



STANDARD SAFETY

SETTING THE STANDARD FOR SERVICE AND SECURITY

June 2012

NAVIGATION SPECIAL EDITION

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This issue of *Standard Safety* is focused solely on navigation. Claims relating to poor navigation are the largest single cause of claims in terms of cost, and the club's experience in recent years provides ample evidence of this. A number of factors are investigated using case studies to illustrate the problems and consider what can be done to curb the increasing frequency of navigational incidents. There are many such case studies available, some of which are published by Flag States and are in the public domain. These, we believe, should form part of a company's loss prevention programme since it is far better to learn from the mistakes of others than experience them yourself. The biggest risk that a shipowner faces is a major navigational incident: not only can it result in fatalities and pollution but can have a substantial impact on the reputations of those concerned.

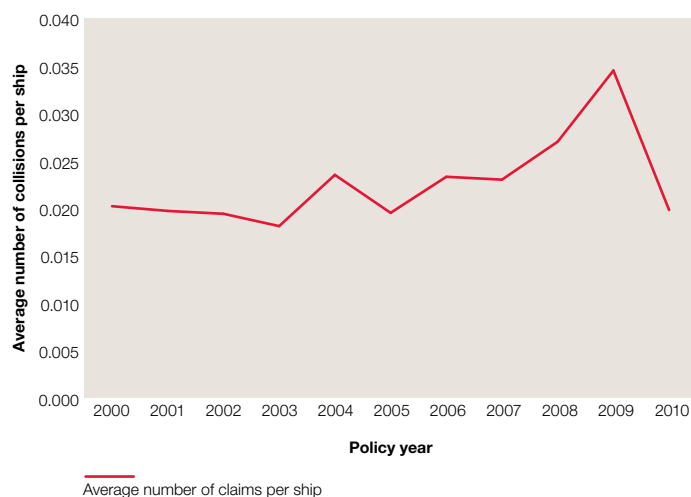
NAVIGATIONAL INCIDENTS AND COLLISIONS ARE INCREASING

The club has investigated the number and cost of navigational incidents over the past ten years and the facts are alarming at many levels. In the past five years, there have been 85 claims of over \$1m of which over 50% were directly related to navigational issues. Of these claims, 42% were due to collisions, 32% were due to damaging fixed and floating objects such as buoys, berths, breakwaters, mooring dolphins and cranes, and 15% were due to ships grounding. Of these major incidents, 16% occurred when the ship was under pilotage. This is a significant figure and the inference could be that either the pilots are not well trained or the master and the bridge teams are not properly monitoring what is happening when under pilotage, or a combination of both. Only occasionally is the cause of a navigational incident a mechanical failure.



Over the past five years, these navigational claims have amounted to \$376m: This means that in US dollar terms, 80% of the club's claims over \$1m are directly related to navigational issues. Looking at the industry, navigational claims could be aggregating approximately \$880m per year for P&I losses alone and the indication is that this trend is getting worse.

The club's data on collision claims shows that from 2000 to 2010, the average number of collisions per ship is steadily increasing – a near 50% increase. The graph below shows the average number of collision claims per entered ship.



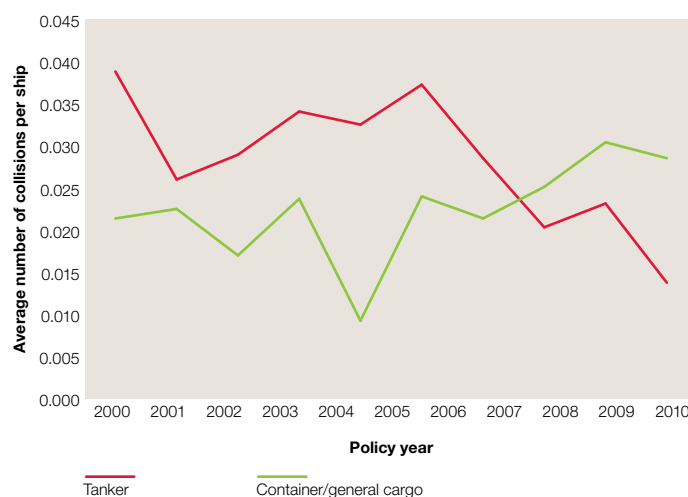
^ Collision Claims 2000 to 2010. Average number of collisions per ship.

What is not clear are the underlying reasons. It would be expected that as ships have become more reliable in a technical sense and more automated with sophisticated bridge equipment, there would have been a decrease in navigational accidents. We would normally assume that with any human endeavour we get better, but this does not appear to be the case with navigation.

