

The ISM Code versus the STCW Convention

MET efforts – challenges convene?

In memory of the first Rector and the founder of WMU, Sölve Arvedson

Jan Horck
Lecturer
World Maritime University (WMU)
Box 500, 201 24 Malmö, Sweden
jh@wmu.se

Abstract

The ISM Code and the STCW 95 Convention can without doubt be considered some of the most important IMO instruments that in their content contributes to “safe, secure and efficient shipping on clean oceans“.

The two instruments are fundamental in the sense that they have a perceptible link to quality assurance (QA). Maritime Administrations (Mar.Ad.), other shipping departments, maritime education and training (MET) institutions, shipping companies and ports etc. ascertain public assurance of efficient and safe ship-operation by opening their doors allowing an external audit.

Apparently, it has been realized that national administrations are given less room for individual interpretations on vital issues in IMO instruments. This is an important step towards harmonization of standards and commercial activities within shipping. With an operational guarantee, e.g. an *international* QA award, the question remains if the ISM Code is an instrument that has got its deserved backup from relevant training of those made to use the Code. Indirectly, the port state control function is made to assure that the MET institutions do their job i.e. that the end-products from the MET institutions know how to use knowledge and show professional skills; a ship seaworthy and safely manned.

Today, it is time to ask oneself if the STCW 95 really pass on relevant and needed knowledge and skill to seafarers and assure the shipowners (hereinafter owner) that the ship not will be detained due to their employee’s substandard education. What subjects in the curricula should be, or has been, rewritten in order to make the ISM Code a real success and useful to the industry? Is it proven that ship *casualties* are reduced with the introduction of the ISM Code? Have ship *detentions* been reduced because of improved knowledge and skills among ratings and officers? Do cargo arrive intact and on time?

This paper is aiming at vital safety issues that still are not adequately addressed in the STCW 95 but important in order to make the ISM Code successful.

The industry is expecting a dialogue with MET, and also that MET not only follows the easiest flow of the stream by no more than fulfilling required minimum knowledge and skills demanded by the lawmakers. Hence, the MET is required to play a more proactive role in the shaping of maritime education.

The views expressed in this paper are those of the author only and do not represent in anyway that of World Maritime University (WMU).

1. Introduction

Five years have passed since the application of the ISM Code for cargo ships > 500 grt. The Revised STCW 74 (STCW 95) entered into force ten years ago. These two IMO instruments play an extremely important role in modern shipping. With ships being ISM certified there should be a well wished safety culture implemented among all seafarers and all owners. With STCW 95 a pragmatic worldwide harmonised MET programme should be achieved. Are these statements reasonable? Is this even a possible accomplishment? Did the industry with IMO and other organisations make shipping what it ought to be with the ISM Code and STCW 95?

In more than 2000 years the industry has tried to make the consignees happy. In just about 60 years, since IMO/IMCO started, the industry has improved ship standards, crew conditions and minimized illegal discharges, groundings and collisions etc. Has the industry come closer to the goal post adding the STCW 95 and the ISM Code? The question is forwarded bearing in mind that all these efforts ultimately should lead to a happy consignee.

This paper will not give a full answer to these questions but merely identify what the MET has to do to help the ISM Code to be the tool needed for “quality shipping”. “Quality shipping” is in itself a disputable expression. The word quality has become a buzzword. Why not just express a wish to have a successful transport effort i.e. cargo arrived on time (JIT) and intact; a happy consignee and consignor, with GOOD shipping. Good is a well known word. The owners still have a lot to do to be able to say to their customers: *Trust me*. This homework is serious. The reason for me saying this is that as long as we agree that there is no process better than training and teaching to change and strengthen the human beings regarding motivation, dedication, attitude, knowledge and skill etc. we simply have to dedicate ourselves to teaching and training. Everybody should be trained, not only the middle management but also the top managers. If training is properly done it will be an eye opener to better safety standards; less pollution, less accidents and incidents, happier crew and cargo being transported in style.

The crucial question is: Do the STCW teach and train becoming Masters, officers and ratings to be able to perform according to ISM Code requirements?

