A review of the risks faced by hull and machinery insurers in 2013.

Simon Groves
Inserve

Background

The shipping industry has never been more heavily regulated than it is today. Rules and regulations are being applied by various bodies in response to accidents and incidents ever more quickly without any real thought of the practicalities, costs and benefits. Often these are knee jerk reactions to perceived problems rather than effective solutions to real ones.

Against this background, accidents, casualties and claims remain at a high level and show no sign of reducing, or being in any way affected by this mounting pile of paperwork.

There are various reasons for this. The regulations are often misguided and actually increase levels of risk instead of reducing them. Also, those who are tasked with applying them such as classification societies and flag states lack the means to do so.

Inserve is a risk based organisation which assesses levels of risk for hull and machinery insurers. We try to reduce risk to a level which meets insurer's expectations. Few insurers have any kind of minimum standards which they expect shipowners to meet. They leave it up to organisations like us to decide what level of risk is acceptable in any particular case.

If you consider the risk profile of a ship or a shipping company on a scale of one to a hundred, you could say that around half of that risk profile is heavily regulated and subject to scrutiny from class, flag, charterers, port state control, P&I etc. There is a lot of overlap in the areas which these bodies concentrate upon. There then remains around half of the risk profile which nobody considers and in which all of the accidents, claims and casualties occur. It is this half of the risk profile that we tend to focus on when it comes to loss prevention.

Fire

Fire remains the biggest category of loss for insurers in terms of cost. In our view all fires are preventable and fire prevention features heavily in our risk based surveys.

SOLAS goes a long way to address fire risks, and if SOLAS was applied correctly to its full extent then it would be effective at reducing the number of fires on board. It is generally considered to be the classification societies who are tasked with applying SOLAS and for example it was in 2003 when all ships had to comply with chapter 2 II 15 – 6.9, 6.10, 6.11 and 6.12. Had this been applied correctly then all of the typical "oil on hot surfaces" fires would have been eliminated. Unfortunately that has not been the case.

Regulatory bodies do not apply the rules correctly and more than ten years later we continue to find exposed hot surfaces and other ignition points on engines and machinery greater than 220C on probably around 90% of ships that we survey.

We find fuel and oil being conveyed in rubber hoses and other unsuitable materials, often rubbing, vibrating and at risk of failure. SOLAS went some way to tackling the failure of high pressure fuel injection piping by requiring double skinned pipes with leak off facilities and alarms. This was very good, but most fires occur from leaks in low pressure systems, fuel and oil supply lines, on/off engine connections etc and while according to SOLAS these should be shielded at potential leak points, they are commonly overlooked. Similar to a lot of new requirements, it was all ticked off at the date of inception and then forgotten about. So engine room fires remain frustratingly common.

The number of accommodation fires has reduced in the last ten years with the widespread use of low combustible materials and the use of fire doors to give vertical separation at stairwells although all too often these are gagged open.

We have a saying at Inserve – "If a door is fitted in a ship it should be kept closed. If the designers had intended it to be left open all the time they would have just put a hole in the bulkhead"

This applies to fire doors and watertight doors of course.

Despite the widespread introduction of hot work permits and other precautions, these seem to be having little effect. We continue to see fires arising from hot work for the simple reason that the area has not been checked for the presence of combustible materials and liquids. Some of the most serious fires and explosions have occurred in this way.

In repair yards the crew often switch off and assume the yard are in charge, but this shouldn't be the case.

Some basic fire safety measures continue to be overlooked. Fuel and oil tanks should not be situated above machinery or in locations where a leak or an overflow will allow liquid to fall onto an ignition source, but this situation is still quite common.

Fuel and oil tank slight glasses should be isolated from the tank when not in use, by spring loaded self closing valves or weighted cocks or other means. In around 90% of cases we find these gagged open such that in any fire, the sight glass will melt and the contents of the tank will spill out, fuelling the fire and making it much more difficult to extinguish.

Simple things like weighted cocks on double bottom sounding pipes are forgotten about and left open, such that if the tank overflows the contents spray out on to nearby machinery.

We continually have to remind crew members about these most basis aspects of fire safety.

As for extinguishing systems such as CO2 smothering, there are requirements for having release equipment in the right locations, but the main problem is that the release procedures are poorly understood. Sometimes the procedures have been lost in translation but mostly the crew members have not taken the time to familiarise themselves.

