MARITIME RESOURCE MANAGEMENT

(Based on the world renowed SAS-BRM Course)

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An accident at sea can have serious economical and environmental consequences, not to mention the loss of life that could take place.

Shipping is a very dynamic activity. No two situations unfold in the same manner. Need for experience is reflected in the requirement of sea-time between certificates. Unlike in shore industry, you do not get your graduation degree, namely Class 1 Master's license, straight out of college. One needs to gain experience on the job prior being declared competent for taking over command of a 100 million dollar asset. Imagine the young cadet coming out of the surveyor's room waving his Class 3 certificate of competency in hand. Does it mean he knows the job now ?- I think its more a license to go out and learn it.

Let us look at a situation, which unfolded on the bridge of a vessel way back on 18th March 1967.
A tanker was coming up the English Channel on its way to Milford Haven on the SW Coast of U. K.

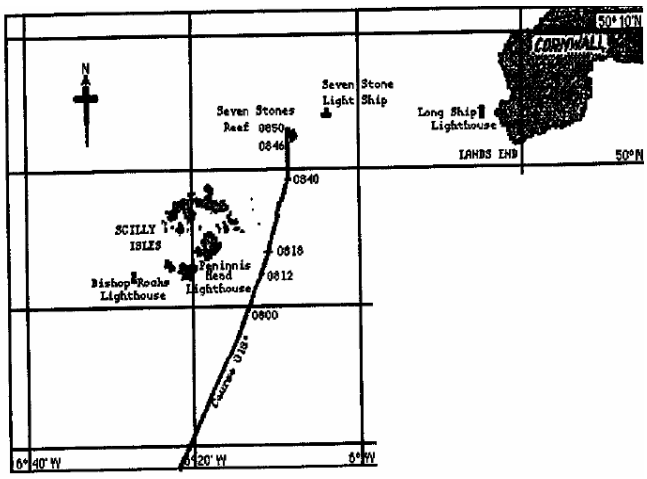


Fig 1 : Torrey Canyon's track

Capt. Thomson (names changed) left his night orders to be called when the Scillies were picked up on the radar, and retired to bed at 2.30 a.m.



Fig 2 : Torrey Canyon's initial course

The Chief Officer Mr. Samuel (named changed) picked up Bishop Rock, at 0630, 24 miles away, but the position came as a shock to him. They were lying 8 miles off course to starboard. He altered course to port to return to the original track, which meant passing the Scillies to the starboard. Then he called the Master and told him what he had done.

"What? You changed course without consulting me", Capt. Thomson was furious. "Yes, but we were off track" said Samuel. "That's not your decision, come back to the original heading and pay attention, in a few minutes I will be on the bridge". Capt. Thomson's first action on the bridge was to confirm that C/O Samuel had carried out his instructions and placed the vessel on the original 018^0 heading. He wanted to now pass east of Scilly Isles.

Capt. Thomson had a draft problem. To enter Milford Haven, he would have to make it on the high tide at 2300 hrs and he may need to transfer some cargo if his trim was more than expected. He and chief officer busied themselves in cargo calculation.

At 0800 the 3rd Officer came up with the helmsman, and relieved the C/O. For 3rd/Officer Peter (name changed) it was his first voyage as an officer. At 0830 Peter called out to the captain, "Captain there are two

fishing vessels ahead". Capt. Thomson looked up from his cargo calculations "Yes, I have seen them already". We will pass between Scillies and the Seven Stones Reef".
"Helmsman, go down and get me 2 ashtrays"

At 0838, Captain saw that the 3rd /Officer was having difficulty fixing position. "Peter, stop using Scillies for bearings", "Use the Lightship". Thomson realized that he would have to take the bearing himself.



Fig 3 : Torrey Canyon 2.8 M from Seven Stones

When the position was plotted at 0840, the ship was only 2.8 miles from Seven Stones, and she was still on autopilot. Capt. changed course to 000^0 on the autopilot. "Where's the helmsman". Just then the helmsman came in with the two ashtrays.

The vessel was doing a very slow sweep to port. He now realised that he was in a difficult situation. The vessel was too large for this narrow passage. He yelled out to the helmsman "Take the wheel, go hard to port, go to 350, 340, take her to 320".
He then returned to the chartroom.
Helmsman Scott put the wheel hard to port. In growing amazement he saw that the rudder indicator did not move. "Captain, the ship is not turning". Captain turned cold, he thought the fuse had gone, this had happened before, he ran towards it, checked it was OK. Then his thoughts ran to the oil pumps. They may have broken down, that too had happened earlier.