Both the STCW and the ISM have guidelines that are patterned after the ISO 9000 series. The major difference between the ISM Code and the ISO 9000 series is that the ISM Code describes more specific requirements applicable to only owners and ships. The STCW has an emphasising regulation on QA; Reg.8.

2. What is required in the ISM Code that requires STCW action?

With the implementation of the ISM Code follows an extensive change in safety management and QA. What is all this about?

The Code has an objective to provide for safe practises in ship operation and continuously improve safety management skills. A number of functional requirements can be identified in the Safety Management System (SMS). Two of them are: 1) procedures for reporting accidents and 2) procedures for reporting to emergencies. These two functions represent two very important elements to improve safety. Logically, with the fast technical development of today each individual has to have a continuous training programme in the agenda. To have a safe ship it requires an understanding of: 1) proper maintenance and 2) regular supervision or inspections. The two functions represent an additional two issues that very much concern the owners and that give the MET and additional responsibility.

To be able to move cargo it arriving intact and on time to the unloading port normally requires very good knowledge in:

- 1) Loading and unloading procedures
- 2) Lashing of cargo to the ship and lashing of cargo in containers
- 3) Ship's stability
- 4) Cargo care during the voyage
- 5) Properties and behaviour of different cargoes.

Above represents subjects that describe the essence of being in shipping. If these issues are not understood those who are set to master these issues should be seen as a big disgrace to the industry. The P&I Clubs can tell how much they pay in compensation for cargo damages; the amounts are enormous. For many years about 30% of all compensations are due to cargo being badly treated in ports and during transport. This is understood, if not directly then indirectly in the ISM Code, to be far from good. Knowledge in cargo care gives benefits to the consignees, the owners' reputation and profoundly to safety and pollution prevention.

Risk identification has become a must in order to professionally master a ship and look after its cargo. The risk is evident i.e. to learn to recognise risk and prepare for emergencies and exercise good safety management skills are very important in modern shipping.

The SMS contains instructions and procedures to ensure safety and environment protection. To instruct is a MET concern. Are such instructions really part of the curricula of today's worldwide MET?

It is now six years since de Bievre (BIMCO News, 2001) reported, after the meeting of the International Maritime Universities (IAMU) in Kobe, that the MET institutes often are said to be too remote for the real world. It is 27 years since the first Rector of WMU, Sölve Arvedson¹, at an international STCW meeting in Malmö November 1980, spoke about the need of bridging the gap between the ships and the MET institutions. Still in 2007 these appeals are relevant.

The ISM Code, §3.3, demand resources and support to enable the designated person (DP) to do the job he/she is assigned to. Training is needed for the DP to optimise resources available and to be able to manage the SMS. §6.3, §6.4 and §6.5 require familiarisation, understanding and training; a direct link to MET activities and obligations.

Many of above §'s and other §'s are controlled electronically. Not to be computer illiterate continuous education and training is needed to maintain skills in the operation of computer hardware and software.

These two regulatory cornerstones are IMO's drive to focus on the human element because at the end of the day these activities very much are reliant on people. The ISM Code should offer a pathway to genuine uniformity of operating practices and place more emphasis on training. All IMO instruments should have a section on how users of the instruments (codes, conventions, regulations etc.) can be educated in the respective instrument. The format for such education could be a wider use of IMO Modelcourses. The IMDG Code has an appeal to training of people involved in handling dangerous goods; § 1.3. The industry needs more of this type of training suggestions in concurrent IMO instruments.

¹ It was during this STCW meeting that the Secretary General of IMO Mr C.P. Srivastava asked the delegates if they wished to have an institution where the IMO instruments better could be promulgated to increase safety at sea and pollution prevention. A voting resulted in an omnibus support which later became WMU. Sölve Arvedson passed away late December 2006; remembered in a world forgetting.

2. What do MET institutions and governments to create a maritime safety culture?

What MET can do is to create a safety culture and change seafarers' attitude to be "quality" minded and take care of cargo and property in the interest of ship- and cargo owners. Implant a teamwork spirit where everybody onboard should realise that they are in the same boat with the same objective – i.e. to have a happy consignee. MET institutions will not be able to survive with an ivory tower mentality; neither to be dogmatic but to be pragmatic and proactive.

