

THE SOUTHAMPTON MASTER MARINERS' CLUB

"MARINE ACCIDENTS, THE HUMAN FACTOR"

Thursday, March 23rd. 1995 at 6.30pm in the Clubroom

PANEL MEMBERS

<u>Captain David Stratton</u>	Latterly Fleet Manager, Marathon Oil and Fleet Director Bergvall & Hudnef Group. Managing Director Glentworth Marine Cons.
<u>Prof. Malek Pourzanjani</u>	B.Sc PhD CEng MIMarE MRINA MSNAME MRIN Head of Maritime Research Centre. S.I.H.E.
<u>Mr. Chris Mackenzie Captain</u>	Head of Administration, M.A.I.B.
<u>David Stocks</u>	Safety Manager Ports & Ferries Division Sea Containers.

Captain Peter Stead MNI, Club Captain, introduced the panel members and gave a brief outline of their professional background before thanking them for contributing to this important event in the Club calendar.

Captain Reg Kelso FNI, Chairman of the Technical Committee, said that each panel member would give an introductory exposition and then, after a short break, the meeting would be open to the floor for questions and discussion. Captain David Stratton was invited to open the discussion.

CAPTAIN STRATTON said that as an independent consultant he did a lot of work at IMO for the Liberian Government and the Liberian Shipowners Council. Experience there had convinced him of the need to stop writing more rules and legislation and to insist on more compliance with the current ones. The industry is already over-legislated and this has little effect on safety. That said, IMO has drafted a new International Safety Management Code and this will soon enter force. In this respect the shipping industry is struggling into the 20th. century ..just in time to progress into the 21st and align with shore based industry in compliance with ISO quality standards. Today's Shipmaster can be held criminally responsible for non compliance with the mass of international, national and local legislation and it is ludicrous to think that he can ever keep up with it. Something must be done about this.

Unfortunately, today people are rewarded for evasion. The visiting Superintendent who manages to steer the Surveyor from known defects is praised; in place of an evasion culture brought about by over legislation we need a compliance culture.

Today we talk-about a safety culture but this is impossible without compliance. You cannot move from evasion to safety without first complying. Currently this vital step is missing. Unfortunately, the substandard operator is not here tonight to listen to us because that message is for him.

The human element is difficult to define but the principal constituent parts comprise :

ABILITY: Seaworthy ships can only be run by people at sea and ashore with the necessary

education, training and qualifications to afford them the necessary skills and knowledge.

SOCIAL : Conditions that allow all to work together as a team.

LEGISLATION: Too much stifles effort and too little leads to chaos.

SHIP CONDITION: Well maintained and equipped ships managed by those actively seeking safety and quality.

HEALTH: Good health maintained by good food and accommodation and adequate manning levels.

CULTURE: The corporate culture of the company is influenced by the owners policies, the nationalities recruited and the extent of loyalty and trust between owner and employees. Accidents rarely happen because one person makes one mistake. A number of factors combine and are frequently attributable to problems in several of the areas mentioned above. However, education, training and crew continuity are fundamental for any programme of improvement. The shipping industry has a good safety record but we need to weed out the bad operators. In this respect the ISM Code is to be welcomed because it will be part of SOLAS and therefore mandatory. At IMO there are 58 Correspondence Groups representing member States all writing rules and codes so we can expect a great deal more legislation. It is time to stop making rules and time to collect more data to enable us to impart knowledge to sea staff and shore staff. It is down to the shipping company. The revision of the STCW Convention of 1978 is to be welcomed but there will be problems with some of the States looking after their sovereign interests and resisting verification and control by outsiders. It is time to restore confidence in Certificates of Competency on an international basis irrespective of the country of issue. Social conditions are a cause for concern, some Classification Societies are failing to operate correctly and these are but two of the factors that detract from safe operation. The shipmaster and crew are always at the cutting edge and a recent seminar in Italy revealed the wishes of Masters and Officers in respect of safe and efficient ship operation.

These were:

The ability to plan and organise.

