Improving Safety at Sea and Ports by Developing Standards for Maritime English

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ABSTRACT

The work reported here shows how communication failures can be addressed through removal of existing deficiencies in the training of the seafarers in Maritime English. EU funded Leonardo MarTEL project is addressing this deficiency through development of standards for Maritime English. The strength of the MarTEL Project is that it takes into consideration the language skills as well as the competency levels in each skill needed for each type and rank of seafarer. One important aspect unique to MarTEL is that it is 'Maritime Test of English Language' and not and 'English Test of Maritime Knowledge'. The research reported in this paper has been used to underpin the development of standards for Maritime English within the MarTEL Project.

Keyword: Maritime English, MarTEL Standards, Safety at Sea, Communication Failures

INTRODUCTION

International Maritime Organisations (IMO) (2005) has reported that by far majority of accidents at sea are caused by human error, and one of the main causes of these accidents and incidents is due to poor standards of Maritime English (Ziarati, 2006). At a recent IMO Maritime Safety Committee (MSC IMO, 2006) this issue was highlighted and reinforced by the papers presented by Turkish and English delegations. The history of navigation, noted by Benett (UFS, 2004) is actually the history of human error. He has argued that unless there is fundamental recognition of the importance of human factors in seafaring, the future looks increasingly fearful. The EU SOS Project was in response to the recognition that Safety at Sea can be improved at source by improving the education and training of merchant navy officers. The on-going EU funded MarTEL Project is also a recognition that English language competency is an important training issue for the Maritime Industry.

The research reported here outlines major problems relating to competency in Maritime English and is concerned with the establishment of standards for Maritime English for all classes of seafarers with the intention of obtaining recognition for their language competence.

As far as English language competency is concerned there are no International or European standards for Maritime English. This paper reports on the work of a transnational partnership working to establish a set of standards by transfer of innovation from existing maritime English model courses and English Language standards, such as IELTS, TOEFL, benchmarking them in terms of testing methods rather than their contents. There is a fundamental difference between the intended standards and systems such as IELTS and TOEFL; in

that, the proposed standards will target each and every class of seafarers. The tests for these standards will focus on all skills with less emphasis on grammar. All tests for Officer and Senior Officer Levels are expected to have different weights on different skills at Elementary, Intermediate and Advanced levels and different proficiency requirements at different ranks or for different duties. For example, a Chief Engineer should be competent on comprehension (specially reading) and writing but a more moderate level of speaking may be tolerated (Ulkuatam and Sernikli, 2008).

Setting aside the positive tangible outcomes of the proposed standards there are a number of intangible benefits, for instance, industry will be able to use the standards to assess the level of Maritime English of its personnel and that individuals are able to self-assess themselves and if need be to use the self-learning platform being developed. The impact of the project is expected to be substantial as it responds to a European and international acknowledged problem.

Birth of MarTEL

Recent report by the UK's Maritime Coastguard Agency (MCA) to IMO MSC 2006 identifies English language competency of seafarers as one of the major problems which has contributed to many accidents and incidents at sea. Although, the number of accidents is decreasing, accidents due to human errors have increased (see Figures 1 and 2) and in fact the trend indicates an increase in the number of accidents due to human error. Some of these problems are due to language communication problems among the crew, often leading to actions responsible for incidents and accidents (Ziarati, 2006).