If MET do not change attitude it might loose the public funding that they today are very dependent on. The MET rescue might come when shipping companies start to realise that an investment in seafarers' training becomes an urgent issue because of the ISM Code. With this realisation might follow an industry own operated MET where the MarAds merely have a supervisory role not taking an active role in what happens between the four walls of the classroom. Taking the speculation a bit further perhaps in the future ships will sail in international trade without a nationality; without carrying a national flag. Though, the but might be some juristically inconveniences in the open sea.

To get some evidence if crew has improved in knowledge and skills, since the introduction of the ISM Code, one could study the PSC annual reports from the different MOU areas. Assuming that the MOU deficiency categories "SOLAS related operational deficiencies" and "ISM deficiencies" can represent crew quality the following can be noted limiting the study to the Paris MOU:

SOLAS related operational deficiencies

2002 report: from 2000 - 2002 a steady increase (20%)

2005 report: from 2002 - 2005 steadily increased (24%).

The table below shows the ratio of deficiencies to inspections x 100

Year	Ratio of deficiencies to inspections x 100					
	2000	2001	2002	2003	2004	2005
SOLAS related operational deficiencies	6,20	6,80	6,85	14,11	11,62	9,85
ISM related deficiencies	5,00	6,60	16,24	17,43	13,75	13,80

With intervals the different secretariats have campaigns on certain controls; could be misleading.

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Because of lack of confidence in standards of competency it prompts owners to develop their own standards. Teekay and NYK (both tanker operators) have established their own competency levels certified by DNV. If this continues where will the link be between STCW and ISM?

In 2007, what knowledge and skills do seafarers really need to have to match the ISM Code? In order to match the ISM the STCW should seriously consider and pay attention to below subjects (a-g):

a) Computer literacy

One concern is the understanding of computers. The reason for additional knowledge is "seafarers work in a more isolated environment where resources are limited and communication is costly" (Patriko, 2001). IT training should be emphasised in the curricula. With the ISM Code comes higher responsibility where computer literacy is necessary. Computer systems are used to manage the SMS system. With the need and demand of "quality assurance" come the requirements to keep operational and managerial records in order to be able to verify that you do what you say that you do. Auditors need to see these verifications in order to revalidate a given QA award. The inability to effectively use computer-based applications will contribute to commercial losses. It should therefore be in owners' interest to assure that the crew has

knowledge in information technology (IT) and electronic data exchange (EDI). With the fast development of EDI/IT in shipping retraining programmes are needed. Retraining could be done at a MET institute or, with some doubt, onboard ships. Certainly it would be an additional welcomed work for MET. The income should be used to upgrade MET equipment and to give participating MET teachers an added income or incentive to an already low MET salary.

IT may not be written into the STCW but it is there in practice. If it is the MET's role and government's role to support owners and seafarers then training should be delivered. A more extensive training, than normally given today, should be cared for.

A growing problem onboard is the increase of e-mails arriving to the ships computer. Masters need to be trained on how to select what is important in a world exaggerating dissemination. In practice it is shown that the Master does not need all information sent to the ship. Instead of looking after his SMS, time is spent on reading inappropriate e-mails. Dragging it to its extreme such flow of information hampers the safety onboard. We have an e-mail paradox that needs to be tackled before the industry will encounter e-mail accidents.

Give, in particular the officers, additional theoretical knowledge in functions of the computer because it will assist the OOW in solving various problems in cargo handling, navigation and ships manoeuvring etc. Give elderly officers the same training because they might be reluctant to seek advice from a junior officer or a person from another culture than himself in operating/understanding the computer. The complexity in electronic based equipment should be understood not to be an easy understanding.

b) Duties of Designated Persons (DP) and Auditors

The MET should be proactive and more contribute in the training of auditors and DP duties. Even if it is not prescribed but indirectly a necessity in the ISM all graduates from a MET institution should have a genuine education in how to meet an audit team. Seafarers need to be trained on how to answer interviews and how to support the audit-team. Auditing in the maritime industry is a "new" activity that requires special training. It should not be the Class Societies training program training its own auditors. It should, in the name of harmonization, be the training program set by the International Register of Certified Auditors (IRCA). In the IRCA web-site it is a recommended route for training auditors. Class Societies should do surveys. Auditing is not surveying. The ISM philosophy is based on checking objectives against the company's documented procedures and nothing else.

