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Assistant Commandant's Perspective

By **RADM Robert C. North**
Assistant Commandant For Marine Safety & Environmental Protection

The Qualifications of Mariners — A Report Card

On February 1, 1997, the 1995 amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW), became effective. Parties signatory to the Convention have five years from that date to change national standards and procedures so as to give full force and effect to the Convention. Much has already been done to implement these changes in our domestic scheme for issuing Merchant Mariner licenses and documents. However, much more remains to be accomplished. This issue of the *Proceedings* provides an update, a report card if you will, on the work completed and about initiatives in progress.

Two Coast Guard organizational elements are tasked with STCW implementation efforts. At Coast Guard Headquarters, the Office of Operating & Environmental Standards (G-MSO) leads Coast Guard's efforts to develop regulations and other standards necessary to implement the STCW. A separate command, the Coast Guard's National Maritime Center, develops operating procedures and policies used by Coast Guard field units to process mariners applying for STCW certification.

I must also acknowledge the invaluable work of the Merchant Vessel Personnel Advisory Committee (MERPAC). MERPAC, with recommendations based on the collective wisdom of its members and contributors, has been an invaluable resource for development of solutions that will enable us to fully implement the STCW. Of particular note, MERPAC members, with the assistance of other dedicated volunteers, have wrestled with thorny issues surrounding recommendations for performance measures and standards that will give us a benchmark for assessing the demonstration of practical skill.

Many challenges await us as we move forward to meet the February 1, 2002, deadline for full STCW implementation, not the least of which is public recognition and acceptance of a significant change in the methods by which a mariner is determined to be professionally qualified. To the former pre-requisites of sea service and a written examination have been added requirements for more formal training and assessment of a mariner's professional skills. This new system of determining a mariner's professional competence will significantly enhance safety at sea. Full international implementation will significantly reduce the percentage of casualties attributable to human error and protect mariners, vessels and the environment. The U.S. Coast Guard is committed to giving full and complete effect to STCW in the U.S. and ensuring that foreign vessels visiting the U.S. are in full compliance.

A handwritten signature in black ink, appearing to read "R. North".

**Admiral James M. Loy,
USCG Commandant**

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By the Way... Editor's Point of View

Information technology is vital to the progress and prosperity of the maritime industry and will become increasingly so as we sail into the new millennium. But while computers can sort through mountains of data and make quicker, more accurate calculations than people, there will always be a need for a mariner to plot a course, maintain a navigation or engineering watch, and handle unforeseen problems and emergencies. Even if some of these tasks eventually become automated, a mariner will still be needed to monitor the system and override it if need be.

Humans still maintain an advantage over computers in areas of judgment, handling new or rare occurrences, learning from experience, and evaluating the situation using highly developed sensory-motor-cognitive abilities. But humans are prone to making errors and mistakes, because to err is human. The goal, then, is to reduce errors to an acceptable level.

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers attempts to do this by ensuring mariners have the knowledge and training necessary to do the job. While STCW-95 could be the best thing since sliced bread, it will not work unless all mariners are convinced that it is in their best interest to embrace it. It is understandable why some hesitate to do so; STCW-78 and its shortcomings are still too fresh in their minds.

STCW-95 rectifies many of these shortcomings through greater reliability, in assessment of competence using measures that have greater degrees of validity, and selecting criteria that measure essential knowledge and skills.

Evaluating STCW Practical Demonstrations: What do I need?

By John Bobb, U.S. Coast Guard, National Maritime Center, Arlington, Va.

In a land far away, the monarch needed a haircut and a shave. Ordinarily, this was not a problem, but the royal barber had recently passed away. The King's ministers appointed a committee with extensive knowledge of barbering to select an appropriate replacement. The committee conducted interviews and questioned the applicants for the job.

They asked about the history of barbering, and about the techniques used by the great barbers of the past. They asked about the proper tools to use, and the hairstyles that would make the King most attractive. Based on the answers to their questions, they selected the King's new barber.

The next day, the King sat in the chair eagerly awaiting his haircut. With a great flourish and the first snip of the scissors, the barber cleanly cut the top of the King's ear off. The King was angrier than Dan Snyder after a Redskin loss. How could the barber do such a thing? The barber explained that it was his first time giving a haircut. We won't go into the unpleasantness experienced by the selection committee.

This outcome was predictable. The King's selection committee determined how much a prospective barber should know about barbering, but not whether he or she could cut hair. Knowing about a job and being able to do the job are two different things. If only the selection committee had observed the applicants cutting hair, the King and his selection committee would still have all their parts.



STCW Description and Purpose

The international maritime community closed a similar training gap with the passage of the 1995 amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW). The 1978 STCW was the first attempt by the international community to establish uniform international standards for the qualifications of merchant mariners. While notable, the original convention was too vague for an effective international program. It did not contain any clear standards of competence, oversight of international compliance, or authority for port states to enforce the provisions of the treaty. In 1993, the International Maritime Organization proposed a revision to the Convention to establish the highest practicable standards of competence for mariners to address and reduce human error as a major cause of marine casualties. By July 1995, a comprehensive and detailed revision was developed and adopted; it became effective on Feb. 1, 1997.

Practical Demonstrations of Proficiency

For the first time, the STCW Convention and Code establish training and certification requirements for seafarers. The training mandated by STCW is outcome based; it requires that candidates for licenses and ratings not only pass a written examination, but demonstrate the ability to perform the tasks for which they are certified. In short, applicants for STCW endorsements are expected to show that they are able to "do" what they were trained to do. This is a significant change from the traditional U.S. method of licensing officers and endorsing ratings.

Outcome-based education is no longer the province of industrial training alone; all types of educational institutions from elementary schools through graduate schools have embraced it. It is not surprising that the international maritime community is requiring demonstration of skills before a certificate of competence is issued.

From an assessment standpoint, educators have



wrestled with how to “grade” practical demonstrations of skill. Tables in the STCW Code provide general instructions on the methods and criteria for evaluating competence, but the terms of reference in these tables are not specific enough to permit assessments that are both valid and reliable, and conditions for the demonstration are not stated. The experience and skill of the assessors or designated examiners vary. Candidates perform tasks in slightly different ways, depending on how they were taught. In our maritime industry, evaluation of practical demonstrations of skill is not the usual and customary way we have determined competence.

All of these problems can be addressed by developing national assessment criteria to serve as guidelines for those conducting assessments of practical demonstrations. Fortunately, a body of work already exists on how to develop assessment criteria. It encompasses the process of determining what skills to teach, the best method to teach the skills, the amount of knowledge and understanding required to perform the skill, reinforcement of the skills by practice, how to assess the knowledge acquired, and whether the skill competence achieved form the keystones of instructional systems design (ISD).

The following five ISD steps will allow a training institution or assessor to develop assessments of performance objectives that are valid and reliable.

Instructional System Design (ISD)

The five steps of ISD are:

- determine the assessment objective;
- determine the assessment method;
- specify the assessment condition;
- develop the assessment measurers and standards; and,
- prepare the assessment package.

These five steps are sometimes expressed using

different terms but the process is the same. Another way to describe the same process is identify the performance objectives; determine the conditions under which the assessment will occur; determine the performance measures and standards; and prepare the assessment package.

What Makes an Assessment Valid and Reliable?

Validity and *reliability* are the goals of any testing, whether measuring the students ability to recall information, solve problems or demonstrate the performance of a required skill. To support a judgement of competence, a performance assessment should be a *reliable* and *valid* snapshot of what can be expected how a candidate will carry out his or her shipboard tasks. A “reliable” assessment is one whose consistency can be trusted; the same performance will receive the same assessment every time, whoever the candidate is, whoever the assessor is, and whichever is the institution. Although paper-and-pencil multiple-choice tests are noteworthy for their reliability, they do not represent a valid snapshot of how the student will actually perform his or her job aboard ship.

The nature of the skill and the method of demonstrating the competence will largely dictate the circumstances under which the assessment must occur.

An assessment is valid if it can be used to predict a seafarer’s ability to functionally carry out or perform a shipboard job or task. A “valid” assessment includes all the critical components of the function or duty that is required aboard the ship. In some cases, simulators offer sufficient realism by including the critical components of a task and can be used to assess the practical demonstration. The components are demonstrated under representative conditions to an agreed-upon standard.

The greatest validity is associated with shipboard experience; that is real shipboard tasks, using the ship's procedures, under operational conditions, to the satisfaction of a watchful, experienced officer. However, the reliability of this type of assessment cannot be trusted. The equipment and procedures may be different on different ships, the conditions presented by the transit conditions may be different, and the assessing officer may have different expectations. The challenge of performance-based assessment is to retain as much as possible of the validity of shipboard experience, while achieving as much as possible of the reliability of controlled testing.

Assessors or Designated Examiners

The STCW also obligates countries to ensure that designated examiners (assessors) are qualified, whether the assessment takes place aboard ship or ashore at a training institution. Regulation I/6 of STCW requires each Party to ensure that those responsible for the training and assessment of seafarers are appropriately qualified for the type and level of training or assessment involved.

Section A-I/6, Paragraph 6 of the STCW Code requires those persons conducting assessment of the competence of a seafarer to:

- have the appropriate level of knowledge and understanding of the competence to be assessed;
- be qualified in the task for which the assessment is being made;
- have received appropriate guidance in assessment methods and practice;
- have gained practical assessment experience; and,
- if conducting assessments involving the use of simulators, have gained practical assessment experience on the particular simulator under the supervision and to the satisfaction of an experienced assessor.

For example, if one is to assess a candidate's ability to navigate a vessel, the assessor (designated examiner) should be a competent navigator, in addition to having the guidance in assessment methods and practice and experience in conducting assessments.

Developing Assessment Criteria

As part of STCW implementation, schools must now, in addition to assessing the knowledge a candidate has acquired, also assess the candidate's ability to actually perform the tasks he or she will do aboard ship. Maritime training institutions and designated examiners are struggling to develop proper assessment criteria because of uncertainty about what is required and lack of experience

in writing performance objectives that include the conditions of the assessment, the performance expected and the standard against which the performance will be evaluated.

To solve the problem of lack of assessment criteria, the U.S. Coast Guard (USCG) has asked industry to participate in the development of the criteria through the Merchant Marine Personnel Advisory Committee (MERPAC). Qualified representatives of the industry can be invaluable in assisting the USCG to develop assessment criteria that meet STCW requirements but don't become too detailed or bureaucratic. MERPAC formed working groups to develop appropriate performance measures and standards.

MERPAC's work has largely been completed and will be reviewed by the USCG, put into a standard instructional system format, and published in the Federal Register for additional comments. When finalized, the criteria can be used by training institutions and assessors to evaluate practical demonstrations, or as a guide to develop their own assessment criteria. Schools and designated examiners are free to develop their own criteria as long as the criteria meets STCW and the twin tests of validity and reliability.

A Sample Assessment Criterion

Section A-II/4 of the STCW Code requires ratings forming part of a navigational watch to demonstrate their ability to respond appropriately to helm orders. It is the first competency listed in Table A-II/4. However, the table does not state which helm orders the candidate for rating should demonstrate.

A training institution or designated examiner has to determine which helm orders are required for a rating forming part of a navigational watch, and then the conditions under which the demonstration will occur are determined. If ratings are only required on vessels over 500 gross tons (International Tonnage Convention (ITC)), must the demonstration be performed on vessels of at least 500 gross tons? What equipment must be available during the demonstration?

Next, determine what behavior you expect to see as a correct response to the helm command. Finally, what standard must the candidate achieve to pass the assessment? How accurate must a calculation be? How fast must an answer be computed? For tasks that require several steps to accomplish, must all the steps be performed? Are some more important than others?

After answering the questions above, the draft performance objective might look like this:

TASK: On command, put the rudder at “Hard starboard”

On a vessel of at least 500 gross tons (ITC) or a full mission ship simulator equipped with a rudder angle indicator, when hearing the command given in English “hard starboard,” the student will repeat “hard starboard,” and will immediately turn the helm (or controller) to starboard until the rudder angle indicator shows the rudder to be at maximum starboard rudder; the student will then state “hard starboard” (or “she’s hard starboard”).

Knowledge, Understanding and Proficiency	Performance Condition	Performance Behavior	Performance Standard	Assessor/Date
Helm order Hard starboard	On a vessel of at least 500 gross tons (ITC), or a full mission ship simulator equipped with a rudder angle indicator, when hearing the command in English, “Hard starboard”,	the student will turn the helm to starboard until the rudder is at maximum starboard rudder.	<ol style="list-style-type: none"> 1. Repeats order 2. Immediately turns helm to starboard 3. Stops turning the helm when the rudder angle indicator reads the rudder is at maximum starboard rudder 4. States: the rudder is “hard starboard,” or “she’s hard starboard.” 	

As you can see, the assessment criteria can be expressed in a sentence or as a Table. A training institution or an assessor could use either as a guideline for evaluating a practical demonstration. The assessment criteria could be supplemented with a checklist to make sure that all required tasks have been accomplished correctly. Because only four actions are required in our example, a separate checklist is not necessary.

If the student fails the assessment, the designated examiner should review the demonstration indicating what the student needs to do improve his or her skill to achieve competence. After additional instruction and practice, the student can be assessed once again.

Conclusion

We have only scratched the surface about a complex subject; however, developing valid and reliable assessment criteria is an important and attainable goal. It has been standard practice in industrial training for a number of years. Its application to assess mariner training and skill is a sea change in how we train, test (assess) and license or certificate seafarers. The demonstration of the skills to perform the competencies listed in STCW will provide additional assurance that mariners are competent to perform their jobs.

Additional references for developing assessment criteria can be found in the following:

The International Maritime Organization’s (IMO) Maritime Safety Committee (MSC) Circular.853, *Guidance on Shipboard Assessments of Proficiency*
 IMO
 4 Albert Embankment
 London SE1 7SR
 United Kingdom

IMO Model Course No. 3.12, *Assessment, Examination and Certification of Seafarers*
 IMO
 4 Albert Embankment
 London SE1 7SR
 United Kingdom

Developing Mariner Assessments, a Practical Manual for Assessment Developers, March 12, 1999
 U.S.C.G. Research and Development Center (R&DC)
 1082 Shennecossett Road
 New London, CT 06340-6096
 This will be available on the Coast Guard R&DC website:
www.rdc.uscg.mil

Preparing Instructional Objectives, A Critical Tool in the Development of Effective Instruction,
 Robert F. Mager,
 The Center for Effective Performance, Inc.
 2300 Peachford Road, Suite 2000
 Atlanta, GA 30338



Developing Valid and Reliable Performance Assessments

It's time to

“Just Do It!”

By Al Kirchner, U.S. Coast Guard, National Maritime Center, Arlington, Va.

With the requirement of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (1995) (STCW) to assess individual demonstrations of mariner competence, the international maritime community suddenly found itself in a new business: performance assessment.

Though STCW might be new to the marine industry, performance assessment and the behavioral science surrounding it are far from new. Performance assessment is actually part of a larger body of knowledge, called Instructional Systems Design (ISD). In ISD, you begin by analyzing the full context of what the student must do, where he or she does it and why (the front-end analysis) and then, break this down into major tasks and component subtasks (task analysis).

A *performance standard* has

three components: the *behavior*, the *condition* and the *criterion*.

- Usually you start by using the tasks and subtasks from the job task analysis as the behaviors that will be assessed.
- Then, define the conditions under which the behavior must be performed.
- Finally, determine how well, or to what criterion, the behavior must be accomplished.

Normally, the *criterion* is expressed in terms of *measures* such as time, accuracy, quality, sequence, completeness, count, form, etc. An example of a performance criteria having three measures is “name all (degree of completeness) 50 states in alphabetical order (sequence) in three minutes (time).”

Lastly, *evaluation* is accomplished by comparing the performance measurement (score) with the criteria. An example would be a student who types 32 words per

minute (the measurement or score) when the criterion is “at least 45 words per minute” and is rated “unqualified” (the evaluation). *Grades* are the formal labels we give our evaluations. In this case, the student would receive a grade of “F,” “Fail,” “No-go,” or “Not qualified.”

“Nuts and Bolts”: Writing a Performance Standard

Behaviors are described in action words—what are people doing when demonstrating competence in this knowledge, understanding or proficiency, as STCW calls them (or, knowledge, skill or ability [KSA] as they are commonly called in the literature).

Directly observable behaviors, such as tying a knot, are called *overt behaviors*. Often we are asked to assess a behavior that is more complex, involving judgement, awareness or appreciation of a situation or outcome. These are

called *covert behaviors* and are not directly observable or measurable. Covert behaviors are assessed through an *indicating behavior*, something that is the outcome of the covert behavior. For instance, a person can understand the mathematical process of addition without doing any observable action or demonstrating any particular behavior. In asking the person being assessed to write or say the correct answer, you are using an indicating behavior that is overt as a means to verify the covert behavior, the understanding of addition.

Words used to describe a behavior should be action words that are as precise as possible.

“To have an appreciation for safety” is vague and open to much interpretation. It would be better to use behaviors such as, “will identify three unsafe conditions,” or “name five hazards normally encountered...”. Some examples of less precise and more precise words for describing behaviors are in the charts below:

Use this next chart as a job aid to help you describe

WORDS OPEN TO WIDER INTERPRETATION	WORDS OPEN TO NARROWER INTERPRETATION
To know	To identify
To understand	To calculate answer
To appreciate	To contrast
To grasp significance of	To construct
To believe	To compare

SAMPLES OF ACTION VERBS	
IF you want the candidate to:	THEN, write the objective with this type of action word:
Recognize objects, symbols and ideas	<ul style="list-style-type: none"> · Identify · Match · Label · Select
Recall information orally or in writing	<ul style="list-style-type: none"> · List · State · Define · Describe · Summarize
Apply principles, procedures, concepts, or formulas	<ul style="list-style-type: none"> · Calculate · Classify · Solve · Troubleshoot · Select · Convert · Compute · Apply · Demonstrate · Determine
Perform a manual skill	<ul style="list-style-type: none"> · Prepare · Repair · Troubleshoot · Tighten · Disassemble · Re-assemble

good, measurable behavior when you develop your first performance standards.

An illustrative example follows.

Fire Fighting Skills Assessment

Competency area from STCW Table A-VI/1-2, “Fight and extinguish fires.”

Among the tasks in fire fighting is the ability to use a self-contained breathing apparatus (SCBA). Two sub-tasks involved with being able to use a self-contained breathing apparatus are “donning the SCBA” and “breathing air in the normal operating mode.” If these are valid and critical components of a fire fighting skill, they should be assessed. The behaviors would be: “donning the SCBA” and “breathing air from the SCBA in the normal operating mode.”

Next, we have to stop and think about the conditions under which this SCBA must be donned (sub-task 1) and operated (sub-task 2). Generally, the SCBA is donned either at a fire locker or possibly at a staging area, which may be poorly lit. The SCBA is used (operated) in environments that have limited visibility. You do some research on the lighting issue and decide sub-task 1 is, more often than not, done with adequate lighting and that reduced lighting should not be a “condition” for sub-task 1, but probably should be for sub-task 2. You know the user usually is wearing a fire coat when donning and operating the SCBA. Factors such as bulkiness, stiffness of the coat sleeves and weight of the coat affect the speed and dexterity in which the SCBA is donned. You decide this is not minor enough to ignore. Therefore, a “condition” for both sub-task 1 and 2 is “wearing a fire coat.”

Next, the air supply must be turned on and the face mask connected just before entry into the fire space – sometimes this is done with bulky fire fighter’s gloves on. While fighting the fire, it may also be necessary to manipulate a SCBA valve or control, or to switch from normal to emergency by-pass operation in the event of a problem with the regulator. This would be done in a smoky, dark and hot environment. “Smoky” suggests limited or no visibility as does “a dark environment.” These are compelling requirements and you decide “in total darkness” is definitely a valid condition for sub-task 2.

The “hot environment” is a little more tricky. A “hot environment” by itself probably does not directly affect one’s ability to operate and manipulate the SCBA. However, a “hot environment” suggests the need for protection. For the fire fighter, protection is the fire fighting ensemble—helmet, coat, pants, boots, and gloves. Again, gloves are bulky and can seriously impair a fire fighter’s dexterity; operating the SCBA air supply valve requires some degree of dexterity. Because of this, you conclude

that another condition for sub-task 2 should be, “while wearing fire fighter’s gloves.” You note though that gloves are not usually worn during the donning of the SCBA, sub-task 1. Assuming you agree with all of these statements, the final statements of conditions for a member of a fire crew donning and operating a SCBA are:

Sub-task 1. Donning the SCBA: “*Wearing a fire fighter’s coat and given an SCBA...*”.

Sub-task 2. Operating the SCBA in the “normal” mode: “*In total darkness, wearing a fire fighter’s coat, gloves and SCBA...*”.

With the behavior given and the conditions determined, the next question is, “How well does each sub-task have to be accomplished?” What “makes a difference” in performing these sub-tasks? First, for sub-task 1, the SCBA must be donned in a correct sequence and in a minimal amount of time. Second, for sub-task 2, the user must be able to open or close the correct valves without hesitation or delay.

The instruction manual for the SCBA shows the correct wear of the unit, so that becomes part of the criteria, “donned in accordance with manufacturer’s instructions.” But what about the time issue? Getting a SCBA donned correctly in 10 seconds during an emergency would be wonderful, but it’s probably impossible. So the question is, how do we determine the acceptable time frame to don an SCBA?

To answer this question, let’s return for a little more “theory.”

First, you have to decide what level of performance you desire or are seeking to identify. Are you trying to identify top-level performance, say above the 95th percentile? This level is often called *mastery*. Or, is it possible to settle for some lesser, “adequate” performance level, called *proficient*? What determines the required KSA levels depends on the nature of the task and the context in which it is accomplished. How critical is the task? What are the consequences of lower levels of performance or even, failure? Once we identify that lowest tolerable level of performance for the task, it becomes the minimum criterion and serves a benchmark from which all equal or better performance will be deemed acceptable.

Lively debate is normal and useful

Many times, subject matter experts (SME) have difficulty determining the minimum acceptable level of proficiency for a task. With the years of experience, it is easy for SMEs to view a task as mundane, routine or easy. Try to think of the first time you performed this task. How easy was it for you? How well did you perform it the first

few times? Think about some of the less skilled crew members you’ve encountered over the years. Even if they were less skilled or knowledgeable than you would have liked, ask yourself, was this performance minimally acceptable? Why or why not? These kinds of questions spark great debate and are a normal part of the evolutionary process for a performance standard. Debate also lends to insight of the task and contributes to a better understood and more defensible performance standard.



Even if this is fun, it’s not always easy

Once you decide on the level of performance needed (mastery versus minimally proficient), you can focus on the specific criteria you want to use in your performance standard. There are two ways for determining valid specifications for the criteria portion of the performance standard: norm- and criterion-referenced evaluation.

Norm-referenced evaluation compares performance with the performance of other candidates. Examples would be: “top 10 percent,” “90th percentile,” or “above average” and “below average.” If we apply norm-referenced evaluation to our SCBA example, there is no guarantee that a “top 10 percent” or an “above average” score can properly accomplish the task. In other words, everyone in the group could have donned the SCBA improperly, and the top 10-percent simply did it with a lesser degree of error than the others.

Criterion-referenced evaluation compares the performance measurement with some objective operational requirement. Using different examples, if a CO₂ system is going to “dump” two minutes after the alarm sounds, the two minutes becomes a determining factor in how quickly one must evacuate the engine room. If a boiler problem must be corrected before the temperature reaches a certain level to avoid catastrophic damage, that temperature becomes a factor in setting a criterion for success versus failure. Or, if a piece of electronic gear must be brought on

line using a precise sequence, the sequence would be a criterion-referenced evaluation factor.

Subject matter experts not only can help you decide which evaluation method is most suitable, they can also render expert advice on what the criterion should be. This is especially useful when operational requirements are either not as clearly defined as we would like, or the requirement is purely a question of degree. In these cases, setting the performance criterion can be a bit more challenging. One of the ways to address these ambiguous areas is to ask a panel of experts, your SMEs. You can also conduct research, do time-motion studies, conduct statistical surveys and similar methods.

Let's recap and return to our SCBA example.

Fire Fighting Skills Assessment—*Continued*

From the operational standpoint of a fire emergency, we agree it would be ideal if the fire party members could all don their SCBA's in 10 seconds and we also understand that such a performance level is probably not even humanly possible. Because of the importance of the task, you decided to do more than solicit the "expert opinion" of your SMEs. In addition, you sampled several groups of career fire fighters. You found that the best performance was 15 seconds, that only one person in 25 could don the SCBA in under 30 seconds (mastery); and that, with some practice, most of the fire fighters could easily don the SCBA in 45 seconds. You also found that after the 45-second mark, performance scores fell off dramatically, mainly because subjects were totally unfamiliar with the task or just didn't know what they were doing.

You now consider the findings:

- (1) Operationally, the task has no practical lower limit, e.g. faster is better;
- (2) It is nearly impossible to do the task in less than 15 seconds;
- (3) It is unrealistic to expect to find many seafarers who can do the task in under 30 seconds;
- (4) The vast majority of the study group could do the task in 45 seconds; those that could seemed more familiar with the SCBA than those that could not; those that could not perform the task in 45 seconds or less seemed to be lacking required knowledge and basic skills;
- (5) Many who could not don the SCBA in 45 seconds or less required much more than just a few more seconds to do the task successfully.

You decide to use the 45-second mark as the breakpoint for the time element of the performance (remember, the other element of the criterion is to have the

SCBA donned in the proper configuration). You make this decision based on these observations and conclusions:

- (1) The majority of those subjects who seemed familiar and skilled with the SCBA could don it in 45 seconds or less;
- (2) The majority of those who seemed unfamiliar or unskilled with an SCBA took much longer than 45 seconds;
- (3) Familiarity with the SCBA seemed to be the factor that made the most difference in performance;
- (4) The level of familiarity needed to achieve a 45-second performance was both practical to expect, and achievable for the mariner.

The final version of the performance assessment (the condition, the behavior, and the criterion) would be:

Sub-task 1:

"Wearing a fire fighter's coat and given an SCBA, the candidate will correctly don the SCBA in 45 seconds."