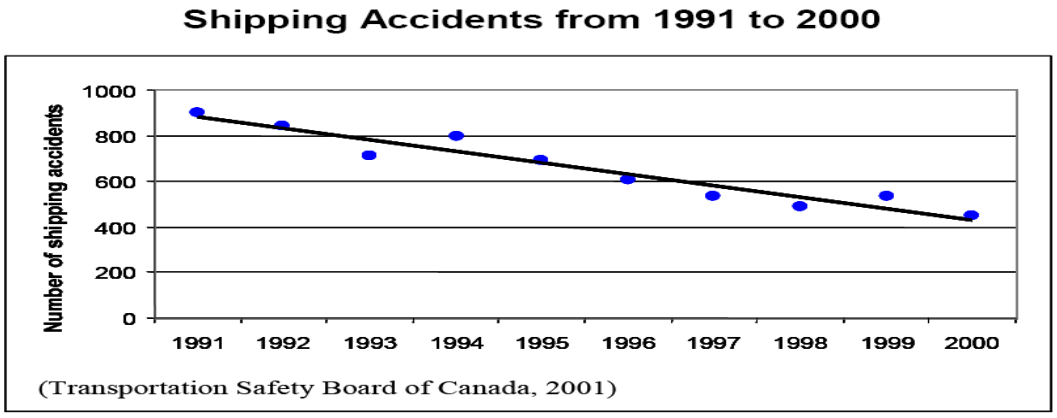

Figure 1. Source: ABS Project (2004)

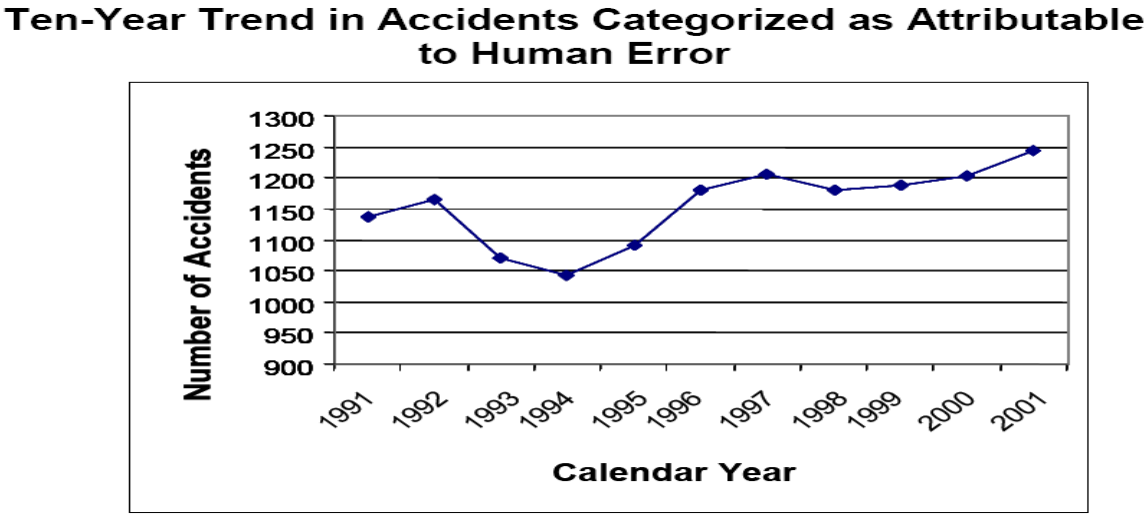

Figure 2. Source: ABS Project (2004)

Many shipping companies or ship owners do not accept responsibility after an accident or incident if language issues are high-lighted. The reasons are generally obvious; however, this paper makes an attempt to discuss the reason for such behaviour to search for real cause/reason for accidents and incidents when language competency or linguistic problems are identified as the main or a contributory factor.

MarTEL project (2007-09) makes an attempt to overcome the problem of not having international or European standards for Maritime English. As stated earlier, the project is an attempt to establish a set of standards by transfer of innovation from existing English language standards and maritime English model courses such as International Maritime Organisation's (IMO) SMCP (Standard Maritime Communication Phrases, 2001). Review of the arguments from the recent IMO meetings (IMO MSC, 2006) considering MSC 82/15/2 and MSC 82/15/3 had identified that 'there is a compelling need to promote a high level of working maritime English language skills'. Several EU member states have invited STW sub-committee to consider how the requirements in the STCW-Code can be strengthened in this connection. It was noted that deficiencies in maritime English causes accidents and therefore needs to be seriously taught in the basic and the main training of all Chapters of the STCW Code of practice. It is interesting to note that both of the above issues were also the findings of an IMarEST paper and report (Ziarati, 2006; Ziarati and Ziarati, 2007).