In order to make the ISM Code more effective also flag state surveyors and port state inspectors should come to school. They should come to the MET institution to get *a teacher mind*. A successful implementation of flag state surveys and port state controls (PSC) requires the performers to be corrective and not have a dictatorial attitude to what is wrong and what is correct. The surveyor/inspector/officer should tell the ships crew what could be a better practice or procedure and then *kindly* have the crew to implement this. Explain the practical, safety, environmental, economical and last the regulatory requirements and other benefits of doing it as the crew just has been told. This is "quality" shipping! An oil major's vetting examination is different in the sense that it is a process that offers a clearance if the ship is accepted or not accepted to carry out a specific transport according to a shipper's requirement/standard.

c) Lecturers' standard

MET should urge owners to allow MET teachers with intervals to work onboard ships to stay license; i.e. to keep their officer of the watch (OOW) certificate. Normally, a typical teacher at a MET institution has seafaring experience. This typical teacher also has lost his licence because he/she has not been to sea with intervals as required to keep the licence valid. An efficient teacher needs to keep up to date with development in the industry. The best way to do this is to observe

and take active part in modern industry practises. An excellent example of such practise can be seen within Chinese MET. The EU CIPMET project showed a remarkable number of teachers still having a valid OOW license. This policy should be introduced and be a worldwide MET teacher requirement. It is far from the situation in EU MET. Teachers: Sign on! Owners: open navigation-bridges and engine-rooms for teachers and you will get value for your training budget and less worries to risk your ships to be detained because of crew substandard education.

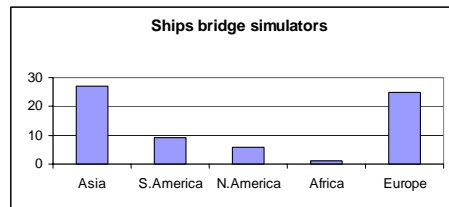
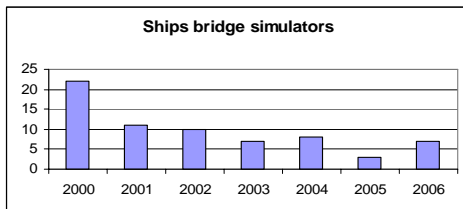
There is a need for a MET teacher's' competency standard (Horck, 2002). Knowledge and skills are passed on beyond conception making one wonder if the endproduct from the MET institutions worldwide possibly could be of the same standard. Train the trainer programmes are meant to have the implementation of the STCW 95 more harmonised. The WMU course MET aims to foster teachers to adapt a harmonised approach to teaching and training.

Consistency with verifications is a must in future safety and environment thinking in shipping and also in MET. Performance-related benchmarks would help to reach the quality we all wish. MET managers (rectors, presidents etc.) should hurry to obtain an ISO 9000 series recognition in order to assure themselves and owners that what is delivered in MET is up to standard.

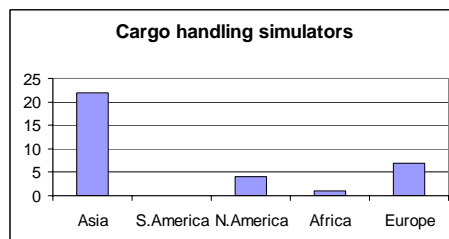
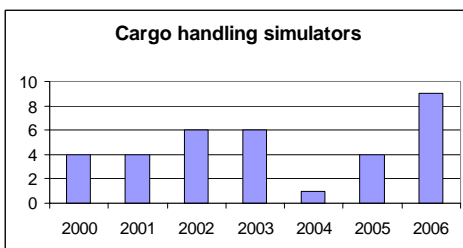
“MET key elements are students, programmes, facilities and teachers. Better programmes attract more and brighter students. Better equipment provides for more effective training/education. Better staff is a prerequisite for anything being good and becoming better. The staff must be better pedagogically educated and have special skills in simulator pedagogy and skills in using simulators for assessment” (Horck, 2001).