Drills and practices are given a high profile within the rules and regulations but in reality we find that most exercises we witness are very poor.

In addition to the usual smothering systems, the latest regulations require water spray systems on machinery. This is excellent and is likely to become commonplace. If it is set-up correctly, an engine fire will be extinguished before anybody knows it has started. Engine fires will be a thing of the past.

Sadly we find that most water spray systems are switched off or the suction valve on the high pressure pump is closed – “to prevent accidental release”. The crew are reluctant to test the systems for fear of water damage to the equipment. Many do not know that there is a manual release capability both locally and at the control panel.

Fire dampers are a crusty old issue that continue to feature in the risk profile. Despite fire dampers appearing on ISM checklists and on the checklists of most types of surveyors and inspectors, we continue to find them seized open, damaged or otherwise defective, such that the fire cannot be suffocated and extinguishing systems will be less effective.

Fuel tank quick closing valves are another fire safety measure which is often found lacking.

It is worth mentioning that on a lot of ships there is often one critical fire door - the door between the engine room and the steering flat. When this is gagged open, as it often is, and the emergency fire pump and sometimes the foam system are located in the steering flat, it immobilises the entire emergency fire fighting equipment.

Watertight integrity

Where watertight doors are fitted between compartments below the main deck it seems to be commonplace to leave these open at all times, in the misguided belief that they can be closed quickly in an emergency.

Casualty investigations show that trying to close them after an accident is too late. In the aftermath of a casualty, they are often forgotten about, don't work, are obstructed in some way or damaged in the casualty. Casualty response procedures and checklists might have the closure of watertight doors on them, but never at the top where it should be. They also act as fire doors so should be on the top of any fire response procedures as well.

However, the best way to overcome all these problems is to keep them closed in the first place, and this is the biggest challenge. Crew members fail to realise that a ship is watertight only when the watertight doors are closed. Yes there are ways of categorising them A, B and C according to which can be left open when at sea in non critical areas of the ship, but for all times when the ship is in anything other than open waters, they should be closed.

Ship's side valves are a traditional item which used to receive lots of attention. They would appear in planned maintenance systems for operating and greasing and you could be confident that they would close fully when needed. These seem to have been forgotten about in recent years. There is a degree of carelessness creeping into the industry when opening up sea strainers for cleaning. People assume the valves are closed and tight, and then remove the top of the sea chest without adequate precautions and then the engine room floods.

Machinery

The greatest category of loss to insurers in terms of claims frequency is crankshaft bearings. This is more common on four stroke engines than two stroke engines for the reason that the crankcase oil is used for cleaning and lubrication, speed and vibration are greater and there is a stress reversal in the four stroke cycle.

The connecting rod bottom end bearing is most at risk due to ovality of the crankpin and connecting rod bore, fatigue of connecting rod bolts, oil contamination etc. Modern designs of bearing shell and installation methods do not help, and the current situation with respect to bearing failures is not getting any better.

Most machinery will be maintained according to running hours and we find that engine overhauls throughout the industry are carried out pretty much on time. The industry seems to be in widespread agreement that running hours are recorded and engine maintenance carried out accordingly. The problems arise when things are overlooked. Overhaul report forms recording levels of wear and clearances are often lacking. There may not be sufficient tools for taking these measurements or the importance of taking and recording such measurements is not fully appreciated.

In our view there is a misconception that four stroke medium speed engines can be overhauled on a cylinder by cylinder basis like a large two stroke engine. Yes,

individual cylinders can be removed for maintenance but it is far better if the overhaul is carried out in one complete operation.

With overhaul intervals of around 10,000 to 15,000 hours and with ships accruing say 5,000 running hours a year, it is ideal if the four stroke engines are overhauled at each two and half year drydocking period under controlled conditions in a shipyard with all the necessary resources. The engines can then run from drydock to drydock with the maximum reliability and minimum intervention from the crew during whatever time they may have available in port.

Particular attention is needed to bottom end bearing ovality and also to the operational life of the connecting rod bolts which suffer from fatigue and elongation.

While not a requirement of any particular body or organisation, lubricating oil sampling and analysis has become commonplace and is probably the best machinery loss prevention tool available. Onboard test kits can be used regularly in conjunction with periodic shore based laboratory analysis.

