

Human Factor in Shipping

N.M.C NAIR

Institute of Marine Engineers (India)

The safety and security of life at sea, protection of the marine environment and over 90% of the world's trade depends on the professionalism and competence of seafarers. With ISM, PSC/FSC in force, the accidents at sea is on the increase and nearly 80% of the cause is attributed to human element. Many of the Maritime Training Institutes are just commercial institutions and they are not bothered about the future of the candidates or on developing their skills. Managers are less bothered to guide the trainees and ship's officers before joining & senior officers on board say they don't have time for mentoring & training juniors on board. Owners are thinking about reducing operating cost. Maritime Labor Convention 2006 was implemented with a purpose of giving enough facilities and rest periods but the seamen use it to avoid learning and to take time to be in their cabins and avoid interacting with other seafarers on board.

KEY WORDS: Fatigue; Morale; Motivation; Loyalty; Training; Experience ; skills, Conditions of service; Culture; Language; Mentoring.

INTRODUCTION

The maritime industry is much more than the deep-sea merchant fleet. It includes port and terminal operations, shipbuilding and repair, naval architecture and marine engineering, seaman training, tug and barge operations, pilotage, forwarding, chartering, government programs and ,shipping, intermodal services, maritime law, passenger and excursion services, vessel classification, marine insurance, communications, recreational boating, yacht, and much more.

It has contributed to the progress of nations and the world in that the development of modern transportation systems worldwide and economic globalization has been driven by the Maritime industry-the transportation industry leader. Besides the progress of the world's port operations, shipping and shipbuilding has also contributed significantly to the global economy through its requirement for supporting services such as ship financing, marine insurance, maritime legal and arbitration services, maritime education and training, maritime research & development etc.

The safety and security of life at sea, protection of the marine environment and over 90% of the world's trade depends on the professionalism and competence of seafarers.

The ISM Code is intended to improve the safety of international shipping and to reduce pollution from ships by impacting on the way ships are managed and operated. The ISM Code establishes an international standard for the safe management and operation of ships and for the implementation of a safety management system (SMS).

For many years ship inspections concentrated on the physical condition of a ship and little time was spent on what should have been considered to be a more important area for concern – the performance of the officers and crew and the manner in which the ship was operated and maintained.

Today, many of the maritime system e.g. ships, ports, offshore platform etc. are complex entities with multiple physical and virtual relationship and multiple internal and external interfaces. As regards to safety, many maritime systems are vulnerable because of lack of awareness of all the threats the system is exposed to. High demands are put on the quality of services and service regularity.

The human element or Human factor or Human engineering as it is known, is the one essential unit that is extremely difficult to modify since it needs a modification in both intentions and attitudes; it is an expression commonly used in the context of the maritime industry as well as shipping industry. The human element is a complex multidimensional issue that plays a most vital role in the operation of industry, in enhancing maritime safety, security and marine environment protection.

It is human nature that handles what occurs daily at work; from the routine tasks of a ship's rating right through to the policy decisions of the IMO. It embraces the integral spectrum of human activities performed by the crew on ships, shore-based personnel, organizational bodies, recognized organizations, shipyards, legislators, maritime education and training and other related parties, all of whom need to cooperate in addressing human issues effectively. It is recognized that the quantification of the human element in general and its role can influence the methods of upgrading safety management systems. All should cooperate to address the human element.

The human element has a role to play in improving maritime safety: Commitment from the top, in every



organization Effective control and monitoring mechanisms
Quality standards in force Training and updating Transparency
Safety culture: safety can never be taken for granted, permanent attention is required.

The human element remains a basic component for all its strengths and weaknesses that can either cause a disaster or prevent it and it is becoming the primary cause of maritime accidents in recent years. The key to prevent accidents is to understand the accident causing mechanism of human error. The human element is being recognized as the greatest source of risk to safe and effective shipping and is one of the most important contributory factor to avoid accidents. The people, systems and machines have changed, through the improvement in technology, and the need for shipping companies also changed to maintain the competitive edge by reducing operating costs. This has resulted in a reduction in manning scales and the employment of multinational, and multilingual crews.