The ability to direct and control.

The ability to communicate.

Some rationality and logic in inter-personal relationships.

Our goals are to build ship management teams which will afford operational safety, environmental protection, cargo care and cost control. Everyone must feel part of the team and the "pecking order" is unimportant.

Senior Officers are afraid to delegate because they have no trust in the certificates of their subordinates. Pilots see numerous examples of the wrong people doing the wrong things at the wrong time as a result of the inability to communicate. There is much to be achieved in the new concepts of training and education and if shipowners were to visit their ships more often they would learn a very great deal. Managing agents are a new concept and the relationship between them and the sea staff needs careful consideration. The "Sweep it under the Carpet" school of management can easily hide mistakes or blame them on somebody else and by sitting tight they survive in the short term. Only by talking about things as a team at company level will things improve.

CAPTAIN DAVID STOCKS said that it was a fact that between 80% and 90% of "incidents" were attributable to human factors.

To illustrate a breakdown in the system leading to a near catastrophe he took us through the events leading up to the Three Mile Island Nuclear disaster in the United States.

Although not a disaster in terms of human life it certainly was in cash terms with a price of 100 million dollars allocated for restoration of the plant.

The main causes of the accident were attributed to misleading and badly presented operating procedures, inadequate training and poorly designed display systems.

Captain Stocks highlighted the initial mistakes and consequences and explained how the simple mistake by a maintenance team escalated into a near nuclear catastrophe.

All the mechanical safety systems operated correctly (with the exception of a vital relief valve) but mistakes by the staff in overriding some of these fuelled the crisis.

The same maintenance mistake had happened twice before and this was well known but management had not put any procedures in place to prevent a recurrence.

Everything happened at some speed but badly positioned read-outs and instruments in the Control Room confused and delayed the response by the four technicians on duty. Audible alarms were adding to the confusion and one vital indicator light on the control panel had been obscured by a stick-on label.

The failure of the vital relief valve went undetected for two and a half hours because the indicator in the Control Room indicated that it WAS closed. The valve was not "sensed" directly, only the operating solenoid was. This same system is commonplace on ventilator controls in many merchant ships. Relief valves of this type had failed in this way before but the vital information had not been promulgated.

At the outset of the incident more than 100 alarm relays were operating demanding action from the four technicians. As this confusion increased more and more alarms were activated adding to the chaos and influencing the failure of the human factor.

In the marine industry the vast majority of engine room fires are caused by oil leaks igniting on a hot surface. Tracing an ignition source close to an oil leakage often shows poor engine room design and lack of essential insulation or screening. Initial cost saving and poor maintenance are the primary causes. Low manning levels, training, stress and workload are all factors. Time may not allow the restoration of vital items of screening or insulation following a minor repair. Management much manage much better than they have done in the recent past. Training must be much more comprehensive to allow the operator to understand his equipment, not just learn how to turn it on and off. Risk recognition training is vital. Safety legislation should come from the operators assessments and if it does they will recognise it, have a belief in it and use it. We must ensure that people actually understand what they are taught during training and that the procedures we put in place are actually undertaken. Employees at all levels should be encouraged to identify problems and to suggest solutions: they know the risks better than an outsider. Directing from an office is inadequate and legislation must not be too prescriptive. Incidents should be fully investigated and the findings promulgated. Then, hopefully, we will have a safety culture worthy of the name.

PROFESSOR MALEK POURZANJANI opened by saying that he wanted to look at how technology can help to prevent accidents. Currently a major project is underway at SIHE (sponsored by the UK and Dutch Government) relating to the human factor in Bridge operations. He dealt briefly with the causes of accidents many of which were due to poor design and factors over which the people on the spot had little or no control.

Frequently, causes of accidents are inter-related. A stranding may be a result of drunkenness or fatigue AND failure to maintain a lookout. The part played by the human element alone is not yet fully understood.