A study of the *Kongsberg's Ship Simulator References* no 1/07 looking into who have invested in simulators and when during the period 2000-2006 the following can be noted (Kongsberg has only been taken as an example to get a tendency on the issue). The study aims to see if MET has done training efforts after the implementation of the ISM Code.

When studying the purchase of Ship Handling Simulators, i.e. not upgrades and specialised simulators, the following is noted:



Asian purchased simulators are mainly done in 2006. In 2000 Asian MET institutions bought 45% of the simulators sold by Kongsberg. Asia and Europe dominate the market.



A study of cargo handling simulators shows that the number of purchased simulators in 2006 mainly comes from Asia (6/9). Every year, in the period, MET institutions in Asia have bought most cargo handling simulators. Asia clearly dominates the market.

If above figures can be considered significant for the total purchasing of ships bridge and cargo handling simulators in the world then Asian MET is very well equipped. Logically, this has a positive impact on the education as such.

If the simulator operating teachers understand simulator advantages it looks good for the future. It should guarantee improved safety? The willingness to change and adapt is apparently there. Lack of training equipment inhibits progress (Muirhead, 1998; Horck 2006).

The income from e.g. mandatory upgrading courses, short courses, professional development courses etc. should be used to upgrade and modernise existing education facilities. Ex MET students will not be puzzled at an ISM inspection they will be familiar with equipment already during their MET studies.

d) Training in the English language and communication in general

The training and also the assessment procedure for application of Standard Marine Communication Phrases must be taken seriously into the MET curricula. Without proper communication skills safety is on stake. Not enough words can underline the necessity for such competence among seafarers all categories.

Alert dedicated its issue no. 14, May 2007, completely on effective communication. With “Can shipping people communicate?” (Horck 2004) and “Communication skills are vital to safe ship operations” (Horck, 2005) and other similar articles in the maritime press, from many different authors, have alerted the industry on a challenge that has become a problem. Recent two accidents attest this statement. Communication constraints have been the major reason for the grounding of the Singapore flagged MS Crimpson Mars on 1 May 2007 (Communication problems ..., 2007) and the sinking of MS Queen of the North on 22 March 2006 (Dålig kommunikation..., 2007).

That the issue is a problem is clear from the *Tanker Management and Self-assessment, a best practise guide for ship operators* (TMSA). In Element 3 it is written “... ability to communicate in a common language ...” (OCIMF, 2004, p.12). The ISM inspectors should do better in checking this crew capability and STCW should not graduate a student not having good communication skills.

To safely evacuate a ship in distress is impossible “if no common means of communication has been established” (Short, 2006). MET has to assure better communication competency and ISM must better control communication skills. The requirement to control crews communication ability is expressed in the ISM Code §6.7.

3) What can the owners do to meet the ISM?

With the ISM Code the owners have been assigned additional responsibility. To burden them also to take care of the MET is absolutely absurd. The governments must also take their responsibility if they wish to have a maritime industry in the country.

Owners should, free of charge, assist in the classrooms and pass on the latest in the industry. It should be in the owners’ own interest because they are the one to use the MET endproduct. Owners should take a genuine interest in institution activities. Cooperate and be active in MET board meetings.

Return to use cargo ships that are servicing as a platform for schooling. The owners have to be more cooperative and allow students to do on-the-job training in a sandwich type of programme. The German owner Hapag Lloyd has recently taken up the old idea of having a cargo ship equipped with cabins for apprentices/cadets (German owner..., 2006; Horck, 2006). Other owners must do the same in order to get the crew that they can trust to handle their ships.

An alternative for countries that wish to have a strong merchant is to have a training ship dedicated to education. Sweden will have such a ship available for 15 students in the autumn 2007; MS Atlantic Cartier (Klart med..., 2007).

It is a company's management role to built up and support the safety attitude onboard. But it is not enough to tell, it also has to be *shown* by senior officers and officials. Sagen said it should be contagious like a disease (Know How, 2002). It then becomes the MET commitment to assure that graduants have this attitude and that officers set a good example onboard; cooperation.

