

Avoiding engineroom hazards through better practices

Rod Neale, safety manager at consultant, design and survey company Burness Corlett Three Quays, relates some of BCTQ's findings from ship inspections

The ship's engine room has always been an area where hazards exist. High noise levels will affect hearing, high temperatures can affect performance and lead to heat exhaustion, personnel or flammable substances can come into contact with hot surfaces, corrosive chemicals are handled and machinery and machine tools are operated.

Many of the hazards can be mitigated by good design, good lighting and ventilation, compliance with safe working practices, good housekeeping procedures, and adhering to the planned maintenance programme. With the exception of the design element, which is obviously a function of the naval architect, the flag state and the classification society, the others are dependent on the way that the engine crew functions.

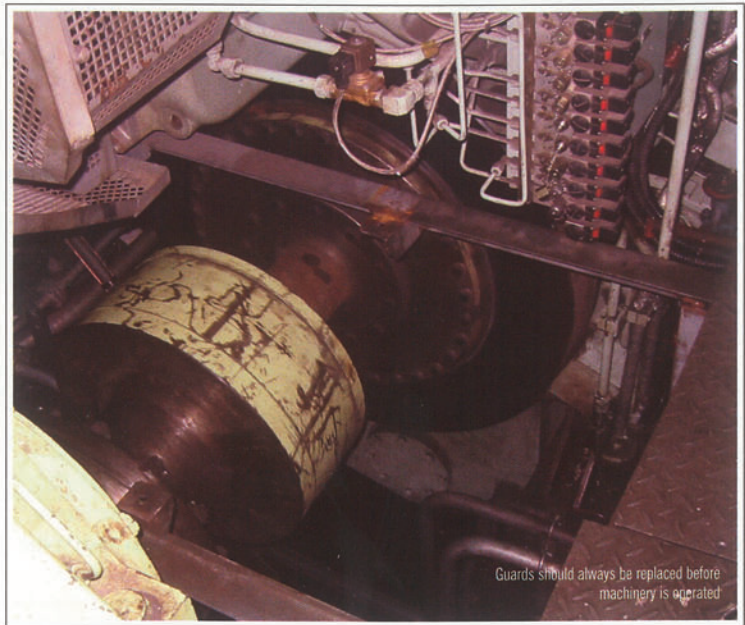
Burness Corlett Three Quays' (BCTQ) safety managers often find unsafe practices or conditions when visiting vessels. In some cases this may be due to a lack of training and experience whilst in others it can be a different perception or attitude to risk.

Working practices

Frequently crews adopt practices perceived to be time saving without fully appreciating the potential consequences of their actions. Examples are watertight or fire doors routinely left open, and spring loaded valves on gauge glasses or sounding pipes 'gagged' open. Even the most safety-conscious ship's engineer can be distracted by having to respond to an alarm, or answer the phone and may leave an area in an unsafe condition. Openings in decks or handrails may not be protected by a barrier, or live electrical conductors may be left exposed.

Human nature also plays its part, as all of us think that accidents happen to the other guy and not to us. This assumption along with a complacent attitude is a recipe for disaster.

A number of hazardous situations, in BCTQ's experience, are common,



irrespective of the type of ship, the flag state or the nationality of the crew.

All of the company's safety managers have been on ships where watertight doors leading to other compartments from the engine room are routinely left open (even though in many cases there is signage stating that the door is to be kept closed at sea). In particular the door to the steering gear compartment is often found latched or tied open.

This obviously has implications in the event of water ingress into either compartment or a fire breaking out. The vessel's stability could be compromised as could the ability of the fixed fire extinguishing system to put out a fire.

Machinery guards and deck plates are another common issue. In order to access machinery, pipeline systems or the bilges it is necessary to remove these, but on occasion they are either not replaced or properly fastened down. Guards have been found missing from flywheels on medium speed diesels as well as from couplings on other rotating machinery. In the workshop grinding wheels are often unguarded or have an excessive gap between the grinding wheel and the tool rest. The grinding wheels are sometimes found in quite poor condition,

with the risk that they might shatter in use.

If deck plates are not properly fixed down they tend to distort and thus present a slip or tripping hazard. Even worse is the fact that in the event of a crankcase explosion they can be potential missiles as well as leaving openings that personnel can fall through.

A couple of years ago a safety manager found a main engine oil mist detector which was switched off due to being unserviceable. Other automation and alarm systems on that particular vessel were also unserviceable including some affecting the main engine bearing temperatures.

