Report of the investigation of
the fatality onboard the chemical tanker

STOLT HELLULAND

in Houston, Texas
on 13 January 2008.

Cayman Islands Shipping Registry
Maritime Authority of the Cayman Islands
Strathvale House
North Church Street
PO Box 2256, George Town
Cayman Islands
KY1-1104

Casualty 01/2008

Report of the investigation of the fatality onboard the chemical tanker STOLT HELLULAND in Houston, Texas on 13 January 2008.

SYNOPSIS

On 13 January 2008, the third officer onboard a chemical tanker was discovered motionless in a partially inerted cargo tank while the ship was alongside in Houston, USA. When discovered, the onboard emergency response team quickly arrived on the scene and effected a tank rescue. Local emergency services were also called and the third officer was evacuated by helicopter to a local hospital. The third officer did not regain consciousness and was pronounced dead on 24 January 2008. The cause of death was given as *"Complications of asphyxia due to nitrogen gas exposure"*.

The third officer had been checking the oxygen level in the tank in preparation for loading a cargo of Voranol. Voranol reacts with oxygen and it is necessary to purge tanks with nitrogen prior to loading. Based on the time that the nitrogen purge had been applied and experience of similar operations in the past, it is estimated that the atmosphere in the tank contained between 8% and 10% oxygen at the time of the accident.

Fatalities in tanks and other enclosed spaces continue to occur at an alarmingly high rate in the maritime industry. The United Kingdom MAIB issued a Safety Bulletin in July 2008 which made recommendations to regulators, ship managers and other industry bodies aimed at improving the identification of potentially dangerous spaces and the identification of measures to reduce this unnecessary loss of life. No further recommendations have been made in this report.

Stolt Helluland (Photo © www.shipspotter.com)

Glossary of Abbreviations and Acronyms

2 Stb	Cargo tank, integral to the hull. The location of the accident. (Number two starboard)
6 Ctr	Cargo tank, integral to the hull (Number six centre)
Stb Deck Tank	Cargo tank, external to the hull (Starboard deck tank)
AB	Able Bodied Seafarer
CCR	Cargo Control Room
DWT	Deadweight
MAIB	The United Kingdom Marine Accident Investigation Branch
MAIIF	The Marine Accident Investigators International Forum
OS	Ordinary Seafarer
STCW	The international Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended.
VHF	Very High Frequency (Radio)

SECTION 1 – Factual Information

PARTICULARS OF STOLT HELLULAND

Vessel details:

Ship Manager	:	Stolt Tankers BV
Port of registry	:	George Town
Flag	:	Cayman Islands
Type	:	Chemical Tanker / Oil Products Tanker
Year of build	:	1990
Classification	:	Det Norske Veritas
Length (overall)	:	174.7 meters
Gross Tonnage	:	18,994

Accident details:

Time and date	:	0700L on 13 January 2008
Location	:	“Stolthaven”, Houston, Texas, USA
Fatalities / injuries	:	One fatality
Damage	:	None

NARRATIVE

(all times are "local". See Appendix 1 for key locations onboard)

Prior to the accident

STOLT HELLULAND arrived at the "*Stolthaven Terminal*" in Houston on the morning of 13 January 2008. The ship was all fast at 0300 and at 0345 the "Tanker / Terminal Checklist" had been signed by all parties and the schedule for cargo loading had been agreed. At 0400 the 4/8 morning deck watch commenced and on duty from that time were:

Chief Officer in overall charge of cargo operations;
the Third Officer as the duty deck officer;
a duty Pumpman assisting the chief and third officers;
a duty AB assisting with cargo operations; and
a duty OS on gangway watch.

Preparations for loading cargo into *6 Centre* and the *Stb Deck Tank* commenced at 0455 and nitrogen purging of *2 Stb* began at 0600. Loading into *6 Centre* and the *Stb Deck Tank* began at 0630.

At 0645 the third officer announced that he was going to check the oxygen level in *2 Stb* and left the CCR and proceeded onto the deck. This operation involves passing a sample tube attached to an oxygen analyser (Figure 3) about 1 ½ meters into the tank and sampling the atmosphere. The tube is passed through the gap in a partially open ullage hatch (Figures 1 and 2).

At 0655 the chief officer called the third officer on the VHF regarding the oxygen level in *2 Stb* and to remind him that loading calculations were due at 0700. When the chief officer received no reply he contacted the duty AB and instructed him to check on the third officer.

After a few minutes, the duty AB reports back to the chief officer that "Third officer is in the tank and not moving".