Modern technology and communication have progressed to the point where autonomous ships are now being tested & tried as an alternative. We will have to motivate our young seafarers to sharpen their knowledge & skills and prepare themselves for a new challenge which could possibly demand revolutionary alterations in their professional skills. But human interface will have to continue for safer ships & seas.

US NAVAL VESSELS COLLISION - US NAVY ENQUIRY REPORT

USS FITZGERALD collided with MV ACX CRYSTAL on 17th June 2017 in the waters of Sagami Wan in vicinity of approaches to Tokyo Wan. 7 lives lost.

SUMMARY OF FINDINGS

- Failure to plan for safety
- Failure to adhere to sound navigation practice
- Failure to execute basic watch keeping procedures
- Failure to use available navigational aids
- Failure to respond deliberately and effectively in extremes.

USS JOHN MCCAIN collided with ALNIC MC on 21st August 2017 in the straits of Singapore. 10 lives lost.

SUMMARY OF FINDINGS

- Loss of situational awareness in response to mistakes in the operation of the steering & propulsion system, while in the presence of high density maritime traffic.
- Failure to follow the international Rules of Road.
- Watch keepers operating the vessel's steering & propulsion system had insufficient proficiency & knowledge of the system.

The collisions were avoidable between USS Fitzgerald and MV ACX Crystal and between USS John McCain and MV ALNIC MC as per the findings of US Navy.

For a definition of “human element,” as it is applied in shipping, the most cited is probably the one adopted by IMO (2003) in its most recent resolution on the subject: A.947 (23) in 2003: The human element is a complex multi-dimensional issue that affects maritime safety, security and marine environmental protection.

It involves the entire spectrum of human activities performed by ships' crews, shore-based management, regulatory bodies, recognized organizations, shipyards, legislators, and other relevant parties, all of whom need to co-operate to address human element issues effectively.

The primary aim of IMO in addressing human element issues is to enhance maritime safety, security, and the quality of the marine environment, and one of its main goals is described as: To provide a framework for understanding the very complex system of interrelated human element factors, incorporating operational objectives, personal endurance concerns, organizational policies and practices, and environmental factors, in order to facilitate the identification and management of risk factors in a holistic and systematic manner. (IMO, 2003)

Human error costs the maritime industry \$541m a year, according to the UK P&I Club. From their own analysis of 6091 major claims (over \$100,000) spanning a period of 15 years, the Club has established that these claims have cost their members \$2.6bn, 62% of which is attributable to human error.

ENCLOSED SPACES- More needs to be done to stem the loss of life caused by this invisible killer. Accidents relating to entry into enclosed spaces on board ships continue to blight the shipping industry, with an unacceptably large number of incidents resulting in the death or injury of both ship and shore personnel reported over the first few months of this year alone.

MASTER-PILOT EXCHANGE- Good & clear communication and team work during pilot operations is a factor affecting the safe berthing & un-berthing, manoeuvring operations. It is common in today's shipping environment for the pilot to arrive on a ship and be greeted by a multi-national bridge team where language and culture can impair proper communications. It is also common to find a bridge team of varying competencies where a proper understanding and appreciation of the pilotage operation cannot always be assumed.

Non-standardisation of bridge equipment, symbols and bridge layout can also add to confusion, especially as the operating environment intensifies, as in the case of reduced visibility, increased traffic density and narrow operating margins.

Commercial pressures on the pilot and master as always are a source of stress. These may be in the form of requests to use fewer tugs or to berth/un-berth within certain time-frames. It is not unusual to find a fatigued master and crew, especially when a ship is making a number of port calls within a short space of time (as in the case of container ships and car carriers). The pilot cannot depend on proper backup from the bridge team in such



circumstances. Fatigue induced stress can also be caused by adverse weather, high workloads and poorly planned duty cycles that do not incorporate sufficient rest periods.

