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**"The Changing Scene of Passenger Travel by Sea — New Risks, New
Challenges, New Solutions"**

The Marine Accident Investigator's Perspective

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Tuesday 12 September 0900 – 1030. Ocean Hull Workshop on the changing Scene of
passenger travel by sea.

Bull points

- **There is, on average, one serious marine casualty somewhere in the world, each day of the year. A percentage of these involve passenger carrying vessels.**
- **The United Kingdom's Marine Accident Investigation Branch receives about 1500 casualty reports every year. A number of these are from passenger carrying vessels.**
- **The consequences of an accident to a passenger carrying vessel can be severe, not only in immediate costs but through lost revenue and the evaporation of passenger confidence. Litigation is now almost inevitable and there is an increasing prospect of criminal charges being brought for negligence.**
- **Preventing an accident is infinitely preferable to having one. While good ship design, formal safety assessments, regulations, procedures and training will do much to ensure a vessel is safe, accidents can happen at any time.**
- **Human error features as the main cause of most marine accidents and very often include those made by people divorced in time and distance from the actual event.**
- **Although no vessel can ever expect to be risk free from accidents, human errors tend to escalate if insufficient care is taken with how the crew is selected, looked after, motivated, treated on board and trained.**
- **Fatigue and overloading of individuals are among the most common causes of accidents.**
- **Assessing risk in passenger ships or ferries involves the analysis of a wide range of factors. Most traditional sources of information, including accident reports, provide valuable inputs to this process. To often however the accident reports are either overlooked, are short of useful information or are never made publicly available.**
- **A thorough accident investigation carried out by a totally independent body without any vested interest other than preventing something similar happening again, is more likely to ensure effective corrective action is taken and that the correct lessons are learned.**
- **The flag state that does not advocate such an investigation process and is reluctant to make the report publicly available is vulnerable to accusations of a cover up or that it accepts lower safety standards.**
- **In similar vein some operating companies, fearful of the consequences of having shortcomings exposed in a thorough investigation after an accident,**

**will seek to delay, curtail or even suppress the subsequent report.
Underwriters will, when assessing risk, have to draw there own conclusions
about such attitudes.**

Author's CV

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John Lang was appointed the United Kingdom's Chief Inspector of Marine Accidents in 1997 and is responsible for the investigation of accidents involving UK registered vessels or to any vessel in UK territorial waters. A professional sailor, he first went to sea in the merchant navy in 1959 but transferred to the Royal Navy in 1962 where he became a submariner and specialist navigator. During his naval career he commanded two submarines and a frigate and was, during the Gulf War, Director of Naval Operations in the Ministry of Defence in London. His last appointment before retiring from the Navy in 1995 was Deputy Chief of Defence Intelligence. He lives in Winchester, is married and has two children.

Submission

The Marine Accident Investigator's Perspective

1. INTRODUCTION

Accidents involving passenger carrying vessels have the potential to be extremely expensive, not only in damage repair and lost revenue but, increasingly, by litigation. While ship owners will endeavour to make such vessels as safe as possible, underwriters seeking to minimise their exposure to the potential risks will use a variety of sources to establish what those risks might be.

Whenever an accident occurs, the first thing that anyone associated with the casualty will want to know is what happened and what measures must be taken to prevent the same thing happening again. In the passenger carrying business, other operator will be asking the same question as indeed will underwriters seeking to reduce their exposure to risk elsewhere.

The work of the marine accident investigator in preventing accidents happening is therefore crucial. A comprehensive report into whatever occurred can provide invaluable information to assist shipowners to improve safety and for underwriters to draw appropriate conclusions.

This paper outlines the work of the independent accident investigator, describes what he seeks to achieve and gives examples of some of the factors that cause accidents at sea today. It also states how comprehensive, and publicly available, reports can help to improve safety and also assist the underwriter in assessing risk. The paper goes on to comment on the reluctance of many flag states to publish such reports giving rise to speculation that something is being hidden.

BACKGROUND

Accidents at sea happen and even the best run vessels, including passenger ships, are affected. Many in the past have attracted widespread public interest such as the *Titanic* (1912), *Egypt* and *Seine* (1922), *Stockholm* and *Andria Doria* (1956), *Herald of Free Enterprise* (1987), *Jupiter* (1988), *Scandinavian Star* (1990), *Achille Lauro* (1994), *Estonia* (1994) and *Romantica* (1997). Less well known but equally tragic for those concerned, are a number that have occurred in the past two years: *Sun Vista*, *Sleipner*, *Dashun*, *Asian South Korea*, *World Discovery* and *Cahaya Bahari*.

Very few people will recognise the name *Dona Paz* yet this Philippine Islands registered motor ferry achieved the uncertain distinction of being at the centre of the world's worst peacetime maritime disaster when she collided with a

small coastal tanker *Vector* in the Sibuyan Sea in 1987. 4386 people lost their lives in the fire that followed.