The introduction of electronic charts, ECDIS and automatic identification system (AIS), bridges equipped with two global positioning system (GPS) units, more reliable radars, the increased use of traffic separation schemes and port vessel traffic systems (VTS), better and bigger tugs, etc. should have made the life of the navigator easier. The apparent increase in incidents is not caused by the machine – it is down to the humans operating and using the equipment. It is caused by the human element.

Analysing the collision statistics of tankers entered into the club over the past ten years has also revealed a surprising fact. The improved operational management of tankers – much of it as a result of the demands made by the oil majors through their enhanced inspections and officer training requirements – is not apparently reflected on the bridges of tankers. You could ask whether these 'regulatory' regimes are too focused on the machine and not enough on the human skills needed to run the ship.

The following graph shows the average collisions per tanker ship vs the average number of collisions per container/general cargo ship for the last 10 year period.



^ Collision Claims 2000 to 2010. Average number of collisions per ship. Tanker vs. general cargo.

TRAINING STANDARDS

STANDARDS OF TRAINING, CERTIFICATION & WATCHKEEPING (STCW) AND THE HUMAN ELEMENT

It is strongly suspected that the role of the Flag States in controlling the quality of navigational training is failing in many cases. The STCW, through the Manila amendments, has recognised that the human element issues surrounding accidents needs to be addressed and this human element training may produce improvements in navigational-type incidents.

The club held a series of seminars on the human element in four major shipping locations in 2011. The goal was to highlight the fact that understanding the human element is critical when trying to prevent major catastrophes, including navigational incidents. One of the main concerns of members was the perceived navigational competence of seafarers. In all seminars, the second most concerning worry after piracy was bridge competence and, more specifically, navigating in high traffic density areas such as the Singapore Straits, Chinese coastal waters and the English Channel.

The book *The Human Element – human behaviour in the shipping industry* (to which the club contributed through a consortium headed by the UK Marine and Coast Guard Agency) states that it takes ten years of experience to achieve mastery in any role and this point should be appreciated by those manning and managing ships.

The club's experience is that, without doubt, understanding the 'human element' is central to reducing incidents and in particular navigational incidents.

BRIDGE TEAM MANAGEMENT OR BRIDGE RESOURCE MANAGEMENT (BTM/BRM)

BTM/BRM is said to be the effective management and utilisation of all resources, human and technical, available to the bridge team to ensure the ship's safe navigation. A key safety aspect of BTM/BRM is the implementation of defences against single-person errors with the aim of avoiding serious incidents. Case studies consistently show that this 'challenge and response' aspect to BTM has failed.

In a significant number of navigational incidents, the watchkeepers have had bridge team management training and so this questions, therefore, the effectiveness of bridge team management training. There is strong evidence that this training is, in many instances, not being conducted well. This training is costly and it is assumed that owners would want to know that it was effective.

It is difficult to get statistics, but it is known that high-profile navigation incidents have occurred where the full bridge team did indeed have BRM training or an equivalent. The evidence is there that many BRM or equivalent courses are not effective and the outcome of the training is poor.

To provide some context into this apparent failure of BTM/BRM, we can quote the Norwegian Accident Investigation Board's (AIBN) report into a bulk carrier grounding in 2008.

"Based on conversations with pilots and bridge crews, the AIBN believes that lack of an effective bridge team is not unique to this accident. Although both the ship's officers and the pilot have attended BRM courses, this appears not to have been sufficient to introduce a practice where the ship's bridge crew and the pilot together form a well-functioning bridge team. Both ship management companies and the pilot services are still lagging behind in establishing how to introduce the BRM principles in practice."

Subsequent to the grounding and based on the internal investigation, the ship management company decided to send the ship's navigators on another BRM course.

BRIDGE WORK

MONITORING THE SHIP'S POSITION

The navigator must accurately establish the ship's position at appropriate intervals and use this information to keep the ship on a safe track, taking into account navigational risks. If this simple task was performed effectively, many groundings would be prevented.

The traditional skill of looking out of the bridge windows and confirming what you see with what you see on the chart, electronic or otherwise, is fundamental for safe navigation.

Fixing the ships position:

- fix at appropriate regular intervals
- fix at more frequent intervals using visual, GPS and radar in confined waters
- if there are discrepancies in the positions to the planned track then this should be investigated, or when under pilotage, brought to the pilot's attention
- parallel indexing should not replace checking the ship's position on the chart at regular intervals.

CHANGE OF THE WATCH

Poor watch handover practices are often an underlying cause of major grounding and collision incidents. and sometimes the use of checklists appears to be covering up the fact that officers consider a good bridge handover needs only a completed checklist without having a proper briefing or exchange of relevant information.