Sub-task 2:

"Wearing a fire fighter's coat, an SCBA and fire fighter's gloves, the candidate will, in total darkness, breathe air from the unit within 20 seconds of being told to do so."

Notice that because these are critical sub-tasks, a criterion-referenced scoring scheme is used. So, for sub-task 1, if the SCBA is not donned correctly or the SCBA is not correctly donned in 45 seconds, the sub-task is a "No-go." For sub-task 2, if the candidate cannot breathe from the unit or can not do so in 20 seconds, then sub-task 2 is a "No-go."

Almost ready to go...

Now that we have a complete and structurally correct performance standard, the final step before we can go out and confidently use it is to ensure that it is valid and reliable. To confirm validity, we have to test to ensure the performance standard actually does what it is supposed to: discern between acceptable and unacceptable performance. Reliability refers to the consistency or "repeatability" of similar skill levels getting similar scores. Checking for validity and reliability requires a trial run, or pilot test, of the new performance standard.

Let's return to the example to illustrate.

Fire Fighting Skills Assessment—*Continued*

A pilot test is administered to five candidates to check the validity of the performance standard. For sub-task 1, candidates are given fire fighter's coats to wear and

complete SCBA units, facepieces disconnected. Candidates are told to correctly don the SCBAs in 45 seconds or less. The stopwatch is activated and the assessor observes. The candidates say, “done” when their task is completed.

The assessor stops the watch and just shakes his head – he has never seen anything quite like this before. One candidate looked like a he was in a fight! The SCBA was donned in 45 seconds, but the candidate was swinging the SCBA around wildly, trying six different ways to get the thing on! Wow, luckily no one got hurt. The assessor notes one small error – a secondary strap on the harness assembly was incorrectly clipped to the wrong point on the harness; it still did the job though. Another candidate has the facepiece donned, and that was really never what was intended to happen during sub-task 1.

Obviously, this performance standard needs some refinement. First, the candidate needs to don the SCBA using one of the four generally accepted methods: over-the-head, across-the-shoulders, jacket style, or assisted by a second person. You decide the “assisted by a second person” is not appropriate and will require any of the other three donning methods in the criterion. With respect to the improperly connected strap, you decide not to get too “picky” but to instead focus on the practical side of things; you’ll let minor errors pass as long as they do not impair safety or operation. Finally, you decide to refine the behavior to clarify that the facepiece is not to be put on during sub-task 1.

The pilot test of sub-task 2 also has a few surprises. The candidates were wearing SCBAs and were told to make the units operational so they could breathe air from them. One candidate tried, but couldn’t reach behind himself to turn on the air bottle. Wow! That was supposed to have been done during sub-task 1. The assessor helped the candidate by turning on the air supply, and then said, “Now, point to the main (or “normal operation”) air valve.”

The candidate pointed to the by-pass valve first by mistake, then to the correct valve. At the end of the demonstration, the facepiece still didn’t look tight enough to make a proper seal. The assessor called it a “Triple no-go,” but the candidate argued. He felt that turning on the air cylinder (mounted on his back) was humanly impossible and didn’t know it was part of sub-task 1. Also, he said there was nothing in the performance behavior for sub-task 2 about pointing out the main valve and there was certainly no criterion by which to call the facepiece seal it a “No-go.” Looks like this standard needs some work, too.

Back to the drawing board!

To adjust these performance standards, the task of

turning on the tank valve is going to have to be assessed in the first performance standard. The performance standard for sub-task 2 needs to assess the ability to operate the main (or “normal operation”) air valve without hesitation. You decide to incorporate this with other change involving the tank valve. Here are the two new performance standards:

Sub-task 1:

“Wearing a fire fighter’s coat and given an SCBA, the candidate will open the air tank valve and correctly don the SCBA, but not the facepiece, using one of the three standard unassisted methods in 45 seconds or less.”

Sub-task 2:

“Wearing a fire fighter’s coat, an SCBA and fire fighter’s gloves in total darkness, the candidate will, within 20 seconds: open the main (or “normal operation”) air valve, don the facepiece and connect it to the air supply, and breathe air from the unit. At the conclusion of the exercise, the candidate will also demonstrate that a proper face seal was achieved.”

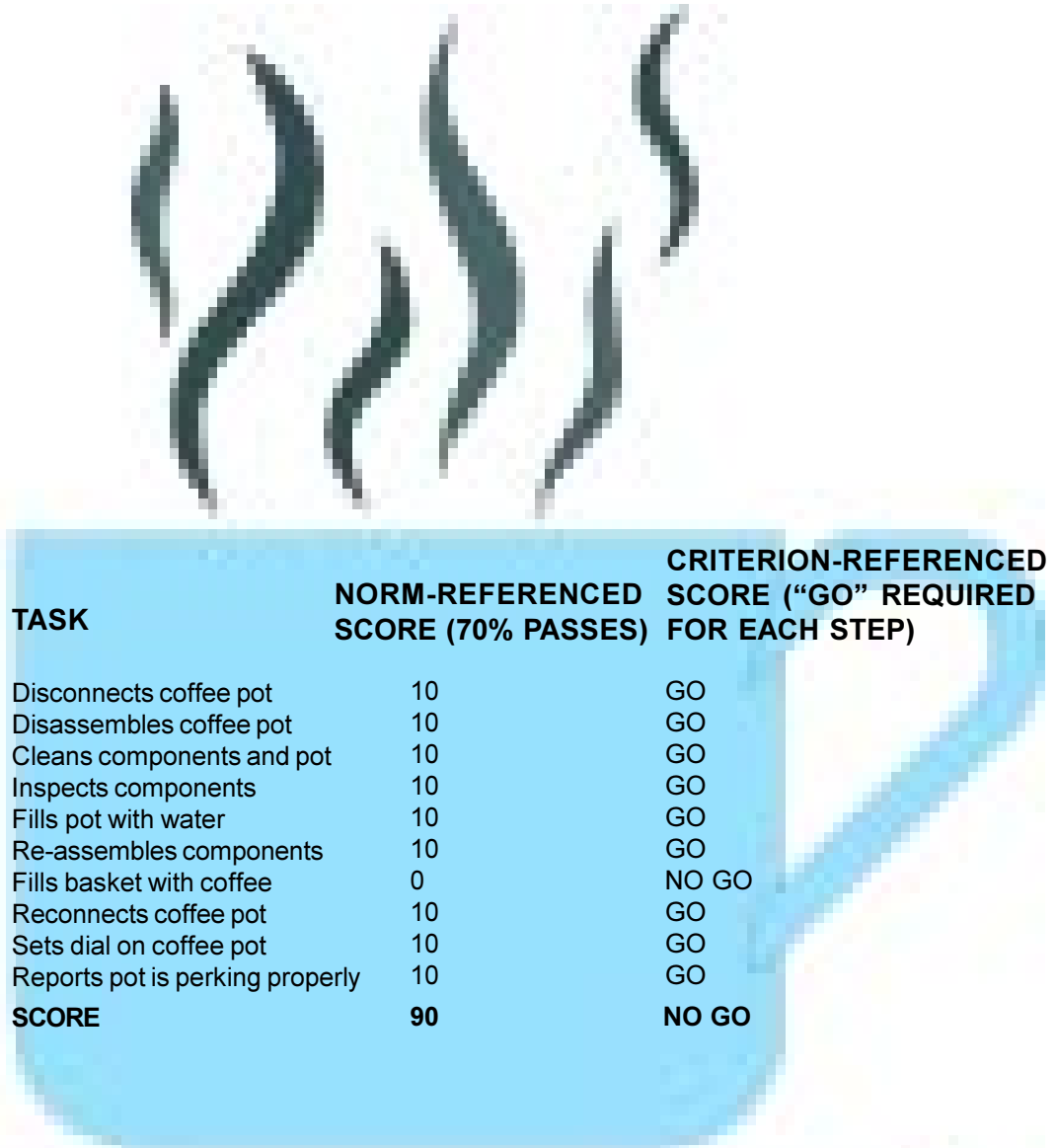
After another quick pilot test, your standard is ready to go. You decide to do one last thing to make the assessment process go a little smoother – you develop a *checklist* to help the assessor conduct assessments with more consistency. Your checklist outlines the steps in the three acceptable donning methods and lists all other little details of the criteria used in the standard. The checklist also fosters both fairness and reliability.

Just a few more thoughts on “Scoring”

Sometimes, a component, step or sub-task of a task is so critical that it must be done correctly for the larger task to be a success. In these instances, it may be better to evaluate the overall outcome rather than each of the component steps. Consider this example developed by Dr. James Whipple that appears in Robert Mager’s book, *Measuring Instructional Results*. Here the failure to complete one simple step illustrates the concept:

From the example on the next page, it is clear that under one scoring scheme it is possible to get a high passing score, a 90%, and still not achieve the goal of making coffee. Under the more appropriate scheme, the same candidate’s performance does not achieve a passing score and must be re-tested.

For many of us who are products of traditional educational systems, we think of 70% as a “passing” score. In the past, this notion has been applied without



TASK	NORM-REFERENCED SCORE (70% PASSES)	CRITERION-REFERENCED SCORE (“GO” REQUIRED FOR EACH STEP)
Disconnects coffee pot	10	GO
Disassembles coffee pot	10	GO
Cleans components and pot	10	GO
Inspects components	10	GO
Fills pot with water	10	GO
Re-assembles components	10	GO
Fills basket with coffee	0	NO GO
Reconnects coffee pot	10	GO
Sets dial on coffee pot	10	GO
Reports pot is perking properly	10	GO
SCORE	90	NO GO

Checklist for Making Coffee

much question in maritime training. Under STCW, this assumption needs to be revisited. To illustrate, consider this example. You can take a 4-question arithmetic test, score a 75% and consider that you “passed.” But the test was to assess competence in all arithmetic skills: addition, subtraction, multiplication and division. From what we already know, in order to assess competence in each mathematical skill, there would have to be a question in each skill area, e.g., on a 4-question test, one question each for addition, subtraction, multiplication and division. And, if there were just one of each type of problem, you would have to get each problem correct to be judged competent in each of these mathematical skills. That was not the case. You got one problem wrong, which says that

you are not competent in one of these mathematical operations.

Now, consider a 100-question test to assess the same mathematical skills. This time you were asked 25 questions each for addition, subtraction, multiplication and division. This time you got an even lower score, a 72%. You had seven incorrect answers each for addition, subtraction, multiplication and division. This time, however, you achieved over 70% correct in each area, and you “pass” for each skill.

Remember, under STCW each candidate must satisfactorily demonstrate *every* competency in the STCW Code’s table relevant to the endorsement he is seeking. This means that every component: knowledge,

understanding, and proficiency (KUP) must be assessed. Considering what we have just discussed above, to certify competency, the assessor must ask at least one question for each knowledge and understanding requirement, and witness at least one demonstration of each proficiency requirement. If just one question is asked for a knowledge or understanding requirement and the candidate answers incorrectly, the assessor cannot certify the candidate competent for that requirement. The same is true for demonstrations of understanding and proficiency. At no time is it valid to certify candidates competent in an entire set of KUPs just because they were competent in 70 percent of the larger set.

Where do we go from here?

There's no doubt that STCW will have a profound effect on training in all segments of the marine industry, whether covered by STCW or not. As a result of STCW, the question, "Can you actually do that (skill)?" now has center stage. The question may have been a valid one for years, but the old paradigm didn't force us to ask it. That has all changed, and performance demonstration will most likely become commonplace in maritime training across the board.

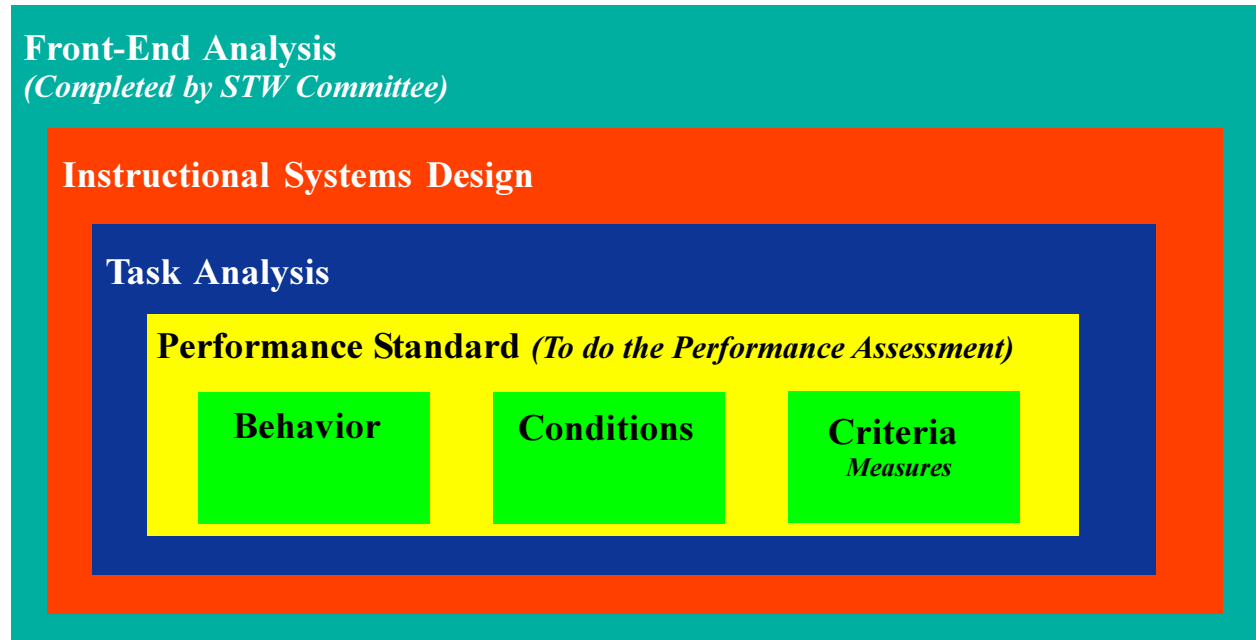
Recognizing the new role of instructional system design and educational methodology in the marine industry, there are a number of valuable resources that you should be aware of if you are involved in assessment, instruction or training development.

The first is what is known as the "Mager 6-Pack." This is all six of Robert F. Mager's books on performance

based instruction; some are considered classics in the field. These are very short books and easy reading. For instance Mager's book, *Preparing Instructional Objectives*, which much of this article is based upon, is about 125, 6-1/4-by-9 inch pages of programmed text, meaning that you'll probably only be reading 40-50% of the book—easy read in two hours.

Besides *Preparing Instructional Objectives* and *Measuring Instructional Results*, mentioned earlier in this article, you can see just by the titles how the rest of Mager's "6-Pack" can be very useful to the work that's ahead in STCW. The titles are: *Goal Analysis*; *Analyzing Performance Problems*; *Making Instruction Work*; and, *Developing Attitude Toward Learning*. Again, these books are recommended because they are relevant, simple and straight forward. Joseph H. Harless and Peter Pipe have also authored "classics" in instructional design, front-end analysis, and performance assessment and testing.

There are also hundreds of other books and courses available to help you design and conduct performance assessments. Courses range from a few hours or a few days to a college semester (which is nothing more than 40 or so hours spread over several months). A good place to start is a State vocational teacher's certification course. These courses are more in depth than typical "train-the-trainer" courses. They are useful and fun, and give you a chance to see how other professions are dealing with issues very similar to ours in the marine industry. Another plus is that they usually conclude with the granting of a State vocational teacher's license or certificate. F



Hierarchy of Developing Valid and Reliable Performance Assessments

HOW DO YOU ASSESS MARINER PROFICIENCY?

By Dr. Myriam Witkin Smith and Dr. Marvin C. McCallum

The 1995 amendments to the International Convention of Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW) demands many changes in the way the maritime industry assesses the proficiency of its mariners. The industry does not have much experience with assessment by practical demonstration before an expert assessor and there are many questions to be asked during the adjustment to these new requirements. In 1997 the U.S. Coast Guard (USCG) Research and Development Center (R&DC) and the USCG National Maritime Center (NMC), selected some key questions presented by the STCW Code:

“What does a valid and reliable assessment of mariner proficiency look like?

- Can industry instructors and examiners prepare such assessments?
- What are the special requirements of using simulators for assessments?
- What are the special requirements of conducting assessments in the operational shipboard environment?

What does a valid and reliable assessment of mariner proficiency look like?

To answer this first question, we brought together a team that, several years before, had successfully developed an objective assessment of Rules of the Road knowledge and skills. Our team of human performance experts from the R&DC and Battelle Seattle Research Center (BSRC) and marine educators from the U.S. Merchant Marine Academy (USMMA) carefully examined the requirements of the STCW Code for assessment. We supplemented those requirements by consulting the Instructional Systems Development (ISD) methods used by the military and by industry and, most importantly, by examining the best practices of the maritime industry. What we learned was that an assessment should be a *reliable* and *valid* snapshot of the performance that can be expected from a mariner. A “reliable” assessment is one whose consistency can be trusted: the same performance will receive the same assessment every time. A “valid” assessment is a sample

of performance that includes all the critical components of the function that will be expected from the mariner on board the ship. From what we learned, we designed a step-by-step method for developing reliable and valid assessments.

The first step of our method is to specify the *assessment objectives*, a listing of the knowledge, skills, abilities, and proficiencies that represent the critical requirements for the competence of interest. Preparation of this list provides an opportunity for review by industry experts and provides a foundation for further development of a valid assessment procedure. With the objectives specified, it is possible to determine the *methods* for the assessment and to specify the *conditions* under which the mariner will demonstrate proficiency. The least intuitive step in the method requires development of the performance measures and standards, which are critical to the reliability of the assessment. *Performance measures* are observable behaviors or the observable consequences of behaviors; *performance standards* are acceptable or target levels to be achieved by the observable behavior or consequence. For STCW implementation, the standard is intended to define the minimum acceptable level of performance. An example of an objective might be to assess a mariner’s ability to steer by gyrocompass. The corresponding observable measure might be the accuracy with which the mariner is able to maintain the ordered heading. The standard might be to maintain the ordered heading to an accuracy of plus or minus three degrees. To continue this example, if the mariner can achieve that accuracy of steering, he/she is to be considered minimally proficient in steering by gyrocompass.

In order to test and refine our method, we did a case study. We selected an assessment emphasized in the STCW Code, the competence of an officer in charge of a navigational watch in the use of the Automatic Radar Plotting Aid (ARPA) to maintain the safety of navigation. We depended heavily on the assessment objectives defined in the Code and concentrated our attention on the later steps of the development process. We were fortunate

in having faculty from the USMMA as members of our team. They provided their expertise in marine training and assessment, in simulator application, in ARPA, and, as a bonus, access to their fully capable ARPA laboratory based on stimulated real equipment.

Can industry instructors and examiners prepare such assessments?

We had demonstrated the feasibility of our method under fairly ideal conditions: a multi-disciplinary team, with dedicated time, with a fully capable simulator, and a competence thoroughly described in the STCW Code. Was our method useful to a broader segment of the industry? How much would it need to be refined? What kinds of materials would “qualified instructors,” developing assessments, need to guide them? In the Spring of 1998, we hosted two workshops for a variety of instructors from marine academies, simulator facilities, large and small training schools, and large and small shipping companies. We were gratified by the readiness of so many people to participate in the project and by their generally positive response to the method. During the workshop, we presented the method, conducted a series of practical exercises, and obtained feedback from participants. We immediately learned that we had more work to do. Our workshop materials were not ready to support assessment development without help from human performance experts. We included too much confusing terminology from the STCW Code and from various versions of ISD. The problems of *developing* assessments and of *conducting* them were sufficiently different to deserve separate treatment.

For further refinement of the method for developing assessments, we were fortunate to be able to enlarge our team with faculty from two state academies. Faculty from Massachusetts Maritime Academy (MMA) provided new case studies on navigational watch procedures for *Lookout* and *Helmsman*. While they developed their assessments and commented on our supporting materials, we commented on their assessments and developed our supporting materials. The language in our materials was simplified, giving priority to that of the STCW Code, and we prepared a *Developing Mariner Assessments* manual. For further refinement of the manual, faculty from California Maritime Academy (CMA) developed assessments for engineering watch procedures, *Preparing the Main Engine for Operation* and *Locating Generator Faults*. We found that industry instructors can, indeed, develop valid and reliable assessments.

What are the special requirements of using

simulators for assessments?

Our team had the advantage of the USMMA’s highly capable ARPA simulator laboratory when we developed our ARPA assessment. However, at the present time, there is a broad range of simulators available to support any given mariner assessment. With the advances in personal computer (PC) processing capability, the advantages of more elaborate simulators are becoming less pronounced. One of our objectives was to develop and test a method to evaluate a simulator’s capability to support mariner assessment while continuing our ARPA case study. How well could two sample off-the-shelf PC-based simulators support the *mariner assessment objectives* that we had already developed? Our *simulator evaluation objectives* were based, first, on the mariner assessment objectives developed for ARPA operation. The simulators were evaluated on their capability to provide the prescribed exercise conditions needed for the mariner to realistically demonstrate the performance to be assessed. Then, we added additional evaluation objectives based on the STCW Code’s standards governing the use of simulators. We designed an evaluation protocol, applied it to the two PC based simulators, and analyzed the results. We found that both simulators satisfied many, but not all, of our objectives and would have to be augmented by other forms of assessment. More importantly, we demonstrated the feasibility of a rigorous evaluation of simulator capability.

What are the special requirements of conducting assessments in the operational shipboard environment?

The most demanding setting for an assessment is on board a commercial vessel where it cannot be allowed to interfere with the safety and efficiency of operations. We were again fortunate in extending our team and in being able to examine assessment in this environment. SeaRiver Maritime, Incorporated (SRM) had sent a representative to our earlier workshop and in 1999 agreed to participate in the development of a “package” of documentation for the shipboard assessor and to actually conduct a series of trial assessments on board their ships. They began by reviewing the sample assessments for navigation and engineering watch competencies that had been developed by the Academies. During these preliminary preparations, the first issues identified were the amount of detail needed in the onboard assessment package and the amount of training needed by the onboard assessor. A related issue was the degree to which the Academies’ assessments needed to be adapted to the operating procedures of the particular company and ship operations.

In late 1999, extensive trials of the assessment approach were conducted onboard SRM tankers. Officers who augmented the ship's regular crew conducted the earlier trials while BSRC experts observed. As the assessments became more polished, the experienced officers introduced the procedures to regular ship officers for them to apply. Figures 1 and 2 are photographs of trial applications of the assessments onboard SRM vessels. As of this writing, only preliminary results of the trials are available. We found that the extent to which assessment procedures require modification for use on a particular ship depends on the general type of assessment. Assessments that address general competencies, such as navigation watch *Lookout* and *Helmsman* procedures, can be used on similar vessels with minimal modification, as long as the performance standards do not conflict with the ship's standing orders and normal operating procedures. However, assessments that address competencies involving vessel-specific equipment, as was the case with the *Prepare Main Engine for Operation* and *Test the Steering Gear* procedures, must be tailored to a vessel's equipment and operating procedures. In addition, we found that it was difficult for some of the regular ship officers to complete some of the assessments during the limited time period provided during these trials. This suggests the need to more completely integrate the assessment process into current operations and training, as well as to refine the assessment procedures to better match shipboard operational conditions and constraints. The results from conducting the trial assessments and the material developed will be available in later project reports.

Project conclusions

Our project served as a laboratory for the USCG and the maritime industry to examine some of the key issues in understanding and implementing the recent requirements of the 1995 Amendments of the STCW Code. With USMMA, we discovered what was needed to develop

assessments that were fully compliant with the STCW Code and that were reliable and valid by the best principles of ISD. With MMA and CMA, we demonstrated that qualified instructors could develop such assessments with appropriate guiding materials. We demonstrated an approach to evaluating simulators in their capability to support assessments. With SRM, we are in the process of determining what is needed for conducting assessments onboard commercial vessels.

Our project reports contain three types of "products." The first are our "laboratory" explorations of some of the critical components of the STCW requirements. We followed the guidance for assessment activities in that document, reported our experiences, and shared the lessons we learned. The second are the methods developed by our team during those trial efforts. Workshop materials and manuals describing rigorous, STCW-compliant approaches to developing and conducting assessments and to evaluating simulators to support assessment are included in our reports. Because these materials have been reviewed and tried by representatives of the industry and then revised as a result of these trials, we believe that they provide a valuable resource to the industry and to

Right: Trial *Lookout* Assessment on board a SeaRiver Maritime ship in San Francisco Bay.

Below: Trial Assessment of *Prepare Main Engine for Operation* on board a SeaRiver Maritime ship in San Francisco Bay



the USCG in implementing STCW's mandates. The last are the sample assessments that were developed by our team members and that we offer for review and adoption by those responsible for assessment in their organizations. Our reports and materials will be available on the R&DC website in the coming months at www.rdc.uscg.mil. F



S T C W

The Present, The Future

By Stewart Walker, USCG NMC

The Coast Guard has published extensive guidance about the implementation of the International Convention on the Standards of Training, Certification and Watchkeeping for Seafarers, 1978, (STCW-78). Most of that guidance has focused on either the initial implementation of the original 1978 Convention or the transition from the 1978 convention to the 1995 amendments (STCW-95). In this article, I will peer into the crystal ball, albeit cloudy, and try to see how STCW-95 will affect mariners once it is fully implemented.

Any mariner who starts service or training necessary to qualify for a mariner's credential¹ after July 31, 1998, *must* also meet the requirements of STCW-95 if the license or endorsement authorizes service on certain seagoing vessels over 200 gross register tons (GRT). The mariner will be issued the U. S. credential as well as an STCW form validating that the qualifications on his or her credential also meet STCW's requirements.

After Jan. 31, 2002, everyone who applies for a mariner's credential that authorizes seagoing service on certain vessels must meet STCW requirements for issuance of an STCW validation form, no matter when the service or training began. I say "certain seagoing vessels" because STCW does not apply to fishing vessels, most government-owned-and-operated vessels, yachts, and wooden ships of primitive build.