In desperation he leaped to the phone to dial engine room. In haste he dialed 14 which was the dining room. "Julius here sir, are you coming for breakfast".
He slammed the phone down. As he was redialing his hands froze. "Jesus Christ" he swore. From where he was standing he could see that the steering lever on the steering console was in "auto" position.
He rushed to the steering, pushed aside the helmsman, switched it to manual and gave hard-a-port.
The bow started to turn, she turned to a heading of 350^0, but it was too late. She was slamming into Pollard Rock at 15.75 kts and Capt. Thomson felt the rocks touch at 0850 hrs.



Fig 4 : Torrey Canyon broke in 3 parts

The rest is history. This was the Torrey Canyon, and the extract is taken from the book "The Black Tide in the wake of the Torrey Canyon" by Richard Petrow.
As you well know the massive oil pollution that ensued gave birth to MARPOL regulations.

Analysis of a large number of accidents in highly operational environment, like ships, show that it is more often poor communication, coordination, teamwork, and judgment rather than lack of technical skills or equipment malfunction that leads to a dangerous situation. Instead of technical incompetence, problems are associated with poor group decision making, ineffective communication, inadequate leadership, and

poor task or resource management. In fact it is said that “where people meet, dangerous situations arise”.

We hear the oft-repeated remark, **“80% of accidents are caused due to human error”**. Yet throughout our sea career we, professional mariners, have devoted all our time and learning into improving technical skills. Nothing was done to improve our managerial abilities. Our examination system historically has focused, almost exclusively, on honing the technical skills and ones individual performance; they did not effectively address crew management issues that are also fundamental to a safe voyage.

These observations have led to a consensus in the industry and government that training programs should place emphasis on the factors that influence crew coordination and the management of crew resources.

Accident analysis show **‘Failure to Manage properly’** as constituting 60-70% cause of accidents.

Common causes include:

- **A breakdown in communication between individuals**
- **Preoccupation with minor technical problems**
- **Failure to delegate tasks**
- **Failure to detect deviations from standard operating procedures**

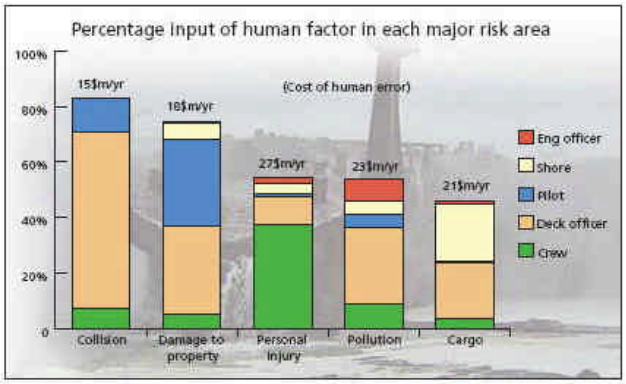


Fig 5 : U.K. P&I Club Accident Statistics 1996

Interesting statistics were put out by the UK P&I club, which showed Human errors as constituting 90% of all collision accidents, 60% of personal injury and pollution accidents and 50% of cargo damages.

It was to overcome these issues that seven major maritime organizations, namely Dutch Maritime Pilots Corporation, Finnish Maritime Administration, National Maritime Administration Sweden, Norwegian Shipowners' Association, Silja Lines, Swedish Shipowners' Association and The Swedish Club, **joined forces with the Scandinavian Airlines System (SAS) Flight Academy to establish the global Bridge Resource Management (BRM) training initiative.**

The central aim of BRM was the transfer of expertise in this area from the civil aviation sector to the maritime sector. It is said that safety standards in aviation are a decade ahead of the maritime industry.

Crew Resource Management (CRM) has been widely used to improve the operation of flight crews. The roots of *Crew Resource Management* training in the United States are usually traced back to a workshop, *Resource Management on the Flightdeck* sponsored by the National Aeronautics and Space Administration in 1979 This conference was the outgrowth of NASA research into the causes of air transport accidents. The research presented at this meeting identified the human error aspects of the majority of air crashes as failures of interpersonal communications, decision making, and leadership.

The airline industry was jolted into action by a terrible tragedy that took place on Sunday, March 27th 1977 at Tenerife’s Los Rodeos airport. Two jumbo jets belonging to KLM and Pan Am collided on the runway in foggy conditions causing loss of 583 lives. Senior investigator Capt. Paul Roitsch concluded that there was nothing wrong with the aircrafts, all systems working well, no malfunctions. Nothing to poke holes at the technical competence of the pilots of the two aircrafts, in fact the KLM flight commander was the senior most and most respected captain in KLM. It was a case of plain human error.



Fig 6 : KLM 747 slicing the top of the Pan Am 747 at Tenerife airport

The first course of CRM, then known as Cockpit Resource Management, was developed in the United States in 1979 which emphasized the role of human factors in high-stress, high-risk environments. John K. Lauber, a psychologist member of the National Transportation Safety Board of U.S.A., defined CRM as "using all available resources—information, equipment, and people—to achieve safe and efficient flight." In 1993, Cockpit Resource Management was expanded to Crew Resource Management as it was felt that all the players in the scenario who have a stake in making the flight a safe and efficient experience, should be part of a Resource Management course. Hence airline pilots, ground control staff, air traffic controllers and cabin crew, all underwent CRM course. This course is now an integral part of airline training.