MarTEL therefore is a maritime language competency assessment project for the language certification with the main aim of developing a series of maritime English language standards incorporating also the IMO's SMCP, at three different levels: i) Elementary, Intermediate and Upper ıntermediate, ii) Officer- Deck and Engineering, and iii) Senior Officers – Deck and Engineering, also senior officers at port and pilots. The tests will be piloted in at least two partner countries (Turkey and the UK). The other partner countries such as Finland, Norway and Poland, with experience in developing and testing of maritime English, will be encouraged to pilot the tests in their own institutions (Ziarati et al, 2008).

Safety at Sea and Ports - Review of Accidents and Incidents

A number of studies conducted by various maritime organizations reported that more than 75 % of accidents at sea worldwide are due to human and organisational errors (IMO, 1994). However, it was noted that the analysis of these reports is very difficult task as maritime accident reporting forms and practices are not standardised worldwide (European Commission, 2001). Lack of an standardised accident report system while raised some 8 Years year has not been addressed. There are also no clear boundaries between accidents and incidents (Ziarati, 2003).

The human failure can be due to several types of error but primarily can be subdivided into mistakes or slips on the one hand, and personal and organisational on the other.

There is substantial evidence to show that humans are most likely to make errors when they are fatigued or under stress. (Grabowski et al,1996). The fatigue or stress could be due to personal reasons or due to organisational culture. Whatever the cause, it is important to identify and classify it so that causes could be studied and properly addressed.

Grabowski et al (1996) suggests that more often, human error is embedded in organizational and 'societal' processes that ultimately result in error. Spafford (2006) states that the following can all cause the level of human error in organizations to increase and thus put the attainment of goals and objectives at risk such as: Increased Complexity, Operating Under Tight Deadlines, Human Fatigue, Task Switching, Insufficient Planning, Insufficient Testing, Lack of Change Management, Development on Production Systems, Functional Silos, Inability to Criticize, Lack of Communication, Lack of Documentation, Lack of Standards, Lack of Shared Objectives, Lack of Training, Lack of Understanding Causality, Lack of Control and Process, and Knowledge.

He suggests that organisations must take a careful look at their culture and processes to understand and subsequently manage the level of human error being introduced. He argues that "if we want to help safeguard the organization and its goals, then it is essential to understand what causes human error levels to increase and correspondingly, what can be done to reduce those levels".
In the article published by the Parliamentary Office of Science and Technology (POST), (2001), the concept of Safety Culture is regarded as an important issue adding that the management of the organization must also take responsibility for decisions which affect the safe functioning of the organization as a whole (Health and Safety Executive, 1999).

In a report (McCafferty - USCG, 2005) it is stated that:

- 45% of shipping accidents are *primarily* due to human error (i.e., humans initiated the chain of events leading to an accident).
- 35% of accidents are initiated by events or situations other than human error, but where humans failed to adequately respond to threats.
- 20% of accidents are due to external events or conditions, or mechanical failures that were appropriately attended to by the crew.

The above classification is rather implicit. For instance, it is interesting to note USCG sees human errors as *primarily* as those initiated by humans leading to accidents. Also, when humans fail to adequately respond to a threat this is not classified as a human error. Somehow, USCG ignores other factors such as design failures. In a paper by Ziarati (2006), the causes of error are identified as follows:

- incorrect use of navigational equipment
- competence (or lack of it) in English Language
- misinterpretation of maritime rules and regulations
- organizational factors – lack of training, disregard of factors such as manning levels, etc. which could lead to tiredness and hence lead to mistakes
- cultural factors
- linguistics

A review of accident/incident reports from some main investigation bodies, established to investigate accidents and incidents, clearly shows that it is not always easy to see the underlying reason for accidents and often these accidents and incidents are not very well classified (IMO MSC 2006).
James Reason (1990), explains that that there are three basic error types, viz., skill-based slips (and lapses), rule based mistakes and knowledge-based mistakes.
Skill-based failures are usually the result of inattention (monitoring); rule-based failures are the result of either the application of bad-rules or the misapplication of good-rules; and, knowledge-based failures are the result of the rational mind (reasoning), or incomplete or inaccurate information. The definition of skill-based failures is not clear. Skill-based failures are often associated with lack of skill, either resulted from the deficiencies in the initial training or absence of skills updating (SOS, 2005-07 – Ziarati, 2005)
There are other issues which need to be taken into consideration. The first one is that no ship is similar to another – unless it is a mass production- and there are no standards in terms of design - placement of equipments and rooms, and so forth - and this may cause several problems concerning safety since it is a habit for the crew to often change the ship they are working due to many issues viz., financial and residential issues. To this end, the new crew on board always need a period of adjustment to become familiar with the equipment and the layout of the new ship. But what if there is an emergency situation before this new seafarer gets used to the ship and if s/he has the key role in matters concerning the safety issues!