In addition, the United States has determined that mariners on certain other seagoing vessels will have no further obligation under the STCW on account of their special operating conditions, such as small vessels engaged in domestic voyages. These comprise passenger vessels of not more than 100 gross register tons (GRT), other vessels of less than 200 GRT, fishing vessels used

as fish-tender vessels, barges, and non-self-propelled mobile drilling units. A mariner may serve on any of these vessels under the authority of their U.S. mariner's credential without having the validation form required by the STCW.

Under the United States' scheme for implementation of the STCW-95, a mariner must meet both STCW's requirements *and* requirements in the domestic regulations for issuance of the credential. The table on the next page compares the sea service requirements mandated under the U. S. licensing scheme, with the sea service requirements of the STCW. An applicant for a mariner's credential with an STCW validation for service on any seagoing vessel must meet the more stringent requirement of either scheme. For example, if a mariner licensed as a mate 1,600 GRT desires to raise the license to a master 1,600 GRT, he or she must have four years of total sea service to qualify for the license and must also have the additional service required to meet the STCW's scheme.

To qualify for the STCW validation form, a mariner must demonstrate to the Coast Guard that he or she has met the STCW's requirements for (1) approved sea service; (2) completion of required training; (3) proof of competency through assessments of designated practical skills; and (4) passing an examination. Let's examine each of these requirements.

Approved Sea Service

This is the first leg on which an STCW validation rests. The STCW specifies length of sea service; however, it is silent as to the nature of the service that must be acquired before it will be considered "approved." For each STCW requirement, the Coast Guard, in consultation with appropriate authorities, will develop guidelines about the nature of the approved service. For example, the requirements may be for service on vessels above a specified tonnage or for service on certain waters. Once developed, these requirements will be made available for

¹In this article, the term *credential* or *mariner's credential*, refers to a U.S. license or endorsement on a U.S. Merchant Mariner's Document (MMD).

Comparison Table Between the Sea Service Requirements of STCW-95 and Domestic Licensing Scheme¹

<u>License</u>	<u>Domestic Requirements</u>	<u>STCW-95 Requirements</u>
Third Assistant Engineer	Three years' service or training and service	Six-months service plus 30 months of approved education and training for OinC Eng. Watch
Second Assistant Engineer	Hold 3AE and one year of service	OinC Eng. Watch is nearest equivalent
First Assistant Engineer	Hold 2AE and one year of service	Hold OinC Eng. Watch and one year of service (STCW term: Second engineer) ²
Chief Engineer	Hold 1 AE and one year of 1 AE service or six mos. 1 AE service combined with other service	Hold OinC Eng. Watch and three years' service that includes one year service while holding second engineer²
Assistant Engineer Limited (Oceans)	Three-years service	Six months' service plus 30 months of approved education and training
Chief Engineer Limited (NC)	Four years' service that includes one year as licensed engineer and two years as QMED	Hold OinC Eng. Watch and three-years service that includes one year service while holding second engineer²
Chief Engineer Limited (Oceans)	Five years' service that includes two years as licensed engineer and 30 mos. as QMED	Hold OinC Eng. Watch and three-years service that includes one year service while holding second engineer²
Mate 500 GRT NC	Two years' service that includes 6 mos. as AB or equivalent on vessels 50+GRT	Three years' service or one years' plus training program for OinC Nav Watch

Notes

1. The most difficult requirements are noted in blue. For items not in blue, there is no basis for comparison. In practice, when training courses are approved to meet the STCW requirements, they will also be approved as substituting for the domestic licensing scheme

2. For engineering licenses, the sea service requirements under the STCW are reduced by one year if the license is limited to less than 3,000kW (4,000 HP)

Continued on next page

Comparison Table Between the Sea Service Requirements of STCW-95 and Domestic Licensing Scheme

Continued from previous page

<u>License</u>	<u>Domestic Requirements</u>	<u>STCW-95 Requirements</u>
Mate 500 GRT Ocean	Two years' service that includes one year supervisory service while holding a license	Three years' service or one year plus training program for OinC Nav Watch
Master 500 GRT O/NC	Three years' service that includes two years while holding a license	OinC Nav Watch plus either three years' service or two years service that includes one year as chief mate
Mate 1,600 GRT NC	Two years' service that includes one year as AB or equivalent while holding AB endorsement	Three years' service or one year plus training program for OinC Nav Watch
Mate 1,600 GRT Ocean	Three years' service that includes one year of supervisory service while holding a license	Three years' service or one year plus training program for OinC Nav Watch
Master 1,600 GRT O/NC	Four years' service that includes two years' service in supervisory position while holding a license	Hold OinC Nav Watch plus either three years' service or two years' service that includes one year as chief mate
Third Mate	Three years' service including six months service as AB	Three years' service and training or one year and training program
Second Mate	Hold third mate plus one years' service	OinC Nav Watch is nearest equivalent
Chief Mate	Hold second mate plus one years' service	Hold OinC Nav Watch plus one years' service; however, STCW allows a mariner to bypass the chief mate level and progress directly to master with increased sea service
Master	Hold chief mate plus one years' service that includes at least six months as chief mate	Hold OinC Nav Watch plus either three years' service or two years' service with one year as chief mate

public comment. When consensus is reached, they will be adopted as the standard.

I anticipate that the Merchant Marine Personnel Advisory Committee (MERPAC) will serve as the primary reviewing body. MERPAC can consult with outside experts in developing its recommendations and can provide a global view of what should constitute approved sea service.

In many situations, I think, the sea service presently required by Coast Guard regulations for the mariner's credential will also be adopted as that required for the STCW validation. The reader must be cautioned that in some instances there is no direct equivalency between the two schemes for issuance of a credential, which may require additional sea service or sea service of a different nature to meet STCW requirements.

There are other areas unique to the STCW, where the domestic standards either do not apply or are non-existent. There is no direct equivalent to the STCW's qualification as a rating forming part of a navigational watch that is required for mariners serving as such on vessels of 500 or more gross tons (GT - international measurement). Should the approved service for that qualification be on vessels of more than 500 GT? Or, is 100 GRT a better figure because that is the threshold for requiring a mariner to hold an MMD? Or is tonnage not a reasonable criterion at all, since the mariner's training should be related to the duties to be performed on the bridge, not the size of the vessel? Similar questions exist for the STCW's proficiency in survival craft and rescue boats, as well as the qualification as a rating forming part of an engineering watch.

Completion of Required Training

Training is the second leg upon which an STCW qualification rests. The International Maritime Organization (IMO) has developed model courses that provide guidance for the scope of the required training. The Coast Guard has reviewed these model courses to determine the standards acceptable for approval of a course to meet STCW training requirements. The National Maritime Center has been applying these standards to many courses approved as meeting the STCW.

The Coast Guard must now determine the training requirements for each level of STCW qualification, and where alternative methods of proving competence are set forth in the STCW, guidance about the nature of the alternative method. The existing scheme of approved courses works well for mariners who elect to attend a formal training course or program to acquire the required

knowledge; it does not provide guidance for those mariners who elect to come up through the hawsepipe. This is another area where much developmental work remains.

Assessments of Competence

For many years the Coast Guard was criticized because the professional examinations used to test mariners did not test the practical applications of a mariner's skills. The STCW now requires assessments of skills in many areas of professional aptitude, and the tables in the STCW Code provide guidance about which competencies require practical assessment.

STCW Code Tables are silent about assessment guidelines, which will contain performance measures and standards for these competencies. MERPAC has already made recommendations for many of the assessment guidelines needed to implement the STCW. These recommendations are under review at the National Maritime Center. When the review is complete, the Coast Guard will publish the assessment guidelines in the Federal Register, along with a request for public comment on the proposed guidelines. Then it will integrate pertinent comments, and adopt and publish the guidelines as national standards.

Guidelines once adopted, a mariner will be required to provide proof of being assessed against the national standards to qualify for an STCW validation form. A mariner may be assessed as part of a Coast Guard approved training program, or the mariner may seek a designated examiner to witness and sign off the successful completion of the assessments. A designated examiner is someone approved by the Coast Guard to perform these assessments. Few designated examiners now exist, but as the number of nationally-accepted, assessment guidelines grows, more professionals should be approved to perform assessments. Costs for the assessments will be borne by the mariner or in some cases by the mariner's employer. Some vessel operators may elect to have an employee approved by the Coast Guard to serve as the designated examiner for the company's personnel as part of an in-house training program.

Examination requirements

One change provided in the regulations implementing STCW is a revision to the examination requirements. An examination is one method of assessing a mariner's knowledge in a particular area. The STCW Code Tables list for each competency the acceptable methods of

demonstrating that competency and require examinations in some areas. A mariner who is subject to the full requirements of the STCW will not have to take an examination that meets the regulatory requirements (46 CFR 10.903), but will be examined in accordance with STCW standards. However, before this can occur, the Coast Guard must modify the current examinations to reflect those areas of the tables in the STCW Code where examinations are required.

STCW-95 also affects those mariners who have renewed their license for continuity. Since all of these mariners began their sea service or training by Aug. 1, 1998, they already meet STCW-78. They must complete certain “gap-closing” training and assessment requirements before Feb. 1, 2002, to qualify for an STCW-95 form. Otherwise, they will have to meet the full requirements of STCW-95 to reinstate full operating authority. Similarly, many former seagoing officers continue to renew their licenses with full operating authority. A typical example is a pilot who holds a license valid for seagoing service but who is now serving as a

pilot and as such is not subject to the STCW. Because of the regulations governing the issuance of state pilotage, he or she must maintain a valid Coast Guard license. Such a mariner must meet the gap-closing requirements to qualify for an STCW-95 validation form before Feb. 1, 2002. The Coast Guard will be publishing further policy guidance on this issue in the near future.

What about the present? This article opened with information about when the 1995 amendments became mandatory and who was subject to those amendments. We are now well within the period for full implementation. Many mariners should already be presenting evidence of approved sea service, required training, and assessments of skills. Until the standards for each of these areas are developed, the Coast Guard will continue to accept applications and issue STCW validation forms using the existing transitional standards and regulations. But, change will come rapidly in the next two years as the Coast Guard moves to fully implement and have in place by Feb. 1, 2002, a scheme for issuance of STCW validation that is in full compliance with the Convention.

Sooner or later, many mariners will need to meet new STCW requirements

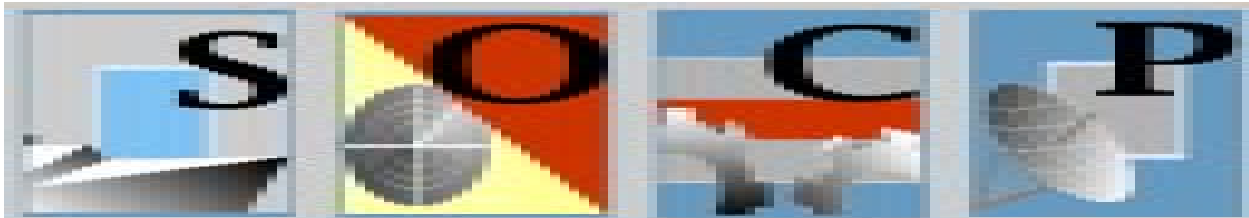
Any mariner who starts service or training necessary to qualify for a mariner’s credential after July 31, 1998, *must* also meet the requirements of STCW-95 if the license or endorsement authorizes service on certain seagoing vessels over 200 gross register tons

After Jan. 31, 2002, everyone who applies for a mariner’s credential that authorizes seagoing service on certain vessels must meet STCW requirements for issuance of an STCW validation form, no matter when the service or training began

SOCP

A Partner in Implementing STCW

By John Dumbleton, U.S. Department of Transportation, Maritime Administration



The 1995 amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW), strive to establish the highest practicable standards of competence for seafarers; they are also the impetus for many initiatives of the Ship Operations Cooperative Program (SOCP), addressing safety and training.

What is SOCP?

SOCP evolved as a result of a workshop conducted by the Maritime Administration (MARAD) in October 1992 for the U.S. shipping industry and selected government organizations. The goal of the workshop was to explore the concept of SOCP, to determine the level of interest of the invited organizations in becoming members of the Cooperative, and to identify projects that the SOCP would undertake. Following the workshop, three ship-operating companies (ARCO Marine, Inc.; Energy Transportation Group, Inc.; and Sea-Land Service, Inc.) along with the National Oceanic and Atmospheric Administration (NOAA) committed to membership.

In December 1992, a meeting was held to form the Executive Committee, elect a chairman, and to develop the 1993 SOCP Program Plan. In April 1993, the SOCP was officially formed with the execution of a Cooperative

Agreement among the parties.

What is SOCP's purpose?

SOCP was formed to provide a forum for developing and applying technology to improve profitability, ship safety, training, quality of operations, equipment reliability, productivity, and competitiveness at a fraction of the cost of conducting projects independently. It also provides a vehicle by which U.S. shipping companies and other maritime organizations can work together to solve common problems relating to vessel operations.

Finally, it provides a forum that follows new technologies to be explored using the combined resources of private industry and government working collaboratively and allows its members to share in the results of technology developments and to purchase this technology at discounted prices.

Who are SOCP's current members?

Over the years SOCP's membership has risen to over 30 members with new members joining on a regular basis. Its present membership is comprised of ship operators, ship managers, government agencies, maritime union schools, independent training schools, research centers, technology developers, and classification societies.

What does SOCP do?

While SOCP is engaged in a number of projects of concern to its members, of particular interest are initiatives that will assist member organizations in complying with the 1995 revisions to the International Convention on STCW. It has undertaken several initiatives in the area of training. Three major initiatives are projects involving the development of training recordkeeping standards, a training materials database, and the production of training videos.

The training video production project has resulted in the production of nine videos for shipboard personnel that address STCW training compliance requirements as well as other subject areas where there is an unmet need. Titles include: International Safety Management Code, Vessel Layup Procedures, Drug and Alcohol Prevention Program, Closed Space Entry, Personal Survival Techniques (Parts 1 and 2), Shipboard Accident Investigation, Bridge Resource Management, and Engine Room Resource Management. A number of additional videos are in the planning stage, including Rigging Safety, Hot Work, and Lockout/Tagout.

The training project has expanded and now includes the development of computer and web-based training. Among SOCP's partners in production initiatives are MGI International and Videotel International, as well as a number of other maritime multimedia experts. MGI International is currently developing a computer-based training product addressing the STCW requirement of Basic Safety Training.

In an effort to enable ready identification of available training resources, SOCP has undertaken the development of a Training Resources Database. The database is accessible over the Internet and can be accessed, along with links to other maritime-related web sites, at www.socp.org. While the database continues to be populated, it is presently operational and provides viewers information on maritime training videos. Future plans include expanding the database to incorporate training courses, computer-based training and web-based training products. The objective of the database project is to identify available materials so that one can determine whether products exist for purchase, compare products that are commercially available, contact developers and suppliers for specific information, or obtain product reviews.


Yet another project with which SOCP has made inroads concerns Training Recordkeeping Standards. The 1995 amendments to the STCW require that a seafarer's training be documented in a training record book. It is also necessary that certain training information be readily

available to various organizations such as regulatory bodies, shipping companies, and union schools.

SOCP's work began in 1997 to identify the content of a core individual training record that would be beneficial to all interested parties and has resulted in a draft of what the standard should include. The goal is to assist in developing American Society for Testing and Materials (ASTM) training recordkeeping standards, which will be referred to by members in the maritime industry in the development of training recordkeeping databases.

SOCP's desire to work collaboratively on major STCW initiatives brought about its offer to work closely with the U.S. Coast Guard and MERPAC on solutions to STCW implementation issues. It has offered its assistance with the following specific actions:

- Co-sponsored the webcast of a USCG public meeting on STCW implementation.
- Polled SOCP members on their experiences with STCW implementation and provided a compiled response to the Coast Guard.
- Encouraged active participation by SOCP members in the work of MERPAC's Working Groups on STCW Competency Assessment Criteria. ^F



WHO is SOCP?
*A Partner in
Implementing STCW!*

WHAT does SOCP do?
*Assists members in
complying with the
1995 revisions to the
International
Convention on STCW*

For more information about these and other SOCP initiatives, contact John Dumbleton, Maritime Administration, at (202) 366-1928.

MERPAC Assists Coast Guard with Implementing STCW

By CDR Steven J. Boyle, Chief, Maritime Personnel Qualifications Division (G-MSO-1), USCG Headquarters, Washington, D.C.

The Merchant Marine Personnel Advisory Committee (MERPAC) was chartered by the Secretary of Transportation in 1992 to serve as a deliberative body to advise the Secretary on matters related to the training, qualification, licensing, certification, and fitness of seamen serving in the U.S. Merchant Marine. Rear Admiral Robert North, the U.S. Coast Guard Assistant Commandant for Marine Safety and Environmental Protection, serves as MERPAC's sponsor. The committee consists of 19 members appointed by the Secretary selected from various segments of the maritime industry and the general public.

MERPAC has provided numerous recommendations to the Coast Guard on a wide variety of merchant marine personnel developments including the deliberations that led to the 1995 amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW). MERPAC routinely provides advice and information to assist with Coast Guard negotiations at the International Maritime Organization (IMO) on merchant marine personnel issues. Its recommendations have helped the Coast Guard representatives negotiate provisions of the STCW amendments that are consistent with U.S. interests.

The committee has provided valuable advice to the

Coast Guard toward implementing the STCW amendments in several areas:

- Regulations requiring practical demonstration of skills to augment written examinations or completion of approved courses to obtain a Coast Guard license or endorsement
- Performance measures for assessing mariner competency in the four elements of STCW-required Basic Safety Training.
- Model course guidelines on subjects for which IMO has not already developed model courses.
- Coast Guard STCW implementation policies, including: NVIC 4-97 – Guidance on Company Roles and Responsibilities Under STCW 95; NVIC 5-97 – Training Record Books (for entry-level officers); NVIC 6-97 – Policy on Qualified Instructors and Designated Examiners Who Train or Assess the Competence of Merchant Mariners; NVIC 7-97 – Guidance on STCW Quality Standards Systems for Merchant Mariner Courses or Training Programs; NVIC 2-98 – Physical Evaluation Guidelines for Merchant Mariners; and NVIC 1-99 – Refresher Courses for Continued Professional Competence for License Renewals (for licensed mariners lacking sufficient sea time).

Recently, MERPAC developed performance measures that will assist those evaluating practical demonstration

of skills by candidates seeking certification as licensed officers or unlicensed ratings, and those requiring special shipboard qualifications. This was a daunting task. Performance measures were needed for 19 specific merchant mariner competencies from rating forming part of a navigation watch to persons in charge of on-board medical care. To accomplish this, MERPAC invited volunteers from the marine industry to serve on sub-committees formed to address each competency. Over 100 volunteers came forward to provide their expertise toward developing the specific performance measures. These measures will provide essential guidance for maritime training institutions and other mariner training programs toward assessing practical demonstration of skills required by STCW, as amended.

Meanwhile, in order to ensure that STCW is given full and complete effect in the United States, Admiral North chartered a Coast Guard STCW Implementation Focus and Coordination Team to develop a plan to identify tasks associated with implementing STCW. The resulting STCW Focus and Coordination Plan identified 91 STCW-related tasks. MERPAC will play a key role in this implementation effort. In addition to the performance measures noted above, the Coast Guard may seek MERPAC's advice in the following areas:

- Developing standards for medical and physical fitness for merchant mariners (to conform to STCW, ADA, and Rehabilitation Act requirements).

- Developing simulator performance standards.
- Developing policy for training-record retention.
- Reviewing proposed regulations to implement STCW V/3—special training requirements for mariners serving on passenger vessels other than Ro-Ro passenger vessels.
 - Reviewing proposed regulations to implement STCW II/1 and II/2—special training requirements for mariners serving on bulk-cargo vessels.
 - Revising and updating current STCW-related policies.
 - Developing a national model Training Record Book.
 - Developing model training courses and programs.
 - Revisiting governing statutes and petitioning Congress for changes, as appropriate.
 - Developing policy and interpretation of STCW standards on methods for demonstrating competence in crisis management and human behavior with respect to shipboard assessments.

MERPAC provides the Coast Guard with an essential link to the maritime industry and is an important resource in the development of Coast Guard policies affecting merchant mariners. The demands of implementing STCW have highlighted the committee's value to the Coast Guard more than ever before. Its dedicated members have proven to be highly capable of meeting these challenging tasks.

For more information on MERPAC and its activities, you can visit the committee's Internet Web site www.uscg.mil/hq/g-m/advisory/merpac/merpac.htm.



Rear Admiral Robert North (front row, center) presides over the fall 1999 meeting of the Merchant Marine Personnel Advisory Committee (MERPAC) held in Easton, Md., Calhoun MEBA Engineering School.



Is Standards of Training, Certification and Watchkeeping for seafarers (STCW) a fancy of an idealist from the International Maritime Organization (IMO) rather than a genuine opportunity for progress in maritime training? There are some highly skilled and respected mariners sitting on both sides of the fence on this question: the U.S. Maritime Administration (MARAD) has chosen to view STCW as a change in maritime training and qualifications that presents a great opportunity for improvement in the United States because STCW fosters better interaction among government implementers, industry beneficiaries, and training providers.

Historical Relationships

What is MARAD's role concerning the implementation of STCW? Where does STCW fit into the excellent mariner training and education programs of the United States? MARAD's mandate, the Merchant Marine Act of 1936, states that "... the United States shall have a merchant marine ... manned with a trained and efficient citizen personnel..."

This provides the legal basis for the Agency's significant support and involvement in maritime education

and training, including the U.S. Merchant Marine Academy (USMMA), the training ships and cadet support programs at the six State Maritime Academies, a series of fire training schools, close working relationships with the excellent union schools, and various other mechanisms to support effective maritime training.

MARAD's 1998-2002 Strategic Plan contains a performance goal that American mariners *with appropriate skills* be available to crew commercial and government-owned cargo ships. It follows that MARAD must work within available resources towards ensuring that our mariner constituency will be of the highest quality and readiness and in compliance with STCW competency standards.

To carry out MARAD's training and education mission, the scope of interaction with relevant industry and government organizations is necessarily broad; a partial list includes the U.S. Coast Guard, International Maritime Organization (IMO), International Labor Organization (ILO), U.S. Department of Labor, U.S. steamship companies, and U.S. maritime labor unions. Relevant MARAD activities are not limited strictly to maritime training. For example, a few recent efforts



concerned with MARAD's holistic perspective are listed as follows:

- The National Sealift Training Program at USMMA to train senior deck officers in sealift support, defense communications and maritime security.
- Implementation of one-day Chemical, Biological, Radiological Defense (CBRD) training for all active high-seas mariners at industry schools and maritime academies.
- Transfers of surplus vessels and marine equipment to Coast Guard approved maritime training schools.
- Seafarers Health Improvement Program (SHIP) Physical Exam Guidelines and Medical Training Standards for seafarers.
- Various research on ship-operator fatigue and alertness, advanced instructional technologies, and human factors.
- Participation in the Department of Transportation's Garrett A. Morgan Technology and Transportation Futures Program aiming at interesting students of all ages in maritime careers and includes active chairmanship and development of the nationwide DOT/Garrett A. Morgan web site for teachers, parents and students (Ref. 1).
- Work with the Propeller Club of the United States to enhance their Adopt-A-Ship educational program (www.marad.dot.gov/adopt_a_ship/)
- Donations of \$300,000 of computer equipment to public schools.

MARAD not only is concerned with training and

education of mariners to meet present operational and safety requirements, but is focused toward the future in recognition of changing maritime technologies and training methodologies and the future use of simulators, whose use is now strongly encouraged by STCW. MARAD pioneered the use of ships' bridge simulators in the U.S. in the early 1970's.

The Computer Aided Operations Research Facility (CAORF), initially operational in 1976 at USMMA, was the first in the U.S., and it provided a research platform to develop appropriate ship bridge training standards for prospective ships' deck officers. Also, in the early part of the last decade MARAD distributed \$7.2 million to the state maritime academies, assisting them in the purchase of training simulators, most being full ship bridge simulators. In 1993 MARAD initiated the Maritime Academy Simulator Committee (MASC), which brought the academies together to address the best approaches to simulator instruction use. MASC has provided useful advancements and developed a model course for maritime academy students, a standard ship bridge simulator instructor training course, and simulator assessment methodology. These standards, for instance, are incorporated by the maritime academies into their program submissions for STCW compliance.

Another MARAD-supported forum that has produced maritime training aids to support STCW standards is the Ship Operations Cooperative Program (SOCP), a government-industry action group initiated by MARAD in October 1992. With strong industry leadership and hard-working collaborative efforts, this group has contributed to many useful areas including education and training (see a separate article regarding the SOCP in this issue of Proceedings).

MARAD and the USCG have worked closely over the years in a highly complementary way on maritime training and standards. One formal relationship goes back to Sept. 6, 1974, with a joint agreement signed by the heads of both agencies, largely in response to several major accidents in marine safety. One of the accidents, the *Esso Brussels/Sea Witch* collision and fire disaster of June 2, 1973, in New York Harbor, resulted in considerable loss of seamen's lives, and vessel and cargo damage. The principles in this agreement are still relevant. One item pertaining to joint oversight indicates that "... joint monitoring of a course will have the beneficial effect of forming a uniform and mutually agreed upon position on issues such as required skills and knowledge, mandatory training, and substitution of training for experience."

The Challenge

Many training providers, including industry schools and maritime academies, were skeptical of the change that STCW represented. It is also true that government representatives, including the author, initially predicted that the STCW requirements would have little impact. On first review of the STCW competencies adopted in London in July 1995, training content did not appear to be substantially different from the ongoing programs available at that time. However, the full impact was obscured; a good assessment of the STCW oversight, accountability and recordkeeping requirements was not made. It was just too new and time was needed to develop effective approaches to oversight. Implementing this new system of training on top of an already excellent full maritime training regime was more than was bargained for by many, the maritime training schools in particular. However, most schools in the U.S. are now accepting the challenge to adjust their programs to meet STCW requirements including several key shifts in focus with provisions for:

- A standard basic training package for entry level seamen,
- Bridge resource management, 70 hour GMDSS, and approved ARPA courses for deck officers, and
- Training in the operation of survival craft for

engineering officers.