Owners should highlight that changing over the watch:

- is an important part of the navigational watch
- should be carried out effectively whatever the situation
- cannot be replaced by a checklist
- requires that the position, course and traffic is checked within a short time
- should be considered as a key part of bridge training.



CASE STUDY

A loaded, chemical tanker on a trans-Pacific passage ran aground on an uninhabited but clearly charted coral atoll, 4 kilometres across. All deck officers had joined the ship and owner for the first time, and the master had also just joined the ship a few weeks previously.

The ocean passage plan showed that the course had been drawn inshore of the 200 metre line when passing the atoll. GPS position fixes were put on the chart every two hours; however, ECDIS displays showed a track at 0.5 mile from the centre of the atoll where the water depths were from 0 to 30 metres.

On the morning of the grounding, the weather and visibility conditions were good and the chief officer arrived on the bridge minutes before 0400 hours to take over the watch. The radar showed an echo at 11 miles, which the second officer reported was a cloud. The chief officer then sat on a stool in the corner of the bridge to smoke a cigarette and drink a cup of coffee. The radar target of the 'cloud' was deselected, now preventing the Automatic Radar Plotting Aid (ARPA) from alarming. At 0400 hours, with the ship's speed at 16 knots, the second officer left the bridge with the island now six miles away, providing a distinct radar echo. At 0430 hours, the chief officer made another cup of coffee and the ship grounded on the atoll six minutes later. There was no other land within 1,200 miles.

LESSONS LEARNT

- masters should check the passage plans as well
- watch handover briefings should be comprehensive
- the officer taking over the watch should confirm the ship's position and passage plan
- the officer taking over the watch should confirm the targets and traffic on the radar
- procedures should ensure that masters assess the navigational competence of officers.

CASE STUDY

A loaded bulk carrier departed a port and after dropping off the pilot, the master left the bridge, handing over to the second officer. The second officer left the auto pilot as set by the master and did not monitor the ship's progress or put a position on the chart for over 40 minutes. 20 minutes after the master left the bridge, the ship had run aground at 14 knots, seriously damaging the hull and steering gear.

LESSONS LEARNT

- a proper watch handover briefing is essential
- watchkeepers must retain situational awareness
- frequent checks on the ship's position-keeping is fundamental for safe navigation
- deviations from the passage plans require additional vigilance in coastal waters.



BRIDGE PROCEDURES

Bridge navigational procedures should be a part of the owner's Safety Management System and this should outline the owner's requirements on how the bridge is to be managed. This is an important procedure and serious consideration should be given to its contents. Initially bridge procedures should include the guidance referred to in the *ICS Bridge Procedures Guide (4 Ed 2007)* and other similar guidance material. However, the following should also be considered to be a part of bridge procedures even if not addressed in the *ICS Bridge Procedures Guide*:

- when to pick up and disembark the pilot
- pilot briefings and duties under pilotage
- training the lookout
- appraisal of navigational competence
- appropriate watchkeeping manning (for example, river transits, heavy traffic, unfamiliar port approaches)
- fatigue management.

The scourge of using the mobile telephone on the bridge should be restricted. A number of case studies point to the use of the mobile phone as instrumental in causing the incident.

BRIDGE FAMILIARISATION

There is a firm perception that when an owner engages a navigational officer, it is on the basis of accepting that his certificate of competency is proof that he will be acceptable on board their ships. Most companies have for some years been diligent in making sure that the certificates of competency are 'genuine'; however, the 'blind' acceptance that the certificate of competency is an assurance that the person is a competent navigator is certainly a false one. A demanding pre-joining navigational assessment is one way of determining if those navigators are suitable.

When the new watchkeeper joins the ship, often he has had no proper familiarisation on that particular bridge and rarely does he have an overlap voyage with the watchkeeper being relieved. It is also rare that a competence assessment is done prior to taking control of the watch, and that should be of some concern.

A significant number of navigational collisions or groundings have occurred soon after the watchkeeper has joined the ship. However, the method of employing the seafarer from a third-party manager or crewing agency could mean that there is less control on who is employed, less control on their competence, experience and suitability.

Owners should ensure that assessments of competence are carried out before a watchkeeper takes over the bridge watch for the first time. No employer ashore would employ a person in a similar position of authority, without some proper assessment, so why should it be accepted on ships.

CASE STUDY

A ship at night was steaming in a traffic separation scheme, at high speed in high density traffic. The experienced master had just joined the ship the previous day but had never sailed with the junior officer who took over the evening watch. The master was therefore unaware of the watchkeeper's competence or confidence on the bridge.