The onboard response

The chief officer sounded the general alarm and called the master. The master recalls consulting his watch when woken and recording the time as 0659. The master instructs the chief officer to call an ambulance and to attend at the accident scene as quickly as possible.

The chief officer proceeded to *2 Stb* with the ship's oxygen resuscitator and takes charge at the scene. He noted that the ullage hatch was fully open and on deck beside the hatch was the third officers safety helmet, VHF radios[1] and the oxygen analyser used to test the atmosphere in the tank. Rescue equipment had also been brought to the scene and the duty AB and the pumpman were erecting the rescue tripod over the ullage hatch. Other emergency response equipment at the scene included a rescue breathing apparatus[2], an oxygen resuscitator and a tank ventilator.

[1] The third officer carried two VHF radios. One was to contact the terminal and the other for inter ship communications.
[2] The Rescue Breathing Apparatus set comprised of a single air reservoir supplying two positive pressure face masks.

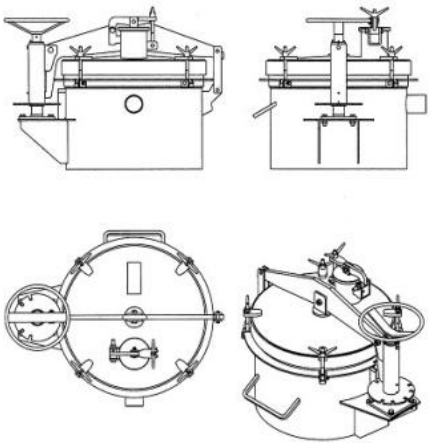

Figure 1: Typical Ullage Hatch

Figure 2: *2 Stb* Ullage hatch partially open for atmospheric sampling

Figure 3: Oxygen analyser similar to that used by the third officer

The terminal was contacted by radio and an ambulance and urgent medical assistance requested. All cargo operations were immediately suspended.

The chief officer entered the tank with the rescue breathing apparatus and found the third officer not moving and unresponsive. The third officer was wearing a filter mask (Figure 4) and a lit flashlight was on the tank bottom next to him. Also found in the tank were a short length of sample tube and the water trap from the oxygen analyser. The third officer was quickly removed from the tank using the harness and rescue tripod which had been rigged.

Figure 4: Filter mask, or air purifying respirator, of the type worn by the third officer when he entered the tank,

Once the third officer had been removed from the tank, medical oxygen was administered by the ship's crew. It is estimated by the crew that the elapsed time from the alarm being raised to the third officer being removed to fresh air was less than five minutes.

Figure 5: Interior of *2 Stb* cargo tank.

Figure 6: Water trap similar to that found with the third officer

Events following the tank rescue

Shore side paramedics were quickly in attendance and the third officer was transferred to a stretcher and taken to an ambulance on the quayside. His medical condition was assessed and it was decided that a helicopter transfer to medical facilities would be required. While awaiting the arrival of the helicopter, medical oxygen and CPR continued to be administered. Although the third officer remained unconscious and unresponsive to stimuli during this period, he did begin to breath unaided.

After approximately 20 minutes the helicopter arrived and the third officer was transferred to Memorial Herman Hospital in Houston. Despite the best efforts of the medical staff, the third officer did not regain consciousness and was pronounced dead at 1352 on 24 January 2008, 11 days later.

THE SHIP

STOLT HELLULAND is a 31,454 DWT chemical tanker with a total of 41 cargo tanks. This gives the flexibility to carry a large number of cargoes (or "parcels") simultaneously. As each cargo may have separate requirements for loading, care in transit and discharging; the demands on deck crew are often more onerous than those found on oil tankers carrying a single cargo. With the exception of two deck cadets from Vietnam, the entire crew were East Europeans from Russia, Latvia or the Ukraine. Although English was the official "working language" onboard, most routine day to day communication within the ship was conducted in Russian.

THE CASUALTY

The third officer was a 40 year old Russian male. He joined STOLT HELLULAND on 04 September 2007. This was his first voyage with Stolt Tankers and his first on a chemical tanker. He held a certificate of competency qualifying him to act as an "Officer in Charge of a Navigational Watch". This certificate was issued by the Russian Federation on 05 July 2005 in Taganrog, under regulation II/1 of the STCW Convention. In addition he held an "Oil Tanker Endorsement" (issued on 05 December 2006 by the Russian Federation in Astrakhan) and a "Chemical Tanker Endorsement" (issued on 27 August 2007 by the Russian Federation in Kaliningrad). Both endorsements were issued in accordance with regulation V/1-1 of the STCW Convention.

Although this was the third officers first voyage on a chemical tanker he had previous experience on oil tankers. Neither the master or the chief officer expressed any complaints about his work and stated that they were pleased with the progress made during the voyage as his experience on chemical tankers increased.