Based on the knowledge and experience the airline industry has gained through Cockpit Resource Management programmes, the BRM course was designed in 1992 to minimise the risk of incidents by encouraging safe and responsible behaviour. It aims to foster positive attitudes favouring good personal communication, excellence in leadership skills and compliance with operating procedures.
The objective is to ensure that sound resource management practices underpin everyday operations. The principles covered include:

- **Recognition of the significance of consistent good management and teamwork**
- **A willingness to change behaviour in a positive direction**
- **Awareness of the importance of using common management-related terminology**



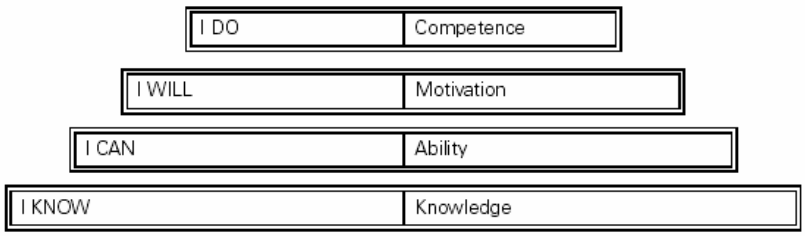
Fig 7 : SAS-BRM Logo

"Bridge and Maritime Resource Management" training has been recommended in **STCW 95 Code Section B-VII/2, Part 3-1 and by the U. S. 33CFR 157.415 regulation.**

Bridge Resource Management is defined as the use and coordination of all the skills, knowledge, experiences and resources available to the bridge team to accomplish or achieve the established goals of safety and efficiency of the passage.

To maintain the integrity of the training process, training methods should be focused on objectives; rather than be activity driven, which tends to encourage a 'tick in the box' mentality. The objectives would be to

ensure that participants develop the right knowledge, skills and attitudes. Whereas hitherto in the marine industry, training programmes have been constructed and assessed largely on the basis of their content, the more recent tendency is to assess programmes on the basis of the trainee outcomes they purport to achieve and the procedures they have in place to assess these outcomes.
This trend focuses the effort and investment in training on objectives which are defined in terms of measurable outcomes. It does not by any means render content obsolete, but recognises that content is only the means, not the end in itself, of training and education. In behavioural training, where behavioural skills development and attitude changes are being encouraged, the interactive process of the actual training is what is of paramount importance. The following model in the field of training emphasises the relationship in which knowledge, skills and attitudes stand to each other in the learning and development process. The essence of the model is that knowledge, ability and motivation are all necessary to effect enduring changes in behaviour.



The main element of the 4-day BRM programme is a series of workshops delivered by a carefully selected, experienced and trained workshop leader. Errors and hazardous behaviour are analysed in a dynamic group situation and actual incidents and accidents are explored from a BRM perspective. The SAS-BRM course is built on the modern day multimedia teaching method.
The workshops are supported by computer-based training modules that examine human interaction and management situations influencing the accident event. Each candidate has a PC to himself. There are 14 modules, each dealing with a different human aspect. Discussions at the end of each module help to integrate experience with theory. Numerous case studies help to reinforce the concepts.

A role play at the end of the course provides every delegate with an opportunity to put new skills into practice, in an exercise that simulates the mental pressure of a demanding situation at sea. This is generally carried out on a Navigation / Engine simulator. Recommended class size is 6-12 participants. Refresher courses are recommended to ensure permanent, positive attitude changes.



Fig 8 : The modern Training Method used in SAS-BRM course

Although initially targeted for mariners serving on the bridge, this course benefits engine room personnel and also marine administrators ashore. It is not a technical course, where you have to know the Rules of the Road, for example, before you can take it. **The course has now been expanded into a MARITIME RESOURCE MANAGEMENT course whereby modules also depict engine officers in video clips shot on ships engine and cargo control rooms.** It would be beneficial if the courses were attended by a mix of deck and engine officers together with those in key positions ashore.

This premier course is run in over 30 institutes in more than 18 countries around the world. **Anglo-Eastern Maritime Training Centre, Mumbai**, is one of the six institutions accredited by The Swedish Club to conduct the MRM course. The course has become so popular over the years that it is now mandatory for crews serving on board certain flag ships. Even Oil Major's Vetting Inspectors are asking for it through their Inspection Checklists and a recommendation is recorded if the officer has not undergone the course.