MOORINGS With its team of risk assessors, the UK Club is in a unique position to gather data and target areas of risk on board ship.

LOSS OF POWER. Industry has noted an increasing number of blackouts and main & auxiliary engine failures. Increasing numbers of main engine failure related incidents and accidents following blackouts have led to a data collection exercise by the UK Club's risk assessors and a detailed analysis of more than 700 claims, which has given cause for concern.

SLIPS, TRIPS AND FALLS: Representing nearly one in three of the large personal injury claims submitted to Club.

MENTAL HEALTH - Managing the emotional well-being of crew at sea. Fatigue, Morale, difficulty in communication, cultural difference, changes in food habits,

CHOOSING A CAREER AT SEA.

For many, a career at sea is a dream come true, and we must not forget the reasons for wanting to pursue such a career. Below are the top ten reasons, according to the **International Chamber of Shipping**, as to why people want to work at sea.

1. **Good wages:** Wages earned by seafarers are normally above similar professions ashore. Opportunities for accumulating savings, even when young, are considerable. The real value of wages may often be substantially greater because they are often tax free.

2. **Early responsibility:** Ships' officers enjoy considerable responsibility from the start of their careers. Within ten years it is possible to qualify as a Captain or Chief Engineer, with total responsibility for the operation of a ship and the management and safety of its crew.

3. **Opportunity to travel:** A career in shipping gives the chance of incredible global travel. This gives seafarers the chance to experience interesting and unusual places, rather than just the typical business or holiday destinations visited by many people.

4. **Long-term prospects.** There is a great need for more qualified ships' officers to meet the skills required by international shipping companies. There is a massive shortage predicted, so the demand for good people will increase.

5. **Career flexibility and job security.** Shipping is an ideal occupation for young people seeking something exciting and different to just working in an office, which in the long run

will also lead to an enjoyable and well paid executive career in a major international industry.

6. **International recognition.** Ships' officers hold internationally recognised qualifications, so most officers are qualified to work for the thousands of international shipping companies located all around the world, on ships flying the flags of almost every country.

7. **Long holidays.** In most jobs, it is only possible to take a maximum of two or three weeks holiday at one time, but seafarers commonly enjoy generous leave or holiday periods. So while seafarers may sometimes be away from home for extended periods, they also enjoy the benefits when they come home.

8. **A career that is different.** A ship is a unique working environment, and those working on-board ship often develop lasting friendships with their colleagues and have a stimulating life which is different to the experience of many people working ashore.

9. **Transferable skills** Qualifications and experience gained at sea are also readily transferable to other industries outside merchant shipping. Career opportunities extend to thousands of shore-based management jobs, which require people with seagoing experience.

MCA, Based on a wide range of consultations with maritime organisations, the guide was produced by organisational psychologists GS Partnership Ltd., for consortium partners UK Maritime and Coastguard Agency, BP Shipping, Teekay Marine Services, and the Standard P Club. Aimed at everyone in the shipping industry, the Guide explains the fundamental aspects of human behaviour, which together constitute what the commercial maritime sector calls 'the human element'. It makes clear that the human element is neither peripheral nor optional in the pursuit of a profitable and safe shipping industry. The Guide clearly shows that managing the human element must take place simultaneously at all levels of the industry. Analysis of continuing shipping disasters has increasingly implicated the human element. The loss of life, the impact on company profits and credibility, and the vast environmental damage that can result from the loss of even a single vessel remain clear. The Guide offers insight, explanation and advice to help manage the human element more effectively, more safely and more profitably.

Younger seafarers can learn modern systems faster than seniors. Proper training ashore and sincere mentoring on board will surely lead to better, safer ships. Better integration of human resources with proper training & continued mentoring, will enhance efficiency of seafarers, their safety at sea, profitability for owners, credit for Managers, safer ships & cleaner seas, as whole.