The third officer is reported to have been a sociable and well liked member of the crew. He was originally due to proceed on leave on 28 December 2007 and his relief was scheduled to join the vessel on 15 January 2008, two days after the accident.

MEDICAL EXAMINATION

The post-mortem examination of the third officer concluded that the cause of death was *"Complications of asphyxia due to nitrogen gas exposure"*. This examination was carried out the day after the third officer died, or 12 days after the accident. The post-mortem made note of a number of "healing abrasions" which appear consistent with the third officer collapsing once inside the tank and the subsequent rescue.

ONBOARD PROCEDURES

The work being undertaken.

Purging tanks with nitrogen prior to loading reactive cargoes is a routine task onboard chemical tankers. Similar operations had been carried out onboard STOLT HELLULAND many times prior to this accident. As nitrogen is non toxic and constitutes over 70% of normal air, monitoring of the atmosphere in the tank should present no hazard to the person undertaking the monitoring. The task involves standing on a well ventilated open deck and passing a sample tube through a gap between the ullage tank lid and coaming (Figures 2 and 3). This task is not subject to any specific "permit to work" as it is not considered to present any additional hazards to the crew, the ship or the environment.

Entry into enclosed spaces

The company has extensive procedures to control entry into enclosed spaces and an effective "permit to work" system. However, the task being undertaken by the third officer should not have involved entry into any enclosed space.

Equipment

In addition to the oxygen and gas analysers used for cargo work, the ship also carries a number of personal gas analysers. These alert the wearer to the presence of toxic gases and to oxygen depleted atmospheres. These analysers are used whenever a controlled entry is made into an enclosed space. They were not in use at the time of this accident as no entry into an enclosed space was planned or should have occurred.

SECTION 2 – Analysis

AIM

The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future.

THIRD OFFICER'S ACTIONS AFTER LEAVING THE CCR

When the third officer was discovered unconscious in *2 Stb*, part of the oxygen analyser sample tube and water trap were also found in at the bottom of the tank. It seems likely that these parts of the analyser fell into the tank and the third officer was attempting to retrieve them when he was overcome by the oxygen deficient atmosphere. Before entering the tank, the third officer went to the deck store for a filter mask which he was wearing when found in the tank.

The filter mask was rated for A2[3], B2[4], E2[5], K1[6] and Hg-P3[7] applications under EN14387:2004[8]. However, respiratory protection with filter masks is dependent on the ambient air containing sufficient oxygen to sustain life. They give no protection whatsoever in an oxygen deficient atmosphere such as was present in *2 Stb* at the time of the accident.

On returning to *2 Stb*, it is believed that the third officer donned the filter mask, fully opened the ullage hatch and entered the tank to retrieve the lost parts of the oxygen analyser.

A reconstruction of the third officer's likely actions was carried out and it is estimated that he entered the tank approximately 7 ½ minutes after leaving the CCR. This would mean that the third officer had been in the tank for 6 minutes before being discovered and 12 minutes before being removed to fresh air.

THE HAZARD

Oxygen deficient atmosphere

The findings of the post-mortem examination clearly indicate that the third officer died as a result of being exposed to an oxygen deficient atmosphere. Further reports of his medical condition on admission to hospital indicate that it is likely that he entered the tank voluntarily, rather than falling into the tank from the main deck level.

Based on performing similar operations in the past, it should take 2 hours of purging with shore supplied nitrogen to reach the 2% oxygen content required for the carriage of Voranol.

[3] Organic gases and vapours (0.5% vol)
[4] Inorganic Gases and vapours (0.5 % vol)
[5] Sulphur Dioxide and acidic gases and vapours (0.5 % vol)
[6] Ammonia and organic ammonia derivatives (0.1% vol)
[7] Mercury Vapours
[8] "Respiratory protective devices. Gas filter(s) and combined filter(s). Requirements, testing, marking."

At the time the third officer went to sample the atmosphere in No 2 Starboard the atmosphere could be expected to contain approximately 8% - 10% oxygen. This level of oxygen is insufficient to sustain life and will quickly disable anyone exposed to this atmosphere.

The physiological effects of decreased oxygen have been well documented and are typically describes as below:

Physical effects of oxygen concentration in an atmosphere	
O_2 (% by volume)	Effects and symptoms
21	Normal atmospheric content
19 -21	No discernible symptoms can be detected by the individual
15 – 19	Moderate lethargy and impaired concentration
12 – 14	Increased respiration; impaired judgement, coordination and perception.
8 – 11	Possibility of fainting within a few minutes. Risk of death if not removed to fresh air.
6 – 8	Unconsciousness, ashen face, nausea and vomiting 8 min exposure – 100% fatal 6 min exposure – 50% fatal 4 min exposure – may recover with treatment
<6%	Coma in seconds, convulsions and death.