The MRM programme is made up of the following modules:

Module 0: Introduction
A short overview of the course and its relevance to personnel and all ship types**.**



Fig 9 : Capt. K.N.Deboo (centre) underwent Workshop Leader training at SAS Flight Academy Stockholm

Module 1. Attitudes & Management Skills
This module explores human nature and its weaknesses.
Management is the social and technical process that utilizes resources, influences human actions and facilitates changes in order to accomplish an organisation's goals. More simply put, Management is the well-known art of getting things done through others. As Paul Getty, the famous oil baron put it, "however brilliant you may be, if you cannot get the work done through people, you are worthless as a manager"

The core to human behaviour is our Attitude.

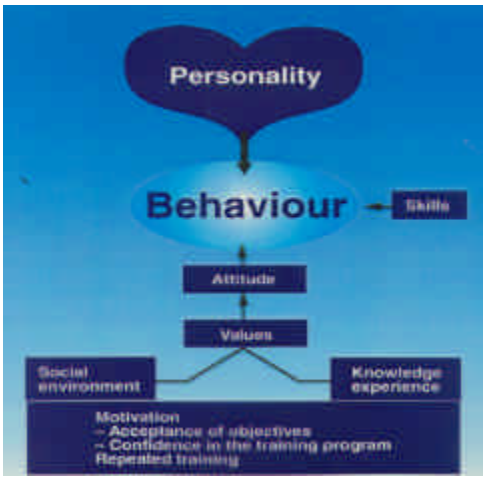


Fig 10 : Influences to our behaviour

Attitude = Personal Beliefs + Knowledge
Whether we see a technicolor world around us or a black and white one depends on us and our attitude to life and work.
For a person with a positive outlook there is no word as "impossible".
Positive attitude should be combined with the right ingredients of Knowledge, Experience, Training, Logic and Anticipation to enable us to perform optimally in any situation in any type of ship.

Participants are encouraged to recognise "hazardous thoughts" capable of inducing accidents and, in contrast, "safe thoughts."

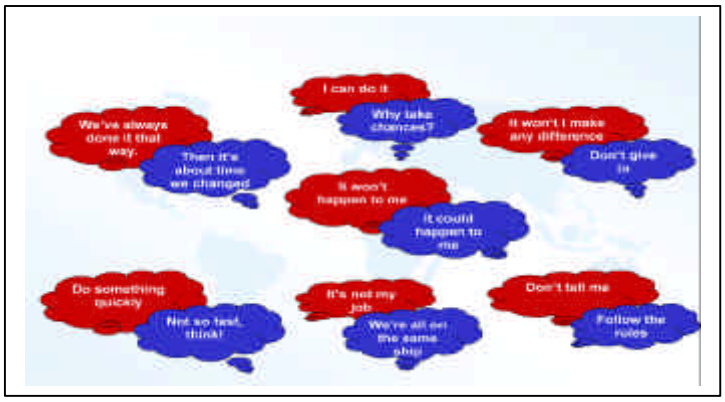


Fig 11 : Replace Hazardous Thoughts by Safe Thoughts

Weed out these fleeting **Hazardous thoughts** that crop up in your mind from time to time and replace them with their opposite **safe thoughts**.

Module 2. Cultural Awareness
Since 60% of ships sail with multi-national crews it is relevant to understand the inter-personal problems that could be associated with them. The Dutch scientist, Geert Hofstede (1980) has defined dimensions of national culture, several of which are relevant to the acceptance of MRM training. High Power Distance cultures, such as China and many Latin American countries, stress the absolute authority of leaders. Subordinates in these cultures are reluctant to question the decisions and actions of their superiors because they do not want to show disrespect. Exhortations to junior crewmembers to be more assertive in questioning their captains may fall on deaf ears in these cultures. Many cultures which are high in Power Distance are also collectivist. In collectivist cultures where emphasis is on interdependence and priority for group goals, the concept of teamwork and training which stresses the need for effective group behavior may be readily accepted.

Module 3. Communications and Briefings
This module deals with common errors in communication between individuals, the importance of "closed loop communication" and how to achieve a climate for effective communication. Briefings and debriefings are mandatory in aviation and this practice should also be followed in a shipboard environment. Practical guidelines are given on how to present briefings and carry out meaningful debriefings.