The SIHE Research Project is sponsored by MTD and several other UK Universities are participating. The project is two years old with a year to run and the major aim is study the presentation of operational information to the Watchkeeper and find out how much information can be taken in together with the best way of presenting it. Technology is here to stay and people have got to be trained in the correct use of the new layouts of navigational bridges being produced today.

Southampton Institute is looking at ECDIS (Electronic Chart Display and Information System) with a view to ascertaining if it improves track-keeping performance and to see if decision making by the Watchkeeper can be improved by fitting ECDIS with a radar overlay. This is vital in terms of traffic management and also of collision avoidance.

The speaker showed various slides depicting proposed bridge layouts and said that several hundred experiments had to be conducted to allow a proper evaluation of each bridge design. The display also encompassed engine room monitoring and is intended to increase the mental workload. At times in the trials ECDIS is replaced with a paper chart and the response by the Watchkeeper is noted.

Trials are carried out using all ranks from Cadets to Master Mariners and various scenarios are depicted on a simulator each with a different traffic disposition and each requiring different manoeuvres to avoid collision. Sometimes, the targets depicted alter course and, at times, they do not.

In trials using an ECDIS of Calais (rather than a paper chart) track-keeping was improved but in one instance the Watchkeeper was so intrigued by position keeping that he was involved in a "collision".

ECDIS will save a lot of strandings but, in common with other developing technology, it must be used correctly.

Kelvin Hughes are developing new bridge designs and the SIHE is co-operating with them. Problems with user interface technology are being ironed out. Trials are now under way using a uniform interface and Professor Pourzanjani compared this to the use of "windows" in computer technology. If systems are all "window based" there are no problems in switching from one system to another. Uniformity in layout and control design is important.

MR. CHRIS MACKENZIE said that the aim of his presentation would be to give an outline of the work being done by the MAIB to afford improved data gathering and analysis of casualty investigations with particular emphasis on the human element.

In 1988 the Tavistock Institute, in a report to the DoT, said that human error is the cause of some 80 to 90 percent of marine accidents. It is relevant to tonight's discussion that the Chief Inspector, in his published report on the MARCHIONESS/BOWBELLE disaster commented "(There) is a pre-occupation with THINGS rather than PEOPLE".

Casualty investigation by the MAIB has always included emphasis on the human factor dimension but, to date, it has proved difficult to establish a set procedure in investigation and a consultant has been engaged to advise on this and to recommend a training programme for investigators.

Errors are unwitting deviations and are either "active" (causing immediate effect) or "latent" (dormant) but Violations are taken to be deliberate acts. Errors and violations are either skill based, rule based or knowledge based.

The MAIB has adopted specific terminology and when gathering data the MAIB Inspector must be conversant with it and convinced of its importance. The consultant will eventually produce a handbook covering data collection, data analysis, validation of conclusions and classification.

Classification covers communications, equipment design, physical working environment, manning, knowledge, skills, training, procedures, standards and legislation. The intention of the investigator is to discover the true underlying cause which may be the organisation, the individual, commercial pressure or legislation.

The proposed guidance handbook for those investigating marine casualties will deal with :

The analysis of human error.

Potential human causes of accidents.

Gathering evidence on human involvement.

Classifying the findings.

Reference to the MAIB database dealing with human factors.

During an investigation the Inspector must gain the confidence of those he is interviewing in order that true facts emerge. Only in a case of "violation" might blame be apportioned so the Inspector will delve deeply to identify the underlying cause of the incident.

Since 1989 more than 600 investigations have been carried out by the MAIB and these will be analysed using the proposed new procedures and the findings entered in the database. Hopefully, in the fullness of time trends can be identified and the involvement of P&I Clubs, Operators and IMO will be sought.

Analysis of trends will continue and these may shed some light on the effectiveness, or otherwise, of the ISM Code.

(End of introductory presentations).

QUESTIONS and DISCUSSION.

CAPTAIN TERRY HUGHES (Consultant) questioned the use of ECDIS - a ground stabilised display - in collision avoidance.