Exposure

The third officer was subjected to an atmosphere of approximately 8 – 10% oxygen for around 12 minutes. This would be sufficient to cause serious and permanent damage or death.

THE MERCHANT SHIPPING (ENTRY INTO DANGEROUS SPACES) REGULATIONS, 2004

These regulations apply to Cayman Islands ships and other ships when in Cayman Waters and define a "dangerous space" as:

"An enclosed or confined space in which it is foreseeable that the atmosphere may at some stage contain toxic or flammable gases or vapours, or be deficient in oxygen to the extent that it may endanger the life or health of a person entering that space."

The regulations require that entrances to dangerous spaces be secured against entry; procedures for entry into dangerous spaces are laid down and observed; drills are carried out; and equipment is carried for testing dangerous spaces is carried where entry into a dangerous space might be necessary. The employer must ensure that procedures for ensuring safe entry and working in dangerous spaces are clearly laid down and the master is responsible for ensuring that such procedures are observed onboard the ship. It is also an offence for any person to enter or remain in a dangerous space except in accordance with the procedures for safe entry.

Procedures for safe entry were available but were not followed by the third officer when he entered the tank.

SIMILAR ACCIDENTS

In October 2007, the Marine Accident Investigators International Forum (MAIIF) started research into the incidence of accidents in enclosed spaces. By July 2008, and based on responses from 18 Administrations, they had identified 120 fatalities and 123 injuries resulting from entry into enclosed spaces since 1991.

Some common factors have been identified:

Complacency leading to lapses in procedure;

Lack of knowledge;

Potentially dangerous spaces not being identified; and

Would be rescuers acting on instinct and emotion rather than knowledge and training.

The United Kingdom Marine Accident Investigation Branch (MAIB) has also investigated three accidents since September 2007 in which six seafarers have died in enclosed / confined spaces.

In September 2007 three crew members died inside a chain locker onboard an offshore safety / stand by vessel. One of the dead entered the chain locker in a failed attempt to rescue the first two. All three men died as a result of lack of oxygen inside the chain locker due to corrosion of the steel structure and anchor chain.

In January 2008 two seamen collapsed in a store onboard a general cargo ship carrying a cargo of "steel turnings". "Steel Turnings" are a self heating and oxygen depleting cargo. Due to a communication path between the cargo hold and the store room, this cargo had depleted the oxygen in both the cargo hold and the store. When tested, the air in the cargo hold contained only 6% oxygen. The two crew members died of asphyxiation.

In June 2008 a crew member was asphyxiated on a passenger cruise ship after he entered an almost empty ballast tank. The crew member was not intended to enter the tank and no permit to work was issued. The atmosphere in the tank was severely oxygen depleted due to heavy corrosion and the tank being unventilated for several years.

Common to the above three accidents is that the victims were not expecting to encounter an oxygen deficient atmosphere. In this instance it is reasonable to expect that an oxygen deficient atmosphere was anticipated as the purpose of the purging operation was to reduce the oxygen content in the tank to below 2%.

FATIGUE

Fatigue has been shown to be a contributory factor in many accidents. Chapter VIII of the Code to the STCW Convention requires that all persons should be fit for duty, such that:

1. All persons who are assigned duty as officer in charge of a watch or as a rating forming part of a watch shall be provided a minimum of 10 hours of rest in any 24 hour period.

2. The hours of rest may be divided into no more than two periods, one of which shall be at least 6 hours in length.

3. The requirements for rest periods laid down in paragraphs 1 and 2 need not be maintained in the case of an emergency or drill or other overriding operational conditions.

4. Notwithstanding the provisions of paragraphs 1 and 2, the minimum period of ten hours may be reduced to not less than 6 consecutive hours provided that any such reduction shall not extend beyond two days and not less than 70 hours of rest are provided each seven day period.

5. Administrations shall require that watch schedules be posted where they are easily accessible.

The effects of fatigue on the third officer and chief officer of STOLT HELLULAND were assessed. Records onboard show that the third officer worked a total of 90 hours in the 10 days prior to the accident. This represents an average of 15 hours of rest per day. The minimum number of hours of rest in any one day was recorded as 13 hours.

In the same 10 day period the chief officer worked a total of 105 hours. This equates to an average of 13.5 hours of rest per day with the minimum number of hours of rest recorded for any one day being 12 hours.