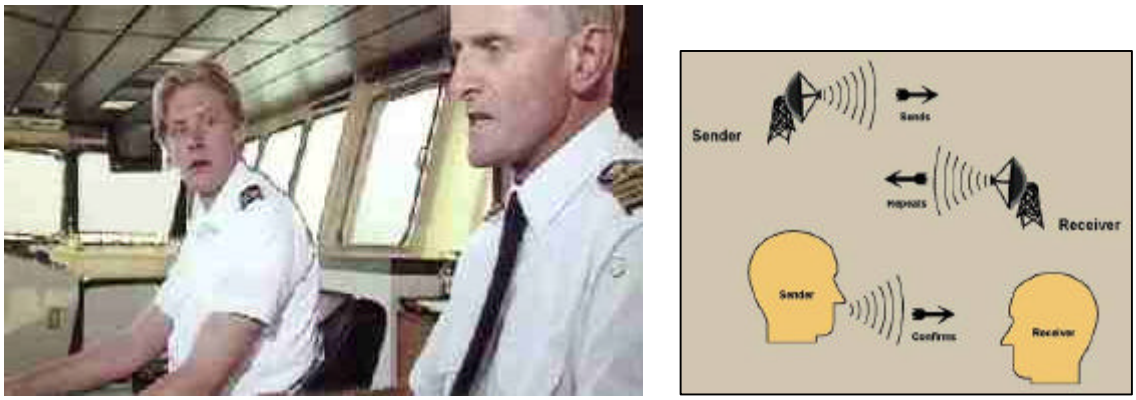


Fig 12 : Closed Loop Communication

An effective briefing is interesting and thorough. It addresses coordination, planning, and problems. Although briefings are primarily a captain's responsibility, other crewmembers may add significantly to planning and should be encouraged to do so.

Module 4. Challenge and Response
The importance of a "Challenge and Response" environment is emphasised. This is defined as a "supportive environment" - in which everybody feels free to question assumptions and actions. This is an environment in which positive responses are the norm. Every one in the team should be made to develop a professional attitude that rises above personal egos, and safety becomes the over-riding concern, whereby subordinates are encouraged to speak-up when safe limits of the concepts are crossed. It is said that 30% of all accidents occur because team members hesitate too long before informing their seniors about the impending problem or danger.

Module 5. Short Term Strategy
"Short Term Strategy" is a practical method for dealing with any untoward situation that may arise, but is particularly valuable in an abnormal or emergency situation where there are no ready contingency procedures available. The technique draws on the knowledge and experience of team members to find a quick but effective temporary solution to tackle the problem. Use of all available resources enables counter the risk area of knowledge of individual actions.

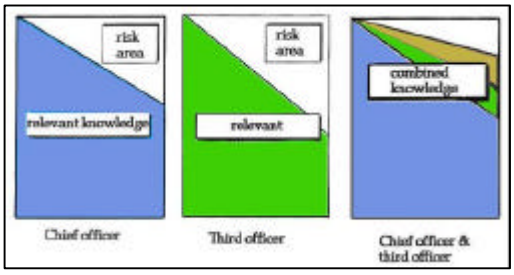


Fig 13 : Risk Area of Knowledge and Experience

Module 6. Authority and Assertiveness.

This module considers behaviour in terms of "authority and assertiveness." The reasons why extreme combinations of authority and assertiveness develop, are analysed together with the hazards they represent. The days when ships were run by a benign autocratic leader as a one – man show are passé. We expect people to do their jobs not just because they are forced to, but to take initiative, shoulder responsibility and carry out their tasks with motivation and teamwork to ensure that jobs get done and done well. This is the development of a participative culture.

Module 7. Management Styles

Different leadership styles are discussed in this module. A performance/human relationship management grid is employed to analyse differing approaches to leadership.

“Master under God," -- the traditional view of the shipmaster as a tiger has changed in recent decades. No longer can one individual possess all the skills and knowledge to safely, effectively and profitably drive a vessel as a commercial enterprise. Animals are used to portray various management styles, as propounded by Blake and Mouton in their Managerial Grid theory. The aggressive tiger style is high on concern for performance, but at what cost – low team morale. On the other hand, the penguin style is high on concern for people, but accepts low standards. The theory goes on to encourage team members to rise beyond rigid styles to a more flexible and adaptive style of a dolphin, who works intelligently in getting the job done by a motivated crew.

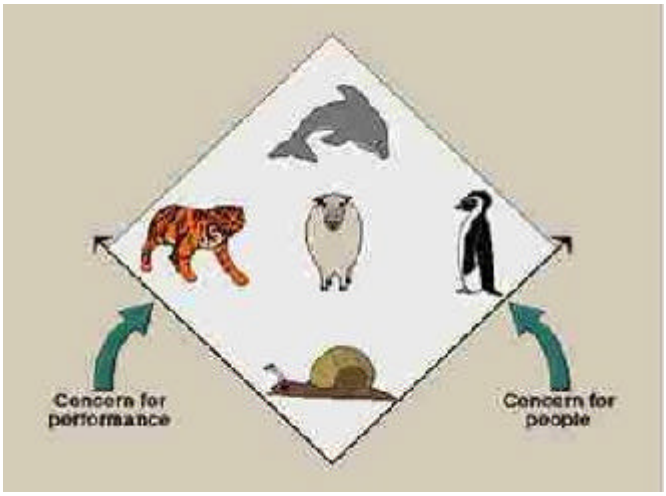


Fig 14 : Management Styles

Command process is more than issuing orders. It is the interplay of individuals working together for a common end. The leader is the focus, communications are the lifelines. Information updates, situation assessments, available resources, gains or losses - without these command is blind, deaf and powerless.