Much of the substance of these course requirements was already in place; but the larger effort required by STCW is to implement the oversight mechanisms, including the Training Record Books, and incorporate accountability into performance standards.

MARAD's priority is with the maritime academies. Federal support for the academies is contingent on the ability of the academies to train qualified mates and engineers, and satisfy the training standards promulgated by the Coast Guard, including STCW. Implementation of STCW, in general, is the responsibility of the Coast Guard, but effective implementation at the maritime academies is dependent on a joint MARAD/USCG approach.

Therefore, in the fall of 1998, MARAD agreed to partner with the Coast Guard to provide maritime academy STCW oversight. This resulted in the formation of the "Joint MARAD/USCG Maritime Academy STCW Review Committee" (Committee), which is chaired by MARAD. This Committee includes three Coast Guard expert-members, one from headquarters and two from the National Maritime Center. The Charter of this committee provides a system of oversight to provide Conditional Approval for the core deck officer and marine engineer officer programs, based on formal program submissions from the academies, and Final Approval after completion of on-site audits



including on-site validation of respective program submissions.

As of this writing, the seven maritime academies have all received Conditional Approval and deficiencies with the preliminary program submissions have been resolved. The first site audit will occur at California Maritime Academy in early March 2000. Audit teams appointed by the Review Committee are expected to complete audits of the remaining six institutions by the fall of 2001, in time for compliance with the IMO schedule.

The Opportunities

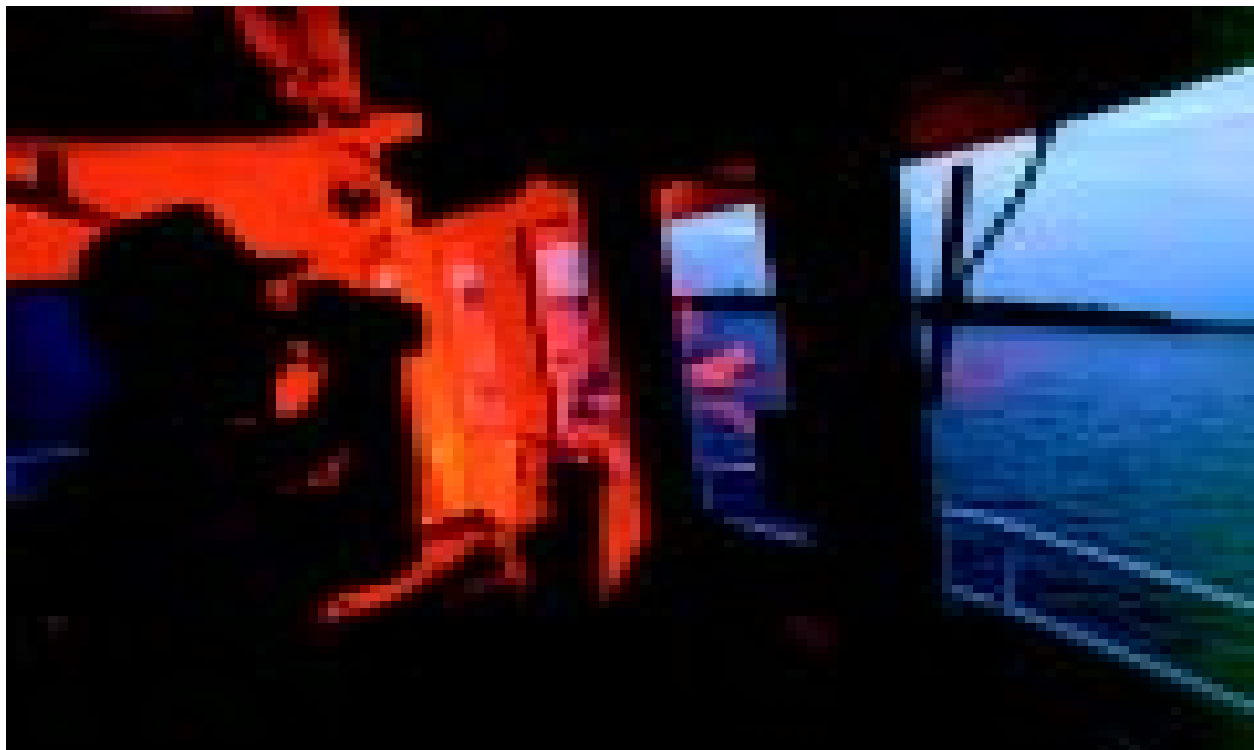
The overall effect of change brought to maritime training programs by implementation of STCW provides opportunity for the future. The U.S. is clearly accepting this challenge as an opportunity for improvement in marine safety and is providing leadership through implementation of STCW, not just on the home front but internationally. One example is the Coast Guard's leadership at the IMO, not only at the Marine Safety Committee level by RADM Robert North, but also at the STW Subcommittee level chaired this past winter for the first time by a U.S. delegate, Mr. Chris Young. MARAD is providing leadership by chairing the maritime academy Review Committee and helping to bridge the academies' transition to the STCW requirements. MARAD also facilitates dialogue and implementation of new technology-based training improvements based on member (government/industry) consensus through programs such as the SOCP.

The long-term benefit is that U.S. seamen will be better trained, safer, and more competitive in all areas of waterborne commerce. U.S. mariners and their training institutions are perceived as world class. STCW compliance will confirm and validate this reputation. The scope of this "opportunity" encompasses not only shipping on the high seas, but also affects U.S. vessel operations on the U.S. coasts, the Great Lakes, and the inland waterways. Many training schools where constituents are not technically bound by STCW are upgrading their programs to STCW standards - good training programs tend to rub off on each other.

The improvements in training and education through STCW changes are significant, especially so because the implementation process has involved many people and raised poignant questions on how to better educate and train U.S. mariners. There are many in U.S. Government and industry who should be complimented on the hard work that has been accomplished in dealing positively and reasonably with the substantial program changes that STCW requires.

Reference:

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The Importance of Industry Consensus Standards to Timely and Effective STCW Implementation*

By Norman W. Lemley, PE,
President, Center for Maritime Leadership

Standardization has a number of purposes; communication among the interested parties and economics are the major ones. Standards communicate the minimum requirements that must be met by all. By knowing the minimums that must be met, competition is based on quality, innovation, timeliness, design, efficient product delivery etc. not delivering less than is expected. Having standards provides a level playing field. This is missing in the STCW implementation arena.

*A paper presented at the Center for Oceans Law and Policy, University of Virginia Law School, Twenty-third Annual Conference held at International Maritime Organization (IMO) headquarters London England, January 6-8, 1999. Co-sponsored by IMO. Reprinted with the permission of the Center for Ocean Law and Policy and Kluwer Law International

The Secretary-General stresses that implementation of IMO instruments is an overarching IMO goal and urges all of the IMO bodies and the maritime community to address implementation on a continuing basis. It is in this spirit that the following discussion, suggestions and recommendations are offered.

Currently there is a significant effort by Administrations and the private sector to implement the 1995 amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW 95). It is a major undertaking. STCW 95 has introduced requirements for mariner licensing and training that are new with respect to the degree of record keeping and accountability. This includes record keeping and accountability for ship operators, training providers, manning agents, and mariners as well, not just flag administrations. All now have a responsibility.

At the same time, the International Safety Management (ISM) Code is being implemented, layering in record keeping and audit requirements that hitherto have not been a part of the mariner licensing process. Taken together and coupled with aggressive port State control boardings, the marine community faces a daunting task. It is suggested that supporting sub-tier standards is the only way that this can be accomplished efficiently.

The STCW lays out a number of requirements, but to accomplish them a number of administrative procedures also need to be developed and followed. Again, these cannot be developed just by flag Administrations. Standardization of a number of the approaches to dealing with the various requirements is called for if ultimately there is to be a level playing field amongst the various signatory nations.

Evolution of Standards

The Load Line, SOLAS, and MARPOL treaties are in reality umbrella documents that set out purpose, intent, and the desired performance in the ship safety and pollution prevention arenas. While there are many technical details in these treaties, they are predicated on the existence of several bodies of additional standards to give effect and meaning to the more general requirements that have been issued as treaty requirements. Most need amplification by flag State regulations as well as ship and equipment specifications and design and performance standards to give them real effect. Fortunately, these amplifying documents exist or have evolved quickly on an as-needed basis in the ship design community.

First and foremost, these treaties assume that vessels

are in class with a “recognized” ship classification society. IMO has requirements that define a “recognized” organization operating on behalf of an Administration. To make this even more clear to all, the SOLAS treaty was recently amended to explicitly require compliance with classification societies’ rules for classification as a condition of meeting SOLAS. Explicitly including “class” as a SOLAS requirement enables flag States and port States to also enforce the detailed industry standards embodied in the class rules. This is a very strong hammer in eliminating substandard ships in that port States can identify problems with class compliance and class societies have greater ability to get substandard ship operators to comply with the class rules.

In the ship design side of marine safety, the key has been having a very large body of industry consensus standards to augment the international and national regulations. As noted, the basics have been the class society rules, but these are augmented by a major body of standards for basic construction materials, for pipe, pressure vessels, threading, and equipment specifications to name but a few. No ship could be built or operated without these industry standards. No regulatory body could develop and maintain them alone.

The SOLAS 60 fire protection regulations for non-combustible materials were an example of this. SOLAS 60 specified non-combustible materials for certain passenger ships and cargo ships. This was a major concern but not all Administrations defined it the same in their national regulations. Following some major fire disasters, passenger ships were being held up by some port States because some insulation was said not to meet the SOLAS standards. Tests would show many so-called non-combustible materials to be combustible.

This situation could not be allowed to continue as long as it was too disruptive to trade. The IMO Fire Protection Subcommittee formed a sub group to work with the ISO Fire Protection Committee to quickly develop an agreed non-combustibility test method that could be referenced in SOLAS. The two groups of experts worked together to achieve a needed internationally agreed standard. It was accomplished and the ISO standard is now referenced in SOLAS Chapter II-2. Without this, the ease of movement of cruise ships, among ports would not be possible, not to mention the significant increase in fire safety that was achieved.

There is a similar critical need for supporting standards if the goals of STCW 95 are to be achieved. STCW 95 was set up to eliminate substandard administrations and ship operators in the personnel licensing and manning arena.

STCW 95, like SOLAS, Load Line and MARPOL, cannot do it on its own strength alone. Unfortunately, no body of commonly agreed specifications, processes, procedures, and guidelines exists. IMO has taken some steps to assist as evidenced by the IMO model courses. While valuable as a starting point, they have not kept pace with need. The IMO courses were created on an ad hoc basis without an established mechanism for improvement or updating and without industry-wide input. Their value is the example set as to what is needed in this and other STCW areas, for example, terminology, document format, training record book content and format, skill assessment criteria, medical record content and format, model course outlines, etc.

A Need for Standardization

There needs to be STCW implementation standards and common procedures. They are needed by the training providers, ship operators, ships' officers, mariners, and by the flag and port State Administrations. This has become very obvious working on STCW implementation issues. Common standards will become even more important with the introduction of the Administrations acceptance of third party organizations evaluating providers.

Course development and approval is a long and tedious process, and an unsure one. There are no clear-cut standards against which courses are evaluated by the Administrations or third party QSS organizations. This makes for considerable extra work and frustration for both the maritime education and training (MET) community and the various flag States charged with administering and enforcing the STCW requirements.

This situation ought not continue. In the past, there was not an identified need, and the flag States and the industry did not foster development of standards in this area as was done in the ship design community. The welcome if belated recognition of the importance of the "human element" changes the situation. The SOLAS treaty and the implementing flag State Administration ship design regulations, shipyard standards, and third party standards are basically technical standards on how to build and operate a ship. STCW is half of the same type of regulatory regime. What is missing is the set of standards that address the details of how to meet the overarching STCW intent.

The value of standards in the ship design and operation is readily apparent. It would not be possible for the ship design world to operate without standards.

Indeed, it is not possible for most commercial activities to function without common industry standards.

A look through the ISO and American Society for Testing and Materials (ASTM) index of standards will demonstrate the importance of standards, from steel specifications, concrete formulations, and fire testing, to the more complex engineering systems. These are given in a variety of forms, standard specifications, standard procedures and standard guidelines.

When taken together with the ISM documentation requirements, full compliance with the intent of the STCW 95 by ship owners and ship managers is virtually impossible without a verifiable source of accurate data on mariners. Mariners need a credible record of their training and experience; shipmasters will need an easily accessible information source to satisfy port State control officers as to training of crewmembers. Mariner training organizations and crewing agencies will need a credible mechanism to assure that their students and clients meet the needs of shipping companies from the training and competency perspective. Port State control officers will need this information in an easily understood format to minimize disruption to ship operations while carrying out their duties. Shipping companies will need such data to be able to crew their ships properly and to be assured that they are able to trade in and out of ports with a minimum of disruption

This clearly cries out for standardization of training record presentation. English is specified as the maritime language. Communication is the key to all endeavors and maritime operations are no exception. Emergencies clearly need to be handled with mutual understanding by all participants. The irony is that poor communication or misunderstanding during routine daily activity is how emergencies evolve. So, the need for common usage of phrases and terms is critical for routine ops as well.

This process of standardization has begun. International Shipping Federation has some very valuable maritime English video model courses that maritime and ship operators can use. Similarly, there are some standard marine communications phrases under test in a number of places. Both could serve as a basis for consensus standards. A taxonomy of marine terms recognized by IMO and used by the mariners and MET community would also be of value.

In a similar vein, common terms need to be developed and agreed by the training providers and the Administrations dealing with approval of courses and monitoring of their execution. For example, "assessment" needs to be understood and have the same components

for all as does the term “shipboard training.” Recent experience has demonstrated that very differing understanding exists for a large number of STCW terms. This can and does result in an uneven playing field for those involved. Standards and clear definition of terms will minimize this. A taxonomy of STCW terms recognized by IMO and used by Administrations and training providers is needed.

This is a great opportunity for the MET community to become leaders in their own field. Who better than those faced with providing the product? This is what government/private sector partnership is all about. More and more, the government needs to be in a mode of facilitating industry in doing what the industry does and helping them to do it well and with quality. While this is a good philosophy, declining budgets say this is the way to go and it has been the pattern for the past ten years.

In the United States, OMB Circular A-119, revised February 1998, sets this philosophy out for the Federal Government. Its title is “Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities”.

There are number of standards bodies utilized by the shipbuilding industry plus there are many shipyard standards and common industry written practices and procedures. International standards are referenced commonly in IMO guidelines. This is surely appropriate for STCW as well.

ISO TC-8, Ship Design and Marine Technology Committee clearly could serve a good purpose and would be an excellent home for any MET standards that would be developed. ISO TC-8 management has expressed willingness to form a MET subcommittee.

In the United States ASTM F-25, Ship Design and Marine Technology Committee is the entry point to ISO TC-8, for ship design and marine technology standards. There is a similar mechanism in other countries as well.

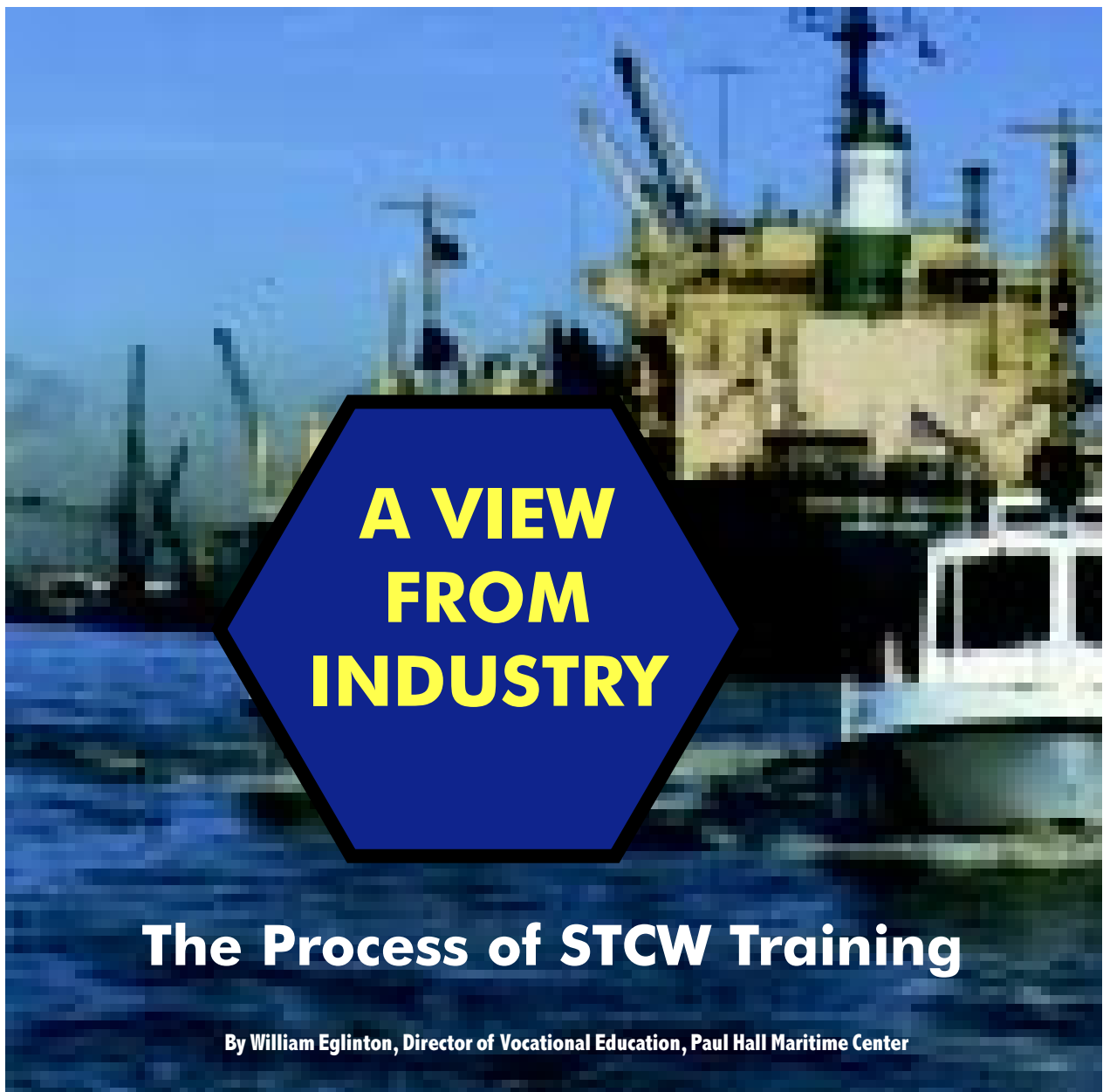
ISO TC-8 MET standards could be recognized by IMO. This would permit IMO to reference the detailed STCW implementation standards that it would not be able to develop easily as IMO documents. This approach is common in the ship design activities of IMO.

An ISO TC-8 member sits as the ISO representative at a number of IMO technical committees and could also sit at the STW Subcommittee. When MET issues are before IMO, an ISO TC-8 MET Subcommittee member could be on the ISO delegation and provide insight on application of STCW provisions at the training provider level as well as suggestions where standardization would serve the common interest.

In summary, the next stage of focusing on the human element is development of the associated industry consensus standards. A body of second- and third-tier standards is necessary to fully and effectively implement STCW 95. Recommendations are given in the table below:

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- IMO, Administrations, shipping companies and training providers must work together to develop a body of standards that will serve their common needs.
- Experts outside the marine field, such as competency assessment experts, need to be included in this effort.
- The MET providers should approach the ISO TC-8 Chairman and request that TC-8 form a MET Subcommittee.
- A video or CD ROM STW tutorial needs to be developed and given wide circulation. It may be appropriate to develop a family of products from a number of perspectives, i.e., flag State, port State, mariners, shipping companies, and training providers.
- IMO STCW Subcommittee develop a list of subjects and areas where ISO TC-8 or other third party organization’s standards, processes, procedures or guidelines would aid Administrations and the marine community in implementing STCW 95.
- IMO actively encourage Administrations to work collectively to develop commonly agreed approaches to STCW implementation.
- IMO invite ISO to form a MET Subcommittee under the auspices of ISO TC-8, Ship Design and Marine Technology Committee.
- IMO provide a liaison member to the ISO TC-8 MET subcommittee.
- IMO encourage development of marine English courses.
- IMO encourage development of taxonomy of marine terms with ultimate recognition by IMO and use by the MET community.
- IMO encourage development of a taxonomy of STCW terms recognized by IMO and used by Administrations and training providers.



A VIEW FROM INDUSTRY

The Process of STCW Training

By William Eglinton, Director of Vocational Education, Paul Hall Maritime Center

For decades, the U.S. Coast Guard has required candidates for licensed service in the merchant marine, as either a Third Mate or Third Assistant Engineer, to satisfy three basic requirements:

- obtain an appropriate document as an unlicensed rating (Able Seaman or Qualified Member of the Engine Department respectively),
- work aboard ship in the appropriate capacity while holding either of the documents for a minimum of three years to acquire the appropriate knowledge and skill, and
- pass a professional examination to be issued their licenses as either deck or engineering officers.

This system is dependent upon on-the-job training,

which produces skilled personnel at the previous level who have the knowledge required at the next level but not necessarily the skills. After being licensed, it was only during the following period of required sea service for upgrading did the individual acquire the skill of the current license.

The world maritime community, through the adoption of the International Convention on STCW, is now requiring a significant change to the U.S. licensing system that had been used to verify candidate competency. A critical addition in refocusing the determination of competency is for the individual to show proficiency in each of the skills identified as necessary to be an officer in charge of the watch prior to taking up

those duties. In order for a candidate to qualify as either an Officer in Charge of a Navigational Watch or Officer in Charge of an Engineering Watch, each candidate must now complete approved professional mariner training and successfully demonstrate the relevant acquisition of both knowledge and skills.

The STCW Code identifies the qualifications and the competencies that must be satisfied for a candidate to be certified as either a deck or engineering officer in charge of the watch. In addition to training, the Code also identifies the demonstrations of skills that must be recorded in a Training Record Book (TRB) by a Qualified Instructor and Assessor when those tasks have been successfully completed.

In response to the diversity and availability of training resources throughout the worldwide maritime community, STCW provides flexibility in the application and implementation of the requirements. For each competency that is to be satisfied, the Code identifies the one or more of the following methods that can be used in the training process to confirm that the skills and knowledge have been acquired by the candidate:

1. Approved in-service experience – service obtained aboard ship during which an approved program of training, examination and assessment of skills has been reviewed and deemed acceptable to achieve the performance outcome of the candidate.
2. Approved training ship experience - service obtained aboard ship designated to reinforce the training of a group of candidates which has been reviewed and deemed acceptable to achieve the performance outcome of the candidates during an approved program of training, or segments of training of an entire training program are administered examinations and skills are assessed.
3. Approved simulator training, where appropriate – an approved program of training that has been reviewed and deemed acceptable to achieve the performance outcome of the candidate, incorporating a computer generated and graphic presentation of events to reinforce knowledge, practice and assess skills as would be experienced and potentially obtained aboard ship.
4. Approved laboratory equipment training – a

specific element of formal exercises presented as part of an approved program of training that has been reviewed and deemed acceptable to achieve the performance outcome of the candidate as experienced and potentially obtained aboard ship, representing shipboard equipment or systems used to reinforce knowledge, practice and assess skills.

While the documentation necessary to support the presentation of the individual competencies is detailed and complex, the elements of the entire process are simple and straightforward. These elements include:

- Approval of a candidate-training program by the Coast Guard as having satisfied all requirements of STCW,
- Development of a TRB for all candidates training to become an officer of the watch, indicating all of the competencies listed in Table A-II/1 or A-III/1 of the STCW Code to be completed by the candidate, and
- Demonstrations of each competency must be

before a qualified instructor or assessor who signs off in the TRB.

The Coast Guard must also determine that all candidates applying for approval as qualified instructors or assessors have the knowledge, professional skills, operational experience, and appropriate training in instructional techniques and/or assessment.

Approval of Training

The STCW allows for all training to be provided through approved in-service experience aboard ship. However, there is an alternative method to implementing theoretical knowledge. Theoretical knowledge can be presented through shoreside training, as long as that training is reinforced and applied in a practical manner. This training and knowledge must be developed into related skills, while completing additional approved training ship experience, or other approved experience on board sea going vessels.

Unlike the U.S. regulations that provide a process to move from an unlicensed rate to that of a licensed officer, the STCW Code has been perceived as not directly



providing a ladder of upward mobility. This has caused some concern in the U.S., since this has been an integral ingredient in the process of developing licensed officers. As the emphasis on training takes root, the overall process can be adapted to that of the traditional U.S. system. On the one hand, a three-year training program, including minimum sea service, appears to be the preferred method by which candidates for Officer in Charge of the Watch will be trained and deemed competent. Ostensibly, the abilities and tasks traditionally required of the unlicensed ratings are incorporated into the training programs. Therefore, it is not unreasonable to consider that individuals choosing to enter into seafaring as an unlicensed rating are also required to obtain competency through training, and will continue to obtain additional training identified in a three-year training program.

Regardless of the overall process of training, the performance outcome of each candidate is required to be the same. Consequently, an erroneous assumption has been made throughout the U.S. maritime industry that only the latter form of training needs review and approval. However, it is not only essential, but required for a program of in-service experience to be reviewed and approved. This process of review verifies that the candidate has not merely been to sea for a prescribed period of time, but also ensures that the candidate has been given appropriate instruction, opportunities to practice the procedures to develop skills, and has been assessed in the competencies and skills identified in the Code Tables.

Approved Training Record Book

The STCW requires candidates for an officer in charge of either a deck or engine room watch to complete a Training Record Book (TRB), verifying that all training and demonstrated skills have been successfully performed. Therefore, the TRB must reflect every aspect of the training program to be completed. In addition to the candidate's biographic information and the historic information of the vessels served (including that of qualified instructors and assessors), the TRB must contain all competencies deemed necessary to fully develop a deck or engineering officer in charge of a watch.