For both officers, the periods of rest were in accordance with the requirements of paragraph 2 of the above extract from the STCW Convention.

Fatigue on the part of the casualty himself or the person in charge of operations at the time of the accident is therefore not considered to be a significant contributory factor in this accident.

SECTION 3 – Conclusions

THIRD OFFICERS ACTIONS

It will never be known with complete certainty why the third officer entered *2 Stb*. The most likely cause is that he was attempting to retrieve parts of the sampling equipment which had become detached from the gas analyser in use.

The third officer may have confused "oxygen deficient" and "toxic" and believed protection against one hazard would offer protection against the other. This confusion may have led the third officer to believe that a filter mask for toxic vapours would offer protection against an oxygen deficient atmosphere.

The third officer chose a "solo course of action" to retrieve the lost parts, rather than reporting the loss and causing possible delays to the ship's schedule. Such a course of action can often be attributed to apprehension at being reprimanded or ridiculed for a perceived failure to perform a routine task. This decision ultimately cost the third officer his life.

Other factors acting in combination may have led the third officer to act in contravention of his training and accepted safe working practice, these factors may have included[9]:

> Risk Taking – Taking an action where the outcome is uncertain, often in contravention of norms, regulations or procedures. "I'll take a chance."
>
> Impulsiveness – Inclined to act on impulse rather than thought. "I know what I am doing."
>
> Invulnerability – Impervious to danger or risk. "It won't happen to me."

THE ONBOARD RESCUE

Once it was realised that the third officer had entered the tank the onboard emergency response was swift and effective. The response team quickly mustered at the scene with the appropriate equipment to quickly affect a tank rescue. The members of the response team acted on knowledge and training, not on emotion and instinct which has led to many failed rescue attempts in the past. There is no doubt that the prompt actions of the crew gave the third officer every chance of survival.

[9] From the Nautical Institute's Alert! program :- "Exploring Rogue Behaviour".

SECTION 4 – Recommendations

In July 2008 the MAIB issued a safety bulletin concerning fatalities in enclosed spaces. This bulletin is as relevant to this accident as it is to the accidents that led to its issue. The recommendations in this bulletin are reproduced below. No further recommendations have been made as a result of this investigation.

Ship owners and managers, and industry bodies and organisations are recommended to:

2008/145

- Identify and implement measures aimed at improving the identification of all dangerous and potentially dangerous spaces and increasing compliance with the safe working practices required when working in such compartments.
- Individually and collectively raise awareness of the continuing high incidence of fatalities of seafarers working in enclosed spaces.

The Maritime and Coastguard Agency is recommended to:

2008/146

Co-sponsor with the Maritime Administration of Vanuatu and other concerned administrations a submission to the IMO aimed at raising awareness of the number of fatalities on ships which have occurred in enclosed spaces, and highlighting the need for measures to be identified which will reduce this unnecessary loss of life, such as the identification and marking of all potentially dangerous spaces.