Although SMS on board the ships and in the company are meant for reducing incidents and accidents, recent trends indicate further efforts are required to improve the scenario. Increasing number of PSC detentions of Ships is a matter of great concern and needs to be analysed and taken up seriously. Objective of ISM Code is to ensure safety at sea, prevention of human injury or loss of life and avoidance of damage to the environment. There is no such thing as ‘the perfect ship’, because the final product is a compromise between what is needed to satisfy the regulations, and what is necessary to fulfil the operational role, with minimum expenses. People are important and ships need good, qualified, and motivated seafarers to operate well. They need to be provided with the proper tools and be adequately trained to be able to conduct their part in a safe and efficient manner.

- **Competence.** The seafarer’s level of competence will depend not only on good and effective education and training and realistic competencies, but also on aptitude – the ability to absorb knowledge and to understand the subject – and on his own skill and proficiency.
- **Attitude.** The seafarer’s attitude towards education and training will be driven by his mental ability, intelligence, personality, character and sensitivity. Self-awareness and self-evaluation are the key drivers.
- **Motivation.** Motivation is driven by good communication, direction, teamwork, mentoring and character building in order to provide the seafarer with a sense of leadership and adaptability.
- **Safe & secure working environment.** Safe working practices, the provision of protective equipment, together with proper physical security will lead to an improved safety culture and greater security awareness.
- **Happy & healthy lifestyle.** A happy and healthy lifestyle through the encouragement of a balanced diet, good hygiene, exercise, rest and recreation, together with acceptable standards of habitability and regular medical screening, including drug and alcohol testing, will ensure that the seafarer has the energy, physical fitness, physical strength, stamina and a sense of wellbeing to enable him to do the job.
- **Moral values.** Personal ethics, religious beliefs, conscience, cultural integration and leadership, together with proper supervision and adequate remuneration can generate a sense of pride and purpose, identity, conviction, trust, expectation, realisation, belonging, loyalty, esteem, fellowship and personal security.

Some of these can be taught, and some are developed through self-education, while others fall to the ship owner or ship manager who has a duty to provide a safe and secure

working environment, decent working and living conditions and fair terms of employment.

It is often stated that around 80% of all accidents at sea are attributable to human error while the remaining 20% may result from hull or equipment failure due to unrecognized faults or lack of expert maintenance.

The causes of maritime incidents can be linked to a number of contributory factors like, Poor design; Equipment failure through poor maintenance & Fatigue; Ineffective communication; Lack of attention to rules, regulations and procedures; Inadequate training in the operation of equipment; Unawareness of the vulnerabilities of electronic systems.

American Club publication on Guidance to Seafarer’s Mental Health states as below:-

There are many different conditions that are recognized as mental illness.

Some of the more common types include:

- **Anxiety** - intense, excessive and persistent worry and fear about everyday situations. Often, anxiety disorders involve repeated episodes of sudden feelings of intense anxiety and fear or terror that reach a peak within minutes (e.g. panic attacks).
- **Depression** - a mood disorder that causes a persistent feeling of sadness and loss of interest.
- **Eating disorders** - involve extreme emotions, attitudes, and behaviours involving weight and food, commonly taking form as anorexia, bulimia, or binge eating.
- **Impulse control and addiction disorders** - People with impulse control disorders are unable to resist urges or impulses to perform acts that could be harmful to themselves or others. Pyromania (starting fires), kleptomania (stealing), drug/alcohol abuse, or compulsive gambling are examples of impulse control disorders.
- **Post traumatic stress disorder (PTSD)** - people with PTSD often have lasting and frightening thoughts after experiencing a terrifying or traumatic event such as sexual assault, death of a loved one, or disaster.
- **Obsessive compulsive disorder (OCD)** - a constant fear that compels a person to perform rituals or “compulsions”.
- **Common stress** – leading to erratic or unpredictable actions.