Professor Purzanjani said that ECDIS in the hands of a trained and competent operator coupled with the intelligent use of radar contributed significantly to collision avoidance. ECDIS was new but if an operator was let loose with it without being told of the limitations of the equipment then it would not be effective.

CAPTAIN LIONEL HALL (Southampton Pilot) agreed that as a pilot navigation and collision avoidance tended to be the same although seafarers might see this in a different light. He told of a recent experience where an untrained Officer operated ECDIS in a manner which gave misleading and dangerous information. The OOW was quite unaware of the dangers of his mistuning but possibly he had just joined the vessel and was unfamiliar with the equipment

Professor Pourzanjani deplored the non-standardisation of the lay-out of equipment and the tendency to deny Officers a chance to become familiar with equipment before taking a Watch.

CAPTAIN LARRY CORNER (Retd. DOT Surveyor) Is there such a thing as a totally unavoidable accident ?.

Captain Stocks said that the majority of accidents were unavoidable; it depended how far back one wanted to go in researching cause. An oak tree falling on a car is classed as "An Act of God" but who examined the roots of the tree, when was this done and should something have been done about it? We have to accept risk and once we agree what degree is acceptable then accident prevention measures ease.

Captain Stratton said that he did not know if accidents were unavoidable but he predicted that the industry would suffer more accidents in the years ahead. A shortfall of some 15,000 recruits a year must dictate a dramatic shortage of trained operators and employers cannot be selective. Any seaman - good, bad or quite indifferent - is guaranteed employment somewhere at sea.

CAPTAIN KELSO commented on the development of the totally unmanned ship (which has been tried with some success) ..if we have fewer, or no seafarers will we have fewer accidents ?

Captain Stratton said the unmanned ship will produce new types of accidents. Low manning may work today but what happens when that technically refined ship is sold to a sub-standard operator with an untrained crew?

CAPTAIN STEAD (Club Captain) said that accidents could not be prevented because it is seldom possible to identify and cover every factor leading to prevention.

Captain Stocks agreed and said that the acceptable degree of risk meant that accidents WILL happen but, hopefully, the incidence of major ones can be reduced. He opined that "the safest Company is the one with the most accidents" and this statement was challenged by CAPTAIN LEVOGUER (Retired DOT Surveyor).

Captain Stocks said that we must start with a wide definition of an accident ...a chain of events leading to death, injury or property damage ..and as long as we research and learn from these then we can identify the root causes and prevent a recurrence.

CAPTAIN STEAD asked about the theory that for so-many cut fingers there was a broken leg and for so-many broken legs there was a death.

Captain Stocks said research showed that for every 600 "near misses" there were 25 "first aid" accidents, 10 that were more severe and 1 fatality. The causes of these accidents were often common so if you break the chain and reduce to 500 you will not reach the fatality stage.

CAPTAIN ROBERTSON (Retired Shipmaster) asked if research showed how much fatigue and undermanning contributed to accidents.

Captain Stratton said fatigue was hard to define. A one man Watch could induce fatigue through lack of stimulation by human contact ...untrained Officers putting a greater workload on the trained man put pressure on him and induced fatigue. It is undoubtedly a factor. Unfortunately, discussions between Owners and Unions soon become polarised because they cannot agree on working hours ..only on the hours of rest.

Captain Stratton said that a company he worked for previously always put an additional Officer aboard for European coastal work but today few would dream of that and owners will risk working with fatigued crews.

CAPTAIN ROBERTSON : Why does IMO dodge the issue ?

Captain Stratton : IMO say they cannot discuss Hours of Work ..their business is the hardware of shipping. Their first step is Hours of Rest and even the involvement of ILO has failed to produce a satisfactory outcome.

Mr.Mackenzie commented that the MAIB was extremely interested in this sensitive subject and was looking closely at manning levels and examining the incidence of fatigue-related accidents.