While the tables in Section A of the Code identify the overall competencies to be satisfied, each competency requires support by a vast and detailed numbered of theories. In addition, the candidate is required to develop specific skills or proficiencies that indicate competent, outcome-based performance.

Approved Instructors and Assessors

An essential ingredient in the process of developing competent ship's officers is the training and assessment of candidates by qualified instructors and assessors. At a minimum, these individuals must have the required knowledge and experience in the duties for which training and assessment will be conducted. The Coast Guard has determined that a valid license will be used as an initial indication that this base requirement has been fulfilled. An exception to this requirement involves those subjects that are not dedicated to professional maritime subjects, i.e. fire fighting, mathematics, etc. Another exception takes into account individuals who

have had military experience comparable to the knowledge and skills at the level to be taught. In addition, all individuals applying for approval as a qualified instructor or assessor are required to have training in instructional techniques. Assessors must have classroom instructional experience, including the development and administering of tests as a means to prepare themselves to conduct the essential assessments of practical skill demonstrations.

An integral part of the training and assessment process is that every aspect of the process to gain approval must be supported by organized and detailed information that upholds the entire training process. Examples of the details, format, definitions, outcome performance, etc. to be incorporated in the development of training, have been uniformly set forth through numerous model courses published by the International Maritime Organization. These models have been helpful to everyone having a vested interest in maritime training and required to submit training courses and programs for approval.

Just as instructors assemble the required documentation representing the breadth and depth of training to be given to candidates, assessors are required



to submit their entire documented process as to how they will assess the performance of a practical demonstration. To a certain extent, the qualified instructor has an easier task than that of the assessor. Not only does the instructor have a significant amount of resources from which to draw in developing a training program, but when it is necessary to examine their students, ostensibly through written examinations, the instructor has a lifetime of testing concepts from which to model his or her examinations. The assessor, on the other hand does not necessarily have a similar amount of experiential resources from which to draw. Many experienced instructors will confidently claim, "I can tell when my students are performing well." Not wanting to deny the experienced instructor his or her due, the keynote of the statement is *when they are doing well*. Regrettably, there are several problems with this perception. First, this method of assessment relies upon a process based upon the assessor's observation and the subjective interpretation of the candidate's performance. Secondly, it is recognized that those candidates who have grasped the process and easily complete the required demonstrations will be readily recognized in their performance. Those candidates who are not as adept and have had difficulty in grasping the simplest of concepts or routines are fairly easy to recognize by their inept performance. But the vast majority of students will fall in between these extremes; while perhaps performing most of the sub-routines properly, their performance will leave doubt in the casual observer's mind. Without sufficiently developed assessment criteria, the assessor will be hard pressed to note, pin point, and assist the candidate in improving his or her skills where they are deficient.

In addition to identifying the overall competency to be assessed, the assessment criteria must identify the specific, demonstrable proficiencies, or performance objectives. To complete the development of appropriate assessment criteria, performance measures and performance standards must be identified to provide successful judging of the demonstrations. A *performance measure* identifies how a candidate's performance is observed and recorded. The *performance standard* is the level of a performance measure that is established as an acceptable target level.

In the following example, the candidate is required to demonstrate competency in extinguishing fires. This competency requires several tasks or proficiencies to be demonstrated before the candidate can be considered competent. One task requires the candidate to extinguish a "small" fire. The *performance measure* will be to "Demonstrate the extinguishing of a small grease pan fire."

To be effective, the candidate will have to extinguish the grease pan fire within acceptable standards. Therefore, the *performance standards* for this proficiency will be established as:

- Step 1** Upon discovery of the grease pan fire, will locate and remove from its mounting bracket, a class B extinguisher within 30 seconds.
- Step 2** Grasp the extinguisher by its handle.
- Step 3** Remove the locking pin from the squeeze grip handle within 15 seconds.
- Step 4** Remove the discharge horn from its bracket attached to the extinguisher within 15 seconds.
- Step 5** Aim the horn at the base of the fire and squeeze the handle together to release the extinguishing medium, moving the horn quickly across the pan's surface until the fire is extinguished, not to exceed 60 seconds.
- Step 6** Observe for re-ignition for 30 seconds before proclaiming the fire to be "out".

While this operation is a fairly straightforward process, the example is primarily provided to relate the development of the assessment criteria and the relationship of terms and the associated processes. In order for the assessor to accurately and consistently determine this and other practical demonstrations, each set of assessment criteria will need to be developed for all proficiencies identified to be performed to establish that a skill has been acquired.

Whether the assessor is associated with a formal comprehensive training program or as an independent assessor, complete sets of assessment criteria must be developed for every practical demonstration identified as skill required of a fully competent officer in charge of a watch. Due to the diversity of the U.S. maritime industry, the Coast Guard has initiated an effort to develop all applicable assessment criteria through the Merchant Personnel Advisory Committee. The criteria, once developed as objective shipboard assessments of practical demonstrations, will then be available for use by any training organization or individual. They may be modified as necessary to conform to ship specific conditions, simulators, static equipment displays, etc. Although assessment criteria may be developed independently, the intent of the exercise is to assure that each and every mariner completing a practical skill demonstration will be uniformly assessed at the same level of competency regardless of the training program completed. ^F



Photo courtesy of Marine Expeditions, Inc.

STCW-95: Officer in Charge of a Navigational Watch

By LTJG Tamara Wilcox, U.S. Coast Guard, National Maritime Center, Arlington, Virginia

The International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers, 1978, as amended (STCW) brought with it a substantial change in the licensing process for mariners. STCW is a product of the International Maritime Organization (IMO). The IMO is comprised of representatives of governments (or parties) from maritime countries. In 1969 the IMO began the process of deciding what to do about mitigating the human factor in maritime disasters.

First published in 1978, STCW was well intentioned, but fell short in effecting change. Each country was required merely to announce that its system of measuring a mariner's competence (i.e.; that the mariner was properly qualified to do his or her job) met the requirements of the Convention. The world continued

with hardly a sideways glance. With this in mind, the parties convened again and published extensive amendments in 1995. The original Convention is now commonly referred to as STCW-78, and as amended it is referred to as STCW-95. To date over 133 nations representing 98% of the world's shipping have adopted the STCW, as amended.

STCW-95 requires countries to show, in a detailed report to the parties of the Convention, that their system of measuring competence meets with the terms of STCW-95. In addition to this initial report, countries must submit follow-up reviews every 5 years. In support of both STCW-78 and STCW-95, countries are required to issue certificates to mariners who have met the terms of the Convention as applied in that country. In the United States

these certificates are called the STCW-78 form and STCW-95 form, respectively. Though the terms of STCW apply to a broad range of mariners, this article will examine the details of applying for an STCW-95 form for an Officer in Charge of a Navigational Watch.

Unraveling the seemingly expansive mystery of STCW comes down to acquiring a basic understanding of the

The 1995 amendments to the STCW completely revised the process by which a mariner becomes qualified for an STCW form.

necessity for it as well as its organization. STCW-95 is broken into two parts, the Convention and the Code.

The Convention is an overview that explains the who, what, where, and when of its stated desire to “promote safety of life and property at sea and the protection of the marine environment by establishing, in common agreement, international

standards of training, certification and watchkeeping of seafarers.” The STCW Code, which is further broken into part A and part B, essentially outlines the “how”. Part A of the Code details “the minimum standards required to be maintained by Parties.” They require more formal training as well as practical demonstrations of competency in many of the skills required of a mariner. Ultimately this section is the main concern of the individual mariner, as it looks closely at each required competency. Part B is “recommended guidance intended to assist Parties and those involved in implementing, applying or enforcing its measures to give the Convention full and complete effect.” As stated in Part B, “the measures suggested are not mandatory, and the examples given are only intended to illustrate how certain Convention requirements may be complied with.”

Let’s talk about how the current domestic licensing process and STCW requirements relate to each other. Simply stated, any mariner who begins the service or training for a license or endorsement to a Merchant Mariner Document (MMD) to which the STCW applies must meet the STCW’s requirements. The United States applied the terms of the Convention to all sea-going vessels of 100 gross register tons (GRT) inspected as passenger vessels, vessels of 200 or more GRT inspected as other than passenger vessels, and most vessels of any tonnage on international voyages operating seaward of the boundary line with the exception of vessels subject to sovereign

immunity (warships etc), fishing vessels, pleasure yachts not engaged in trade, and wooden ships of primitive build.

You can see that we must consider when the mariner began service or training to determine which STCW requirements he or she must comply with and which form will be issued (78 or 95). If the mariner began his or her service or training before August 1, 1998, then the mariner must only meet the licensing requirements that existed before the 1995 amendments. These regulations meet the STCW-78 requirements and the mariner will be issued an STCW-78 form with an expiration date of January 31, 2002.

Until February 1, 2002, a mariner may serve with an STCW-78 form provided the mariner can also prove to an employer proficiency in the four elements included in basic safety training (BST). After that date the STCW-78 forms become invalid, and the mariner must qualify for an STCW-95 form. To do this the mariner must complete training and practical assessments of skills in areas where the STCW-78 differs from the

No matter when a mariner began the service or training to qualify for a credential, effective February 1, 2002, every mariner must comply with STCW-95.

STCW-95. These are called “gap-closing requirements.” If the mariner began service or training on or after August 1, 1998, he or she must comply with all requirements in STCW-95.

The U.S. Coast Guard, working with the Merchant Marine Personnel Advisory Committee, is developing performance measures and standards that will be used by designated examiners to determine the mariner’s competence through practical demonstration. For Officer in Charge of a Navigation Watch these skills are outlined in Section A-II/1 of the STCW Code. Once the performance measures are completed they will be published for general information with appropriate notification about their implementation, and the mariner may comply with them either by being evaluated by designated examiners, as mentioned above, or completing a U.S. Coast Guard approved or accepted training program.

Officer in Charge of a Navigational Watch encompasses the traditional U.S. licenses of 3rd and 2nd mate. A Deck Officer, having started service before August 1, 1998, currently sailing with an STCW-78 form, and seeking this distinction on an STCW-95 form must complete the gap closing requirements. In addition to the four

elements of BST, this mariner must demonstrate proficiency in survival craft and rescue boats, Bridge Resource Management (BRM), and for Deck Officers serving on ships so equipped, training courses in Advanced Radar Plotting Aid (ARPA) and Global Maritime Distress and Safety System (GMDSS).

The four elements of BST are personal survival techniques, fire prevention, first aid, and personal safety and social responsibilities. Each element may be completed separately, and thus the mariner may present four different proofs of competency, one for each element. BRM refers to the effective teamwork of personnel on the vessel's bridge who are engaged in directing and controlling the vessel's movements. A mariner may comply with these requirements by completing a U.S. Coast Guard approved or accepted course or satisfactorily demonstrating competence to a designated examiner.

Mariners working on ships equipped with ARPA and GMDSS must have formal training and assessment in the use of this equipment. For both, this means attending a U.S. Coast Guard approved or accepted course. In addition, GMDSS qualification requires an appropriate license issued by the Federal Communications Commission. If this training is not completed the mariner's STCW form will be annotated to limit their service to vessels not equipped with these systems.

A mariner seeking a U.S. license as 3rd mate and qualification as Officer in Charge of a Navigation Watch and having started service after August 1, 1998, must meet both the STCW-95 requirements for Officer in Charge of a Navigational Watch, as specified in Regulation II/1 of the STCW Convention, and the domestic license requirements. For the mariner this means they will be evaluated according to current domestic requirements for medical, character, and sea service standards. The mariner will also be required to be in an approved training program, demonstrate practical skills (as outlined in Chapter II Section A-II/1) and take a U.S. Coast Guard examination based on STCW requirements.

The practical skills for the general requirements of Officer in Charge of a Navigational Watch, as outlined in Chapter II Section A-II/1, relate to navigation, cargo handling and stowage, and controlling the operation of the ship and care for persons on board.

In addition to the general requirements for Officer in Charge of a Navigational Watch, there are some special requirements for personnel serving on certain types of ships. These are outlined in Chapter V Section A-V of the STCW Code. Section A-V/1, 2, and 3 cover mandatory minimum requirements for personnel serving on tankers,

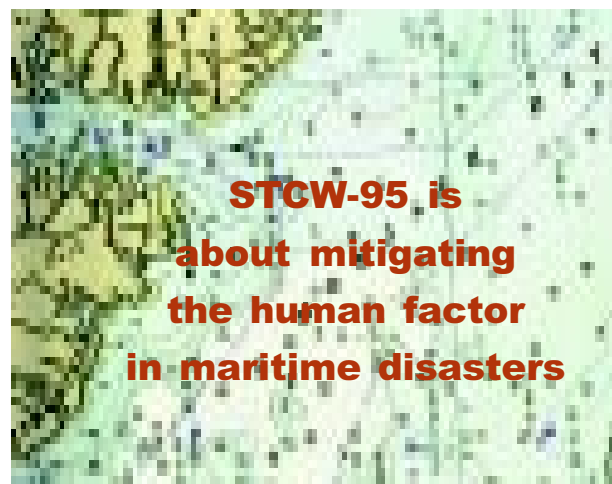
RO-RO passenger ships and passenger ships other than RO-RO passenger ships respectively. It is important to note that none of this training will be endorsed on either the license or STCW form. A mariner must carry proof of having completed this training either in the form of a course completion certificate from an approved or accepted course or certification from a designated examiner attesting to the mariner's proficiency.

All personnel serving on tank ships must complete a tanker familiarization course. Depending on what type of tank ship the mariner serves, there are additional requirements for training in the handling of oil, chemical, and liquefied gas. On RO-RO passenger ships as well as passenger ships inspected as other than RO-RO passenger ships an Officer in Charge of a Navigational Watch must complete special training in assisting passengers, crowd control, and passenger safety.

Licensed officers are already qualified as proficient in medical first aid under the STCW-95 as it is a basic requirement in qualifying for an officer's license. Others may qualify for an endorsement as "medical first aid provider" on an MMD by completing a training course approved or accepted as meeting the requirements for that qualification. Persons who desire to qualify for an endorsement on an MMD as "PIC medical care" must complete all of the required training approved or accepted as meeting the requirements for that qualification.

Once an STCW-95 form is acquired the only periodic refresher training required is in BST and the special requirements associated with RO-RO passenger ships. Each of these elements are valid for 5 years and certificates of course completion or examination by a designated examiner are required in order to renew the STCW-95 form.

If you have questions concerning qualifying for an STCW form you may visit the National Maritime Center STCW homepage at www.uscg.mil/STCW/.





UNDERSTANDING BASIC SAFETY TRAINING

*How I Learned to Stop Worrying
and Love the STCW*

By Stewart Walker, U.S. Coast Guard National Maritime Center, Arlington, Virginia

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended (STCW) requires both initial and ongoing safety training for most mariners. The requirements for basic safety training, commonly known as BST, have been a source of widespread comment and confusion to many mariners. Typical questions about BST include:

- “Why do I have to have this training?”
- “Is it good forever?”
- “How do I prove that I’ve completed this training?”

Hopefully, this article will answer these questions, and many others as well.

The STCW requires that every seafarer “employed or engaged in any capacity on board ship on the business of that ship as part of the ship’s complement with designated safety or pollution-prevention duties in the operation of the ship shall, before being assigned to any shipboard duties, receive appropriate approved basic training or instruction in:”

- (1) Personal survival techniques;
- (2) Fire prevention and fire fighting;
- (3) Elementary first aid; and
- (4) Personal safety and social responsibilities.

Let’s take a closer look to see exactly to whom these requirements apply. The first phrase requires seafarers “employed or engaged in any capacity on board a ship on the business of that ship as part of the ship’s complement.” This excludes persons such as a contract maintenance person who are not part of the ship’s crew or passengers.

Attention is focused on the vessel’s crew and that attention is not limited to any specific department - deck, engine, maintenance, and stewards department personnel are all affected. However, the next phrase limits the requirement for completion of BST to those who have “designated safety or pollution-prevention duties in operation of the ship.” U.S. regulations, Title 46, Code of Federal Regulations, Section 15.1105(c), clarify the STCW’s language. The regulations make the requirement for BST apply to everyone who is “...serving in a position that must be filled as part of the regular crew complement or who is assigned a responsibility on the muster list...” For most seagoing, U. S.-flag vessels, this will include everyone on board. Exceptions may exist if a mariner is not assigned emergency duties on the station bill. A typical example is an emergency duty to muster at the abandon ship station. This is an emergency duty sometimes assigned to entertainers, musicians, croupiers, and other non-professional mariners found on passenger vessels. These persons are not required to have BST, but they are required to have familiarization training which is outside the scope of this article¹.

BST actually includes the four separate training elements as noted above. A mariner must have been trained or instructed in each of these elements before being assigned to shipboard duties. The STCW contains tables showing the specific pieces of knowledge or practical skills,

¹. Information on familiarization training is located in the STCW Code, Section A-VI/1 and 46 CFR 15.1105.

sometimes referred to as “competencies” that relate to each of the elements. Each competency is subdivided into separate components of knowledge, understanding and/or proficiency (KUP) that apply to that competency. The KUPs establish the scope of the training required for each competency.

As an example of this hierarchy, Table A-VI/1-1, the standards for competence in personal survival, is shown in Figure 1 on the next page. For a seafarer to prove competence in this element of BST, he or she must demonstrate the appropriate knowledge, understanding and/or proficiency listed in Column 2 of the table. Column 3 provides information about the methods by which a seafarer may demonstrate the knowledge, understanding, or proficiency, while column 4 establishes the criteria for evaluating that competence. The STCW contains similar tables for each of the other elements of BST.

The table does not include the standards of measurement of how a proficiency is measured. A standard of measurement is an established standard of how a person’s ability to perform a given task is assessed. The standards of measurement will be used by assessors to determine if a seafarer can safely and effectively perform the necessary tasks or demonstrate the knowledge required to prove competency. For example, some of the standards of measurement to demonstrate competency in the use of equipment in a liferaft could include locating the equipment and demonstrating the proper and safe use of the equipment within a stated time limit.

Once a mariner has completed the requirements for proof of competency in BST, he or she will receive documentation attesting to the completion of the training. The mariner should provide that information to the master at sign-on or to the vessel’s operator when hired. The vessel’s operator has the responsibility to ensure that every mariner employed on the vessel has the proper safety training. A mariner must also prove completion of BST within the past five years when applying to the Coast Guard for a license or merchant mariner’s document where STCW certification is also required.

The requirements for a seafarer to be trained in BST became effective on Feb. 1, 1997. While there are provisions to permit existing seafarers to continue to serve without the training, many mariners immediately needed proof of training in BST. In February 1997, there were no approved courses available and, even if there were, the training providers would have been swamped by the demand for this training. Several alternative schemes were accepted to permit a seafarer to demonstrate competency in BST by using the talents and skills of the officers on board ship as the assessors. A summary of these

alternative schemes was published in the National Maritime Center’s Policy Letter 5-99, Evidence of Completion of Basic Safety Training (BST), and is available through the World Wide Web at www.uscg.mil/hq/g-m/marper/pers.htm. Some of these temporary schemes have already expired; others will become outdated in the near future.

Because of the diversity of temporary schemes by which a mariner could be assessed for competency in BST, several different methods can be used to prove competency. These include a letter from the vessel’s master and signed check-off lists. Some unions use a record of training in which all of a mariner’s training is recorded. An entry in a record of training is acceptable proof for all training provided by the agency that maintains the record of training. Another common proof of competence is a course completion certificate from a Coast Guard approved or accepted course. Policy Letter 5-99 provides information about other acceptable proofs. In most instances, these proofs of competency from an interim scheme are valid for five years. At renewal these temporary schemes will have expired, and the mariner will be required to attend a Coast Guard-approved or accepted refresher course. Upon successful completion of the course, the mariner will be issued a course completion certificate or have an entry placed in a record of training.

Each element of BST is valid for only five years from the date it was last completed and must be valid for the entire course of the intended voyage for a mariner to remain part of a vessel’s crew. Mariners who complete all four elements at one time for the original qualification, find it easy to remember when refresher training will be required. Mariners who complete the training in a piecemeal fashion, with the elements having widely separated expiration dates, must be extra careful to ensure all dates are valid. To renew each element of BST, the mariner must demonstrate continued competence in the proficiency or proficiencies that apply to the element. The present renewal method is the satisfactory completion of a Coast Guard-approved training course that leads to proof of continued proficiency in the elements of BST. Other methods may become available as full implementation of the STCW occurs.

BST is an important step for the entry-level mariner. It provides the initial training in the areas essential for the protection of the mariner, the crew, and the vessel. BST applies to every mariner, no matter at what level the mariner is serving. Without this basic training, the new mariner is extremely vulnerable if an emergency occurs shortly after the mariner reports to his or her first vessel. For the seasoned mariner, it provides recurring training in the basics of safety. F

Table A-VI/1-1
Specification of minimum standards of competence
in personal survival techniques

<u>Competence</u>	<u>Knowledge, understanding and proficiency</u>	<u>Methods for demonstrating competence</u>	<u>Criteria for evaluating competence</u>
Survival at sea in the event of ship abandonment	<p>Types of emergency situations which may occur, such as collision, fire, foundering</p> <p>Types of life-saving appliances normally carried on ships</p> <p>Equipment in survival craft</p> <p>Location of personal life-saving appliances</p> <p>Principles concerning survival, including:</p> <ol style="list-style-type: none"> 1. Value of training and drills 2. Personal protective clothing and equipment 3. Need to be ready for any emergency 4. Actions taken when called to survival craft stations 5. Actions to be taken when required to abandon ship 6. Actions to be taken when in the water 7. Actions to be taken when aboard a survival craft 8. Main dangers to survivors 	<p>Assessment of evidence obtained from approved instruction or during attendance at an approved course or approved in-service experience and examination, including practical demonstration of competence to:</p> <ol style="list-style-type: none"> 1. Don a lifejacket 2. Don and use an immersion suit 3. Safely jump from a height into the water 4. Right an inverted liferaft while wearing a lifejacket 5. Swim while wearing a lifejacket 6. Keep afloat without a lifejacket 7. Board a survival craft from ship and water while wearing a lifejacket 8. Take initial actions on boarding survival craft to enhance chance of survival 9. Stream a drogue or sea-anchor 10. Operate survival craft equipment 11. Operate location devices, including radio equipment 	<p>Action taken on identifying muster signals is appropriate to the prevailing circumstance and conditions and minimize potential dangers and threats to survival</p> <p>The timing and sequence of individual actions are appropriate to the prevailing circumstance and conditions and minimize potential dangers and threats to survival</p> <p>Method of boarding survival craft is appropriate and avoids dangers to other survivors</p> <p>Initial actions after leaving the ship and procedures and actions in water minimize threats to survival</p>

Figure 1

A person wearing a yellow and black survival suit is in a pool of water. The person is holding a red and white life preserver. The background is a blurred blue and white, suggesting an outdoor pool setting.

STCW

Basic

Safety

Training To Save Your Life

by Michael Carr, Instructor, Marine Weather & Safety Maritime Institute of Technology & Graduate Studies (MITAGS)

Valuable benefits to mariners can be found in the amendments to the International Convention on Standards of Training Certification and Watchkeeping for Seafarers, 1978 (STCW), required under the 1995 Basic Safety Training (BST). The initial training ensures that all mariners possess the “basic” skills needed to properly perform their safety duties. In addition, the five-year renewal requirement keeps mariners abreast of the latest advances in safety techniques and equipment.

There are numerous past marine accidents validating the need for basic safety training. The U.S. Coast Guard Blackthorn collision in Tampa FL, and the M/V Marine Electric sinking off the U.S. East Coast were glaring examples of shipboard crews that lack these safety skills.

The Maritime Institute of Technology and Graduate Studies (MITAGS) Basic Safety Training spans five days, and takes mariners through four modules: personal survival techniques; personal safety and social responsibility; first aid; and firefighting. STCW’s fundamental “show me” philosophy makes these modules much more than just classroom lectures.

STCW requires successful completion of specific skills under designated conditions and within specific time constraints. For example, survival suit skills involves students inspecting and packing a survival suit, donning it in less than five minutes, and properly entering a pool.

After entering the pool, the students swim to a liferaft where they climb inside. Once inside the raft, they assist in pulling aboard a simulated injured person. Pulling an injured person into a liferaft is no easy task, especially when wearing a survival suit. This task can be compared to lugging around bags of sand inside a large bowl of Jell-O! Demonstrating survival suit and liferaft skills in a pool environment is both tiring and challenging. It alerts mariners to the difficulties/stresses involved in donning a survival suit and entering a raft in a real emergency when conditions could be much worse (at night, cold water, and rough seas). The training may one day help them save themselves and/or shipmates.

The pool sessions also provide an opportunity to demonstrate a variety of lifesaving gear and techniques, such as float coats, personal flotation devices (PFD),

and clothes inflation. Although these “extra” training elements are not required by STCW, knowing how to rig a floatcoat beavertail, pop the CO₂ cartridge on an inflatable PFD, or contain air in a garment to keep yourself afloat are valuable lifesaving skills.

During the firefighting phase of BST, students inspect, fill, don and wear self-contained breathing apparatus (SCBA) during several fire evolutions. Students also maneuver through a darkened maze while wearing a SCBA to build familiarity and ease with the unit. Fires are attacked from above and below, with students organizing an attack plan, hauling hoses and needed gear, locating water sources, performing search and rescue, and rigging positive ventilation using fans and fire hose hydraulics. Gasoline, diesel, propane and wood fires are fought using water, dry chemical and CO₂ extinguishing agents. Each student is given an opportunity to be the first to attack as well as organize a fire team.

The personal responsibility module provides information on subjects such as ballast water exchange reporting and SOLAS requirements for endangered Right Whale avoidance and reporting. BST is an excellent forum for discussing and disseminating information on these subjects, since associated rules and regulations evolve and change.