Although less serious the implications of recent accidents involving passenger ships such as *Norwegian Dream* colliding with the container vessel *Ever Decent*, and the two Strait of Gibraltar ferries, *Ciudad de Ceuta* and *Ciudad de Tánger* colliding with each other, are of equal concern and it is only good fortune they were not infinitely worse.

Some passenger ships are now very large indeed. Many carry several thousand people and have been built to the latest safety standards and with the most modern and reliable technology installed. Full risk assessments have been carried out and every conceivable eventuality has been thought through and allowed for. Or have they?

The reality is that an accident will expose every weakness, bad decision, oversight and human shortcoming. People are an integral part of seafaring. They always have and always will make errors. Accidents have the means of showing up every human frailty or failing in a most comprehensive and devastating way. Although such exposure can be uncomfortable for some, it is essential that the lessons are learned to prevent a recurrence and that any remedial action to prevent a repetition is implemented without delay.

No accident is ever caused by a single action. Each one is a combination of circumstances that come together to cause the event and it is essential that both the initiating and underlying causes are identified to prevent the same thing happening again. The sad fact is, however, that too many accident investigations fail to produce a sufficiently comprehensive report to enable the necessary remedies to be put in place.

3. THE ACCIDENT INVESTIGATION PROCESS

The United Nations Convention on the Law of the Sea (UNCLOS) Article 94 requires that "each State shall cause an inquiry to be held by, or before, a suitably qualified person or persons into every marine casualty or incident of navigation on the high seas involving a ship flying its flag and causing loss of life or serious injury to nationals of another State or serious damage _..or to the marine environment_.."

IMO resolution A.849 (20), adopted on 27 November 1997, "Requests flag States to conduct an investigation into all very serious marine casualties___".

The actual implementation of these laws and resolutions vary widely. Some flag states ensure comprehensive inquiries are carried out on a wide range of accidents by professional full time inspectors. The investigation bodies of such states remain totally independent of the regulatory regime and have no qualms about levelling criticism at the regulator should it be found necessary. Such practices are adopted by flag states with high safety standards and these same standards will invariably be reflected in their ships. Investigations by such flag states make a point of identifying

all the factors that contribute to the cause of the accident and focus increasingly on the human factors involved.

Others do no more than meet the very minimum requirements and often use the same people to investigate the accidents as those who draw up and enforce the regulations. Such an arrangement can lead to a conflict of interests.

Some flag states conduct investigations with a view to prosecuting 'offenders.' Others will meet the basic investigation requirements but will refrain from publishing the findings. A third group will carry out an investigation using consultants and produce a report but, with one or two exceptions, they rarely include any in depth analysis of the underlying causes or the human factors involved. With one or two exceptions, such investigations make little or no contribution to improving safety at sea.

The flag state that does not, for whatever reason, ensure that a thorough and impartial accident investigation is conducted, or fails to publish its findings, will have its reasons. These could be pressure from the ship owner who does not want any shortcomings in his ship or company exposed or where there is concern that the information provided may be unhelpful when settling liability in the Admiralty court.

Whatever the reasons for such reticence, the failure to publish the findings of an accident investigation, is unlikely to contribute much to improving safety at sea. Underwriters, meanwhile, are denied the opportunity to make their own judgements about the standards of safety employed in a particular company.

The United Kingdom's Marine Accident Investigation Branch (MAIB) is one of the small number of totally independent organisations that carries out full investigations of casualties and makes the findings publicly available. The sole objective of the MAIB is to establish the circumstances of a particular accident with a view to preventing the same thing happening again. The Branch does not seek to apportion liability and has established a reputation for producing comprehensive reports without allocating blame.

One of the least satisfactory aspects about marine accident investigation is the lack of co-operation between many flag states whenever an accident occurs involving separate flag and port states. This is particularly evident when ships of different flags collide on the high seas and there is, very often, a tendency for the investigating bodies not to co-operate with each other. Passenger ships do, from time to time, become involved in collisions on the high seas.

4. CONDUCT OF THE INVESTIGATION

The aim of the investigator is, initially, to establish the facts about what happened. The inquiry will be evidence lead and any speculation about the most probable causes is likely to be unhelpful. The collection of evidence is not necessarily straight forward and the investigator may well face a number of constraints as he sets about his task.

For various reasons he may not be able to visit the vessel involved until some time after the event. She may be several days steaming away from a port of refuge or she may be the subject of a major salvage operation. Or she may have sunk and key witnesses may have lost their lives.

Unlike the air transport industry the inspector is unlikely to have the benefit of data recorders to assist him reconstruct the events leading up to the accident. With one or two conspicuous exceptions very few passenger ships are currently fitted with voyage data recorders (VDRs) and this is a major handicap when trying to reconstruct what happened with any accuracy. This shortcoming is being addressed and from July 2002 VDRs for passenger carrying vessels will be a requirement.