While all of them are different, without effective treatment for the ailing seafarer, these illnesses could result and have resulted in serious consequences for the ship and its operation. Situational mental illness unlike the more severe and diagnosed illnesses can result from circumstance or increased stress. Stress can have mental, physical, emotional, and behavioural effects on a person. You may recognize small changes in an individual or feel that “something is just not right.” Some detectable manifestations include:



There are many contributors that can impact the mental wellbeing of a seafarer, some obvious and some seemingly benign, but harmful nonetheless. Seafarers may be more likely to suffer from mental health issues as opposed to those working on land due to a number of environmental “stressors” such as:

1. **Seclusion from the outside world:** from the confines of living on the vessel and having limited contact with family.
2. **Monotony of work duties:** modernization and automation of certain functions aboard ships has increased monotony for seafarers.
3. **Possible addiction to alcohol and/or drug:** there is a connection between mental illness and substance abuse and the symptoms of one disorder can trigger the other. The substance abuse may be an attempt to self-medicate, however mental illness is usually worsened by substance abuse.
4. **Social Isolation:** 76% of seafarers reported to have never or rarely gone ashore while on board, which can contribute to mental health symptoms associated with social isolation. Causes of social isolation include reduced crews, lack of social cohesion aboard, time spent away from home (a very frequent cause of loneliness and social isolation) fatigue, harassment and bullying, and limited shore leave.
5. **Language Barrier:** The employment of multinational crews aboard ships leads to a lack of social cohesion and a difficulty for seafarers to communicate with each other. The added language barrier for multinational crews makes it more difficult for communication and may lead to crewmembers becoming more isolated from each other.
6. **Bullying:** Almost 50% of seafarers experience bullying and harassment while at sea. Bullying is often called psychological harassment or violence. These attacks destabilize and disassemble the target's identity, ego strength, and ability to rebound from the assaults. The longer the exposure to stressors, like bullying, the more severe the psychological impact.

These symptoms may cause difficulty with completing tasks and duties aboard ship and should be a sign to a ship's master its officers and senior crew that a crewmember is in distress. Early intervention can help prevent an illness from worsening.

Even the ship type influences seafarers' stress

- Tankers: more stress due to danger nature of cargo, risk of fumes, explosion and pollution.
- Container ships: busy in port, quick turnaround.
- Passenger ships: less stress, as more often in port, more easy to go ashore, better food, communications and social interaction.
- Small ships: fishing boats, offshore supply, rough weather, small crew numbers, short stay in port

Better connectivity with the internet has its advantages and disadvantages, including contact with family and friends

ashore. Reduced crew numbers onboard ship make connectivity a more important tool for social interactions because there are less people on board to physically interact with regularly. A lack of social cohesion aboard ship contributes heavily to these unhealthy mental states, which is why members are advised to counteract this. A social or non- social ship environment is key to the success of implementing positive mental health initiatives aboard a vessel.

On board Care: It is up to the Master's discretion to determine if a crewmember needs to be monitored to ensure their own wellbeing and the safety of the ship and other crewmembers. Always consult the opinion of the doctor or medically qualified person if on board, or a medical advice call-in service. Crewmembers who have expressed symptoms of anxiety, depression, or a more severe illness should be monitored and/or have their duties curtailed to a minimum until a medical professional has treated them. Crewmembers with a mental illness may pose a risk to themselves and the rest of the crew with whom they work with. It is important to develop a monitoring protocol that protects seafarers during these times while waiting for proper medical treatment. Every situation will require different strategies and details so you may consider seeking advice on a contingency plan and documenting any preventative actions taken.

Professional Treatment: When diagnosed early and treated properly, many people fully recover from their mental illness or are able to successfully control their symptoms. Statistics show 8 in 10 people suffering from a mental illness can effectively return to their normal activities if they receive appropriate treatment. This treatment is beyond the care that can be provided on board may require some encouragement.

Seafarer's strength should be in developing his:

TALENT,
KNOWLEDGE,
SKILLS &
PERSONAL COMMITMENTS TO THE PROFESSION.