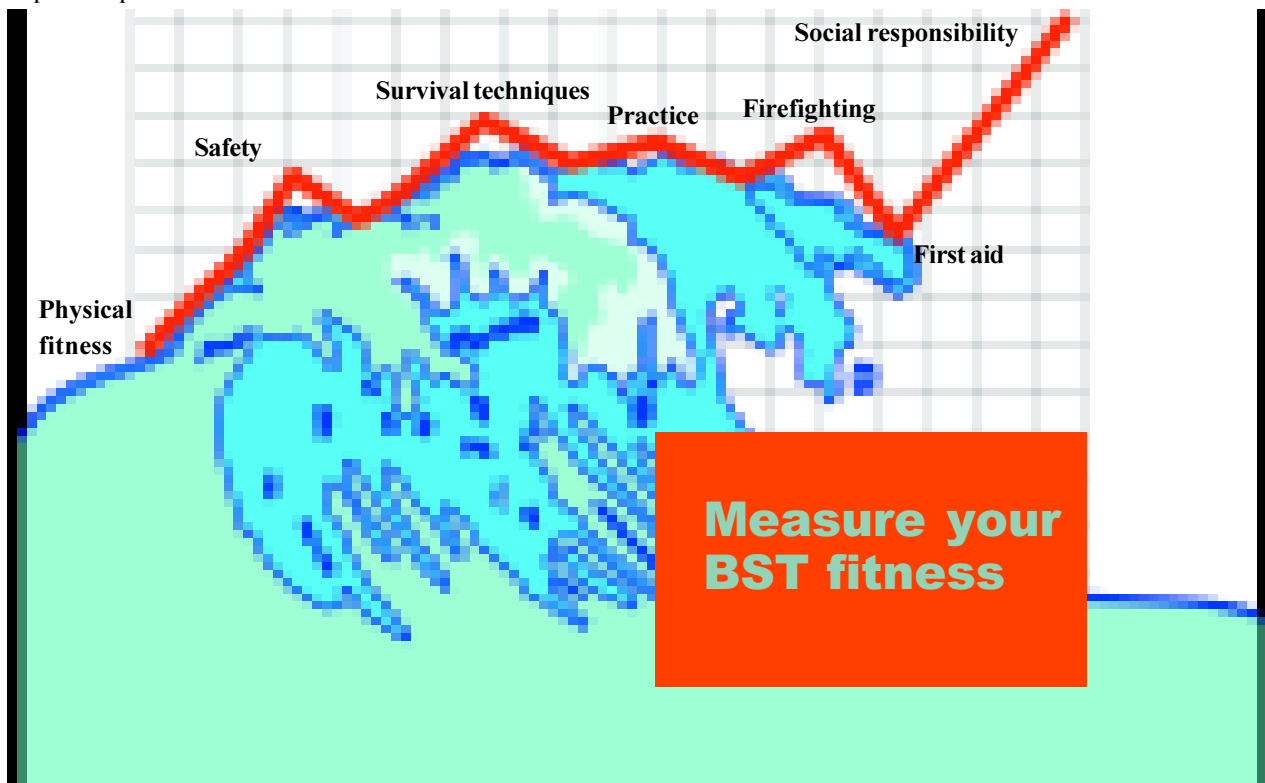
The medical component covers the basics of first aid with an emphasis on properly detecting problems and stabilizing a patient. Additionally, hygiene and methods to prevent problems are discussed. CPR is demonstrated

by each student on a mannequin, and each student is exposed to equipment such as external heart defibrillators and air mask breathing units (AMBU). A review of the latest information on how heart attacks occur and how to treat burns is always valuable.

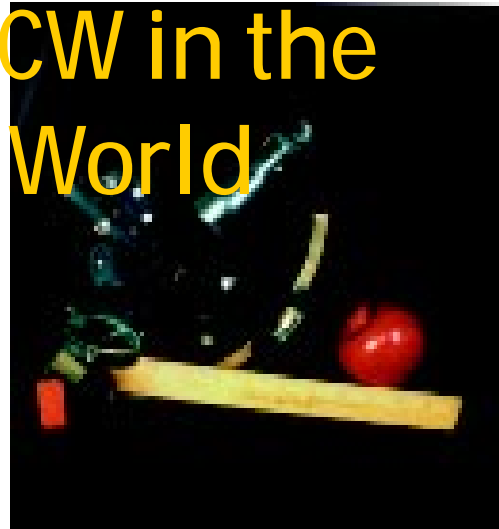
BST also covers safety requirements for entering enclosed spaces and handling hazardous material, Maritime pollution laws (MARPOL) regulations, helicopter rescue procedures, and Emergency Position Indicating Radiobeacon (EPIRB) and Radar Transponders (SART) capabilities. Most importantly, the course emphasizes the need for routine organized and effective drills. The goal is to have all BST students leave with an enthusiasm for drills, based on an understanding of their value and purpose. There is no better way to prepare for an emergency than to simulate it in routine drills.

Physical fitness is a concern as many students struggle with the physical challenges of pool and firefighting sessions. Shipboard life tends often toward the sedentary side and BST highlights the need to maintain a certain level of physical and mental capabilities to respond to emergencies.

Since implementation, MITAGS has trained hundreds of professional mariners (both military and civilian) to the letter and spirit of the STCW code. In looking back, the vast majority of students valued this type of training. We will continue to update and refine BST to ensure that the mariners obtain the most useful and up-to-date information and skills. F



Implementing STCW in the University World



As the STCW process at the California Maritime Academy approaches the audit phase, it is interesting to step back and consider how the process has evolved in our particular circumstances. The Cal Maritime experience stands as a case study of one approach to reconciling the “top down” formulas of STCW, emerging as they have from international and national agreements and agencies, to the less structured environment of a university campus. Cal Maritime has worked for compliance while advocating, forcefully when necessary, faculty curriculum prerogatives and the need for faculty “ownership” of implementation at the classroom level.

Perhaps more than has been generally understood or appreciated, administrative and academic leadership on campus has had to rise to the occasion in creating and nurturing a structure and atmosphere where STCW could be dealt with constructively and successfully.

How did we proceed? In the very beginning President Jerry Aspland made some critical decisions. First, he determined that while STCW would be, unavoidably, a bureaucratic exercise, complete with the usual kinds of directives and deadlines, Cal Maritime’s response would have to be carefully structured and inclusive of the faculty’s claim to primacy in curriculum matters. He viewed it as essential that our internal efforts should be carried out in a fully consultative and collaborate manner. Second, he took the position that our Plan for Compliance, in addressing the requirements of the Maritime Administration (MARAD), the U.S. Coast Guard, and the Review Committee, should also reflect the educational philosophy of our faculty and the culture of our institution.

To achieve the desired level of collaboration across the institution, President Aspland appointed a

representative STCW Council. This group consists of the Vice President for Marine Programs, the Vice President for Academic Affairs, the Academic Dean, and the academic department chairs for both the deck and engineering programs. Staff support is provided by the Executive Assistant to the President. The Council serves two important functions: It provides a clearinghouse for data on STCW compliance and an advisory forum for institutional response issues; and it is also a mechanism for sharing this information with the many faculty who are involved and whose cooperation is essential to the many details of implementation. This structure works well, primarily because of its inclusiveness and its success in substituting a largely orderly process for what otherwise would be a series of crises at the compliance level. The Council’s advice is subject to the approval of the President.

Early in its deliberations, the STCW Council wrestled with fundamental conceptual issues involved in formulating Cal Maritime’s Plan for Compliance. This brought the institution face-to-face with a question much broader than STCW itself. We had to ask ourselves: “What kind of institution of higher education are we?” The conclusion, unavoidable in the end, was that, besides providing preparation for license examinations, we are a university campus offering the baccalaureate degree, which includes a substantial general education component. From this foundation, Cal Maritime arrived at the position that competency, as we define it, requires passing an entire course in which STCW-related elements are present. Thus, while certifying that STCW curricular components are included in course outlines, our emphasis is on the course as a whole. To count as having met STCW expectations, such courses must be passed with a grade of C or better.

Besides wrestling with such matters of educational

philosophy, but consistent with the concepts described above, we have addressed less esoteric concerns such as the documentation of Cal Maritime's program. Course outlines have been methodically reviewed for compliance, seetime calculations verified, and training record book procedures carefully implemented. Perhaps the most important products of all these extensive efforts are the heightened awareness and renewed commitment the STCW process has brought to the faculty and the Academy community generally. As STCW has impacted the ways we make and evaluate curricular decisions, it has

evolved into a valuable assessment mechanism. This creates a useful linkage with the expectations of our regional accreditation commission. Now fully integrated into the curriculum, STCW is a force for the continual strengthening of our educational program. We look forward to the coming on-site regulatory audit with the conviction that here at the California Maritime Academy we have gone beyond compliance in training seafarers to the higher threshold of preparing our graduates to grapple successfully with new kinds of career challenges now only dimly seen. F

*California
Maritime
Academy*

Taking Compliance to a Higher Level

- Systematic, orderly process**
- Getting the faculty on board**
- Reading from the same sheet of music**
- Internal consultation and collaborations**
- Fit with educational philosophy**
- Cultural compatability**
- STCW advisory group**



Quick Rescue Confirms Value of STCW Training

By Joe Kuca and Jim Ashlock

Expansion of oil and gas exploration and production in the Gulf of Mexico, as far as 200 miles offshore, has made personnel safety training more critical than ever. Quick rescue of anyone falling from a boat or drilling platform is absolutely essential to assure survivability in rough, cold seas.

The Center for Marine Training and Safety (CMTS), operated as a partnership between the Texas Engineering Extension Service and the Texas A&M University at Galveston, concentrates on this essential factor at its facility on Galveston's Offatts Bayou.

CMTS is the first such facility in the nation to receive the U. S. Coast Guard's approval of its Fast Rescue Boat course under new requirements of the 1995 amendments to the International Convention on Standards of Training,

Certification and Watchkeeping for Seafarers, 1978 (STCW). The Center offers a full complement of courses to the maritime and offshore industries; 22 of their courses are approved by the U.S. Coast Guard.

"Perhaps the most important fundamental of everything we do at CMTS is our rigid adherence to competency based practical exercises, particularly the requirements of the new STCW code," said Keith Palmer, director of CMTS. "We have developed a strong partnership with the maritime and offshore industries in advancing the cause of marine safety in the Gulf of Mexico, and intend to maintain and improve on that relationship in the future."

Fast Rescue Boat training is rigorous and encompasses a wide array of topics. Training involves

the launching and recovery of craft known generically as Rigid Hulled Inflatable Boats (RHIB), which are stable, quickly deployable and especially suited for installation on offshore platforms. Also used extensively in training are Fast Rescue craft provided to CMTS by Ambar Marine. These boats, particularly Ambar's AM550 Coastal Patrol Boat, were selected by the U.S. Coast Guard for installation aboard all its vessels.

Training also involves open water search and rescue techniques, search protocols and procedures, plus rescue control center communications and rescue swimming. The most important aspect of the training is the practical exercise component, which contributes significantly to the melding of individuals into coordinated rescue teams. Students acquire confidence and appreciation of the value of teamwork during the training.

Does the training pay off? Experience shows clearly that it does.

Bob Thomson, Shell Rescue Team Coordinator, relates

a Christmas Eve incident during the night shift on a Shell Offshore platform in the Gulf. A 200-ft. supply vessel had just finished transferring food and gear to the platform and was preparing to cast off and head home for the holidays.

The supply boat was bobbing wildly in 10-foot seas when a deckhand suddenly toppled from the stern into the churning Gulf. Shell's Fast Boat Rescue team, which had been trained at CMTS, sprang to action on the platform.

First, a life ring was thrown down 100 ft. from the platform to the man in the water, who had managed to grab a mooring line trailing from the platform. The fast rescue boat was launched and quickly reached the man who was alert but starting to suffer from the cold. Within five minutes he was plucked from the water and moments later was in dry coveralls and being observed for signs of hypothermia. F



"The training received from the Center for Marine Training and Safety was highly effective in creating a greater sense of confidence among our crews, and our safety records speak volumes as to the benefit of the training."

—Bob Thomson



As a result of implementation of the 1995 amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW) on Feb. 1, 1997, Edison Chouest Offshore, L.L.C. (ECO) of Galliano, Louisiana, has embarked upon an ambitious safety training program to ensure that all of its employees are ready for the new millennium.

The company owns and operates a fleet of over 100 state-of-the-art vessels, varying from offshore supply vessels in the Gulf of Mexico to deep sea research vessels and ice breakers operating in the Antarctic. STCW-95 has affected virtually the entire fleet of ECO vessels, and personnel must meet the training requirements in order to be certified under the new regulations.

The far-reaching STCW training requirements have had a major impact, not only on international operations, but also on those mariners operating in the Gulf of Mexico. All mariners sailing on vessels subject to the Convention must meet the STCW training requirements by January 31, 2002. ECO began to address this issue early on and decided that the most effective way to guarantee that its employees were “up to speed” on the new Convention training requirements would be to conduct the necessary

training in-house. That was the beginning of what has evolved into a million-dollar plus safety training center at the company’s corporate headquarters in Galliano. The center has a full-time staff of four and 10 part-time U.S. Coast Guard-approved instructors, and its own fire field and indoor environmental pool. Classrooms are state-of-the-art, utilizing the latest in electronic technology.

The STCW-95 Convention requires basic safety training and familiarization in four general areas or elements. The ECO Safety Training Center conducts a U.S. Coast Guard-approved 40-hour STCW Basic Safety Training course on site for approved students and includes both classroom and practical demonstrations.

The Personal Survival Techniques element is designed to improve the mariner’s chance of survival if the vessel must be abandoned. The Fire Prevention and Firefighting element gives instruction on minimizing the risk of fire and on the ability to fight a fire at sea. The First Aid/CPR element of the training shows how to respond to a medical emergency, while the Personal Safety and Social Responsibility element prepares the mariner to comply with emergency procedures, pollution prevention requirements, safe working practices and to effectively communicate with others.

To ensure that students are able to demonstrate competence in their tasks, duties and responsibilities during a fire emergency, classroom instruction is provided to illustrate the theory of fire prevention, while practical demonstrations on the fire field give students the confidence to fight fires during actual emergencies. The ECO fire training facility simulates various types of offshore fire scenarios, such as galley, engine room and electrical fires. In compliance with the Company Environmental Protection Policy, the fire training facility utilizes natural gas in all firefighting simulations.

The Personal Survival Techniques element includes both classroom and practical demonstrations in the indoor survival pool. The in-pool portion of the training allows the student to practice launching, righting and entering a life raft, donning an immersion suit and entering the water from a height. Helicopter underwater evacuation training, along with other necessary survival techniques used when abandoning a vessel, are also practiced.

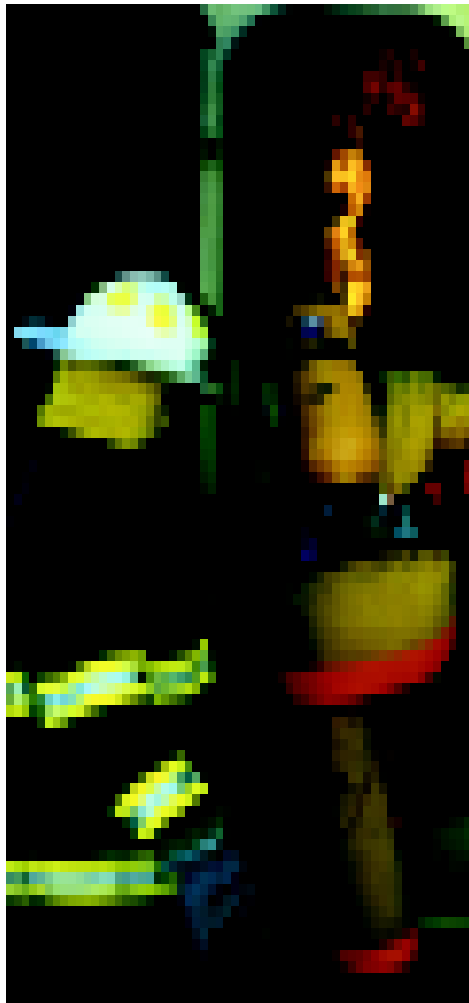
Formal training and assessment must be completed on vessels over 200 tons equipped with Automatic Radar Plotting Aids and/or Global Maritime Distress and Safety

System (GMDSS). Our U.S. Coast Guard-approved GMDSS and ARPA courses include training classrooms that are equipped with fully functioning GMDSS and ARPA equipment to simulate actual conditions on board vessels. Other officer training classrooms are equipped with individual computer training stations to allow students the benefit of self-paced study to prepare for advancement in their chosen field.

ECO president Gary Chouest stated, with the advent of the STCW-95 training requirements; tomorrow's mariner must be prepared for the new millennium. We must all be partners in that training effort. In doing so, he said, the ECO training center will be open, not only to ECO employees, but also to others who need this valuable training.

The ECO Safety Training Department has a goal of ensuring that education and training objectives and related standards of competence are achieved through clearly defined levels of knowledge and understanding, and that the skills learned are suitable to the examinations and assessments required under the STCW-95 Convention.

F



Implementing STCW at a Community College

By **Mary P. Bartholomew, Ph.D.**

Partnerships

Delgado Community College in New Orleans, La. will begin the new millennium with the U.S. Coast Guard-approved classes, which meet requirements of the 1995 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). The Basic Safety Training course offered at Delgado's Marine Fire School is the result of powerful partnerships between industry, the U.S. Coast Guard, the Louisiana Department of Labor, and Delgado Community College.

A component of these partnerships was the financial help received from the Louisiana Department of Labor. Delgado Community College was awarded three grants from the Louisiana Department of Labor Incumbent Worker Training to train 811 mariners in STCW. Delgado used these funds as start-up money to begin this specialized training. As a result of the grant funding, these 811 mariners will receive STCW basic safety training without any personal costs for tuition.

The three grants were written with the intent to retain the mariner workforce in Louisiana. As part of the requirements of the 1995 STCW Convention, mariners must provide evidence of completing an approved basic safety training course for license renewal in 2002. Without this training, mariners will not meet the requirements for license renewal. Since New Orleans is a port city, a large portion of the labor market in Louisiana consists of mariners and oil production service jobs. Job retention in this market in Louisiana is imperative.

Another aspect of the partnerships that were formed were the bonds that developed within the college. After failed negotiations between Delgado Community College and a private company, which had prior approved STCW courses, it was decided that the college should seek approval from the U.S. Coast Guard for this training. Members of Delgado's administrative, clerical, and instructional staff consorted to write the curriculum for the STCW Basic Safety Training. After long hours and much weekend work, the curriculum was perfected and submitted to the U.S. Coast Guard for approval.

In December 1999, the U.S. Coast Guard approved the four modules that comprise the STCW Basic Safety Training -- basic fire fighting, personal survival, first aid and CPR, and personal safety and social responsibility -- just in time to fulfill the grant time lines. Each individual module is approved as a separate course for individuals that do not require all four modules.

The partnership that was formed between industry and Delgado Community College also facilitated the implementation of the STCW Basic Safety Training. In order for a company to be awarded a Louisiana Department of Labor Incumbent Worker Training grant, the company must choose a training provider. This training cannot replace current training already offered within the company. The company receives preference if it chooses a public training facility. Three companies chose Delgado Community College as the training provider. As a result of meetings concerning the grants, the college has formed a mariner advisory board comprising the company representatives. This board meets monthly to discuss issues of concern in the industry and the training requirements that the college might provide.

The partnerships formed between industry, the Louisiana Department of Labor, the U.S. Coast Guard, and Delgado Community College have enabled the college to meet a demand from industry and implement a program that will help retain jobs in this field.



FIREFIGHTING SPECIALTY

The Delgado Community College Marine Fire School is a 3.3-acre facility for shipboard fire fighting training. At this facility is a two-story ship simulation structure built by MARAD for compartment entry, search and rescue, engine room fire, and other training scenarios.

Implementation of STCW

After the curriculum was written by the college and approved by the U.S. Coast, the facility where the classes are offered was inspected by the U.S. Coast Guard to ensure that standards are met. The Delgado Community College Marine Fire School was designed by the U.S. Maritime Administration (MARAD) and built through the cooperative efforts of MARAD and Delgado Community College in 1978. The Marine Fire School is a U.S. Coast Guard approved facility. The principal function of the 3.3-acre facility is training for shipboard fire fighting.

At this facility is a ship simulation that was built by MARAD specifically for marine fire fighting. The two-story ship simulation structure is the center for training of the field scenarios, including compartment entry, search and rescue, and engine room fires. There are three classrooms located at this facility, in which the lecture portions of STCW are held. The water survival field scenario will be held at an Olympic size pool at a neighboring university in New Orleans.

The first Incumbent Worker Training grant STCW class was scheduled to begin January 10, 2000. A mariner advisory meeting was scheduled for the following week to correct any unforeseen challenges of the first class. STCW classes are a reality and have been implemented at Delgado Community College through the powerful efforts of partnerships that produce results. F



S T C W

Implementation for a Small Passenger Vessel Operator

By Chris Volkle, Special Expeditions Marine, Seattle, Washington



Special Expeditions Marine (SEM) operates five passenger vessels under four different flag states, two of which sail under the U.S. flag and are regulated under Subchapter T of 46 CFR (the others are Swedish, Bahamian, and Ecuadorian).

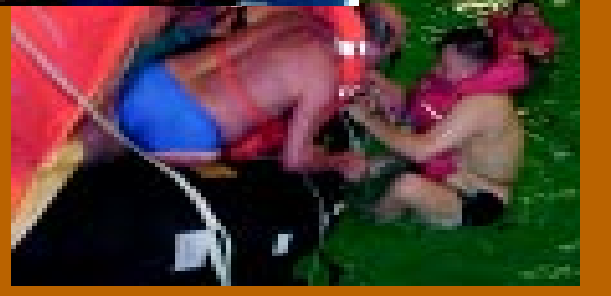
Our U.S. vessels are subject to the familiarization and basic safety provisions of STCW, since they operate on international routes. However, the company requirement is for the crews of these vessels to complete additional STCW training in accordance with the Coast Guard's recommendations in NVIC (Navigation Vessel Inspection Circular) 4-99. Our other ships are subject to the full scope of STCW.

The company training program for shipboard employees, including provisions of STCW, was formalized in 1998 as part of our ISM (International Safety Management Code) certification process. A full-time training coordinator was hired in January 1999 to assist in developing courses and obtaining approvals. Since the IMO white list has not yet been developed, it has been necessary to obtain approvals from each flag state. The U.S. Coast Guard and the Bahamas Maritime Authority have approved the Basic Safety, Crowd Management, Crisis Management, and Human Behavior courses and instructors. These have also been submitted to the Swedish National Maritime Administration (SNMA), and approvals are expected as soon as this regulatory agency develops an approval process. We continue to develop other STCW courses—the Survival Craft and Bridge Resource Management courses should be completed shortly. SEM's STCW training programs are designed to be delivered in a variety of venues, including, in many cases,

After receiving U.S. Coast Guard approval, the next round of STCW training was performed with 60 crewmembers from our U.S.-flagged ships, while the vessels were in dry dock in Oakland, California. Alternate site approval was obtained from the local REC, who sent a representative to observe a portion of the training.

The STCW Code has augmented our training program by providing a more formal structure and standardizing the curriculum while meeting regulatory requirements. A comprehensive training program has many benefits, including fewer accidents, injuries, and other losses, increased effectiveness of emergency response, and higher employee morale. Our Training Program also teaches our employees to work together as a team to accomplish common goals.

Special Expeditions Marine continues to lead the



aboard our ships. Training equipment is stored in Seattle and can be easily shipped or transported to a training site. Except for the Training Coordinator, all our Instructors are drawn from the ranks of office and shipboard employees to perform instruction on a part-time basis as necessary.

Although we have conducted comprehensive safety training each year for crewmembers, 1999 was the first year that training was approved as meeting the requirements of STCW. The Basic Safety course was first delivered in Stockholm after being “accepted” by the SNMA.

industry in innovation in the fields of marine safety and environmental protection. Creation of our comprehensive training program with company standards that exceed regulatory requirements ensures this leadership position will continue and it enhances the responsible operation of our vessels.

We are in the process of exploring relationships with other companies and industry associations to provide quality training experiences to others. F

Your Coast Guard Credentials and the

NDR

By William Chubb, U.S. Coast Guard,
National Maritime Center, Arlington, Va.

Background

One of the many hurdles that an applicant for a Coast Guard license or Merchant Mariner's Document (MMD) must clear is the NDR¹ check. Because completing the check involves coordination between two Federal agencies, and frequently coordination with the States as well, it can be a time-consuming process that bottle-necks the issuance of a credential. If we know a little about the process, it can help us get through it with minimum stress.

The requirement for a National Driver Register check prior to issuance of Coast Guard credential is one of many requirements that stem from the Exxon Valdez grounding in 1989. Factors identified as contributors to that casualty included the history of alcohol-related problems of the vessel's captain. Access to the NDR was "intended to give the Secretary [of Transportation; and by delegation, the Coast Guard] additional information on the background of applicants for licenses, certificates of registry, and MMDs. The purpose of this section [of the Oil Pollution Act of 1990] is to ensure that the Coast Guard can identify vessel personnel with motor vehicle offenses related to the use of alcohol and drugs. ... These provisions are intended to provide an additional tool in the effort to promote a drug- and alcohol-free workplace in the maritime industry."² This Congressional intent was implemented in regulation in 1995. The provision for licenses is found at 46 CFR 10.201 and for MMDs it is found at 46 CFR 12.02-4.