But even with VDRs much of the evidence for analysing the causes of an accident will come from witness interviews. The problem is that the human memory is extremely fallible; about 50% of recall is lost within 30 minutes and the decay factor thereafter is very rapid. The MAIB has startling evidence to show how inaccurate personal recollections of an event can be. This makes the accurate collection of evidence difficult and the process of analysing the results very time consuming. Very often the available evidence is incomplete and often conflicting which is why it takes the full time professional investigator so long sometimes to draw the right conclusions from what he has available.

Once the analysis is complete the inspector has the task of committing to paper a full, accurate and easily understood account of what occurred. He has to support his findings with rational argument calling on many inputs from a variety of sources. Drafting the report is rarely easy but a crucial component of the process is that draft copies are sent to anyone whose reputation might be adversely affected by the contents. This gives them an opportunity to comment on it before it is made public.

5. THE ANATOMY OF AN ACCIDENT AT SEA

The litany of daily casualties includes groundings, collisions, bumps and scrapes, personal injury, pollution, fires, explosions, personal injuries and, occasionally, deaths.

The accident, when investigated thoroughly, has the potential to expose every weakness, bad decision, oversight and shortcoming. It has the means of showing up any human frailty or failing in a most comprehensive and devastating way. Many find such revelations uncomfortable. The majority should, however, welcome the approach because only by subjecting events to the penetrating scrutiny of the accident investigator can both the principal and underlying causes be identified. By doing so the appropriate, rather than the convenient, measures can be introduced to prevent them happening again.

In the past many casualties were, in most people's minds, caused by a single event, often described as human error. This was a convenient means of concluding an investigation; and it was all too easy to blame one person for whatever happened. Many companies did no more than dismiss the unfortunate individual and felt they

had dealt with the problem satisfactorily. But the system was, and still is, deeply flawed. It also ignored the mechanics of an accident which is rarely the result of a single action but the consequence of several wholly unrelated circumstances coming together to create a causal chain that led to the actual event.

It falls to the marine accident investigator to identify the component parts of this causal chain and to explain what happened with a view to prevent it happening again. No matter what claims are made the human factor will be involved and also the organisational structure behind the event. To achieve maximum effect and long term benefit these must be correctly identified, and without apportioning blame. Few things distort effective accident investigation quite as much as the blame culture and the endless battles that ensue from legal arguments. The essential need is to identify inputs to whatever happened and then explain it with the maximum co-operation of those involved.

In the event of any marine accident, and especially when passengers are involved, the investigator will attempt to do two things: establish the circumstances and the reasons why it happened, and how the situation was handled in the immediate aftermath. Unlike other transport accidents where whatever the means of carriage has probably stopped moving, a shipping accident invariably involves continuing effort to contain the situation and, perhaps, the survival of passengers and crew.

Study of all aspects of lifesaving is of direct relevance to the work of the inspector. In passenger vessels this embraces examining the means by which survivors are evacuated. With the size of some ships nowadays and the number of people carried, this is likely to be a formidable task. Should it ever be necessary to evacuate several thousand people from a large cruise ship in bad weather, the inspectors of the appropriate flag state are likely to be extremely busy. It is only in a real evacuation that the theories will be put to the test.

A serious accident involving a large passenger carrying vessel will, in the author's opinion, necessitate allocating a large number of professional inspectors to the investigation if it is to be done thoroughly. Few flag states are so equipped.

5. ACCIDENT FINDINGS

Although no two accidents are ever quite the same the same reasons why they happen occur over and over again. One of the reasons is that the superficial explanation for whatever occurred is usually identified but not the underlying reasons. This failure to do so is one of the reasons why so many accidents happen and keep on happening.

Passenger ship operators pay particular attention to technical aspects such as fire prevention, containment and fire fighting. Somewhat less attention is paid to the human dimension and man's propensity to make a mistake, not only on board but ashore as well. Ship owners go to great lengths to establish procedures to cover every eventuality but it is sometimes forgotten that a procedure alone is among the most inefficient of safeguards against error.

The operational efficiency of a passenger vessel is dependent on several factors, its design and construction, the ability of the master, officers and crew and the organisational support structure. If one or more of these component parts falls down, the risks of an accident are increased, perhaps significantly.

Most passenger carrying companies have heeded the lessons of the *Herald of Free Enterprise* accident when massive complacency and organisational failures both ashore and afloat contributed to this tragic event and the deaths of 192 people. Some companies, or even authorities, haven't. One can reasonably ask what measures have been taken to prevent the endemic practice of overloading ferries at peak times in south east Asian waters.