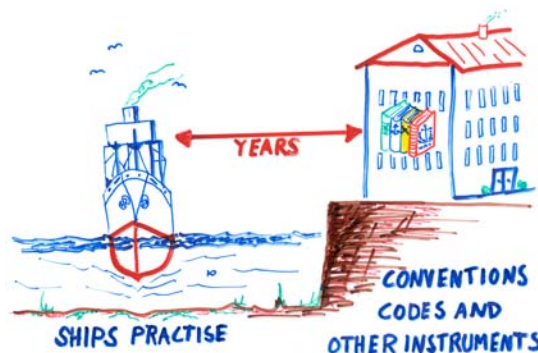
The owners should increase crew motivation, invest in human beings and realise that no machine can replace the human being. The bad image that the maritime industry has been marked with has to be washed away. A way to do this is to accept a recruitment of "an adequate number of ordinary unexceptional people" to serve onboard (Mottram, 2000). In addition strive for decentralizations and thereby give the crew an opportunity to run the ship on own best-cost consciousness and own high safety level. Let them show their ability to use their qualifications and experience. Not only the transportation revenue will increase and operational costs decrease but safety will be an every bodys' heartfelt concern.

4) To bridge the gaps

To link the gaps between ship and shore is being increasingly important. Not only for the ship's increasing demand for operational communication but also because of crew's need for social communication. The Swedish owner Wallenius Wilhelmsen has decided to install a broadband service based on the C-band VSAT Sealink System from Telenor Satellite services to meet this ambition (Swedes settle ..., 2007).

To "bridge the gaps" (Arvedson, 1980) means, not only between players ashore but foremost between ships and MET Institutions. Seafarers must get information faster. Not only rules and regulations but also findings from casualty investigations, P&I Clubs reports etc. must be passed on to the actors that wish to do their duties well. One has to be transparent so we can learn from each other. To "bridge the gaps" means to allow staff to be systematically updated not only through mandatory and supplementary courses but a general update on findings in the industry. It is the owner's responsibility to make room for refreshing and updating staff/crew (Horck, 2001).

Bridge the gap between ships and MET Institutions



Another bridge important to build is a closer link between the MET and the MarAd. If MET does not receive the IMO instruments the message will not be passed on to the seafarers; an ISM problem will follow.

5. What can be done in the future to harmonise the STCW and the ISM?

IMO has an ongoing review of the ISM Code and the STCW Convention where observations and awkward procedures will be taken into consideration.

Let us assume that the STCW 95 is clear in its objective to cover what the ISM Code requires. But what should be covered in future maritime training to be in step with today's quick evolution in the industry? Six years ago Mottram (2001) suggested the following improvements: 1) communication, 2) teamwork and 3) training systems. These topics are still relevant. I would like to add the importance of taking MET to a 4) better worldwide MET harmonisation and 5) introduce the subject *cultural sensitivity* into the curricula.

a) Training again

Knowledge and competence in e.g. marine pollution prevention should be introduced as a MET subject and perhaps later also becomes part of STCW requirements. A positive environment protection *attitude* should be intensified among all seafarers. This would not only be a step in widening the scope for MET students but also an introduction to safeguard the future of STCW 95. Mottram (ibid.) summarises from the EU MASSOP study that the shipping companies realise as a 2nd important factor in ship management to have more "staff training on familiarisation". This is not a surprise because additional responsibilities have been laid on owners to make sure everything is in compliance. The important question is if the owners should take care of this training on their own cost and with own sources rather than turn to MET professionals. To conduct familiarization training is an excellent opportunity for MET to shoulder. It would give the already low paid teachers an opportunity to earn a bit extra. Ship-targeted computer softwares are made and giving crew, in advance, a possibility to be familiarized with the ship they are going to sign on. In three dimensions it is possible to locate safety equipment and an interactive can check if the operator can handle it. The control of such training is a MET mission; no doubt.