Some common problems with laboratory analysis mean that shipowners are not seeing the full benefit. Oil samples should be taken from the correct locations on the machinery which ensures they are representative of the oil in the system.

We find that there is too much reliance on the comments from the laboratory, whether there is an alert or caution, an orange or red light. The comments from the laboratory are often acted upon without any real thought given to them. The laboratory comments are computer generated and do not consider the nature of the machinery involved. So it is essential that somebody scrutinises the results and applies the corrective measures which are appropriate.

Inconsistent sampling is commonplace, and makes results erroneous. Sometimes samples are taken from completely the wrong place such as filter drains.

Another common cause of crankshaft bearing failure is fitting the incorrect size bearing. Crankshaft crankpins and main journals can be machined following a failure and may be below their original size. If this is not made clear then a standard size bearing can be fitted to a non-standard location.

This kind of incident features heavily when a ship moves from one manager to another. All too often maintenance records are not handed over with the vessel and the presence of non-standard bearings is typically the kind of information which gets lost. This reluctance to transfer maintenance records has sadly become embedded within our industry. It gives rise to a large number of breakdowns, claims and casualties but is not being tackled by any of the regulatory bodies or by insurers.

Given the above it is not perhaps surprising that crankshaft bearing failures remain at a high level. It is often thought that the oil mist detector (OMD) will alert the operator to an overheating bearing sufficient to prevent damage. This is not the case. OMDs are there to alert the operator that conditions exist which can cause a crankcase explosion. By the time the OMD has alarmed there has to have been some serious overheating and bearing damage.

Bearing temperature monitoring is the most effective way to prevent serious crankshaft damage in the event of a bearing failure. In recent years there has been a lot of consolidation among engine manufacturers and most, if not all, now offer some kind of crankshaft bearing temperature monitoring.

The systems are very effective but they must be set up to automatically stop or slow the engine. All too often we find this function disabled for fear of false alarms. The engineers say that they prefer to investigate any alarm before deciding what to do, but by then it is too late - making the system a complete waste of money.

Safety and protection devices in general need a greater level of attention. We find ISM systems written which include monthly testing of all alarms and shut downs. Clearly this is far too frequent and in reality it is just being ticked off. Annual testing would be fine, provided it is done thoroughly. All too often overspeed trips fail to operate when needed, and damage arises. There are also many casualties where main engine overspeed trips have operated and the crew do not know how to reset them.

Turbochargers remain high on the list of machinery failures and like crankshafts these are becoming much more expensive to repair or renew. The typical turbochargers with ball and roller bearings at each end of the rotor with individual lubricating oil sumps remain quite reliable. It is those which utilise sleeve bearings within the rotating element often using oil from the engine circulation system which are more problematical from an insurance claims perspective. Some will argue that the sleeve bearings have a longer life but they are harder to monitor and are susceptible to lubricating oil contamination or starvation.

Fuel oil sampling and analysis has gone a long way to deal with the problems of contamination, incompatibility and catalytic fines. Most shipowners will use such a service when taking bunkers and it is very effective, if the results are acted upon. I think it good to say that shipowners and crews in general are much more aware of the problems caused by poor quality fuel.

Where these do occur it is often not just a simple matter or poor quality fuel having been bunkered, there are often a number of factors involved such as fuel handling, filtration and purification issues, even pressure from charterers.

The introduction of 1% sulphur fuel in SECA areas has been managed quite well, with ships being adapted in terms of storage tanks for low sulphur fuel and low alkalinity cylinder oil.

Problems have arisen from the sudden imposition of 0.1% sulphur fuel in EU ports. As an industry we spent the last 30 years developing engines and machinery to operate safely on heavy fuel at all times, and now the only way to comply is to change over to distillate fuel. Apart from the typical main engine fuel pump problems there has already been a number of quite serious casualties when trying to burn distillate fuel in large boilers which were not designed for it.

Navigation

In terms of hull and machinery insurance casualties, the split between hull damages and machinery damages is about 50/50 in terms of numbers. Hull damages from errors in navigation are harder to prevent than machinery failures and fires. They are often caused by a genuine oversight or an isolated case of negligence which is not east to foresee.

Crewing issues, the lack of sufficiently qualified and experienced crew members is probably more noticeable and relevant on the bridge than elsewhere.