CAPTAIN ROBERTSON said that it was obvious that reduced manning was a factor in accidents and, indeed, the high incidence of engine room fires could probably be attributed, in part, to the "UNMANNED ENGINE ROOM". CAPTAIN LEVOGUER disagreed, saying that constant supervision of the engineroom by television monitors afforded a high degree of watchkeeping efficiency.

CAPTAIN HAMISH ROBERTS (Retired Shipmaster and Barrister) asked if it was the human element that prevented "near misses" from becoming casualties and how DOES one prevent a well trained and competent Officer from making a mistake?

Captain Stocks said as mariners we think of "near misses" as close quarter situations but in his job a "near miss" could be a man slipping from a faulty ladder. A second man uses the same ladder but neither reports the defect so a third man falls and suffers serious injury. The human element,

properly trained, will prevent accidents.

Captain Stratton said he was more cynical and put it down to luck. He told of an explosion in an engine room killing three people and the fire spreading because a door was left open. Instructions were issued to keep that door closed on all ships of the fleet but it was cooler with the door open ..so when he boarded people rushed off to close the door. We are told that Quality Assurance will overcome this but how do we get people to do what they are told to do in the interest of safe operation. None of us act wisely at all times ..we take chances. I see unsafe acts in every ship I visit.

Shipowners hire from anywhere so there is no loyalty and even less institutional knowledge. In my early days people served twenty years on the same ship and knew every inch of it ..today that has all gone and many know very little about their ship.

MR.WALTER WEYNDLING, (Retd.Ship Surveyor BOT), spent many years investigating marine casualties and he said that the causes of most accidents were simple in the extreme. The human element failed and the accident happened. Today, IMO has made an industry from investigating accidents. Poor training is a contributory factor but ..at the final count .. accidents are often caused by a lack of common sense.

Mr. Chris Mackenzie commented that common sense is not all that COMMON.

MR.WEYNDLING said that the Zeebrugge disaster said it all ..if you leave your bow door open and forget to pump out the forward ballast then you have a disaster situation ..yet we had page after page of reports and ideas as to the cause of the accident.

CAPTAIN TERRY HUGHES said that he had heard of one company who ensured that the OOW was alert at night by requiring him to answer computerised questions ..if he got the answers wrong an alarm sounded !

Captain Stratton said that he must repeat that there were various types of fatigue and boredom must rank highly in that list.

CAPTAIN KELSO asked Professor Pourzanjani if boredom had been considered when OMBO (One Man Bridge Operations) had been approved.

Profesor Pourzanjani said that OMBO is an interesting concept but the research that had been done showed that it did not completely work in practice. It poses many problems and work is still progressing on it. Fatigue has been studied in depth by the USCG and they reported on this two years ago. In the UK much work has still to be done on fatigue and/or reduced manning but SIHE is currently carrying out a study.

Captain Stratton said that high-powered groups were not necessary ..just ask any Master or Chief Engineer and then the shipping company can act on their advice.

CAPTAIN KELSO asked if it was a fact that "market forces" were a root cause of reduced safety and Captain Stratton said that this was a factor. Seafarers were afraid of their jobs so they took chances. Masters and Chief Engineers should not have to fear "speaking up" ..it is invariably in the best interests of the owner that they do so.

CAPTAIN HALL related piloting a ship into Southampton with the visibility from the bridge centreline obscured by containers. The Captain said the Agent had wanted him to load in that way and had he not done so he would have been fired.

Captain Stocks said that in the company he worked for Masters and Chief Engineers were

encouraged to come ashore and share in the management of the company and were afforded time to do so. They are part of the management team not just navigators and technical people.

Captain Stratton asked how do we target the minority of substandard companies who are causing most of the problems. Most of the ships I see are well run but there are exceptions... will those Owners slip through the net again ?

CAPTAIN KELSO said that recent lecturers on the STCW revision, in the Master Mariners' Club and in the Nautical Institute, had expressed doubts about the success of the revision due to opposition from certain Third World owners and operators.

CAPTAIN ROBERTSON asked if there was any advantage in the Master and Chief Engineer actually hiring their own ratings and renting them to the shipowner. This might improve the quality of training.