Appendices

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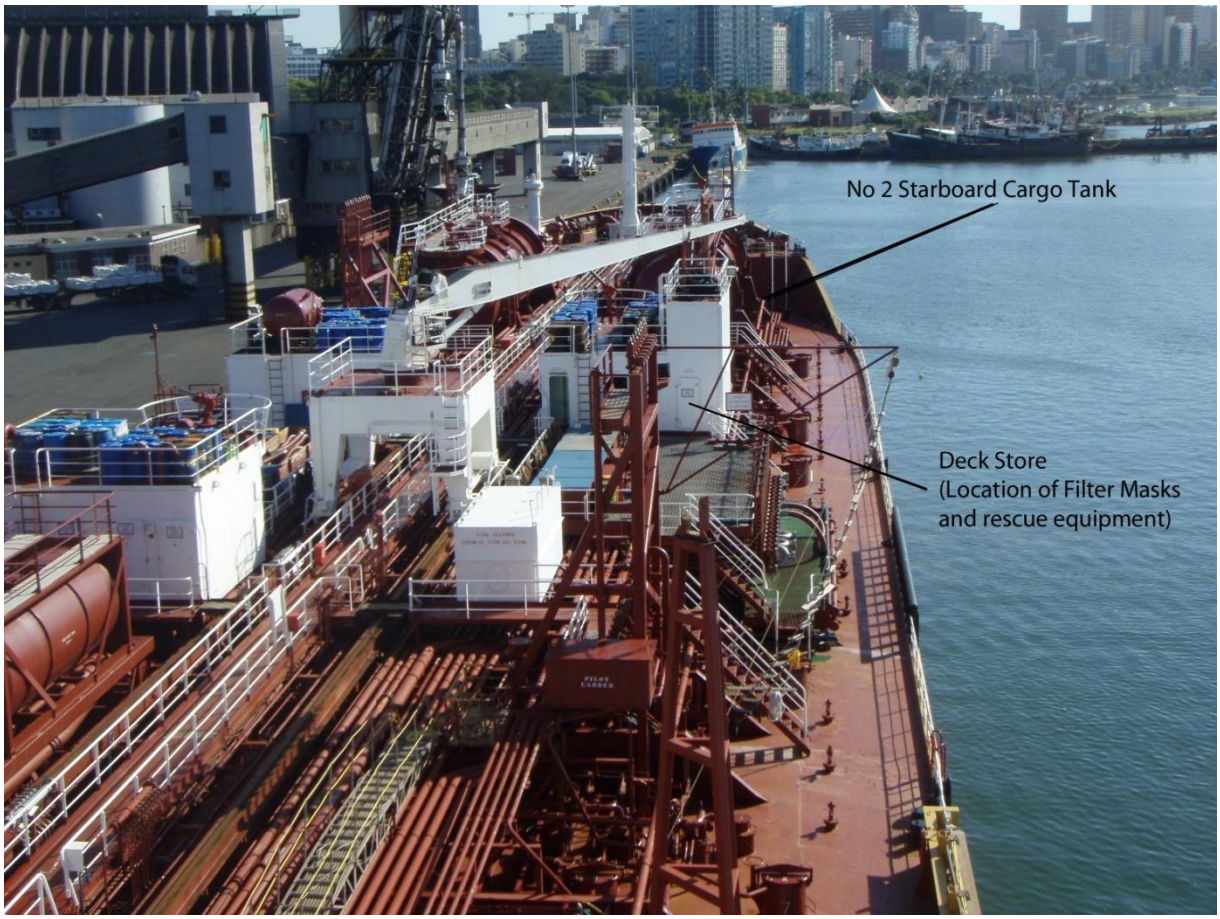
Location of the CCR

Location of 2 Stb and CCR

View from CCR (*2 Stb* unsighted)

View aft from *2 Stb*



View from Stb Bridge Wing (*2 Stb* unsighted and deck store location)

MAIB SAFETY BULLETIN 2/2008

Fatalities in enclosed spaces

MAIB SAFETY BULLETIN 2/2008

This document, containing urgent safety recommendations, has been produced for marine safety purposes only, on the basis of information available to date.

The Merchant Shipping (Accident Reporting and Investigation) Regulations 2005 provide for the Chief Inspector of Marine Accidents to make recommendations at any time during the course of an investigation if, in his opinion, it is necessary or desirable to do so.

This Safety Bulletin is issued to raise awareness of the unnecessary and avoidable loss of life of seafarers working in enclosed spaces and, through industry bodies and organisations, seeks to establish control measures that can be utilised to prevent such accidents in the future.

Stephen Meyer
Chief Inspector of Marine Accidents

BACKGROUND

Since September 2007 the MAIB has started three investigations into accidents in which a total of six seafarers have died in enclosed/confined spaces:

- On 23 September 2007, three experienced seamen died inside the chain locker on board the emergency response and rescue vessel *Viking Islay*. The first two were overcome while tying off an anchor chain to prevent it from rattling in the spurling pipe. The third to die was the first rescuer who entered the chain locker wearing an Emergency Escape Breathing Device (EEBD). He was soon constrained by the device and removed its hood. All three men died as a result of the lack of oxygen inside the chain locker caused by the on-going corrosion of its steel structure and anchor chain.

- On 18 January 2008, two seamen collapsed in a store on board the general cargo ship *Sava Lake*. The chief officer entered the store to try and rescue the men but was soon forced to leave when he became short of breath and his vision narrowed. The two seamen had been asphyxiated. The store was adjacent to the vessel's forward cargo hold containing 'steel turnings'. To allow for the drainage of sea water and the removal of cargo residue, the bellows pieces on the cargo vent trunk either side of the cargo ventilation fan motor, located in the store, had been cut. This allowed a path for the air from the self-heating cargo, to enter the store. When tested, the air in the cargo hold contained only 6% oxygen.