Module 8. Workload

The dangers of low and high workloads are discussed, along with systematic techniques which can be used to avoid these hazards. Methods such as task analysis, delegation and task rotation are considered. Stressing the importance of maintaining awareness of the operational environment and anticipating contingencies. Instruction may address practices (for example, vigilance, planning and time management, prioritizing tasks, and avoiding distractions) that result in higher levels of situational awareness. The following operational practices may be included:

(a) Preparation/Planning/Vigilance. Issues include methods to improve monitoring and accomplishing required tasks, asking for and responding to new information, and preparing in advance for required activities.

(b) Workload Distribution/Distraction Avoidance. Issues involve proper allocation of tasks to individuals, avoidance of work overloads in self and in others, prioritization of tasks during periods of high workload, and preventing nonessential factors from distracting attention from critical tasks.

Module 9. The State of the Bridge / Engine room

The "state of the bridge or engine room" is the product of the personal state of mind of each individual on the bridge. The underlying reasons for different states of mind are discussed, as well as the importance of detecting and taking action on extremes and variations between individuals. The various “states of alertness” could be attributed to +1 optimum (the desired state to be in) and the -3 inattentive in critical situations (the most dangerous state of mind). These states dictate how a person would react, an emergency occurring in a -3 state could be disastrous as the officer would go into a state of “spontaneous incompetence”, as he jumps from an inattentive to an alarmed state.

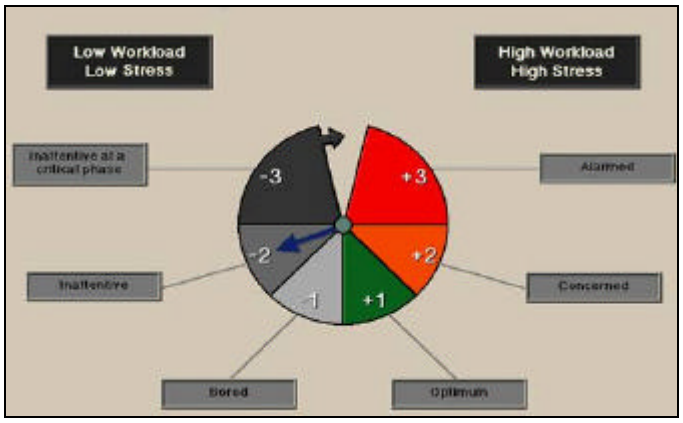


Fig 15 : States of Alertness

Module 10. Human Involvement in Errors

This module evaluates the underlying causes of accidents in terms of externally and internally induced errors. External errors relate to inaccurate information, equipment malfunctions, hull fractures and latent defects. Internal factors are the psychological factors such as boredom, poor attitude, fatigue, lack of knowledge and experience. Emphasis is placed on the ability to learn from errors. This module deals with Error Management. Underlying is the premise that human error is ubiquitous and inevitable - and a valuable source of information. If error is inevitable, MRM can be seen as a set of error countermeasures with three lines of defense. The first, naturally, is the avoidance of error. The second is trapping incipient errors before they are committed. The third and last is mitigating the consequences of those errors which occur and are not trapped. This error management *troika* is shown in the figure. The same set of MRM countermeasures apply to each situation, the difference being in the time of detection. A careful briefing on task procedures and possible pitfalls, combined with communication and adherence to Standard Operating Procedures would probably avoid the error (troika 1). Cross-checking entries before execution and monitoring of position should trap erroneous entries (troika 2). Finally, as the last defense, inquiry and monitoring of the position should result in mitigating the consequences of an erroneously executed command (troika 3).

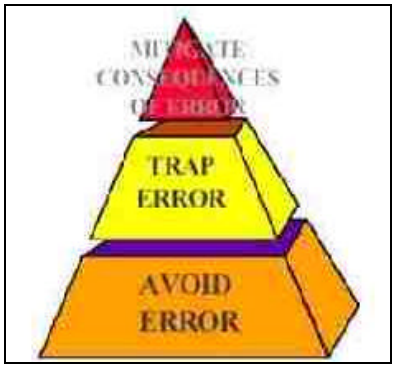


Fig 16 : Troika of Error Management

To gain acceptance of the error management approach, organizations must communicate their formal understanding that errors will occur, and should adopt a non-punitive approach to error. (This does not imply that any organization should accept willful violation of its rules or procedures.) In addition to normalizing

error, organizations need to take steps to identify the nature and sources of error in their operations. Shipping companies should encourage incident reporting within organizations to deal with safety issues proactively. A case in point is the exercise by American Airlines in 1997, wherein cooperation of the pilots' union and the FAA was sought. This confidential, non-jeopardy reporting system allowed pilots to report safety concerns and errors. The program proved to be a resounding success, with nearly six thousand reports received in a two year period. Data generated by this system allowed the company to take steps to prevent / minimize the recurrence of incidents.