Fire at sea is one of the greatest hazards facing the passenger carrying vessel. When fires occur they often reveal major shortcomings and it is essential these are properly identified so that steps can be taken to overcome them. Shortcomings with crew experience, training and competence are often revealed as in the *Scandinavian Star* fire in April 1990.

More recently the cruise ship *Sun Vista* caught fire in Far Eastern waters. Although there were no fatalities or injuries, the vessel capsized and sank. Many people will be interested in finding out from the official investigation how the fire started and the reasons why the ship was lost.

Groundings are not uncommon. Even the most highly regarded vessels can feature and there have been a handful of high profile incidents in recent years. The *QE2* grounded in Vineyard Sound off the east coast of the USA in August 1992, and the *Royal Majesty* did the same 10 miles to the east of Nantucket Island in June 1995. And more recently *Albatross* damaged her bottom when she struck a rock as she left the Isles of Scilly in 1997. In each event human error played a significant part.

One of the more disquieting findings in recent years has been the emergence of a number of accidents involving ship's lifeboats. Nearly all the accidents have resulted in personal injury or deaths to crewmen while the boats are being tested. Incidents involving a wide range of ships have been reported and include passenger carrying ferries. The MAIB is carrying out a study into the reasons.

6 ACCIDENT CAUSES

Accident findings reveal many common factors, most of which affect human performance. This paper does no more than attempt to focus on one or two of the most common causes of which fatigue is one. Although instances of fatigue are not so prevalent in passenger vessels as they are in other types, this can be a contributory cause to things going wrong. One of the main reasons for fatigue is that it is not clearly understood and there are many, often of the

old school, who totally fail to understand its consequences on human performance.

Overloading individuals, especially at times of high tension is endemic in many vessels. As operators attempt to trim overheads and replace people by technology, the advantages are often negated by overloading the remaining individuals on board with other tasks. The most frequently observed symptom of this predicament is the relentless need to attend to paperwork when the individual concerned should be monitoring something else.

A variation on the theme of overloading is the amount of work a master takes on himself in the event of an emergency. Very often there is nobody he can reasonably delegate certain responsibilities to and he is no longer as capable as he should be to take effective decisions. At the same time the failure to rehearse, or train for emergencies, is often cited as an underlying reason why crews are sometimes so poor at reacting to the unexpected. Ship's staff who train in simulators as a team are far more likely to operate accident free vessels or, in the event of the worst happening, coping with them.

Passenger operating companies that operate a safety audit system and routinely train personnel on board are far less likely to find one of their ships involved in an accident.

Special mention has been made of passenger ship groundings. If there is one feature that links them all it is the failure of those on the bridge to constantly monitor what someone, or something, else was doing. The ship where officers are constantly double checking every move, and are not afraid to speak up when something isn't right, is likely to be a safe ship.

But not all accidents are caused directly by human error. Some of the more elderly vessels are not so well endowed with reliable equipment and even though they may meet all the SOLAS requirements, leaking oil pipes or overloaded electrical equipment may be the catalyst for trouble.

And finally, the operator needs to take account of the changing nature of the passenger. Today's passenger reacts in a different way to those of old. It is highly likely he, or indeed she, will be recording every action on his video or monitoring every movement on his personal GPS. He will almost certainly be attempting to establish communications with someone ashore on his private cellnet or satellite telephone and there is every prospect he will be in touch with the local TV station giving a detailed account of what is going on before the owners ashore are aware of what is happening. All this adds to the pressure of how an emergency is handled on board. The accident investigator will, in due course, be very anxious to view every video taken of an accident and there are several instances when such information has proved crucial to establishing what actually happened. Passenger complaints about how badly they were kept informed about what was going on are a common feature in many accidents.

Many passengers feel aggrieved if they are not contacted by investigators after the event. Although they may decline a request to provide information at the time, it is important an approach is made so they are made aware of how they can provide it at a later stage. The fresher such information is in the minds of those involved the more reliable it will be.

7 SUMMARY

An accident at sea is very rarely the result of a single event and it is up to the investigator to identify every feature in what might be a long causal chain. The accident inspector who does his job thoroughly makes a major contribution to the improvement of safety at sea. His findings are worth heeding, not only by those charged with implementing any safety recommendations or seeking lessons to be learned, but also by those assessing risk.

The limiting factor in the passenger carrying sector is that many of the flag states operating such ships do not have full time accident investigation organisations to carry out the comprehensive investigations necessary following an accident. Other flag states do not publish their reports for fear they may be used in claims procedures, in litigation or other court proceedings.

But the investigation report is likely to be one of the few publicly available documents that can give an accurate report about the true state of a ship or company. The lack of such a report can however be even more revealing and risk can be re-assessed accordingly.

Passenger ship safety will, in the opinion of the author, improve substantially if every flag state operating such vessels has a fully independent accident investigation organisation capable of carrying out thorough investigations that result in the publication of a report that is made available to all.