The weather and visibility were good and a lookout was on the bridge. The watchkeeper had to monitor the ship's position and make a number of alterations of course for small ships. He mistook a slow-moving coastal ship being overtaken as a crossing vessel, altered course and ran the ship aground at full speed.

The inexperienced junior officer was overwhelmed by the amount of navigational duties he had to cope with and he lost his situational awareness. He appeared to have little understanding of the COLREGS and was not confident enough to call the master. The master did not ensure that the watchkeeper was supported in a busy navigational area and he did not carry out a proper assessment on the watchkeeper before he was left to do the watch on his own. This is also not an isolated example, and it is often found that the master apparently does not consider it necessary to provide support to junior watchkeepers in busy waters.

THE COLLISION REGULATIONS – (COLREGS)

The issue of not fully understanding and complying with the COLREGS is possibly the major cause of collision incidents. It is difficult to understand, because after a collision, more often than not the watchkeeper has indeed got the correct certificate of competency. However, there is much evidence from many navigational incidents, not only from the club's analysis of incidents but also from incidents in the public domain that suggest that numerous bridge watchkeepers, including masters, appear to have a lack of understanding or a disregard of the COLREGS. This raises a number of questions which could include:

- are the certificates of competency properly examined by the examining authorities?
- are the candidates for watchkeepers properly screened by companies prior to signing on?
- is there a need for additional training and examining of the COLREGS?

RESPONSIBILITIES

- training institutions should make sure that the COLREGS are taught effectively
- managers and owners should ensure that navigating officers recruited for their ships, especially for the first time, are competent navigators. Evidence shows that reliance on the certificates of competency is no longer acceptable as proof that the watchkeeping officer understands the COLREGS. Owners must positively make the effort to engender a safe navigational culture on board their ships
- masters should assess watchkeepers' navigational competence
- bridge watchkeepers should ensure they have the proper navigational skills.

HOW TO ENSURE THAT NAVIGATING WATCHKEEPERS HAVE THE RIGHT COMPETENCE

The lack of understanding of the COLREGS can be addressed by considering:

- rigorous pre-joining assessment
- navigational audits, including engendering a safe navigational culture
- appraisals of watchkeepers to include bridge competence assessment
- additional training, for example computer-based assessments
- to include bridge competence in ISM masters reviews.

CASE STUDY

In 2011, a large container ship was proceeding at 21 knots from Hong Kong to Shanghai. The second officer was on watch and at 0200 hours the AB lookout was allowed to leave the bridge to carry out fire patrols. The visibility was good although reduced at times by heavy rain and moderate seas. At 0200 hours, the ship was overtaking a slow-moving freighter and was clearing some fishing vessels on the port side. However, the watchkeeper was concerned by the movement of a large fishing vessel ahead not showing regulation lights and he decided to leave this fishing vessel two miles to starboard by making a bold alteration of course to port. Four minutes later, the ship collided with another unseen fishing vessel. The collision resulted with the fishing vessel sinking with fatalities.

The Flag State investigation resulted with some conclusions, including:

- the watchkeeper was not competent to keep a bridge watch
- there was a failure to comply with the COLREGS, master's night orders and the Flag State guidance for carrying out a safe navigational watch
- watchkeeper did not reduce to a safe speed when navigating in heavy traffic
- watchkeeper released the lookout from the bridge
- altered course to port when the ship was the stand on vessel.

The Flag State considered that these were serious departures from regulation, guidance and best practice that brought the knowledge, competency and judgement of the watchkeeper into question. The watchkeeper had sailed with the owner for many years.

The above incident is not an isolated case study and the club's experience often suggests that similar situations are regularly happening. A proper assessment of the navigational competence of officers prior to joining the owner and an assessment of the watchkeeping competency by the master should be considered as part of the joining and familiarisation process.

CASE STUDY

A large ship was navigating off the coast, with the master and a junior officer of the watch on the bridge. The ship encountered fog patches and the lookout was sent down below to work on deck and shortly afterwards the fog closed in to become dense. The ship maintained its course and speed of more than 20 knots and no fog signals were sounded. A radar target was picked up one mile ahead and a small alteration of course to starboard was made by the junior watchkeeper. The master countermanded this alteration and the watchkeeper thinking that the master had command of the watch did not challenge the master's order.

The collision resulted with the small ship sinking. The small ship also failed to sound fog signals or take avoiding action.

LESSONS LEARNT

- comply with the COLREGS
- proceed at a safe and appropriate speed
- use fog signals
- have a lookout at appropriate times
- encourage 'challenge and response' from the junior officers
- check masters and bridge team effectiveness with navigational audits.