Module 11. Judgment and Decision-making

Factors that affect judgment and decision-making, together with the very process of decision-making, are addressed in this module. The importance of detecting and avoiding hidden pressure is emphasised.



Fig 17 : MRM modules viewed on multimedia computers

From a practical standpoint, MRM program typically includes educating crews about the limitations of human performance. Trainees develop an understanding of cognitive errors, and how stressors (such as fatigue, emergencies, and work overload) contribute to the occurrence of errors. Typically participants are required to assess personal and peer behavior. Operational concepts which are stressed upon include inquiry, seeking relevant operational information, advocacy, communicating proposed actions, conflict resolution and decision making.

As per Rasmussen, decisions could be Skill based, Rule based or Knowledge based. 70% of the decisions fall into the first two categories. As you rise up the ladder, your role as a senior manager, calls you to make more knowledge based decisions. Knowledge based decisions are those that require you to draw on your knowledge and experience to take decisions where there is no ready answer, situations out of the ordinary where one needs to utilize his faculties to make an informed decision. These could be stressful situations which lead quickly to exhaustion.

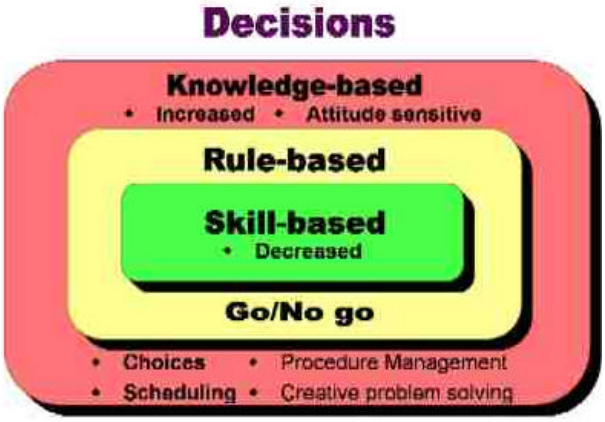


Fig 18 : Rasmussen's model on decision making

It was Richard Nixon who said " I wouldn't take a decision which someone else could also have taken. I save myself for the big one".

Module 12. Leadership in Emergencies

The transformation of an emergency situation from an unexpected, "fast-reaction type" into an anticipated, "slow-reaction type" calls for different leadership styles in different emergency situations.

Whatever the causes, the effect on shipboard organization has been to emphasize the necessity of teamwork. Not the teamwork of several tars hauling on ropes to the shouted orders of one leader, but the true teamwork of professionals, each with his/her own expertise and specific role to play. In such a team each member checks the work of others, thus minimizing the risk or effect of error.

This evolution of leadership is not peculiar to seafaring; it is, however, more noticeable because the traditional shipmaster was expected to be the tough, no nonsense, all knowing, omniscient leader who would have the crew spread-eagled on the ropes and flogged at the slightest whimper of disagreement.

As you train so shall you respond. The way you command in everyday situations is close to the way you'll respond to emergencies. One cannot expect a crew, sloppy in their performance of day to day activities, suddenly transform themselves into heroes when faced with an emergency situation. By command, I refer here not the style but to the process. Orderly presentation and recording of data, regular reporting and updating, use of common terminology -- all are part of a successful command process and may be evaluated during onboard training.

An example comes to mind of leadership in emergency, in the sinking of the Oceanos. This Greek passenger vessel sank in stormy seas off the southern coast of South Africa. Captain Yiannis Avranas was one of the first to leave the ship along with many of the crew, leaving 220 passengers, many of them elderly and infirm, to fend for themselves. An entirely new leadership emerged from amongst the ship's entertainers. They rose to the occasion and organized an orderly rescue of passengers through helicopters of the South African air-force. Miraculously all 571 on board were rescued without a single loss of life.



Fig 19 : Discussions during Workshop session

Module 13: Crisis and Crowd Management

This module covers the following items:
1. Management of technology crises
2. Management of passengers during an emergency. (Crowd Management)
3. Human crisis management after an emergency or incident; namely Crisis debriefing.

This module to an extent covers the STCW mandatory requirement of "Crowd Management" for passenger ships and ferries. It is interesting to note that in a crisis, the animal instinct in a human being tends to overpower the logical, controlling part of his brain.