Fire

Fire is an ever present risk, which has the potential to grow rapidly due to the relatively large volume of most engine rooms and the proximity of flammable substances. As well as adopting good fire prevention practices the prudent engineer will also ensure that quick closing valves, ventilation shut downs, and fire detectors are well maintained and regularly tested.

BCTQ is aware of an incident recently when the gasket on a main engine fuel pump blew out. Luckily the resultant oil spray did not hit any surfaces hot enough to be an ignition source and the oil mist which

was created activated a fire alarm detector and so alerted the crew.

Unfortunately crew members are not always alert to the potential consequences of the actions they take. A scenario recently saw wooden crates and cardboard boxes containing stores being stowed adjacent to the main engine exhaust during a lay-up period. Luckily the small fire which resulted when the ship was re-activated was detected and extinguished during the early stages of propagation.

Doors to purifier rooms are often left open due to the fact that these compartments can get very hot. While this may be acceptable if someone is actually working inside, in some cases the door is not closed when the person leaves the room, or even when the engine room reverts to an unmanned status during mealtimes.

Safety managers have also found oil soaked lagging or oil soaked absorbent pads in the engine rooms they visit. The use of unsuitable containers for the disposal of oily rags can also be an issue if personnel are not aware of the risk of spontaneous combustion.

Emergency equipment

One very hazardous situation concerned the engine room on a ship which was being painted by the crew. Several 5-gallon paint drums and thinners were temporarily stowed on the walkway just above two roof fired boilers, with the intention that they would be left overnight while the engine room was in the 'unmanned' mode. For some reason the tops had been cut off of the thinners containers which were found about half full. Nobody had considered the risk that the vessel might start rolling or pitching.

Surprisingly escape routes are occasionally found to be impeded, or escape trunks not illuminated, which will obviously hinder safe evacuation in an emergency.

Fixed flooding systems can present their own hazards. We have witnessed two accidental discharges of CO₂ into the engine room. One was due to a faulty CO₂ pilot cylinder valve and the other while the system was being serviced in the shipyard.

The failure to use, or have available, PPE (personal protective equipment) is another item that features regularly in our safety managers' reports.

The wearing of suitable clothing can be another issue. Failure to wear proper safety shoes obviously leaves feet vulnerable and short sleeves may result in burns or cuts to arms, particularly if the ship is in rough weather so increasing the risk of slips or falls. On occasion personnel have been seen in machinery spaces without wearing hearing protection (although when challenged most claim that they are only visiting for a short time for reasons such as collecting tools from the workshop).

Accidents

Some companies have very good procedures for ensuring that lifting equipment is properly inspected and maintained. Unfortunately this is not universal. Sometimes we find that the engine room crane is not subject to any inspection and testing routine by a competent person. Other lifting equipment such as chain blocks, strops and shackles are also assumed to be fully serviceable despite being several years old and with no record maintained showing their history; often with no formal inspection procedures in place.

Hand injuries are a regular feature on engine room accident reports we receive. One engineer recently lost the tip of his finger due to using it to line up a couple of pipe flanges. In other cases gloves, sleeves or jewellery get caught in rotating equipment. The use of hand tools presents hazards if in poor condition or used inappropriately.

When machinery spaces are unmanned at night the duty engineer is vulnerable should anything happen while carrying out night rounds or when responding to an alarm. It is essential that procedures are in place to alert personnel in the event that anybody gets injured.

Three elements

Some companies have a far better safety record than others. Those that tend to be better, foster a positive safety culture in their offices and on their vessels. In our experience there are three main elements which influence this safety culture.

The first is the attitude of the management company. Although every company would claim to have a good safety culture, the fact is that some are much better. An active and visible commitment to safety from senior management ashore is the starting point in adopting a true safety culture. This can manifest itself in different ways but commonly it can be seen in a commitment to best operating practices. A willingness to commit resources for training and equipment, good lines of communication within the ship and shore organisations, and the adoption of a no blame culture are all contributory factors.

The second element is the commitment of the onboard management team. Senior officers leading by example, offering guidance to junior officers and crew, and regularly checking that safe operating procedures are being complied with are all factors. Managers need to be proactive and intervene at early stages where unsafe practices or conditions occur.

The third element is the way that the company mans its vessels. Those that routinely have the same personnel regularly sailing on their ships tend to have a better safety record as the crew are familiar with the vessels, the company's procedures, and have an incentive to meet the safety standards expected.

It is therefore recommended that an independent third party is occasionally called in by owners to audit procedures and ensure that vessels are operating safely.



Attention needs to be paid to lifting practices to ensure these are safe