Causal Factors of Shipping Accidents per Review ATSB Accident Reports

Causal Factor	Count
Task omission	16
Situation assessment and awareness	15
Knowledge, skills, and abilities	13
Mechanical / material failure	6
Risk tolerance	5
Bridge resource management	5
Procedures	5
Watch handoff	5
Lookout failures	5
Unknown cause	5
Communications	4
Weather	4
Navigation vigilance	3
Complacency	3
Fatigue	3
Maintenance related human error	3
Business management	3
Commission	2
Manning	2
Uncharted hazard to navigation	1
Substance abuse	1
Total	109

The above table was extracted from ATSB. There are similar tables produced by TSB, MAIB, and MINMod. The reason for showing the table is that causal factors due to communications have been reported in only 4 cases. A careful study of the reports clearly shows that in many cases the cause is actually due to language and communication problems. Most companies do not admit to self-criminating failures particularly taking responsibility for lack of competence in English Language when this has led to accidents. Ziarati (2009) gives an account of several accidents due to communication failures. References to these accidents will be made when the paper is presented at the Congress.

In large-scale disasters, the 'often-cited' cause of human error is usually taken to be synonymous with 'operator error' but a measure of responsibility often lies with system designers (Parliamentary Office of Science and Technology (POST), 2001). It is also reported that 'system design' should be considered carefully since a good system should not allow people to make mistakes easily. The report also adds that commonly, system design is carried out in the *absence of feedback* from its potential users which increases the chance that the users will not be able to interact correctly with the system. System design here should not be divorced from Maritime language system. In fact the IMO SMCP is in a form of system design, albeit in need of further improvements which projects such as MarTEL are attempting to address.

Among all the above factors that have crucial impact on safety issues, the one regarding 'high level of working language' forms the main concern of this research as poor communication is considered to be one of the main causes for maritime accidents. It is pertinent to note that only in few publications communication failures or linguistic problems were classified at all or even if they were, they were not one of the main causes of the accidents.

The shortage of deck and marine engineer officers, in water transportation sector (Urkmez, 2005, Warwick Report - BIMCO/ISF, 2005), for example, is an undeniable fact and all concerned are aware that one way of overcoming this shortage is to recruit seafarers from other nationalities. Unfortunately when trying to solve the shortage problem by recruiting seafarers from other nationalities, ship owners and shipping companies often overlook the training issues, viz., that seafarers from different nationalities have received often different standard

of training, particularly as far as Maritime English is concerned and also these seafarers bring with them cultural attributes that are unique to their origins which brings another dimension to the use and interpretation of the 'Maritime Language' onboard the vessels.

Ziarati (2005) applied Pareto Analysis in finding solutions to the problem areas in education and training of seafarers. Pareto Analysis is based on the proven principle that %20 of sources cause %80 percent of the problems. And a very important fact is that the shipping industry could benefit immensely in that Pareto prevents shifting the problem where the solution removes some of the causes, but worsen others.

Ziarati (2005) in his paper Pareto Analysis, draws the attention that IMO's priority in recent years has been to revise the crew standards – STCW but he argues that IMO cannot work alone therefore governments and related industries should show the same determination. He supports this argument through two studies, one by Torkel and the other one by the University of Technology and Science (NTNU[6]) in Norway. Torkel reports that 25% of the world fleet was responsible for more that 50% of shipping accidents around the world. The study notes that the top 25% of the safest ships were involved in just 7% of all accidents; and NTNU reports that by improving the quality of the world fleet to the same level as those in the safest 25% category, there might be an overall reduction of 72% in shipping accidents.