After the initial announcement of an emergency…
. 10% accept the situation immediately
. 30% investigate
. 60% ignore the situation

After people accept the danger…
. 10% flee and save themselves
. 5% stand and fight the danger
. 10% help others
. 60% await initiatives from others
. 12 to 14% freeze and do nothing

. 1 to 3% panic

Module 14 : Automation
This is a new module, lately added. While automation systems accurately process large volumes of data, they lack the essential human attributes – including the ability to anticipate and deal with unexpected events. This module covers the following items ;

1. Engage automation as a team member
2. Maintain mode awareness.
3. Orient towards continuous learning about the automated systems.

In recent issues of Seaways there has been considerable discussion on the grounding of the Royal Majesty and how an innocuous disconnection of GPS antenna led to a train of events, where the officers seem to have been in a state of trance, overwhelmed by the array of gadgetry available to them on the bridge. Automation lulls you into a false sense of security. Human beings are notoriously poor monitors, left to only observe dials and gauges they quickly fall into the complacency trap. It is worthwhile to remember the computer adage GIGO "garbage in, garbage out". Computers will answer as you have programmed them, they cannot think on their own. Be their master, not a brainless all accepting slave.

Case Studies form a very crucial part of this training as they bring to life the fact that "accidents don't just happen to others". Participants, during the analysis, get into the skin of the characters on the ill fated ships and begin to see for themselves that in most cases it was basically a human error chain that perpetrated leading to the sorry end.

At the beginning I recounted the tragic events that lead to the breaking up of the Torrey Canyon. On the face of it, the grounding resulted from a "simple" mistake of not changing over from auto-pilot to hand steering in time. Yet, how could such a thing happen?

Some key issues that it brought out :

- Who was in control when the Master was on the bridge? Clearly, everyone thought it was the Master and that, therefore, it was not their responsibility to think!
- When were the briefings given?
- Who was monitoring the passage plan? Was there a passage plan?
- Who made the "challenges"? The 3rd officer mentioned fishing vessels in the way. Was his challenge accepted and responded to ?
- If a voyage is routine, does this mean that things cannot go wrong? The circumstances, in this case, suggest that those on the bridge felt that nothing could go wrong.
- The Authority/Assertiveness factor is also significant. The personality clash between the Master and Chief officer, and its consequences, warrants exploration.
- It seemed to be a case of too little to late. Was it a one-man show? Could the master not delegate cargo calculations to the mate ?
- Emergency brought out the true colours of the master. Panic, a classic example of spontaneous incompetence.

"I am not smart. I try to observe. Millions saw the apple fall, but Newton was the one who asked why" …….. B.Baruch

In tests carried out at **NASA** where aircraft crews were put through emergencies situations the crews that came out successful showed the following attributes :

- They have good situational awareness- that is they anticipate each next condition.
- They obtain relevant information early during times of low workload.
- They have built a shared mental model through briefing, effective communication and good interaction.
- Their decisions are realistic and sensitive to constraints- they replace hazardous thoughts by safe thoughts.
- They share workload and relieve stress through teamwork, delegation and setting priorities.

- They monitor progress by cross-checking actions and constantly accessing the quality of information received.
- And above all, they possess the right ATTITUDE.

The final role play in the environs of a simulator, enables the participants to apply the MRM principles in practice, both during normal operations when the going is good as well as during emergencies when things start to go wrong. Under a similar pattern to the "Line Oriented Flight Training" exercise, the officers are observed whether they adhere to Standard Operating Procedures and any deviations are discussed prior implementation.

In a survey carried out of ship's officers who had undergone the SAS-BRM training, 64% agreed very strongly that the course had a potential to increase safety and crew effectiveness.

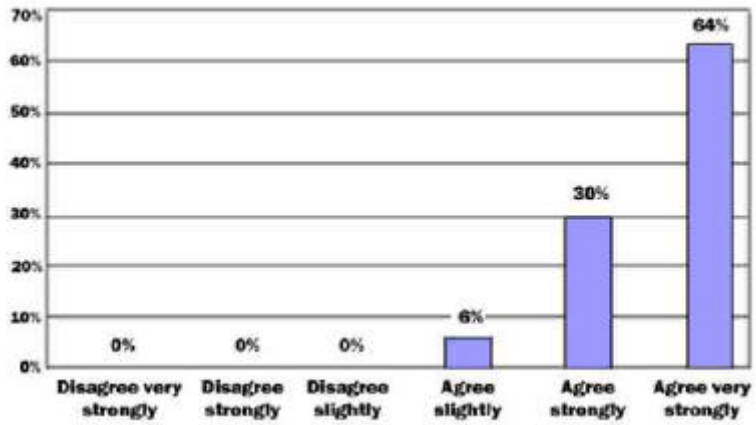


Fig 20 : Survey Results of BRM participants

Resource Management is the future whether it be on the Bridge, Deck, Engine room or in the Shore Manager's office. It has the potential to reduce accidents to a significant extent. If a little can get us more, why not make the most of it.

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