Human factor competencies for the future mariner

By

Capt. Pradeep Chawla

Managing Director, QHSE & Training

Anglo-Eastern Ship Management Ltd.

Abstract: *This paper discusses the changes that are taking place in the maritime industry and their effects on the daily life of the seafarers. It further discusses the human factor competencies that will be essential for the future mariner.*

The last two decades have been extremely fast paced with respect to technology influencing every walk of life.

Internet, Google, Facebook, Linkedin, smartphones, WhatsApp etc. and their effects on the way we communicate, interact and learn are well-known.

Maritime industry has also made great strides in the use of technology and the daily life on board ship has changed significantly from what it was in the 80's and 90's.

Here is a quick review of some of the changes that have taken place already or are coming in the next decade or two and my opinion on the challenges associated with them.

1. ECDIS is a revolutionary change and there is no doubt that it has improved safety of navigation. The full benefits of ECDIS will be realized as e-navigation strategies evolve. The discussions of type specific familiarization for ECDIS, have made it obvious that non-standardized interfaces present a challenge in the processing of information by the navigator and this is an aspect that needs to be carefully analyzed and addressed as we move forward with e-navigation.

2. Electronic engines controlled through advanced computer systems bring about similar issues for the engineers. However, presently with the market domination of only two brands, this has not led to the issue being experienced in a similar manner as ECDIS. The issue of processing, analyzing and controlling data from a single screen is a dramatic change from 'touching', "feeling" and 'hearing' sounds from the machinery.

3. Position fixing with GPS, combined with ECDIS with radar overlays, has revolutionized the bridge watch-keeping practices.

   Over-reliability on GPS is a constant discussion amongst older navigators and the younger ones who have never witnessed a GPS failure. The younger navigators question the practices of manual / radar fixes when they seem to be obtaining continuous accurate

positions from 3 or 4 GPS sets on board. The debate on the concept of "cross-checking" of vessel's position is taking a whole new meaning with the advent of combined GPS/ GLONASS receivers coupled with other satellite positioning systems on the horizon.

4. Environmental regulations are evolving and developing rapidly. Regulations for measurement of harmful gases are inked. Ballast water treatment plants are being fitted. Emission regulations are being rapidly tightened. Belief among the world citizens on taking the steps to protect the world for the future generations is often found wanting.

   The shipping industry is under pressure and efforts to educate the seafarers in their role in this important field are urgent and important.

5. E-Navigation, as presently envisaged by IMO is a dynamic target and the evolution brings about various challenges of collection, integration and analysis of data.

   The way mariners will interact with e-navigation presents a number of challenges that need to be carefully studied and risk assessed as new equipment and systems are designed and developed. Alarm management will be a critical feature here.

6. Besides the social media byproducts of the internet that have become an integral part of our lives, the introduction of cheaper communication, has resulted in increased volume of data exchange being handled by vessels.

   There are additional tasks to manage the various software issues. The increased use of electronics has come with the problem of frequent hardware related breakdowns. There are several cases of Radar, ECDIS and other electronic equipment breaking down, thereby putting extra stress and workload on the mariners who have to wait till a suitable port for repairs. There is a need for standardization and having strict equipment quality monitoring standards at manufacturing and installation stages so that they are better able to withstand marine conditions and have better "mean time between failures".

   The time spent on handling the increased enquiries and requests from people ashore is a significant factor that brings about challenges in designing onboard tasks and responsibilities to prevent any neglect of the core tasks of navigation and care of the cargo.

7. Maritime Labour Convention, which was a much needed legislation for rights of seafarers, has focused the attention of companies and port states on the issue of rest hours; however it has not yet focused the attention of the port-states and regulations on the cascading effects on safety of navigation; especially in areas of long pilotages.

   The effects on traditional expectation of Master's presence on the bridge and the laws about the responsibilities of the pilots have not been sufficiently deliberated over prior to entering into force of the MLC.

This brings about testing times for the mariners, who often are the 'scapegoats' of regulatory decisions when things go wrong. The fundamental issue is the manning scales on board that regulators find impossible to get consensus between various countries.

8. The traditional hierarchy on board and the management styles of 'My ship, My law' have become obsolete in modern days. Whistle blowing, MLC complaint procedures and transparent systems have brought about a change in the way Masters and companies manage the workforce.

9. The amalgamation of ship and shore systems is inevitable and an inherent part of e-navigation. However it opens up fresher challenges of cyber-security. Possibility of terrorists taking over a ship remotely are being speculated.

The mariners will soon need to understand and appreciate the dangers associated with cyber hacking.

10. Making sense out of the 'big data' is becoming the buzz word in all industries. Maritime industry is a traditional industry and usually not the first to adopt the latest technologies.

The advantages of business intelligence through the use of big data is enormous and it would be good if the industry does not delay investing in this new field.

Besides the areas discussed above, the mariners are also faced with changes being bought about by increasing number of regulations.