KEEPING A LOOKOUT – COLREGS RULE 5

Rule 5 states: *Every vessel shall at all times maintain a proper lookout by sight and hearing as well as by all available means appropriate to the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision.*

Keeping a lookout is the first rule to comply with whilst on the bridge. Looking out of the bridge windows and seeing what is ahead, astern and either side of you seems to be stating the obvious, but experience and case studies show that many navigators appear to forget this advice.

The lookout is an integral and important part of the bridge team. There are a large number of incidents that could have been prevented by a well-trained lookout. It is implicit in STCW 95 that at all times during the hours of darkness and in busy shipping areas when underway a separate dedicated lookout must be kept on the bridge in addition to the watchkeeper.

COLLISIONS WITH FISHING VESSELS

Fishing vessels have always been a source of irritation to the officer of the watch. They rarely show the correct navigational lights, hardly ever abide by collision regulations, behave erratically, fish in traffic separation schemes and more often than not do not keep a proper lookout. However, they share the sea lanes with ships and we therefore have to deal with their actions in as safe a way as possible.

Club data over the past 10 years shows a definite increasing trend in the number of collisions involving fishing vessels. These collisions show an increase particularly in Asian and most noticeably in Chinese and adjacent waters. This could be because of the increased trade to that geographical area, the fact that sophisticated electronic devices (VDR, shore VTS and radar) can confirm that a collision has taken place and the fact that the fishing communities in these areas are reporting incidents to the authorities. The costs of the collisions are also increasing and the fact that the fishing vessel was not showing the correct lights or navigating without a proper lookout seems to have little bearing on the outcome of the claim or the subsequent court proceedings.

In many cases analysed, it is evident that the straightforward navigational techniques of:

- making sure a good lookout is maintained
- complying with a safe speed would have been enough in the majority of cases to have prevented many of the incidents.

FATIGUE

Fatigue is definitely an issue that has an impact on navigational claims. It is difficult to see how many claims are caused solely by fatigue, but the navigational claims identified by the club where fatigue was an issue and those in the public domain make this issue significant.

Bridge procedures should ensure that fatigue is addressed by:

- having a formal fatigue management plan
- having guidelines to address the problem of fatigue on watch. For example, calling the master when starting to fall asleep
- masters referring to fatigue in their standing orders
- always maintaining a bridge lookout AB at all times during the hours of darkness
- training lookouts in their duties.

The now famous pictures of the container ship *Alva Star* running into the cliffs of a Greek island is not an isolated case. Similar incidents happen regularly and are more often than not caused by the watchkeeper falling asleep without having a lookout AB on the bridge. The club is a partner in a consortium of academic institutions and shipping organisations sponsored by the European Commission to carry out a research project named '**Project Horizon**' (www.project-horizon.eu), which is looking into 'watchkeeper fatigue'. The project results will provide useful advice for combatting watchkeeper fatigue.

CASE STUDY

A container ship doing 16 knots was overtaking a handysize bulk carrier doing 13 knots coming out of the Baltic. It was approximately 0500 hours in the morning with good visibility when the overtaking container ship collided into the stern of the bulk carrier. The watchkeeper on the container ship was alone on the bridge and fell asleep, and the bulk carrier did not take action to avoid collision.

There have been a number of documented collisions, including some recorded by the club where the overtaking vessel has just apparently run into the vessel being overtaken. It often appears that the watchkeeper had either just not taken any action for reasons unknown or that the watchkeeper had simply fallen asleep. There can be no other explanation. Fatigue is a major problem in the context of safe navigation. It leads to groundings and collisions, and it should be addressed by owners.

ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM – (ECDIS)

The introduction of ECDIS is going to have a big impact on how ships will be navigated. (Please refer to *Standard Safety ECDIS special edition*, September 2011 link below). If, as it appears, we are seeing navigational incidents increasing where there is moderately sophisticated equipment, it is reasonable to assume that there could be further increases when a sophisticated system such as ECDIS is mandatory on all ships. Presently a low percentage of ship's watchkeeping personnel have been trained in the use of ECDIS. Many authorities have warned of the issues and complexities surrounding the training that is going to be required for watchkeepers on the different types of ECDIS. Companies should heed these warnings and consider the introduction of ECDIS as a significant management of change issue and carry out the risk assessments associated with its introduction and implementation.

There is already evidence that the failure to understand ECDIS systems on board has been the cause of some groundings.

www.standard-club.com/docs/StandardSafetyECDIS24August2011.pdf



^ ECDIS – Image courtesy of ECDIS Limited

PILOTAGE ISSUES

NAVIGATING WITH A PILOT

There should be a sense of increased confidence when the pilot comes on board the ship. Not only does the pilot bring local expertise that reduces the risk of navigating in constrained waterways, he also should add to the bridge team. However, pilots are human and they also make mistakes; they become tired, fall ill and sometimes they are just not good pilots. Whatever their human faults, the master and the watchkeeper must always monitor the pilot's actions and ensure that they are properly integrated into the bridge team.