STCW seems to have reduced the competence levels to the lowest level which all countries can meet. Rather than raise the standards of the lowest it has lowered the standards of the best. The falling competence level of pilots continues to cause concern.

There is over reliance on electronic aids without the necessary skills to use the equipment. Basic passage planning and position fixing is becoming a thing of the past, it is more a list of waypoints and a route to follow on a screen. This is going to be more noticeable as electronic chart display systems (ECDIS) become more common and indeed they become a mandatory requirement.

Bridges have become relaxed social centres with people sitting around talking instead of places of work where a navigator remains on his feet keeping an effective watch.

Shipping companies are contributing towards the navigator becoming distracted by fitting computer terminals for work at the back of the wheelhouse, further increasing the risk of distraction for the bridge watch. This has caused numerous accidents. It seems to becoming more common for deck officers to use their bridge time catching up on paperwork.

In a recent one in the North Sea involving loss of life the navigating officer on the surviving vessel is now admitting he was working on the computer.

ECDIS related incidents often occur on passage at full speed therefore there is a lot of damage. The picture shows the Pride of Canterbury having completely torn off a propeller after hitting a shallow patch.

The next picture shows the AIS track of the CFL Performer on the Haisbro Bank.

Both vessels were modern and well equipped. Both navigating officers lacked training in ECDIS.

By using the zoom facility on electronic vector charts a number of ECDIS related accidents have occurred.

With regard to ECDIS everyone is agreed that the most fundamental issue with electronic charts is training. There are about 30 different systems in use. Around 6 hydrographic agencies producing electronic charts (ENC), each which show and interact slightly differently with each manufacturer’s software.

This software is being regularly up-dated. A number of what IMO euphemistically call “anomalies” are being worked on by the various manufacturers, when they are spotted by alert navigating officers.

So a navigator who always used to know how to use a simple chart, is being expected to understand how to interact with possibly 30 x 6 = 180 types of displays. Previously he used a paper chart where all the available information was right in front of him, now he has to search for it.

Throw in the challenge of shipping companies using navigating officers from various manning agencies. There was a time when all navigators knew how to use the available charts. But now a new joining officer going on the bridge of a ship might need type specific training.

Type specific training can be decided by the manufacturer and the flag state. Generic training has been stipulated as being 5 days by the IMO. But they have back tracked a little already and said it can be tied in with the renewal of certificates. So this is already being dumbed down. In fact the UK MCA are already saying it can be done in 3 days. So even though everyone is agreed that training is the issue, the authorities are making the issue fuzzy and dumbing it down.

What not always fully understood is that ECDIS is changing the way the bridge team operates. A fundamental review needs to be undertaken by shipping companies of the bridge management team if ECDIS is to be of value. Putting the system on board and hoping the navigators will figure out how best to manage it, is short sighted, and has led already to a number of ECDIS assisted accidents.

We frequently come across deck officers who cannot undertake simple tasks on the ECDIS. We find captains and navigating officers who do not know how the device is updated, and where the records are. Shipping companies are also not taking sufficient interest in keeping their electronic charts updated.

There is a tendency for a shipping company to try and get around the problem by simply stating that regular positions should be put on the chart and the ECDIS should only be used as an aid.

When we watch what is actually happening on the bridge, the navigators are gathering around the ECDIS and watching it, although not checking it against the radar. Then a navigator is putting a GPS position on the chart to satisfy the company’s wishes, but nobody actually refers to it. Consequently if the GPS position differs from the hydrographic survey, no one in the wheelhouse knows where they are. In some areas the chart can be 0.5 miles different to the GPS position.

The purpose of the recently introduced Bridge Navigational Watch Alarm System (BNWAS) is to reduce the risk of the OOW falling asleep – snoring damages as they are sometimes known in the insurance industry as they often occur in the early hours of the morning.

Use is therefore being made of infra red detectors to detect officer’s movement and therefore their level of alertness. However if the system can detect the officers

movement and he is simply sitting at the computer away from the lookout position it is of little value. There appears to be no legislation, or manufacturer's guidance, as to the area the BNWAS system is monitoring to ensure that the navigator is not only awake but is carrying out an effective watch.

This final picture shows the extreme level this particular master has gone to. He has made locked cabinets for the printer, PC monitor, telephone and fax machine. To stop his crew phoning home, and looking at pornography and printing out the pictures whilst on watch!!! All of which he had caught them doing.

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