the fitters' safety helmet was knocked of during the fall even though the chin strap was fastened.

The Division of Investigation of Maritime Accident estimates that the type of safety helmet guarding against falling object does not offer sufficient protection against an impact to the head caused by a fall.



Type of safety helmet used on board

8 Appendixes

8.1 Appendix A. Risk assessment for Working inside Tank

Revised on the: 11/11/2009

Printed on the: 11/13/2009

Working inside Tank



Sofartens Arbejdsmiljøråd

Replacement of Speed Log Transducer.

Instruction

- Give instructions on tank entering techniques and working postures.
- Make sure that the necessary medical supplies are available, including oxygen and antidotes.
- Make sure that eye drops are available.
- Familiarity with the ship's procedures for entry into and spending time in the tanks.
- Familiarity with the ship's procedures for getting people safely out of the tank and first aid.
- The handyman should remain at the entrance to the tank as long as anyone is inside the tank.
- As far as possible, avoid carrying tools and other heavy objects inside tank.
- As far as possible, use mechanical aids to reduce the time spent on the work, so that contact with chemical substances is limited.
- Do not run or rush up.
- Any doubts with Atmosphere or any alarms on oxygen meter. Come out of tank
- Lower the transducer gently as it is very delicate and expensive

Accidents and Injuries

- Falls.
- Presence of poisonous gases.
- Injuries caused by objects inside the tank.
- Lack of oxygen.

Illnesses

- Injuries caused by awkward working positions.
- Chronic diseases such as allergies, cancer or diseases of the nervous system through inhaling or contact with harmful vapours over a long period.
- When ventilating the manifold, there is a risk of allergies, poisoning, dizziness and discomfort - dependent on the product in the tank and dependent on whether or not the ventilation system forces gases and vapours up onto the deck.

Prevention

- Access routes with direct access to all working areas should be properly maintained.
- Manifold ventilation.
- Good lighting.
- Procedures for access to and time spent inside the tank.
- Procedures for cleaning the manifold.

Protection

- Hard hat.
- Goggles.
- Nose mask with filter.
- Protective clothing.
- Protective gloves.
- Knee protectors.
- Safety shoes.
- Lifeline.
- Stretcher Standby

Aids

- Portable gas meters
- Walkie-talkie.
- Adequate Illumination / Torch lights
- Weldon pump standby for emergency.

1 / 2

Read More

- Ergonomics.
- Chemicals and paint.

8.2 Appendix B. Points from tool box meeting

At a tool box meeting before entering the fore peak tank the following points were discussed and stressed upon.

1. Scope of job, where the transducer in question had to be removed and replaced with a spare Transducer.
2. It was discussed that the tank may be slippery at places and crew was advised to be slow in movements and cautious.
3. The Transducer weight was heavy and the transducer had to be packed, put in a bucket and lowered through a tackle.
4. All other tools required will be lowered through buckets.
5. A Weldon pump had to be kept standby at the cofferdam where transducer was Located in order that in case some water is ingressing from the valve same be pumped out from the cofferdam to forepeak tank.
6. It was agreed that should leakage be excessive, the work will be immediately stopped. Crew was advised to open the transducer cover slowly and check for leakage at each step during opening.
7. It was also decided to keep a running a power pack, prior to removing sensor. Should the ballast pump be required
8. Each one entering the tank was advised to carry a torch hanging to his neck/shoulder.
9. Two teams were made one consisting of Fitter and AB2, who will be removing the transducer and other one consisting of AB1 and Trainee Pumpman who will be cutting and removing the cable as the first step. Each team was handed over a portable gas meter.
10. Elect Officer was assigned to be on top, disconnecting cable from ECU in Fwd store and then getting that pulled up after it is disconnected from the transducer at tank bottom.
11. It was again emphasised that atmosphere in the tank be monitored at all times using portable gas meters and from top as well.
12. Space where the Doppler Log transducer is located is very cramped and to be very careful.
13. It was confirmed that Power supply to ECU and display unit for Doppler Log has been put off and tagged.
14. Bosun and OS were to remain at top supervising entry and arranging stuff as required.
15. CE and COF will be around to supervise the job.