Language difficulties can also add to problems associated with pilots and these should be taken into account.

When under pilotage, the ship is exposed to higher risks and a pilot's local knowledge should reduce these risks to an acceptable level. The pilot must be integrated into the bridge team and should not be considered as a replacement for a bridge team member. Numerous instances provide evidence that many incidents that occur during pilotage can be attributed to ineffective BRM, and it is often the case that the master and watchkeepers cease to monitor the navigation and position of the ship after the pilot has boarded.

Careful management of the pilot is vital, and when the officers do not monitor the ship's progress or the pilots' actions, this often leads to a major incident. The attitude that the master and the officers can relax when there is a pilot on board must change; in fact, the bridge team should be in a higher state of alertness.

CASE STUDY

A bulk carrier arrived at the pilot station without charts for the pilotage. Due to the poor weather, the pilot boarded inside the normal boarding area and brought with him the appropriate navigational charts; however, no passage plan was plotted on the new charts. Once on board, the pilot tried to plug in his laptop computer to the AIS/GPS system, but there was a fault with the connection and the master called the electrician to assist. The master and the electrician were engaged in the chart room trying to fix the defective connection; the pilot was also in the chartroom on the mobile phone to see if the weather conditions would allow the ship to berth safely and the chief officer was in the wheelhouse with the helmsman. The ship was proceeding in a narrow channel at 12 knots with no one monitoring the ship's position.

When the ship was two cables away from an island lit by a lighthouse, the chief officer decided to alert the pilot. The pilot, now in the wheelhouse, put the ship hard to starboard and full astern, which had little effect on the laden ship and it ran firmly aground, ripping out several double bottoms.

The port state's conclusions from its investigation report can be summarised by:

- insufficient voyage preparation
- deficient bridge team
- no control on the navigation
- no effective master/pilot exchange
- ship's crew did not participate in the navigation.

The observation was also made that all the navigators on the bridge at the time of the grounding had undergone Bridge Team Management training, and it was also a fact that both the master and chief officer were new to the company and to the ship.

Many pilotage authorities are extremely competent and have rigorous controls and appraisals of their pilot's competence and fitness. However, it would be fair to say that there are some that do not. Even the most highly regulated pilotage authorities can fail in providing a competent service. The *Cosco Busan* incident in 2007 highlighted many deficiencies in a supposedly highly regulated environment. IMO resolution A.960 gives recommendations on training and certification and operational procedures for maritime pilots other than deep-sea pilots, but this protocol will be implemented to different levels by the pilotage authorities.

LESSONS LEARNT

- master/pilot briefings are vital, whether for short or for long pilotages. Identify critical areas, mark master and pilot call points on charts and brief the watchkeeper on critical areas and required actions during the passages
- position monitoring under pilotage is vital
- challenging the pilot appropriately should be accepted practice.

NAVIGATING IN PILOTAGE WATERS – WITHOUT A PILOT

A number of high-cost incidents have occurred when the ship was leaving or arriving at a port and the pilot requested that he wanted to board the ship inbound of the pilot boarding station or disembark early before the ship reached the designated pilot station.

Usually pilotage is compulsory and so when the pilot requests to board or leave at a location other than the designated boarding station, it is rarely, if ever, for the benefit of the ship. Sometimes, for example, because of marginal weather conditions, the master's judgement may be required to assess if he should drop the pilot early or when inbound, go through the breakwater before picking up the pilot, but his decision should always be taken with the ship's safety in mind.

Significant claims have occurred because the pilot wanted to get off early or board later, not because of marginal weather conditions but for other reasons, for example the port is short of pilots. These

requests often happen in good weather and so masters and bridge teams are more relaxed and less alert.

Owners should give their masters guidance in these situations and unless it is for weather reasons (and also safe to do so) letting the pilot leave early or picking him up at an inshore location should be carefully considered. The master should consider the risks, including his own familiarity with the port and its approaches, have a passage plan and a full bridge team available. These judgements should not be just driven by commercial pressure.

CASE STUDY

The bulk carrier with an experienced master was leaving a port to which he had been to many times before. The ship left the berth behind schedule during the late afternoon and in good weather, when the pilot told the master that he wanted to disembark before the designated pilot station. This request turned out later to be for the pilot's personal reasons.