SOLAS 74 was 158 pages.   SOLAS today is 294 pages

MARPOL 78 was 265 pages. MRPOL today is 447 pages

STCW 78 was 243 pages.   STCW 2010 is 356 pages

And we of course have the Maritime Labour Convention (110 pages)

Ballast Water Convention (38 pages), Anti Fouling Convention (45 pages)

This is without counting regional regulations like OP90, Vessel Response Plans, SOPEP etc etc.

A rough estimate is that a Master needs to be familiar with at least 4500 pages including company's SMS and owner's and charterer's instructions.

So what competencies should our future super-mariners need?

In my opinion the most critical human factor competencies that are needed in the future are:

1. <u>Ability to process large amounts of data from various man-machine interfaces:</u>
   Standardized and well thought of user interfaces will be a critical part in the design of future shipboard equipment. Insufficient research or attention to this could endanger the progress of adoption of new equipment and systems.

   Accident case studies show that the majority of 'situational awareness' errors were due to a failure to monitor or observe data from the various equipment due to either overload of information or distractions.

2. <u>Ability to focus on critical issues</u>
   Overload of information can cause the danger of missing out on the critical issues. This issue is already being experienced on the modern day bridge. The plethora of alarms, and displays sometimes distracts the navigator from keeping a proper lookout by sight and other available means.

3. <u>Ability to work with remote teams</u>
   Teamwork on board is well understood at sea. However with the closer integration of ship and shore systems, a large number of tasks will be done by people ashore. Vessel traffic services will have a larger role to play. Teams ashore will analyze engine data and advise the shipboard teams.

   The large mix of shipboard crew nationalities and multi-national shore teams will bring about new challenges in communications and teamwork.

4. <u>Ability to be assertive</u>
   The interaction with a larger number of shore based teams will require a clear emphasis on Masters over-riding authority enshrined in the ISM code.

   With the lower costs of communications and e-mail systems, Masters are already reporting a feeling of being 'controlled' too closely by shore staff.

   While the laws make the Master responsible for all accidents, the reality is that Masters feel that their authority (w.r.t. day to day running of the vessel) is being 'taken away'.

5. <u>Ability to understand the limitations and recognize changes of automation</u>
   Significant improvements are expected in automation of shipboard systems. Other industries have recognized that automation leads to complacency, thereby resulting in slower response in case of emergencies related to failure of automation. Other industries already talk of 'Automation Complacency' and 'Automation Traps'.

6. <u>Ability to manage change</u>
   The pace of change of technology and regulations in all industries has never been faster. We see the challenges in adopting change in our daily lives. 'Instagram' and

'Snapchat' are not needed by the people in their 50's, however for a teenager they are basic necessities of daily life.

A significant number of seafarers and managers ashore are experiencing challenges with adapting to ECDIS or accepting the inevitable irrelevance of celestial navigation to a young officer.

7. Ability to learn continuously

The human race is discovering new knowledge faster than ever before. It is no longer possible for any professional to be considered 'competent' without constantly keeping abreast and subsequently adapting to these changes.

8. Ability to cope with increased stress

The shorter turnaround in ports, faster speeds of transit, larger sizes of vessels, stricter financial constraints, extremely low manning levels, criminalization of seafarers and various other factors have changed life on board to a high-stress job.

Social media is a wonderful way of keeping touch with the family but it also has an effect on rest hours and it brings the problems of the family closer on board.

The high stress levels amongst seafarers and the effects on their health is not being fully recognized and appreciated by regulators and industry leaders. A lot more research is needed on the topic of stress affecting seafarers.

9. Ability to communicate effectively

The ship-shore and ship-port interface is becoming more complex due to various factors like port security (without the port taking any moral or financial responsibility for a stowaway boarding a vessel), terminal regulations and increased pressure on profits in all parts of the industry.

The role of the Master to effectively deal with charterers, terminals, port state officials, oil major inspectors and the multitude of agencies that now come on board the ship has become more critical than ever before.

10. Ability to be a leader

In addition to the Master and Chief Engineer of the future retaining their traditional skills of managing their shipboard teams, He / she will also need to learn and adapt to various new skills of organizing, motivating, negotiating, running meetings, public relations and time management.

The seafarer of the future will need to be tech-savvy, adaptable, analytical and a rational manager, who will be able to do a lot more with better technology and shore based support;

Or perhaps, he will be sitting ashore monitoring drone ships!

Various companies are already tackling these issues through their recruitment and training programs. Psychometric testing in some form has been adopted by many companies to try and identify the behavioral competencies needed for the future mariner.

Training requirements can only keep on increasing with the increased regulations. Blended learning, Outcome Based Education and 'On the job training' will take on a greater significance in the future.

Our industry, like others, is going through a transition and debate between the believers of the traditional 'good old ways' and the futurists who are looking at technology and modern human performance management theories to get ready for the future.

But, there is no doubt that the human factor competencies is critical for progressing in our industry.

The maritime industry has only recently started looking at the human factor competencies. One of the most significant amendments of the Manila Convention (STCW 2010) was to incorporate competencies for leadership, teamwork and managerial skills.

Even the name of the IMO's sub-committee on "Standards of Training and Watchkeeeping (STW) has changed to "Human Element, Training and Watchkeping (HTW)" in 2014.