The Coast Guard Process: In conformance with the congressional mandate, the law, and the regulation, we

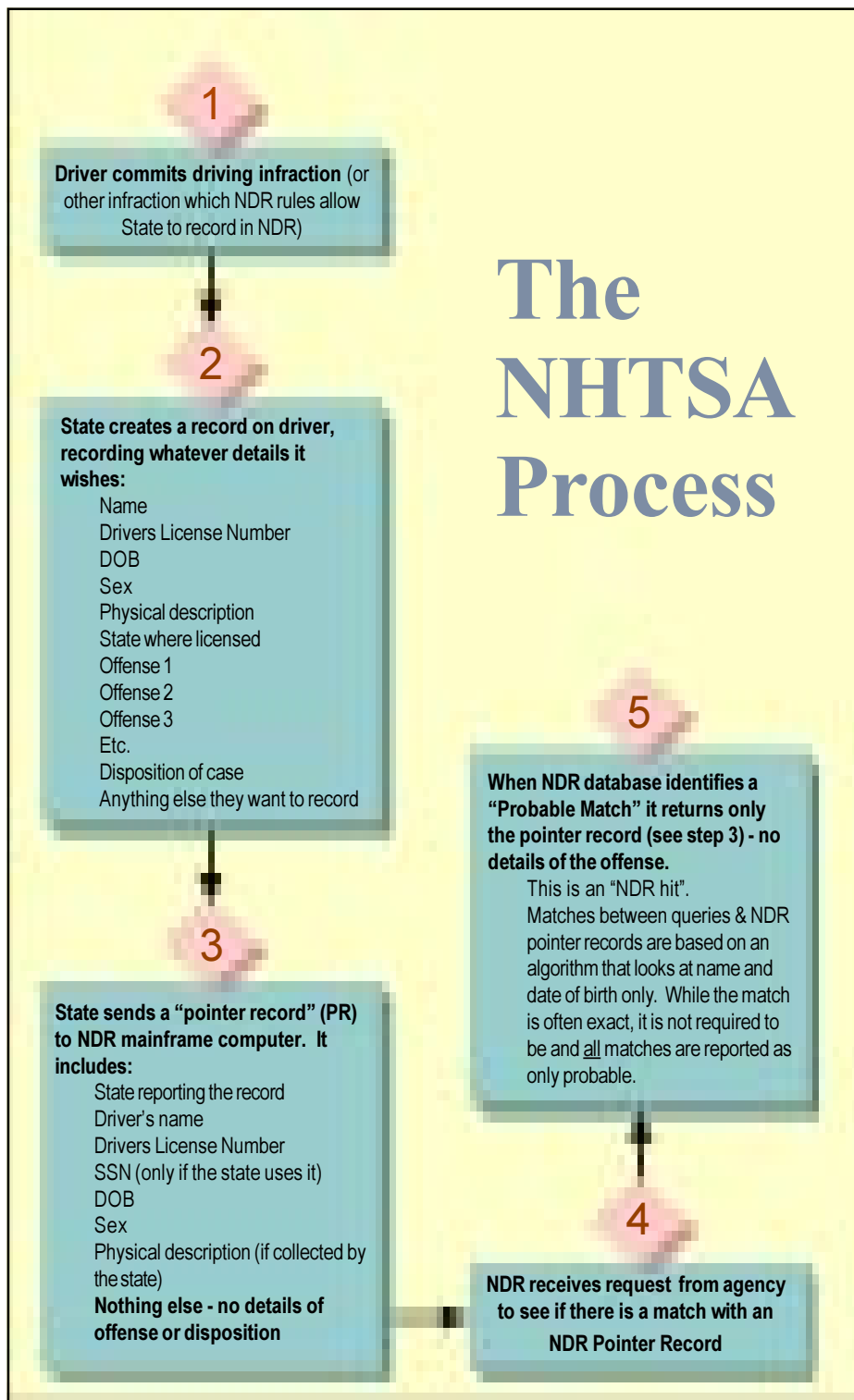
require completion of the NDR check before we issue any Coast Guard credential with a new expiration date. The process starts at the Coast Guard Regional Examination Center (REC) when a mariner makes application for a license or MMD that will be issued with a new expiration date. The REC compiles a daily list of the mariners who need NDR checks. This list includes each mariner's name, social security number (SSN), and date of birth (DOB). Each day, each REC sends this list to the National Maritime Center in Arlington, VA. The NMC staff compiles these lists and takes them down town the following morning to the Department of Transportation headquarters building. Once there, the NMC staff member uses a computer terminal at the National Highway Traffic Safety Administration (NHTSA) to log into the NDR system and enter the requests (name, SSN and DOB). After entering the requests (which had been submitted by the RECs the day before) the staff member retrieves the results from previous requests and returns to the NMC. At the NMC the results are faxed to the RECs and the new REC requests are compiled. It is on the third day after the REC submits the request that the staff will pick up most of the "no hit" results from the NDR. Generally it will be the day after that when we get the results for those mariner requests where the NDR has "hits". The process of making the check is not a simple one, and at best, takes two days to complete.

The NHTSA Process: The nature of the NDR system requires significant intervention by the NDR staff of NHTSA. An overview of how the system works will help you understand the meaning of the results we get from it. At NDR the process looks like this:

¹ The National Driver Register

² House Conf. Rep. No. 101-653, reprinted in 1990 U.S. Code Cong. & Admin. News, 722, 807

The NHTSA Process



strategies that are known to be used by individuals who are fraudulently trying to obtain a driver's license by confusing the system. These include techniques like switching first and middle names or initials, or changing a digit in the birth date. For this reason, the resulting "probable match" reported by NDR may well show a close, but inexact match between both the name and birth date. This effort to err on the side of safety can create difficulties for both the REC and the mariner.

NDR may report back the SSN and descriptive information, but only in cases where the state has provided the information as part of the pointer record. The NDR computer does not use this information in determining the "Probable Match". In addition, neither the details of the infraction that caused the state to generate the pointer record in the first place nor the age of that infraction is known. This means that the infraction giving rise to the NDR hit may not be one of the four infractions which the Coast Guard is permitted to consider (DUI, reckless driving, violation in connection with a fatal traffic accident, or racing on

The Results

As indicated in step 5 above, NDR "hits" are not necessarily bulls eyes. The NDR search of its database is based on name and date of birth. In borderline cases, the algorithm uses sex. Since we neither capture nor report sex, this leaves only name and date of birth for the NDR search to use. The NDR search algorithm incorporates

the highways). The infraction may also be older than we are permitted to consider (three years, unless it is related to current suspension or revocation of the applicant's driving privilege). Remember that the NDR system does not have the details of the offense. That information is retained by the state and if the NDR reports a "probable match," it is the mariner's responsibility to resolve it.

Several other factors to consider:

- The states share information that can result in pointer records originating from a state where the driver has never incurred a violation. In a recently communicated example, a driver's driving privilege was suspended in State A because he had failed to pay a ticket in State B.

- A driver can have his driving privilege suspended or revoked in states other than the one in which he or she is licensed to drive.

- Some states are using NDR pointer records to track non-driving infractions like failure to pay child support or even library fines.

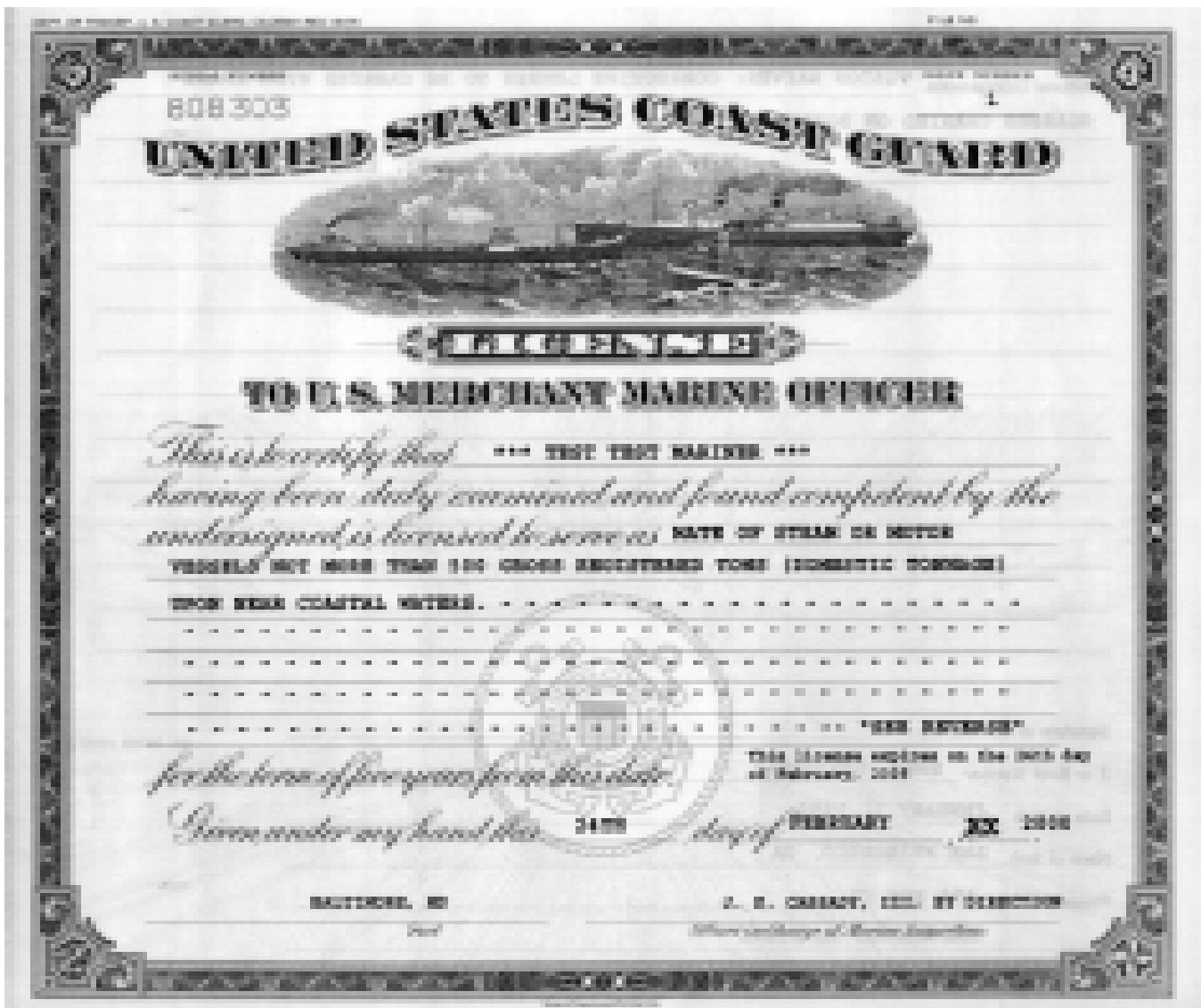
These factors can lead to an applicant being genuinely surprised when told that NDR is reporting a record in a state where he or she has never driven or has never been cited for an infraction.

The Future: The NDR system described above errs on the side of safety. By using the "probable match" concept, the system prevents persons from getting past this safeguard simply because there was a keystroke difference between the request we make and the record the NDR holds. This inevitably means that we will

occasionally require a mariner to obtain his driving record from a state where he or she has no record.

We are working with the NHTSA staff to reduce this burden. They have agreed to "filter" our hits so that they would report only infractions that our regulations allow us to consider. This will eliminate hits for old parking violations, etc. In addition, we are pursuing a more automated "front end" to the process so that the RECs can use the Merchant Mariner Licensing and Documentation system (MMLD) to auto-generate the requests. This will reduce the delay in getting the NDR requests from the RECs to the NDR system.

As we work to improve our NDR process, the best advice we can pass along to our customers is: "Don't wait 'til the last minute." Plan ahead for your MMD and/or licensing transaction and get your completed application to your servicing REC in advance. It will enable the REC to comply with its responsibilities while meeting your needs without unanticipated "surprises." In the long run, by working together we will ensure a safer workplace for the U.S. merchant mariner. F





The IMO 'White List'— What is it and What Does it Mean?

By Christopher Young, U.S. Coast Guard,
Headquarters, Washington, D.C.

Introduction

One of the most significant features of the 1995 amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW), is the requirement for the countries which are party to the convention to subject themselves to an evaluation by a panel of experts who report directly to the International Maritime Organization (IMO).

If the information provided by a party demonstrates that the party is giving the requirements of the Convention "full and complete effect," the IMO Maritime Safety committee can confirm that this process has successfully been completed and identify the party as having received this recognition. This process of identification is informally referred to as the "IMO White List." But

since there is no mention of such a list in the STCW Convention itself, some explanation might be helpful in understanding why this terminology is widely used.

Background

The STCW Convention was originally developed at IMO during the 1970s and finally adopted by an international conference in 1978. It came into force in 1984 and now has 133 State-Parties. The United States ratified the convention in 1991.

In 1993, IMO undertook a major effort to address weaknesses that had become apparent in the 1978 version of the convention; and this resulted in the adoption of the 1995 amendments. Along with introducing “standards of competence” for seafarers serving in seven functional areas at three levels of responsibility, basic safety training for all seafarers with safety or pollution prevention duties, and new rest period requirements for watchkeeping personnel, one of the goals was to introduce a “well balanced package of control and verification measures.” None of the specific measures was seen to be airtight or fully adequate in itself to ensure that only qualified individuals would be to acquire a certificate of competency for service on seagoing ships; but taken all together the package of measures was

intended to represent a commitment to international compliance with the new requirements.

The range of the new control and verification measures extended from more explicit responsibilities for countries issuing certificates of competency, to a more specific role for the flag State (allowing foreign seafarers to serve on ships flying its flag), to special provisions focusing on company responsibilities (to parallel the ISM provisions in SOLAS), to an increased range of options for port State control, and “quality standards system (QSS)” requirements (an independent means of verifying that approved procedures are being followed), to cover all training, assessment, and certification activities. The “verification” measures also included dramatic new provisions on mutual oversight, with a unique system of evaluation by experts, and special roles for the Secretary-



General of the IMO and the Maritime Safety Committee.

The Procedures

Regulation I/7 (along with section A-I/7 of the STCW Code) sets out the procedural framework for this system of mutual oversight and verification of compliance.

Essentially, every Party is required to submit to the IMO detailed information on how it is implementing the requirements of the 1995 STCW Amendments. The information must include details on training programs, examinations, assessment procedures, and QSS arrangements, along with the legal and administrative measures put in place to ensure that certificates are issued only to qualified individuals. This information was required to be submitted to IMO by August 1, 1998. Only 60% (81 out of 133) of State-Parties submitted the reports by that date. Others have been submitted since that time.

Meanwhile, the Parties to STCW also nominated experts to be identified as “competent persons” to be available to serve on panels convened to evaluate individual country reports. The Maritime Safety Committee approved a list of approximately 150 persons, and the Secretary-General organized the list into five-person panels. As each report was received, it was sent to one of the panels for evaluation. The panels were empowered to request “clarifications” from the country being evaluated when material was found to be unclear or somehow incomplete. On completion of its work, each panel is to report its results to the Secretary-General of IMO. At this time, approximately 25 % of the panels have completed their work, and another 30 % are nearing completion. In some cases, the countries concerned have not yet provided the “clarifications” requested by the panel conducting their evaluations. Information on the status of individual country evaluations (including that of the United States) is considered by IMO to be proprietary and will not be released until a full report is submitted to the Committee.

In order to ensure that no Party enjoys a significant advantage over other Parties simply because some panels are able to work more quickly than others, the Maritime Safety Committee instructed the Secretary-General not to report on the results of evaluations for any country until all evaluations were completed for all information submitted in time to meet the deadline of Aug. 1, 1998. Thus, no reports were submitted until all 81 reports were evaluated by panels of competent persons.

Of critical importance is that the Secretary-General is only to submit a report to the Maritime Safety Committee when the required information has been received and such information “confirms that full and complete effect is given to the provisions of the Convention.” In other words, no negative report is to be submitted to the Committee. Thus, the use of the “White List” terminology.

The most recent information from IMO suggests that a report could be submitted to the Committee as early as next spring (in time for the 72nd session in May 2000), but this would depend on all of the panels completing their work by early in the new year. If even one panel has not been able to finish its work, a report to the Committee will be delayed.

Significance

STCW Regulation I/7 was originally drafted to put in place a “positive” process of international oversight with special recognition for countries which are able to establish, to the satisfaction of an independent panel of experts, that they are giving the convention full effect. In

other words, there was no underlying intent to create a negative stigma on a country which did not satisfy a panel on the first try; and there was no plan to generate a “Black List” of countries which fell short of the test. On the contrary, one of the key aims was to identify where some countries might be in need of technical assistance, enable them to make the necessary changes to fulfill their responsibilities, and to target the available assistance in those areas.

However, as the prospect of an IMO “White List” has become increasingly real, the view is being widely circulated that if a country is not on the “White List,” its seafarers will not be employable, and its ships will be subject to increased scrutiny and detention. Hopefully, this will not be the case. Clearly, the burden should be reduced for a flag State which is on the “White List” when it recognizes certificates issued by another Party which is also on the “White List.” A port State might certainly choose to allocate limited resources to boarding ships from countries which are not on the “White List.” However, the wording of the STCW Convention does not provide a basis for automatically presuming that any country which is not yet on the list is fundamentally in non-compliance with the Convention. At least during the transitional period (before February 1, 2002), and until IMO panels have had the opportunity to evaluate the results from the country’s first five-year QSS under regulation I/8 of the Convention, the working presumption should be that the Party is making good faith efforts to address deficiencies and to meet its obligations. To apply a negative presumption is, in the author’s opinion, to give an unintended meaning to the IMO oversight function, to overemphasize the paperwork aspects of the process, and to take away the incentive that exists for a developing country to seek assistance and pursue proper implementation to achieve a special international recognition.

The “White List” (along with the idea of outside scrutiny), already seems to be having a positive effect by compelling all parties to STCW to review their entire system of seafarer training, assessment, and certification to identify where changes may be necessary or where improvements should be introduced. Announcement of the first “list” should serve as a measure of progress; and the “list” will continue to play an important part in the international system as long as it is used to build confidence in the STCW system of certification rather than penalize or punish countries which still have some way to go. The “White List” is only one of many tools in the STCW toolbox—and at the early stages it should be used as a tape measure rather than a sledgehammer.

Passing the Port State Control Test

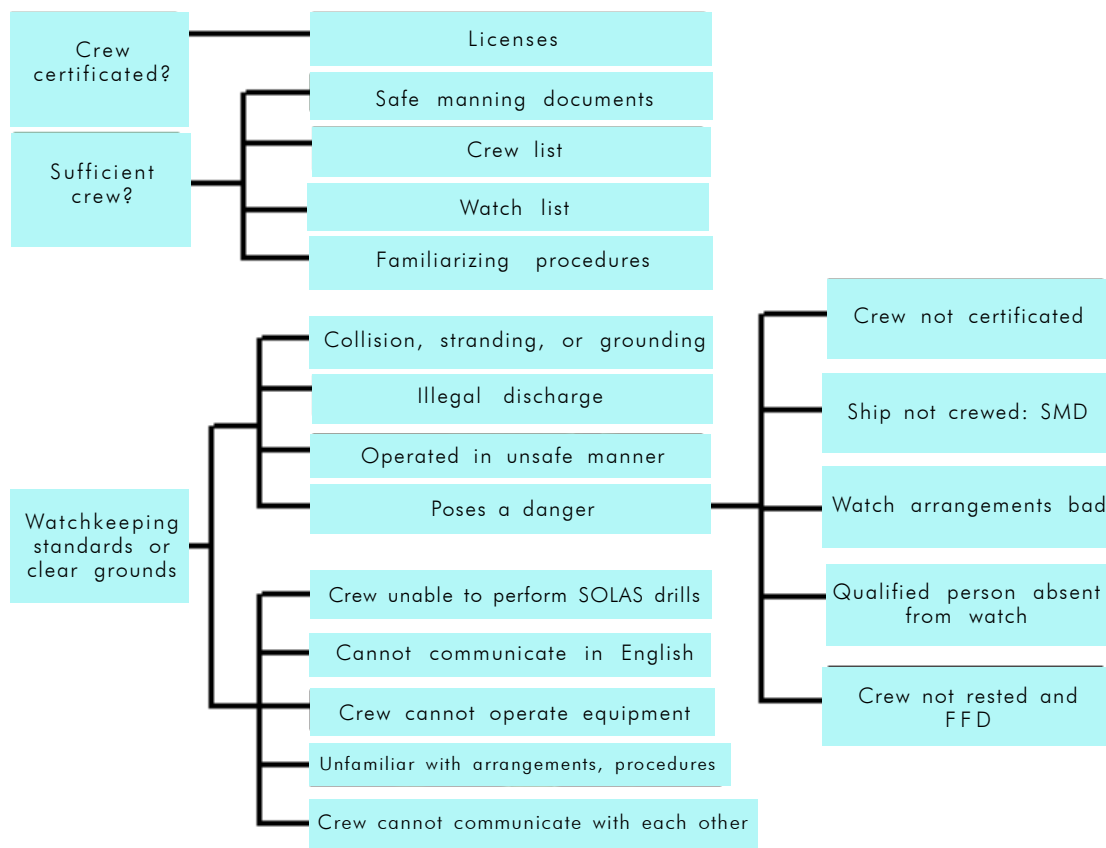
By **CAPT Joseph P. Brusseau, United States Coast Guard, Commander, U.S. Coast Guard Activities Far East, Tokyo, Japan**

The International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW), was adopted on July 7, 1978. It came into force in 1984, and has been amended four times since then. The extensive amendments adopted in 1995 came into force on February 1, 1997. They were implemented in the United States in July 1997, just as the U.S. was putting considerable effort into strengthening and refining its port state enforcement program. Since then, compliance with STCW, along with SOLAS, MARPOL, ILO 147, and the ISM Code has been one of the important “tests” in the nation’s Port State Control program. This article describes general port state control procedures in the United States, with a special focus on STCW enforcement procedures. It looks at recent deficiency and detention data for ships arriving in the United States, and it looks ahead to changes which may lie in the future.

U.S. domestic regulations require ships planning to call at a port in the United States to give 24-hours advance notice of arrival. Even though this rule predates most formal port state control efforts in the U.S., it has for many years provided the local Coast Guard Captain of the Port

with an opportunity to prepare for foreign vessel arrivals. Since a focused port state control effort began in the mid-1990s, Port State Control Officers (PSCOs) began using the advance notice of arrival as an important part of their work. When they receive this advance notice, PSCOs gather certain information about the ship and establish an appropriate priority for boarding the ship when it eventually arrives. This is done with a simple, but rational methodology employing a “Boarding Priority Matrix.” This matrix and a variety of other information about Port State Control is available on the U.S. Coast Guard Web site at www.uscg.mil/hq/g-m/psc. This boarding priority matrix assigns each ship a numerical score for each of five performance categories: flag state, classification society, operating company, prior history, and service. The total score represents the relative risk that the U.S. Coast Guard associates with the ship’s arrival, with higher scores representing higher risk. Since Coast Guard staffing levels do not allow PSCOs to board all foreign ships entering the U.S., priorities for each day’s activities are based, to a great extent, on the relative risk each ship poses to the port area, as calculated by the boarding priority matrix.

BOARDING PRIORITY MATRIX				
OWNER	FLAG	CLASS	HISTORY	SHIP TYPE
5 Points Listed Owner or Operator	7 Points Listed Flag State	Priority 1 ≥10 arrivals with detention ratio more than 4 times the average, or; <10 arrivals and involved with at least one detention in the previous 3 years 5 Points ≥10 arrivals with a detention ratio between 3 & 4 times the average 3 Points ≥10 arrivals with a detention ratio between 2 & 3 times the average 1 Point ≥10 arrivals with a detention ratio between the average & twice the average 0 Points ≥10 arrivals with a detention ratio below the average, or; <10 arrivals with no detentions in the previous 3 years	5 Points each Detention within the previous 12 months 1 Point each Other operational control within the previous 12 months 1 Point each Casualty within the previous 12 months 1 Point each Violation within the previous 12 months 1 Point each Not boarded within the previous 6 months	2 Points Bulk freighter over 10 years old 2 Points Carrying low value commodities in bulk 1 Point Oil or chemical tanker 1 Point Gas carrier 1 Point Passenger ship



The boarding priority matrix also helps PSCOs decide on appropriate operational controls for the ship's arrival. For example, priority 1 ships—those with the greatest risk—are normally ordered to anchor outside a port until a port state control boarding is completed. Yet priority 4 ships—the lowest risk category—usually proceed directly to berth and begin cargo operations without waiting for a boarding officer.

The advance notice of arrival sets the stage for port state control, but a port state control examination actually begins as the PSCO meets the ship on its arrival. As he or she approaches the ship, climbs over the side, looks the crew in the face, and walks the deck for the first time, the PSCO is already gathering information. Climbing to the master's office, the PSCO briefly but carefully observes the general condition of the ship, its equipment, and its crew. At this point, the PSCO wants to form an impression about the ship's general adherence to standards and the effectiveness of the ship's Safety Management System. Like the first impression between two individuals, the PSCO's first impression of the ship often presages the future relationship between the ship and the Coast Guard Captain of the Port.

In the master's office, the PSCO begins by checking the many certificates and documents that form the basis of a port state control exam. But the exam includes far more than merely paper. A good PSCO carefully compares the ship's documents with the impressions formed on arrival. He or

she considers all aspects of the ship, its equipment, its maintenance, and its crew, seeking to verify compliance with all applicable international conventions: SOLAS, MARPOL, ILO 147, ISM, and STCW, as well as U.S. laws and regulations. In practice, port state control exams integrate the requirements of all these conventions, regulations, and laws into a single exam. During the exam, in other words, it would be very difficult to identify which convention's requirements are under consideration or which control regime is activated at any moment. For clarity, this paper focuses on STCW aspects of the port state control exam, almost to the exclusion of other requirements. In that respect, it does not accurately portray the "typical" port state control examination.

The control regime laid down in Regulation I/4 of the STCW Convention is made up of three deceptively simple questions. First, are all seafarers appropriately certificated? That is, does each have the training and experience necessary to do the job, and has each been awarded a certificate attesting to the fact? Second, does the ship's on-board complement of crew include a sufficient number of appropriately certificated seafarers? Finally, are the watchkeeping standards being met, or are there "clear grounds" for believing the watchkeeping standards of the STCW Convention are not being maintained?

It is a relatively simple matter to address the first two questions. The PSCO examines the individual STCW certificates of the ship's officers to determine each person's

qualifications, including appropriate endorsements such as Radar Observer, GMDSS operator/maintainer, rescue boat operator, and the like. Next, the Crew List is compared to the vessel's Safe Manning Document to ensure that a sufficient number of appropriately qualified crew is aboard. The PSCO checks the watch list to be sure certificated crewmembers are the ones actually standing watches, and that they are given required rest periods. The company's procedures for familiarizing new crewmembers will be examined as well.