Of course, training at the workplace is conceptualised by interactive e-communication or distance learning. It is a method that will make continuous professional development feasible in a very cost-effective way. In 2003 *Videotel* launched a training package for ship safety officers. The course includes an assessment element that also covers a subject like ISM Code responsibilities. It is a both practical and cost-effective alternative to produce a safety officer. Perhaps the days of the charismatic teacher have become less important? No, never! Since the *Videotel* programme was launched students in excess of 1500 have taken up the portfolio not including the number of seafarers that have followed the course from videos provided to the ships.

b) Cultural diversity and attitude

What MET has to do in order to make the ISM successful is to make the students realise that safety is a matter of teamwork. To be successful when practising teamwork it is paramount that the members can talk to each other in a language understood by all. In addition it is also essential that there are no cultural barriers for full understanding of messages and orders. Courses must be conducted to learn the students about the existence of such obstacles. Studies have been carried out on the pros and cons of mixed crews and concluded both negative and positive outcomes (Horck, 2000, 2005, 2006). In the future, lack of cultural awareness and the negative and afraid liking attitude to diversity perhaps will be a problem, if not already a problem, also in the owner's boardrooms, surveyors' inspectors' and controllers' contact with crew and within MET institutions. Workforce mobility has become fundamental in shipping. To manage, a company with many different cultures is complex. In addition seafarers usually cannot choose their fellow workers i.e. it will be more difficult to manage people onboard than ashore. Apparently, multicultural awareness training is required to be able to manage this challenge.

When onboard teamwork is practised a MET emphasis must be on subjects like behaviourism, fatigue and cultural understandings. Owners cannot afford to have delays and misunderstandings because crew do not understand each other. Failure of crew to follow correct procedures and to speak with a professional language is major factors for accidents. The MS Bow Mariner accident is a good example of this.

From now on, MET institutions must emphasise their efforts to change becoming seafarers mentality to safety. Teaching is to change people's behaviour and attitude to certain phenomena linked to the knowledge and skill they need according to mandatory and national MET requirements. Teachers, and of course Rectors, should not be afraid of doing so. Contrary, show what good seamanship is by your own good example and be proactive!

MET should foster students self-motivation to acquire knowledge and skill. To quote de Bievre: "... include professional work ethics, teamwork and leadership" (Lloyds List, 2001). All are subjects that in one way or another will have an impact on "quality shipping".

The Maritime and Coastguard Agency (MCA) recently issued a booklet named *Leading for Safety* (2006). The booklet has a heading "Be sensitive to different cultures" (ibid. p.18). The mere fact that the subject appears in it is an added argument to urgently introduce cultural awareness in the MET curricula (Horck, 2006). The content should not be a surface introduction but to go in depth.

Crew fatigue is many times referred to as the reason for casualties. We cannot teach people to work without rest. What owners, MarAds and perhaps IMO can do is to review manning levels and the ISM Code would be easier to comply with.

c) Technology

Training is without any doubt a proactive approach to safety. If looking to the future, changes will be necessary as ships are differently built and designed.

The question is if training is catching up with the change in technology. There are indications that high technology is a contributing factor to casualties. Crew get sort of hypnotised by all the "fancy" equipment onboard; gadgets. We also know that a little knowledge is dangerous. Therefore, training must embrace also abnormal situations. The ability of understanding equipment limitations and awareness of distraction factors must be more considered as important issues in future MET. It is imperative that an emphasis is placed on the man-machine interface. "In the years to come maritime development will require a blending of advanced computing of dynamic analysis of risk and reliability and of human capabilities and behaviour" (Gard News, 2002); a direct link to the ISM Code. After five years, any changes in MET? It appears that reactions are slow.

If nothing is done it will take safety to the back seat and the OOW will continue to be more focused on the instrumentation than looking out of the windows. For instance, if the overburden of understanding radar screen markers is not reduced the world will soon experience icon or sign accidents.

MET needs better safety-training facilities for crew's regular safety training and better update on the handling and maintenance of safety equipments carried onboard. It has been shown that there is less time during service to do update training. It is too hazardous to perform on a ship in service. An example of this is the launching and "home taking" of a free fall lifeboat. It is too a dangerous exercise to do onboard. Let MET do it.