To develop these strength points, Seafarers should:

1. Read and learn often to update their knowledge.
2. Meditate & exercise regularly.
3. Spend time outside the cabins, mix with others
5. Add more plant-based foods to diet.
6. Fuel your passions- painting, singing, writing, etc.
7. Let go of the little things.



8. Reduce major sources of stress out of life.

9. Have positive attitude in

- ✓ MENTORING & ENCOURAGING OTHERS
- ✓ BEING HAPPY THRU ACHIEVEMENTS
- ✓ NOT WORRYING ABOUT PROBLEMS
- ✓ FACING PROBLEMS CONFIDENTLY
- ✓ AIMING FOR SUCCESS
- ✓ NOT LOSING FAITH IN SELF & OTHERS
- ✓ MANAGING STRESS
- ✓ HAVING PATIENCE

10. Develop Soft skills in

- ✓ COACHING & MENTORING
- ✓ EMPATHY
- ✓ COMMUNICATION
- ✓ CREATIVITY
- ✓ TIME MANAGEMENT
- ✓ NEGOTIATION
- ✓ MOTIVATION
- ✓ PERSONALITY DEVELOPMENT

11. Initiate Team work

A team leader leads, coaches, inspires, motivates, listens & learns through: Clear Communications, displaying Confidence, Commitment, delegation, positive attitude.

As most shipboard systems depend on some level of human involvement, the human link needs to be managed, monitored and nurtured. Healthy, happy, well trained and motivated mariners are essential to the safe running and commercial efficiency of any ship. This is achievable thru the Spirit, Mind & Body training.

- Moral values (*Spirit*)
- Self-actualisation (*Spirit*)
- Happy & healthy lifestyle (*Body*)
- Attitude (*Mind*)
- Safe & secure working environment(*Body*)
- Competence (*Mind*)
- Motivation (*Mind*)

Mentoring – a personal development relationship in which a more experienced or more knowledgeable person helps to guide a less experienced or knowledgeable person. True mentoring is more than just answering occasional questions or providing ‘ad hoc’ help. It is about an ongoing relationship of learning, dialogue and challenge.

The positive benefits of mentoring for both the mentor (career advancement, passing the torch and learning from the mentee) and the mentee (career advancement, salary

improvements, organization and professional identification) should be discussed and a better structured system should be brought back to seafarers on board – because mentoring can reduce the probability of leadership failures and will surely lead to a safer ship, cleaner seas, with happy seafarers on board.

CONCLUSIONS

Marine accidents / incidents can be controlled and reduced with proper involvement of all seafarers on board - in his/her work, safety culture, communication, mentoring & interaction with others on board. If the seafarer is competent, healthy, happy, well trained and motivated then the commercial efficiency of the ship will surely improve.

REFERENCES

1. RISK FOCUS: CONSOLIDATED 2016 Identifying major areas of risk by UK P&I Club & Analysis of major claims
2. The American Club
3. Seafarers are Owners Yangon, Myanmar, 9th & 10th April 2015
4. Mentoring – 21st Century Shipping – 25th October 2013
5. The UK Maritime and Coastguard Agency (MCA) publication *The Human Element – a guide to human behaviour on the shipping industry*.
6. The 13th Annual General Assembly of the IAMU. Expanding Frontiers - The Maritime Industry and the Human Element Phenomenon by *El Ashmawy, M.E Prof Captain, Arab Academy for Science Technology and Maritime Transport*
7. Department of the Navy, Office of the Chief of Naval Operations, 2000 NAVY PENTAGON Washington, DC 20350-2000
8. Resolutions of IMO from web site & Lesson learned from accidents/ incidents
9. The Human Element in shipping
Commodore David Squire, CBE, FNI
Editor- Alert! – *The International Maritime Human Element Bulletin*
ALERT series of Nautical Institute
10. International Chamber of Shipping- Annual Review 2017