The third question is the most difficult, because it requires the PSCO to first determine if any of four conditions exist:

- If the ship has been involved in a collision, grounding, or stranding
- If there has been an illegal discharge under any international convention
- If the ship has been operated in an erratic or unsafe manner or if safe navigation procedures have not been followed
- Whether the ship is "being operated in such a manner as to pose a danger to persons, property, or the environment."

(Note: STCW Regulation I/4 also gives five specific deficiencies which may be deemed to "pose a danger:" if crewmembers are not properly certificated, if the ship is not crewed in accordance with its safe manning document, if watch arrangements do not meet the Administration's requirements, if a person qualified to operate equipment is absent from a watch, or if the ship is unable to provide properly rested persons who are fit for duty.)

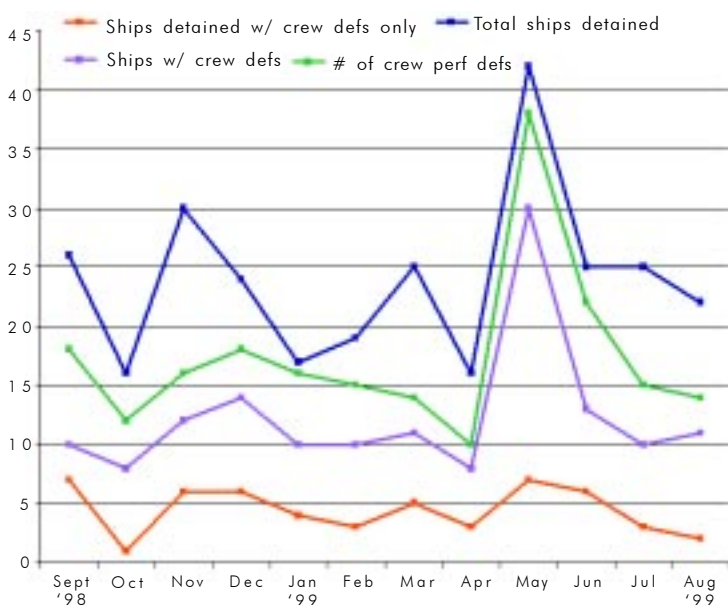
If any of these conditions exist, there are "clear grounds for believing... standards are not being maintained." The Coast Guard believes there are also "clear

grounds" if crewmembers are unable to perform assigned tasks during SOLAS-related emergency drills; if watchkeeping officers cannot communicate with the PSCO in English; if crewmembers cannot operate shipboard equipment during the course of the examination; or if crewmembers are unfamiliar with the ship's arrangement or procedures; or if crewmembers cannot communicate or coordinate with each other.

Whenever there are "clear grounds for believing... standards are not being maintained," the PSCO must notify the flag state in writing (usually by fax) in accordance with STCW. The PSCO must then make an assessment in accordance with section A-I/4 of the STCW Code, of the "ability of the seafarers of the ship to maintain watchkeeping standards." This is no small matter. About half the pages of the STCW Code, in fact, are devoted to describing the minimum standards of competence required of various seafarers, and most "criteria for evaluating competence" listed in the Code require that seafarers "demonstrate the related competency at the place of duty." An exhaustive assessment could indeed be exhausting for both the ship's crew and the assessor. Not only would a comprehensive assessment be a huge undertaking, but the results might be very controversial, since the standard has so much room for subjective interpretation and personal bias. This has given rise to much talk on the subject of harmonizing procedures and interpretations from country to country. But STCW is still young. In fact, individual party nations are still sorting out their own approaches to assessing competence, with considerable effort being expended to ensure consistency between different PSCOs and ports within the same nation. Consequently, very little international harmonizing has been accomplished so far.

At first reading, the STCW Convention's detention criteria appear reasonably clear and focused: failure to correct deficiencies posing a danger to persons, property, or the environment are the only grounds for detaining a ship. However, the assessment scheme under the STCW Code has the effect of broadening those criteria considerably, to include virtually every aspect of ship operations where a seafarer is involved as a human element. This situation causes a fair amount of anxiety among both ship operators and PSCOs. On one hand, ship operators are concerned that a comprehensive assessment would make everything about the ship subject to the PSCO's microscopic scrutiny. PSCOs, on the other hand, are concerned about the time and expertise it would take to do a full assessment. Real world practicalities, however, usually limit both the scope of any assessment and the need for it in the first place. In the past 12 months in the

DETENTIONS AND CREW DEFS, SEPT '98-AUG '99



U.S., for example, 68% of STCW-related deficiencies were failed fire drills and lifeboat drills. In fact, just three deficiencies (failed drills, inadequate numbers of crew, and improperly licensed crew) accounted for more than 90% of STCW-related detentions. If all the ships detained in the U.S. last year had been crewed according to their Safe Manning Documents, with all crewmembers appropriately certificated, and if those crews had demonstrated they could fight a fire and launch a lifeboat, then only 4 ships would have been detained for STCW-related deficiencies. The lesson is pretty clear: most port state control problems go away by taking care of the basics.

STCW deficiencies, in fact, account for about 30% of all “detainable” deficiencies discovered during port state control examinations in the U.S. over the past year. From September 1, 1998 to August 31, 1999, a total of 287 ships were detained in the U.S. Fifty-three of these were for STCW-related deficiencies alone. Another 95 had deficiencies under STCW and at least one other convention. One hundred thirty-nine had only non-STCW deficiencies. The Coast Guard conducted about 4,000 boardings during the past 12 months. So about 3.7% of ships boarded for port state control in the U.S. in the past year were not in compliance with STCW. Since the U.S. has a targeting scheme to identify the highest risk ships for boarding, the 3.7% figure probably considerably overstates the actual percentage of non-compliant ships.

The 1995 Amendments have only been implemented in the United States for about 2 years, so it is perhaps a bit too early to speak of any trends. The number of STCW deficiencies and the number of overall deficiencies stayed remarkably steady from month to month over the past year, but this level represents a significant increase compared to 2 or 3 years ago. This is probably due more to enhanced enforcement and reporting than to declining compliance. However, it is safe to say the human element in general will remain a prominent focus of port state control in the U.S. in coming years, certainly until there is a noticeable decrease in STCW-related deficiencies.

STCW Regulation I/7, the International Maritime Organization’s (IMO) first attempt at an international system of oversight to see that parties are meeting their obligations under the Convention is of considerable interest to those involved in crewing ships these days. Because it was originally conceived as a way to give positive recognition to party nations successfully vetted by IMO, it is sometimes referred to as the “white list.” In fact, some party nations are using Regulation I/7 as it was intended, by reviewing their national systems to ensure certificates are issued only to qualified candidates. Others seem to be focused on the negative implications of not

Failed drills+insufficient crew+improper licenses=More than 90% of STCW detentions

being included on such a list, particularly with respect to port state control and the supply of seafarers. Certainly, those implications should not be ignored, so it is reasonable to expect that IMO will develop some additional guidelines on how the list should be interpreted and used once it is released. In advance of the list and any guidelines, speculation about dire consequences may be premature, but efforts to fully implement STCW would not be. Clearly, effective implementation is what the parties to STCW intended.

Some in the industry have looked into the future and suggested that the increasing demand for seafarers and the reduced supply will take the bite out of STCW and force port states to accept ships that are less than fully compliant. Again, it may be too early to say, one way or the other. In the U.S, the public has little tolerance for maritime casualties, especially those resulting in fatalities or oil spills, so vigorous port state enforcement of STCW will certainly continue. In fact, the Coast Guard is determined that the U.S. will be on the “white list,” and has committed to giving “full and complete effect” to the Convention by the end of the transition period on February 1, 2002. Additional personnel may even be assigned to accomplish that.

As we continue through the 5-year STCW transition period, STCW training requirements will become more and more evident. Put another way, the need for qualified mariners (those trained in accordance with STCW) will become more critical as the transitional provisions of STCW fade and disappear by February 1, 2002. There have already been cases in the past year where U.S.-flagged ships have been delayed until qualified seafarers could be hired, and instances where the master chose to “sail short” when the circumstances and the law allowed it. This situation may become worse.

Training, qualifying, and certificating the world’s entire seafaring workforce to meet the new STCW regime is an enormous undertaking. For those who supply and manage the workforces, there are tremendous challenges ahead. But for those who embrace the new regime and commit to meeting the February 2002 deadline, there are significant opportunities as well. The number of firmly committed countries makes it clear that this global standard is not only long overdue, but also here to stay.

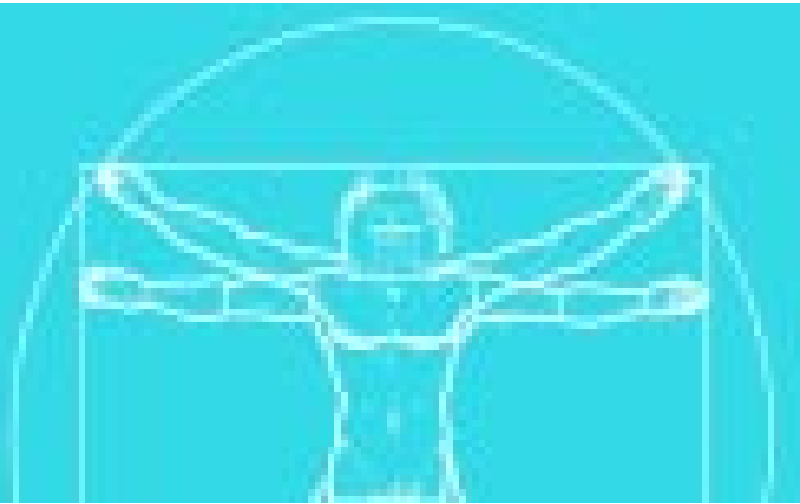




Physical Requirements for Entry Level Ratings

By Betty Garner and Luitenant Commander David Dolloff,
U.S. Coast Guard, National Maritime Center,
Arlington, Virginia

(Photos courtesy of Marine Expeditions, Inc.)



In the past, a physical examination was not required to obtain an entry-level Merchant Mariner's Document (MMD). However, the International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers 1978, as amended (STCW), requires signatory countries to establish standards of medical fitness for all seafarers. To conform to the requirements of the STCW and Title 46, Code of Federal Regulations 12.02-17 (e), the Coast Guard established minimum standards for those entry-level mariners who will be sailing on seagoing vessels of 200 gross tons or more. The standards were published in Navigation and Vessel Inspection Circular (NVIC) 2-98 on December 29, 1997.

A physical examination is not required. However, a mariner must demonstrate that he or she has the agility, strength, and flexibility to:

- Climb steep or vertical ladders;
- Maintain balance on a moving deck;
- Pull heavy fire hoses up to 400 feet, and have the capability to lift fully charged fire hoses;
- Rapidly don an exposure suit;
- Step over door sills of 24 inches in height; and,
- Open or close watertight doors that may weigh up to 56 pounds.

A physician, physician assistant, or licensed nurse practitioner must certify the mariner's ability to perform these tasks. This certification may be in the form of a letter or physician issued document, or the CG-719K, Merchant Marine Personnel Physical Examination Report, which has been amended to include the required tasks.

Applicants who are unable to meet these standards, or who desire to sail only on vessels not subject to the STCW, such as vessels sailing exclusively on the Great Lakes or inland waters, are not required to show any medical certification. However, their MMD's will be issued with a restriction to seagoing vessels of less than 200 gross register tons.

As with any licensing issue, if you have questions, please contact your local Regional Examination Center.

WEBBASED DATABASE APPLICATION

Improves Processing and Tracking of Merchant Mariner Documentation and Licensing Transactions

**By William Chubb, Chief, Marine Personnel Branch,
U.S. Coast Guard, National Maritime Center,
Arlington, Virginia**

In December 1998, the Coast Guard implemented the new Merchant Mariner Licensing and Documentation (MMLD-Web) database management system used for tracking U.S. merchant mariner license and document transactions. MMLD-Web struck new ground as the first web-based system for Coast Guard-wide use. For the first time all credentials needed by a mariner may be printed, provided, processed, and issued from a single system.

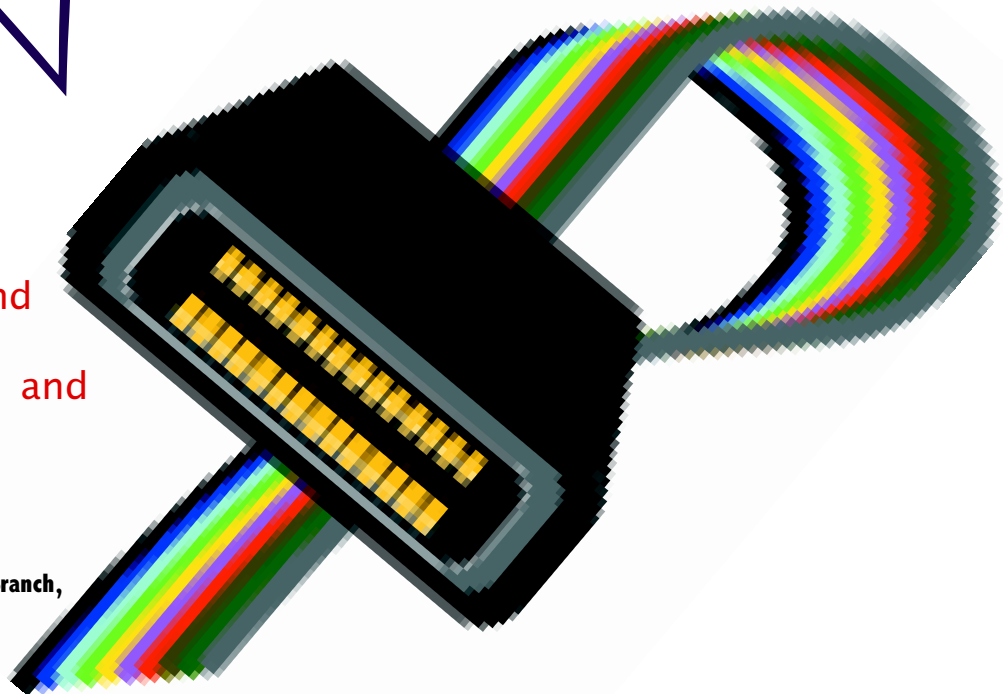
MMLD-Web replaced the previous version of MMLD, which was based on a client-server architecture and operated on old Coast Guard computer equipment that was being phased out. Unlike its predecessors, MMLD-Web is a single, integrated application that takes advantage of the speed of today's technology via the Internet. Another benefit of MMLD-Web is the ability to make nationwide changes to the system from one location at the Web server, located at the Coast Guard's Operations Systems Center in Kearneysville, WV. All changes to the old system had to be separately installed at each of the 17 Regional Examination Centers (REC). The previous system was slow to retrieve information from the central database, causing delays in processing mariner applications, and difficult to improve.

The transition from the old MMLD system to MMLD-Web presented difficult challenges. In particular, the task

of converting system hardware and software was especially difficult because the old and new systems had to be operated in parallel, accessing a single database, while the old equipment was replaced. In addition, the new MMLD-Web had to be made Y2K compliant. With these major hurdles behind us, we are now positioned to be proactive, rather than reactive, in planning further improvements to MMLD-Web's performance and utility.

Currently, MMLD-Web allows each separate REC to access the central database and complete a license or document transaction without the computer being the bottleneck in the process. The system is also used to print Licenses, Certificates of Registry (for Staff Officers), Merchant Mariner Documents (MMDs), and STCW Endorsements.

Many further improvements are in the works. Emphasis is being placed on two main areas, enhancing the efficiency and usability of the system, and maintaining data integrity. Automation of National Driver Register checks is among the first improvements we are tackling. For our merchant mariner customers who rely on the RECs for their maritime industry working credentials, the efforts to improve MMLD-Web should expedite the Coast Guard's ability to provide timely and accurate service.





Help is on the Web

By Stewart Walker, U.S. Coast Guard, National Maritime Center, Arlington, Virginia

Do you need information about the renewal of your license? Are you confused about the requirements for basic safety training (BST)? Do you need a training record book? What the heck is a training record book? Lost in the maze of regulations, policy, standards and procedures that apply to the issuance of a license or a merchant mariner's document?

The World Wide Web may have the answers and contain information about issues that affect your livelihood.

The Federal regulations are the first place to check when you have a question. The regulations applicable to the issuance of merchant marine licenses and certificates of registry are found in Title 46, Code of Federal Regulations (46 CFR), Part 10. Part 12 of the same regulations governs the issuance of merchant mariner's documents, also commonly known as Z-cards. Both of these parts of the regulations also contain information on requirements of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended (STCW).

Don't forget to check 46 CFR Part 15 if you can't find the answer in Parts 10 or 12. While this section covers the crew requirements for vessels, it also contains some information that is often overlooked. For example, the requirement for a deck officer to have an endorsement as a radar observer to serve on certain vessels is found there. Part 15 also contains information about who is required to have basic safety training on vessels to which the STCW applies and information about equivalencies for licenses. For example, it answers questions like "If I hold a mate 1,600 ton license for inland waters, can I serve as the master of a T-boat?"

These regulations can be found on the World Wide Web at: www.access.gpo.gov/nara/cfr/index.html.

The regulations are the law. However, in many cases, the Coast Guard must interpret the meaning and application of these regulations to enable them to be consistently applied to specific situations. These interpretations are

called policy. The most important document to check for the Coast Guard's policy on matters affecting mariners is the *Merchant Marine Safety Manual Volume III*. This publication can be found on the Web at www.uscg.mil/hq/g-m/nmc/genpub.htm. In fact, there is a wealth of other related information at this Web site. You can also get access to all of the Navigation and Vessel Inspection Circulars (NVIC) issued by the Coast Guard. A NVIC is a document that provides information to the public on the Coast Guard's recommendations and policy on this topic. For example, if you need information about the Coast Guard's procedures for issuance of an STCW form, see NVIC 8-97 titled *Issuance of International Form Required by the STCW to Validate Merchant Mariner Licenses and Documents*. The site contains a list by title of all currently valid NVICs.

Other policy may be found in NMC Policy Letters, which are published to meet an immediate need by Coast Guard field units, such as the Regional Examination Centers, for uniform direction, in regards to a specific issue. NMC Policy Letters can be accessed at: www.uscg.mil/hq/g-m/marpers/pag/policy.htm.

Specific information about the STCW is available on the Coast Guard's Web site for STCW implementation at www.uscg.mil/STCW.

Are you studying for an examination? Perhaps you should check out www.uscg.mil/hq/g-m/examques/index.htm to see what types of questions are used on examinations. While it won't tell you the exact questions that will appear on your examination, it will assist you in studying for the examination. If you need information about the test itself, such as the number of test modules or the number of questions in each module click on either *Deck Guide* or *Engineering Guide* at www.uscg.mil/hq/g-m/marpers/pers.htm. These guides are the same publications used by the proctors in the examination rooms to select the modules used to test an applicant.

Feel shaky about the examination? Possibly some training may help. All U.S. Coast Guard-approved courses are listed at: www.uscg.mil/hq/g-m/marpers/examques/achome.htm. These courses provide sea service credit upon completion of the course, substitute for the Coast Guard examination, or meet a regulatory requirement such as RADAR or BST.

Have you searched everywhere and still can't find the answer to your questions? When all else fails and you need a real living person to answer your questions, contact any Regional Examination Center. Their phone numbers and addresses can be found at www.uscg.mil/hq/g-m/marpers/recs.htm.



Mariner's Seabag

A three-shift task force of nearly 200 employees was mounted to meet the demand. As the initial rush was quelled, the task force was reduced consistent with the demand, until today, two employees at the Coast Guard's National Maritime Center (NMC) keep up with about 1000 applications that still arrive each year. To date, the Coast Guard has reviewed the records of over 80,000 WWII mariners and issued qualifying documentation to those with the required service.

Although merchant mariners were finally recognized in 1988 for their service in World War II, the qualification period was shortened compared to that applicable to other veteran groups. This was despite the very real dangers they continued to experience after the hostilities had ended. Several U.S. flag vessels were lost or damaged as a result of striking enemy mines. Merchant mariner organizations, such as the U.S. Maritime Service Veterans Organization, continued to fight for an additional 10 years to extend the recognition period for veteran status through the end of 1946, the official date recognized by President Truman as the end of World War II.

Finally, on November 11, 1998, President Clinton signed Public Law 105-368; the Veterans Programs Enhancement Act. That law extended the qualification period to December 31, 1946, although it limited benefits for mariners qualifying in this "extended period" to burial and interment benefits only. The law also required that the Coast Guard collect a \$30 fee to process each application that qualified under this extended period.

On April 23, 1999, the Coast Guard received authority

from the Department of Defense to issue form DD214 (Certificate of Release or Discharge from Active Duty) and form DD256 (Certificate of Discharge) for certifying qualified service under the new law. The NMC was tasked with the responsibility of issuing these certificates.

Knowing the urgency with which mariners had anticipated this recognition, the NMC realigned staff and initiated new procedures, including an informative Web page (www.uscg.mil/hq/g-m/nmc/wwiimm.htm), to help expedite the certification process. Since November, over 2000 mariners have submitted applications for certification under the new law. The NMC continues to process these applications in the order received.

To qualify under Public Law 105-368, a member must submit an application (form DD2168) and \$30 check or money order, payable to the U.S. Treasury, to:

WWII Merchant Mariner Qualification
Highland Community Bank
P.O. Box 804118
Chicago, IL 60601-4118

The NMC uses this U.S. Treasury-contracted bank to handle the accounting associated with collecting the processing fee required under the new law.

The application forms (DD2168) are available from Veterans Administration Offices, merchant marine veteran organizations, and from the National Maritime Center. For more information, log onto the NMC's WWII merchant mariner web page at www.uscg.mil/hq/g-m/nmc/wwiimm.htm.



Nautical Queries

Deck Questions

- The number of fire extinguishers required on an uninspected "motor vessel" is based on the vessel's _____.
 - length
 - gross tonnage
 - draft
 - crew list
- (Both international and inland) While underway in fog, you hear a vessel ahead sound two prolonged blasts on the whistle. You should _____.
 - sound two blasts and change course to the left
 - sound only fog signals until the other vessel is sighted
 - sound whistle signals only if you change course
 - not sound any whistle signals until the other vessel is sighted
- The term "oil" as used in the Oil Pollution Regulations means _____.
 - fuel oil
 - sludge
 - oil refuse
 - all of the above
- The difference between the DR position and a fix, both of which have the same time, is known as _____.
 - the estimated position
 - set
 - current
 - leeway
- A vessel will moor port side to a wharf at a berth limited by vessels ahead and astern. Your tug should be made up to the vessel's _____.
 - stern on a hawser
 - quarter
 - waist
 - bow
- When a merchant vessel is under the control of the Naval Control of Shipping Organization in wartime, naval authorities may give orders pertaining to _____.
 - minimum manning standards
 - regulations about darkening ship
 - the stowage of explosives
 - the types of cargoes permitted on board
- A series of trays with sieves that vibrate to remove cuttings from the circulating fluid in rotary drilling operations is called the _____.
 - shale shaker
 - settling pit
 - desilter
 - desander
- What is NOT an indication that pack ice may be nearby?
 - The presence of icebergs
 - Ice blink
 - Absence of wave motion
 - Sighting a walrus in the Arctic

Questions 9 and 10 pertain to small passenger vessel regulations.

- Each vessel shall be dry-docked or hauled out at intervals not to exceed 2 years if operated in salt water for a total of more than _____.
 - 3 months in any 12 month period since it was last hauled out
 - 6 months in the 3 year period since it was last hauled out
 - 12 months in the 5 year period since it was last hauled out
 - whenever ownership or management changes
- Whenever practicable, the Certificate of Inspection must be posted _____.
 - as high as feasible in the pilot house
 - near the area where passengers embark
 - in any location desired
 - in a conspicuous place where it will most likely be observed by the passengers



Nautical Queries

Engineering Questions

1. Water can enter the lube oil system of a main propulsion turbine unit from _____.
 - A. leaky tubes in secured lube oil coolers
 - B. steam sealed turbine glands
 - C. vents on tanks and gear casings
 - D. all of the above
2. Which of the following terms would best describe the temperature at which a liquid boils at a given pressure?
 - A. Degree of saturation
 - B. Saturation temperature
 - C. Superheated temperature
 - D. Degree of superheat
3. Valves in the cylinder head of a diesel engine are opened by the direct action of the _____.
 - A. exhaust pressure
 - B. valve spring pressure
 - C. rocker arm movement
 - D. wrist pin movement
4. If an operating bilge pump is developing good vacuum, but is unable to discharge any water, which of the following problems is the most probable cause?
 - A. The wearing rings are excessively worn.
 - B. The suction strainer is clogged.
 - C. The discharge valve is clogged.
 - D. The shaft is worn.
5. A characteristic of most petroleum vapors is that they are _____.
 - A. lighter than air
 - B. not explosive at low temperatures
 - C. heavier than air
 - D. inert in stable air
6. If the compensating needle valve of a hydraulic governor is opened more than necessary the governor will _____.
 - A. have a larger than normal dead band
 - B. produce excessive speed response to a load change
 - C. response slowly to any change
 - D. stabilize engine speed at the new governor setting
7. An incandescent white flame in a boiler firebox would indicate _____.
 - A. efficient combustion
 - B. low fuel oil temperature
 - C. excessive fuel oil pressure
 - D. too much excess air
8. The boiler fuel oil service pump takes suction from the _____.
 - A. fuel oil heater discharge
 - B. contaminated drain inspection tank
 - C. fuel oil service settler tank
 - D. double bottom fuel tanks
9. Which of the following is used to hold the poppet valves closed in the turbine nozzle control valves?
 - A. Lifting beam
 - B. Springs
 - C. Steam pressure
 - D. Oil pressure
10. When a refrigeration compressor motor fails to start, the FIRST thing that should be checked for is a _____.
 - A. loose expansion valve control bulb
 - B. low differential setting on the H. P. cutout
 - C. blown fuse in the motor circuit
 - D. faulty suction pressure regulator

Engineering Answers 1-D, 2-B, 3-C, 4-B, 5-C, 6-B, 7-D, 8-C, 9-C, 10-C

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