- On 11 June 2008, an experienced seaman died on board the passenger cruise ship *Saga Rose* after he entered an almost empty ballast tank. The tank's manhole cover, which was inside a small cofferdam accessed from within the engine room, had been removed and the seaman had been instructed to confirm the tank's contents. As it was not intended for the seaman to enter the tank, no permit to work was issued. When the seaman was found to be missing, an experienced motorman was sent into the cofferdam to check on his wellbeing. He found the seaman lying at the bottom of the empty tank and raised the alarm. The motorman then entered the tank but collapsed when trying to recover the seaman. After the ship's emergency response team provided air to the stricken crew via in-line breathing apparatus, the motorman recovered and was able to leave the tank. However, the seaman never regained consciousness. He had been asphyxiated in the oxygen depleted atmosphere of the tank, which had not been inspected for several years and was heavily corroded. It is not certain why the seaman entered the tank but it is likely it was to determine whether a small amount of water in the tank bottom was salt or fresh water.

The MAIB report of its investigation of the fatalities on board *Viking Islay* was published on 9 July 2008. The MAIB will publish reports on the fatalities on board *Saga Rose* and *Sava Lake* on completion of its investigations.

Co-incident with the MAIB investigations, the Marine Accident Investigators International Forum (MAIIF) identified the large number of fatalities in the shipping industry worldwide which were related to work in confined or enclosed spaces and considered that the occurrence of such accidents was increasing. Accordingly, in October 2007, MAIIF tasked its representative from Vanuatu to research the incidence of this type of accident with a view to the submission of a paper to the International Maritime Organization (IMO). To date, responses from 18 administrations identify 120 fatalities and 123 injuries resulting from entry into confined spaces since 1991. These statistics do not include the fatalities from *Sava Lake* or *Saga Rose*.

SAFETY LESSONS

There can be few aspects of personal safety on board ships that have received more attention than the importance of following the correct procedures before entering a dangerous enclosed/confined space. Tragically, it is clear that the measures which have been put into place have failed to prevent the death of many seafarers. Indeed, the data collected on behalf of MAIIF indicates that accidents in enclosed/confined spaces continues to be one of the most common causes of work-related fatalities on board ships today. This is due to:

- Complacency leading to lapses in procedure;
- Lack of knowledge;
- Potentially dangerous spaces not being identified; and,
- Would-be rescuers acting on instinct and emotion rather than knowledge and training.

It is essential that the IMO recognises the unacceptably large fatality rate in this area and takes the lead in identifying initiatives to improve this very poor safety record. It is also vital that all shipping industry bodies raise the awareness of the continuing and increasing number of deaths in enclosed spaces to show that no-one is immune to the physical effects of the lack of oxygen or harmful gases. While the holding of breath might seem a logical step to a person entering a tank 'for a few seconds' or to a would-be rescuer, it is all too frequently the last life sustaining breath he or she ever takes.

RECOMMENDATIONS

Ship owners and managers, and industry bodies and organisations are recommended to:

2008/145

- Identify and implement measures aimed at improving the identification of all dangerous and potentially dangerous spaces and increasing compliance with the safe working practices required when working in such compartments.
- Individually and collectively raise the awareness of the continuing high incidence of fatalities of seafarers working in enclosed spaces.

The Maritime and Coastguard Agency is recommended to:

2008/146

Co-sponsor with the Maritime Administration of Vanuatu and other concerned administrations a submission to the IMO aimed at raising the awareness of the number of fatalities on ships which have occurred in enclosed spaces, and highlighting the need for measures to be identified which will reduce this unnecessary loss of life, such as the identification and marking of all potentially dangerous spaces.

Issued July 2008

CAYMAN ISLANDS

Supplement No. 1 published with Gazette No. 26 dated
29 December, 2004.

THE MERCHANT SHIPPING LAW
(2004 REVISION)

THE MERCHANT SHIPPING (ENTRY INTO DANGEROUS SPACES) REGULATIONS, 2004

THE MERCHANT SHIPPING LAW
(2004 REVISION)

THE MERCHANT SHIPPING (ENTRY INTO DANGEROUS SPACES) REGULATIONS, 2004

ARRANGEMENT OF REGULATIONS

CAYMAN ISLANDS

THE MERCHANT SHIPPING LAW
(2004 REVISION)

THE MERCHANT SHIPPING (ENTRY INTO DANGEROUS SPACES) REGULATIONS, 2004

The Governor, in exercise of the powers conferred on him by sections 173 and 459 of the Merchant Shipping Law (2004 Revision), makes the following Regulations:

Citation

1. These Regulations may be cited as the Merchant Shipping (Entry into Dangerous Spaces) Regulations, 2004.

Interpretation

2. In these Regulations, unless the context otherwise requires–

"dangerous space" means an enclosed or confined space in which it is foreseeable that the atmosphere may at some stage contain toxic or flammable gases or vapours, or be deficient in oxygen, to the extent that it may endanger the life or health of a person entering that space;

"employer" means the person for the time being employing the master;

"gas carrier" means a ship constructed or adapted for the carriage in bulk of liquefied gas; and

"offshore unit" has the meaning ascribed to it by section 162 of the Merchant Shipping (Marine Pollution) Law, 2001.