The pilot did not leave the master with information of what courses to take, what dangers to avoid and/or any information about incoming or outgoing traffic. The watchkeeper had accompanied the pilot to the main deck to disembark and, during this period, the master was alone on the bridge. No positions were maintained on the chart and the master was navigating by 'eye'. For reasons that can only be explained as human error, the master steered the ship the wrong side of a navigational mark and it ran onto submerged rocks, which ripped out the double bottom tanks. The wreck removal and oil pollution costs were significant.

LESSONS LEARNT

- masters should always be very aware of the significant risks that can arise when pilots leave or join the ship before/after the pilot station. Safety management systems should give the master guidance on what should be done in these circumstances. For a number of reasons, the master may not be aware of the full circumstances surrounding the navigation of the ship within the port area. These could include, VTS/pilot relationships, language, local conditions including currents and tidal conditions, fairway depths and draft restrictions, incoming and outgoing traffic, local passing protocols, restrictions, problems with ships in the vicinity, and so on
- masters must ensure a proper handover briefing is given, including full information required for the remainder of the passage if the pilot insists on leaving before he should
- masters should always proceed at a safe speed with or without a pilot, especially within port limits. If the master is left without a pilot, he should always proceed with caution and with a full bridge team
- masters should not relax when navigating (or anchoring) within port areas covered by VTS, as experience shows many ports have VTS arrangements that are not always competent.

OTHER NAVIGATIONAL CONCERNS

NAVIGATING IN SOUTH AMERICAN/AFRICAN RIVERS

The club has experienced a number of significant claims arising from ships navigating in major South American and African rivers. The Marshall Islands administration issued a notice in November 2011 concerning navigational incidents on South American rivers.

"Within the past six months the Maritime Administrator has received six reports of Republic of the Marshall Islands flagged ships grounding during transits of rivers and ports in South America. the overall impacts have been significant.

The underlying factors/root causes of the reported groundings have been:

- *Insufficient coordination between local pilot and harbour tugs*
- *Unpredictable shoaling conditions and strong currents; and,*
- *Inadequate coordination amongst the pilot augmented bridge teams."*

The club's experience mirrors this but with significant grounding and pollution claims. Navigating in these rivers is not easy and owners should provide as much support to their masters as possible before the ship arrives so that the river passage can be planned. The charted information is not always up to date or accurate. Rivers such as the Orinoco River are major rivers that may not be hydrographically mapped out regularly, water depths are uncertain, the course of the river is often changing with shifting sandbanks, navigational marks such as buoys and lights may move because of the currents and moving river beds, and navigational lights are often not operational. These therefore produce significant navigational challenges.

The pilots may be knowledgeable, but their English is often limited and so communication may be hampered. Currents can be considerable and increased by rains, and some of these pilotages can often be over 24 hours in duration and the pilots themselves can become very fatigued. Full bridge teams are required and passages should be carefully planned and monitored.

ANCHORING IN CONGESTED ANCHORAGES

Anchoring in congested anchorages is a frequent cause of major incidents. There are often collisions with other ships or fouling of subsea cables and pipelines. Congested anchorages are extremely hazardous places to navigate in, particularly with a large ship, and masters should give careful consideration to the risks when asked to anchor in these areas. As with incidents occurring when berthing or manoeuvring in a port area, too high a speed is often a significant contributing cause.

A number of collisions also have occurred, for example in the Singapore or Chittagong anchorage areas, when ships have dragged their anchors or when manoeuvring to and from an anchorage position. The fact is that the ships are often too close to each other so as not to provide a reasonable margin of error. Even in apparently benign waters, currents and strong winds can have a significant impact on the ship's passage.

Guidance should be available to masters about the dangers associated with congested anchorages. It is also a fact that commercial pressure is an underlying cause of these incidents in congested anchorages.

A special edition of the *Standard Safety* on anchoring was issued in October 2008 <http://www.standard-club.com/KnowledgeCentre/14.aspx?p=172> and this publication provides useful information.

FISH FARMS

In recent years, the club has seen a rise in claims that resulted from collision damage to fish farms, mussel beds and other aquatic agricultural activities. Fish farming or other sea agricultural activities have sprung up in many places, including the Norwegian Islands, Chilean, Japanese and Chinese coasts, off the west coast of Scotland, the Mediterranean Sea and other areas. Many of these will be noted by the hydrographical survey offices and marked on the charts; however, a number of them are not reported to the hydrographical authorities and are not noted on the charts, although they may be reported locally in the temporary and preliminary notices and/or local navigational broadcasts.

These farms are usually located relatively close to shore, although often in deep enough water for large ships to navigate in. China is a good example of this. Usually they are lit, but often with weak lights on low 'stick' buoys, so they are not easily seen in poor weather conditions. Damage to these structures results in large claims since the farming stock is often of high value.