Captain Stocks said that in his fleet he had well trained crews but it was the Masters and Officers who determined if they would remain in the ship. The office did not dictate this. The Master can hire and fire.

Captain Stratton repeated that today there is no selection. Such is the shortage that everyone who wants can go to sea ..trained or untrained, qualified or unqualified. The lowest quality man is fired, moves to another company without further training and ends up with a sub-standard operator on sub-standard conditions. There is no selection.

CAPTAIN KELSO recalled the days in the early 50's when the Master and Chief Engineer attended the Shipping Office and selected a crew. More recently the Master of a large containership when asked if he could operate with a crew of 14 said "Yes ..if I pick all fourteen"

CAPTAIN DAVID DUNN (MAIB) asked Profesor Pourzanjani about OMBO in view of the apparent success of the scheme in other European countries. If we decline to accept it we will be at a commercial disadvantage. People assume fatigue is due to overwork and lack of sleep but often, in small vessels including fishing vessels, the man on the Bridge simply falls asleep. Today every ship provides a comfortable chair for the Watchkeeper ..surely this is unwise and induces sleep ? Of course, we have alarms to prevent this but they may not arouse the man sufficiently to be efficient ..very much as we turn off our alarm in the morning and fall asleep again. Are OMBO and armchairs compatible?

Professor Pourzanjani said OMBO did not work completely in the experiments but OMBO is here to stay and the industry is moving in that direction. If you have a total manning of 8 or 9 it is inevitable. The problems can be overcome with technology. Various speakers commented on experiences involving sleeping Watchkeepers and chairs and it was recalled that a few years ago any OOW found sitting on a chair during his watch would have been censured.

CAPTAIN KELSO commented that it was disappointing to hear that despite the fact that trials showed that OMBO was not entirely satisfactory it would be implemented for commercial reasons. This would not happen in the aircraft industry but at sea "market forces" prevailed.

CAPTAIN HALL commented on a OMBO situation where the Bridge watchkeeper also had to carry out an engine room inspection and CAPTAIN DUNN said that the chair in the wheelhouse dictated that the OOW remained firmly in the wheelhouse ..and the BRAER demonstrated the folly of that type of watchkeeping.

CAPTAIN LARRY CORNER recalled the West Hartlepool wheelhouse which was completely

open ..and rigging of canvas "dodgers" was regarded as being "effeminate". Nobody slept on that Bridge!

CAPTAIN DUNN said that MAIB statistics showed that many many accidents were caused by poor lookouts ..or none at all.

CAPTAIN KELSO asked Captain Stratton if he had the opportunity to speak to underwriters and how do they react to factual stories about the vessels they insure?

Captain Stratton said that the introduction of the Hull/Warranty clause a few years ago was extremely effective. This necessitated a much higher standard of maintenance. P&I Clubs are now losing and are making efforts to set matters to rights. Unfortunately, this results in too many in-port inspectors but unfortunately these are often ineffective as the Inspector is guided away from the worst areas of deterioration.

CAPTAIN DUNN commented that the Port State Control inspector was used by some owners as a Superintendent to identify minimum requirements to allow the ship to sail.

CAPTAIN ROBERTSON asked if it was modern conditions that precluded good men from pursuing a seafaring career and how could this be overturned ?

Captain Stratton replied that today seafaring was regarded as anti-social. Some years ago in Europe seafaring was a respected profession ..but not today.

However, in the Far East seafaring is still highly regarded as are those who follow it. It is up to the owners to restore the standards and hence the pride.

CAPTAIN STEAD, in the final comment of the evening, assured those present that some Owners did use charterers inspectors as Owner's Superintendents. As one of three such Inspectors simultaneously aboard a sub-standard tanker it was obvious that the Master was using them to compile a defect list to allow him to keep his owners informed of the minimum work to be done to achieve a charter.

The Chairman then asked Captain Terry Hughes to sum up and to thank the Speakers and the audience subsequently demonstrated their appreciation with warm applause.