Application

3. (1) Subject to paragraph (2)-

(a) these regulations, except regulation 11, apply to Cayman Islands ships wherever they may be; and
(b) these regulations, other than regulations 6 and 10, apply to ships other than Cayman Islands ships when they are in Cayman Islands waters.

(2) These regulations do not apply to-

(a) fishing vessels;
(b) pleasure vessels;

(c) offshore installations whilst on or within 500 metres of their working stations; or
(d) ships in which there is for the time being no master or crew or watchman.

Entrances to dangerous spaces

4. Except when necessary for entry thereto, the master of a ship shall ensure that all entrances to unattended dangerous spaces on the ship are either kept closed or otherwise secured against entry.

Entry into dangerous spaces

5. (1) The employer shall ensure that procedures for ensuring safe entry and working in dangerous spaces are clearly specified.

(2) The master shall ensure that the procedures laid down pursuant to paragraph (1) are observed on board the ship.

(3) No person shall enter or remain in a dangerous space except in accordance with the procedures laid down pursuant to paragraph (1).

(4) In fulfilling their duties under paragraphs (1), (2) and (3) the employer, master and any other person shall take full account of any directions that may be published by the Director.

Drills

6. The master of-

(a) a tanker or gas carrier of five hundred tons and over; and
(b) any other ship of one thousand tons and over,

shall ensure that drills simulating the rescue of a crew member from a dangerous space are held at intervals not exceeding two months, and that a record of each such drill is entered in the official log book.

Testing equipment

7. (1) The employer shall ensure that each ship where entry into a dangerous space may be necessary shall carry or otherwise have available an oxygen meter and such other testing device as is appropriate to the hazard likely to be encountered in any dangerous space on board.

(2) The master shall ensure that meters and testing devices referred to in paragraph (1) are maintained in good working order and, where applicable, regularly serviced and calibrated according to the manufacturers' recommendations.

Penalties

8. (1) An employer who contravenes regulations 5 or 7 commits an offence and is liable on summary conviction to a fine of four thousand dollars or on conviction on indictment to a fine and imprisonment for two years.

(2) A master who contravenes regulations 4, 5, 6 or 7 commits an offence and is liable on summary conviction by a fine of two thousand dollars.

(3) A person other than an employer or a master who contravenes regulations 5(2) or 5(3) commits an offence and is liable on summary conviction by a fine of one thousand dollars.

(4) It is a defence for a person charged under this regulation, including a person charged by virtue of regulation 9, to show he took all reasonable precautions and exercised all due diligence to avoid the commission of the offence.

Offences due to the act or default of another

9. Where an offence under any of these regulations is committed, or would have been committed save for the operation of regulation 8(4), by any person due to the act or default of some other person, that other person shall be guilty of the offence, and a person may be charged with and convicted of an offence by virtue of this regulation whether or not proceedings are taken against the first mentioned person.

Inspection and detention of a Cayman Islands ship

10. A surveyor or any other person duly authorised by the Director may inspect any Cayman Islands ship and if he is satisfied that there has been a failure to comply in relation to that ship with the requirements of these regulations he may detain the ship until the health and safety of those persons aboard ship is secured, but shall not in the exercise of these powers detain or delay the ship unreasonably.

Inspection and detention and other measures in respect of ships registered outside the Islands

11. (1) A surveyor or any other person duly authorised by the Director may inspect any ship other than a Cayman Islands ship when the ship is in Cayman Islands waters and if he is satisfied that the ship does not conform to the standards of health and safety required of Cayman Islands ships by these regulations, he may -

(a) send a report to the Government of the country in which the ship is registered and a copy thereof to the Director General of the International Labour Organisation; and
(b) where conditions on board are clearly hazardous to safety or health -
    (i) take such measures as are necessary to rectify those conditions; and
    (ii) detain the ship.

(2) The measures specified in paragraph(1)(a) and (b) may be taken only when the ship is in Cayman Islands waters in the normal course of business or for operational reasons.

(3) Where the surveyor or person duly authorised takes either of the measures specified in paragraph (1)(b) he shall forthwith notify the nearest maritime, consular or diplomatic representative of the State whose flag the ship is entitled to fly.

(4) The surveyor or person duly authorised shall not in exercise of his powers under this regulation unreasonably detain or delay a ship.

Made in Cabinet the 30th day of November, 2004.

Carmena H. Watler
Clerk of the Cabinet.