To achieve good training is the financing of a *variety* of equipment needed at the MET institutions. Seafarers need to be trained on different eg. lifesaving equipments. Techniques on how to operate the different equipment need to be taught and taught again. Crew has difficulties to be familiar with operation manuals, company manuals and equipment manuals. The language

in these manuals should also be improved to better and faster understanding. Like in the QA manuals the language should be talkative to the reader, not cryptic and certainly not commanding. An improvement on these issues will reflect on a better ISM.

IMO should develop new mandatory training requirements because of all the new and more complicated equipment that is put on a modern ship. The officers of today might not be capable of carrying the burden of all the new technology. "Professionals in need of greater support" (de Bievre, 2001; Horck, 2001).

Use the human being and its brain instead of introducing a lot of gadgets to help/assist in handling a ship. The human should not be over exhibited with instrumentation. It is not that difficult to take a ship from A to B.

The following statement is still relevant and MET should pay attention to it:

"Safety is paramount. However, it is all too common to find that ships have been fitted either originally or as a retro-fit with equipment for which the seaman has not received any training whatsoever"
(Nautical Briefing, 2001)

Practical training is the only way to learn to react properly. People solve problems by knowledge, experience and behaviour. The experience should be obtained through realistic exercises. Real exercises (contrary to simulations) can be risky. Therefore, it is important that the instructors are properly trained to instruct in risky environments and with real equipment.

d) Cargo care

Statistics from the International Union of Marine Insurance (IUMI) show that 67 ships with gt > 500 were total losses in 2006. In 2000 the figure for total losses was 140. Good - a decrease. But there is a dramatic increase in serious partial losses which has risen by 200 % since 1998. Bad - an increase. One can blame the current boom in shipping but also a growing shortage of trained and experienced personnel (IUMI, 2007; Total losses , 2007).

Conclusion

To bridge the gap is still a very relevant issue in the shipping industry. Some caretaking MarAds and MET institutions have been bridging with success but a lot is still to be done. Sölve Arvedson was very foreseeing in his speech in 1980. The WMU academic programme is bridging gaps between shipping stakeholders and users of IMO instruments. WMU is also bridging cooperative relationships between people who have devoted themselves to shipping.

All training should be in everybody's interest. To have this important statement properly planted in everybody's mind the cure probably is to cry out loud that this is a matter of having the *attitude* for it and develop it in the companies' management culture.

From this paper one can see that several years ago many different writers have made their views known on the core issue of this paper. The hot discussion is if any of these foreseers have resulted in any changes, for example in decisions by MarAds and IMO in order to be ahead of developments in the industry. Readings from reputable maritime journals and other papers appear to indicate the opposite. Some issues are repeated year after year without result. If so, MET should be proactive and on own initiative educate to meet future needs of the industry. MET should not wait for the lawmakers to tell them what to do.

Other instruments contributing to safer shipping and cleaner oceans, like the ISM Code, should be thoroughly discussed in parallel with STCW subjects in order to have the latter properly implemented. STCW 95 is a complement to the ISM Code. Subsequently the STCW 95 is directly dependent on the capacity of the MET institutions to extend their

courses to industry requirements as well as students' requirements above the minimum requirements according to STCW 95. This statement cannot be emphasised enough. If governments adopted the IMO resolution A. (890(21) that sets out guidelines on *Principles of Safe Manning* as mandatory perhaps it would improve PSC statistics.

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According to the IMO “White List” in 2006 the world has 118 States, with MET institutions, that have communicated information demonstrating that they were giving “full and complete effect” to the relevant provisions of the Convention; in 2000 there were 71 States giving “full and complete effect” to the relevant provisions of the Convention. Conclusion: worldwide MET is improving but on the subjects relevant to the ISM?

The Paris MOU Annual Report 2000 on page 14 tells us that operational deficiencies (lack of knowledge and training) have increased since last year (1999) with 14%. “Vital safety areas, such as life saving appliances, fire fighting equipment, safety in general and navigation account for 55% of the total number of deficiencies (MOU, 2001). The same figure in 2006 is xxxxx%. Where is the improvements/change in knowledge and skills?

Table 1. MOU deficiencies 2000 and 2006 (Paris MOU)

Year	Lack of knowledge and skill; an increase since the year before (%)	Total number of deficiencies
2000	14	55% on fire fighting equipment, safety in general, navigation
2006		
Diff.		