The enclosed space management system

Establishing an Enclosed Space Management System is a straightforward process that could have a dramatic impact on the marine industry's safety record

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It would be inconceivable for a ship or marine installation to operate without a fire plan which identifies the whereabouts of all fire equipment and the identity of the designated emergency response team.

Even at the design stage, considerations for reducing the risk of fire are incorporated into the build process. Fire doors, access to fire hydrants, emergency escape routes and the use of fireproof materials are a just few examples of this. Without doubt, the risk of fire at sea has been considerably reduced because of the advances made in equipment, training and design. It would be gratifying to say that this was done voluntarily by the marine industry but unfortunately, without legislation enforcing standards, training and equipment, many ships and installations today would not have such fire management systems in place.

Attaining that legislation was not easy. It took many years to gradually arrive at the stage we are at today, but without those who worked and fought for those standards, undoubtedly many more ships and lives would have been lost.

It would be nice to say that this work was carried out in response to the deaths of seamen, but it was the loss of the ships, rather than the loss of life, that gave the impetus for adequate fire prevention and fighting.

Safety knowledge

That brings us to enclosed spaces. If the problems of these spaces endangered the ships themselves, rather than only lives of those onboard, there would undoubtedly be robust legislation in place similar to that dealing with fire.

The first step to an enclosed management system is to identify and categorise spaces

Over the years, developments such as reduced crew numbers, changes in cargoes, including increasing amounts of chemical cargoes, changes to the nature and design of enclosed spaces, the pressures of work and the accompanying fatigue have resulted in a gradual increase of enclosed space incidents. We have now reached a critical situation, with more people injured or dying in enclosed spaces than through any other related on-board work activity.

With no legislation in place, the methods for coping with enclosed spaces on ships and installations are driven by risk assessment, and based on individual company safety management systems. In some instances this system may be flawed. The quality of risk assessments ranges from the comprehensive, with an assessment of each space on board, to the cursory, with just one generic risk assessment for all spaces onboard, regardless of any particular hazards or design features associated with each individual space.

In most cases, the only in-depth knowledge of any particular space is the individual knowledge gained by members of the crew during their contract. When they leave, that knowledge goes with them, compelling the next crew to start the whole learning process all over again. On most ships, there is little consistency in the overall control and protection of these spaces, regardless of their safety regimes.

The Enclosed Space Management System

The enclosed space problem will only be dealt with effectively by definitive legislation. In the meantime, however, there are certain measures which can be put in place that would considerably alleviate the problem. The most obvious of these is that ships and installations should adopt an enclosed space management system similar to the fire fighting arrangements which have served the marine industry so well since their implementation.

For several months now, staff at Mines Rescue Marine have been working on an enclosed space management system which will provide those on board, whether crew, shore contractors, visitors or company representatives, with a better system of protection than presently exists.

The main aims of the system are to:

- Offer protection to all those working on board;
- Be simple to understand and use;
- Cope with the disparity of ships, installations, companies and their respective procedures;
- Provide a comprehensive risk assessment for all spaces;
- Provide a basis for the initial entry of all enclosed spaces regardless of their type and where necessary, deal with responsibility issues.
- Provide a continuity of knowledge of the spaces on a ship or installation.

It must be understood at the outset that the enclosed space management system does not deal with the lack of training, equipment, and design enhancements which currently exist in varying degrees throughout the entire marine industry. However, it does increase awareness by highlighting potential problem areas, thus supporting a culture of safe practice and for the first time providing a comprehensive knowledge data base of all enclosed spaces.







Ease of access and rescue are key criteria

Once adopted, the system will:

- Provide a definitive list of all enclosed spaces.
- Be easy to access, understand and update. It is intended to be a 'living document'.
- Reduce existing paperwork.
- Be suitable for use in any fleet or collective of installations regardless of their size or type.
- Cope with the problem of continuous crew changies.
- Provide instant up to date information to offices both on and offshore.
- Deal with the responsibility issue between the ship/installation, company and outside contractors.

Categorising spaces

The confined space management system is based around a simple traffic light warning system. This system is already implemented and working successfully in industry ashore.

Under this system, the ship or installation would classify all enclosed spaces on board based on a physical audit, not just the previous references of the space. When classifying a space, consideration would be given to the degree of difficulty of entry/exit, freedom of movement within and ability to rescue from any particular space. For example:

Green

Space is considered safe for normal use. Unless temporarily re-categorised, there is no need for special precautions to be made before entering. No work permit is required. Sole worker entry is permitted

Amber

Certain precautions may have to be taken prior to entry. A work permit will be required for entry. Sole worker entry is not permitted.

Red

High risk space. It is not to be entered without senior officer authority, and pre-entry procedures must be carried out. Rescue team to be on standby. Any space from which it is difficult to carry out a rescue should be automatically classified as a 'red' space, regardless of any other risk factors.