NAVIGATIONAL AUDITS

The club carried out 396 condition surveys in 2011/12 and over the past three years, the club has carried out 169 risk reviews on members' safety management systems. Sometimes these have taken place following a major navigational incident. These reviews have delivered a number of findings and one of these is that only a few companies carry out effective navigational audits. The club surveyors have seen, for example, engineer superintendents carrying out navigational audits whilst the ship is alongside. It is fair to say that a port inspection of a passage plan, chart corrections and compass errors, etc. is not equivalent to a navigational audit. In order to carry out an effective navigational audit, an experienced person with bridge watchkeeping knowledge needs to see the watchkeepers in action.

A recent innovation presently being developed, which will become available for general use by the end of 2012, is a system where bridge activity is continuously monitored and analysed remotely. This monitoring when analysed will give useful information, for example, how often was the under-keel clearance or closest position of approach parameters contravened; how many times did a helm order produce an angle of list that exceed the company's laid-down limit; have shipping channels/traffic separation schemes been adhered to. Many navigational parameters can be set, remotely monitored and infringement trends analysed, and subsequent corrective actions and/or additional training can be provided. This is similar to what happens in the airline industry today. Shipping companies should consider these remotely managed, continuous navigational monitoring techniques in the future, especially where navigational mistakes could not only be expensive but also critical to the company's reputation.

We know of one member who is considering analysing the bridge VDR on a regular basis to supplement navigational audits to see if any navigational errors can be identified. Navigational incidents are where the shipowner's largest risks lie. Navigational audits are a good way to properly evaluate those risks.

CONCLUSION

This issue of Standard Safety is unable to cover every scenario where P&I claims involving navigational errors occur, but there is overriding evidence that:

- the number of navigational incidents is increasing
- the cost of navigational incidents is increasing
- the impact of navigational incidents on company reputations is becoming more serious
- the predominant cause of these navigational incidents is human error due to poor training and auditing for compliance with COLREGS and SMS procedures.

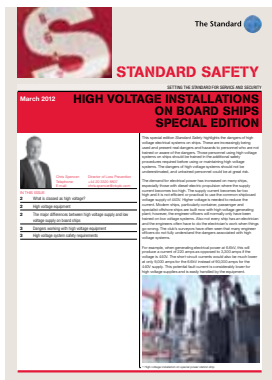
Preventing these accidents is not difficult. The techniques for safe navigation are widely known and when mastered and professionally carried out, the navigational risks are reduced.

OUR KEY ADVICE IS:

- learn from your and other people's mistakes
- engender a safe and professional navigational culture
- keep a proper and effective lookout
- know, understand and apply the collision regulations correctly
- conduct comprehensive briefings when taking over the watch
- maintain a frequent check on the ship's position by appropriate means
- assess navigators' competence when they are new to the company or ship
- provide support to watchkeepers in high-risk areas
- provide guidance for watchkeepers to mitigate the risk of fatigue
- monitor the pilot's actions
- have a 'challenge and response' culture towards pilots and master's actions
- understand that the human element plays a major role in the causation of accidents
- use effective navigational audits to reduce risk.

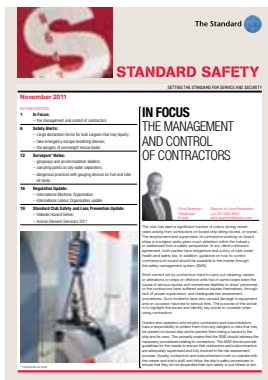


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Standard Safety October 2011

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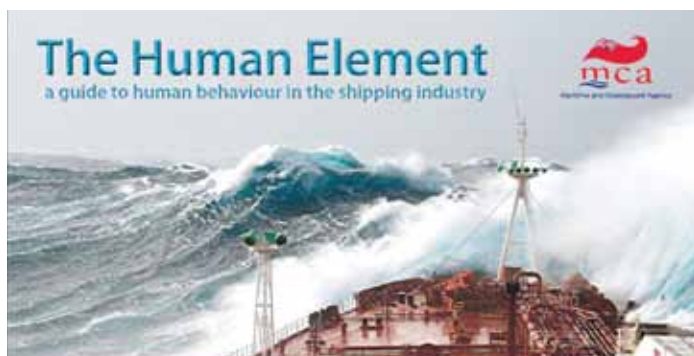
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The Human Element:

This book makes it clear that the human element is neither peripheral nor optional in the pursuit of a profitable and safe shipping industry. On the contrary, the capabilities and vulnerabilities of human beings are – and always will be – at the centre of the enterprise.

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