In a report by POST(2001) it is noted that human beings will always make mistakes because they have 'limitations'; limitations in their attention, perception, memory, logical reasoning and so forth. It is suggested that a good system that is designed through the 'feedback' from its potential users will help people to make less mistakes. Therefore, in developing standards for Maritime English, it crucial to realise that communication failures do not just concern failures purely relating to competence in use of English language, but lapse of memory, perception and so forth, are part and parcel of it. In many accident reports it was found that due to lack of a uniform formatting system (standardisation) and lack of meaningful classification of causes of accidents and incidents, many causes relating to communications failures are attributed to other causes.

In the same report by POST, it is stated that standardisation is sometimes used as an attempt to make the situation 'predictable' and it is suggested, for example, that medicine profession is one of the areas most amenable to standardisation. It continues that resuscitation units in accident and emergency hospitals vary considerably in their design and operation and adds that this diversity coupled with the movement of staff between hospitals, mean that errors can be made and delays occur. It is concluded that if all hospital equipment had standard placement and design, then all staff would be able to locate and operate equipment with ease. But immediately after this statement, the attention is drawn to how costly it would be to re-implement standardisation across all departments of an industry. This fact can be regarded as a limitation in approaches to reducing human error in general and communication failures in particular. In medical practice, the standardisation of medical terms and these terms' applications plays a major role in reducing communications errors to minimum.

In shipping SMCP has also served same purpose, however, SMCP only covers issues about 'safety', but not the issues that have 'impact on safety'. There are no training methods to overcome pronunciation, reflect of cultural differences on the Maritime Language, organizational issues, comprehension and application of common terms and terminologies, and so forth. Therefore SMCP is in need of a major overhaul if a similar practice to the implemented in medical profession is to be applied in shipping operations. A reference to the INTERCO International code of Signals and the IMO SMCP Codes clearly shows there are two 'number pronunciation' systems used worldwide and this in itself is a cause for concern.
As mentioned earlier, there may be other types of communication problems that may not conveniently fit into communication failure categorty, namely, cultural, social, etc. For instance, Chinese seek perfection (Jin Yongxing,????). Jin Yongxing states that for a particular nation, some common characters can still be identified and categorized as "Typical Characters". For instance, he talks about Chineese nation's 'pursuit of perfectness'. He supports this observation with the outcome of a survey conducted domestically to investigate the expectation

of the parents of the students in middle and primary schools that helps to show the tendency of most Chinese in seeking 'perfectness'. With the question "What are your expectation from your child ?" The survey indicates 71.3% of the parents answered "they should do everything as perfect as possible" and 9.67% of them said "they should do everything better and better." That is to say, over 80% of the parents expected very high standards from their children. He continues and relates this outcome to Chinese communication problems in Maritime industry and suggests that during communication with others, efficiency would be reduced to some degree undoubtedly since Chinese seafarers are likely to pursuit 'perfectness' hence taking their time to think and organize good sentences as well as they may put themselves under pressure in making correct and prefect expressions.
One further issue is that in medical profession and indeed in airline industry assessment of knowledge, skills and understanding is based on criterion referencing. That is to say, all outcomes of a given unit of study, or training, needs to be developed, assessed and passed. The final assessment is fully competence based. This is not currently the mode of practice in most Maritime education institutions.

Conclusions

It is common sense that a great deal has and can be learnt from accidents and incidents. In fact all major maritime rules and conventions have emanated from major accidents at sea and in ports. The problem seems to be that different accident authorities use different formats to investigate and report accidents. For obvious reasons the owners also do their utmost not to shoulder any responsibilities for any accidents that may be used against them no matter what. Review of accident reports and technical papers clearly elucidates that there is no unified format for classifying the causes of accidents that could sensibly be used to classify communication failures and those that do, some do not consider the communication errors to be the main cause of many accidents or incidents.

However, the review of many accidents to date clearly shows that communication failures to be one of the main or contributory causes of accidents, and more importantly they can be avoided if those involved with developing and delivery English language training for merchant navy cadets and officers learn from the identified causes and support the development and implementation of standards such as those being developed by project such as MarTEL. Thus, MarTEL should be considered a positive development and a valuable contribution in improving safety at sea. Improved competence in English language would also help in improving communication among the crew and with others as well as creating a more amenable environment on board of vessels at sea.

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