Methodology

To begin the process, a full audit of all spaces that workers may have to enter should be undertaken. Each space should be given a unique identification number. Its location is recorded on the enclosed space list and annotated on a plan of the ship. The audit must be comprehensive and cover all aspects of the space, both internally and externally if possible. Where available, previous risk assessments should always be referred to for background information.

Once all spaces have been audited and listed, they will be colour categorised.

The updated risk assessment and colour code will be written in for each space. The department and rank of the authority required for entry permit will be noted along with the unique space information. Any other department or supervisors to be notified of entry will also be listed.

The information will initially be paper-based but should preferably then be transferred to an electronic database on the ship's main computer for ease of access and amendment. The information can then be shared instantly with all interested parties when required.

Enclosed space audit

Whilst recognising that the audit process will undoubtedly be time consuming, once completed, it will not have to be repeated unless major modifications to the space have been made. It must also be noted that any outputs from these audits are wholly dependent on the auditor. Always be mindful that in order to carry out this process the auditor should at least have a good understanding of enclosed space procedures.

The format of the enclosed space management audit looks at four key areas for each space:

- Potential dangers;
- The entry point;
- Physical aspects of the enclosed space;
- Capability of rescue.

Potential dangers

The first section of the audit looks at the existing risk assessment for each individual space, with a view to identifying potential dangers associated with that space. A review of the risk assessment will highlight previously identified hazards and the relevant control measures. These should be updated and any changes recorded. In the absence of an existing risk assessment, a new risk assessment will have to be carried out and the information documented.

Entry point

Section two of the audit looks at issues associated with the entry point. In particular, it should review:

- The space available at the entry point for entry and rescue equipment;
- The height and width available to erect man riding winches;
- The availability of anchorage points;
- Whether the entry point is inside or open to the elements;
- Is there adequate lighting?
- Are communications viable?
- Most importantly, the type and dimensions of the entry point, and whether it is horizontal or vertical.

Individual characteristics

Section three deals with individual characteristics of the space itself. In particular, it should identify:

- Previous contents of the space;
- Depth and condition of internal ladder systems if the space has to be entered vertically;
- Internal distance to be travelled within the space;
- Internal obstacles (pipes etc.) or design issues such as lightening holes which would impair travel or indeed rescue operations.

Other issues such as internal height and/or width restrictions would be recorded, as would be the potential presence of solids, liquids or gases which could present additional hazards. The section should conclude with a review of communication feasibility, the presence or absence of internal lighting and ventilation requirements.

The root of the problem?

Within the past few months we have seen five men die on a Varun Shipping Company ship in the Indian Ocean. More recently, three men died on a Syrian ship. We are still awaiting the findings from the promised enquiries into these incidents. Unfortunately, the frequency of enclosed space related fatalities and accidents continues to increase. Safety booklets and posters litter the alleyways and bookshelves, but the death toll keeps on rising. Surely this should tell us that something is wrong with our approach?

Perhaps placing a safety poster in the boardroom as well as on the ships, and organising a visit to a double bottom space by the Chief Executive would have more effect on dealing with this problem, and help establish a safety culture in the marine industry rather than the existing legislative culture.

Rescue capability

The final section af the audit should address the issue of 'rescue capability'. It should consider how a rescue team would recover a casualty to the entry point and transfer them on to the medical centre.

As an added bonus, this computerised enclosed space management system can be accessed instantaneously by the office ashore, enabling the ship/installation and management company to review information jointly in a 'real time' situation and collectively formulate solutions.

Contractors

The enclosed space management system will help underpin and support the Master's/managers' responsibility of care toward all persons on their ship or facility.

The system can provide a full printout of the status and risk profile of any particular space, including the relevant risk assessment, observed hazards, recommended rescue equipment and rescue team availability. This information can be be sent direct to the contractor prior to the work commencing in order to help with the compilation of their safe system of work and rescue arrangements. Any particular hazards, and any need for specialist training and equipment or rescue arrangements, can be flagged up and resolved in advance.

In this way, for the first time in the marine industry, all workers, whether from the ship, installation or from ashore may be provided with comprehensive information regarding all enclosed spaces at the workplace. In addition, and probably more importantly, it ensures that there is an effective exchange of safety information between the ship/installation, managing offices and contractors.

Conclusions

It should now be plain just how straightforward it is to establish an enclosed space management plan. The main benefit is that any worker tasked with entering an enclosed space can refer to the electronic database for that space and download relevant information, regardless of their previous work history at that location. The system should be regarded as a living document which contains an up-to-date and permanent record of information of all enclosed spaces on that ship or facility.

If this system could be adopted by the marine industry as a standard requirement it would, for the first time, place enclosed space safety management on the same level as fire management. It would also ensure that, again for the first time, there exists comprehensive knowledge of enclosed spaces and their individual dangers on each ship or installation and allow access to that same information by the operating office of the ship. Equally important, it would provide a safety net for shore workers when engaged in work in these spaces.