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ENGINEERING OFFICER EDUCATION AND TRAINING PROGRAM

5th EDITION
June 2012



Canada

<p>Responsible Authority</p> <p>The Director, Marine Personnel Standards and Pilotage is responsible for this document, including any change, correction, or update.</p>	<p>Approval</p> <p style="text-align: center;">“Original signed by Naim Nazha”</p> <hr style="width: 50%; margin: auto;"/> <p style="text-align: center;">Naim Nazha Director, Marine Personnel Standards and Pilotage Marine Safety and Security</p> <p>Date signed: August 24, 2012</p>
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Originator	Amir Maan Marine Personnel Standards & Pilotage Tower C, Place de Ville 330 Sparks Street, 8 th Floor Ottawa, Ontario K1A 0N8	Telephone	(613) 990-2075	
		Fax	(613) 990-1538	
		E-mail	marinesafety-securitemaritime@tc.gc.ca	
		URL	http://www.tc.gc.ca/MarineSafety	

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1. SCOPE AND APPLICATION

1.1 PURPOSE

- (1) To inform marine stakeholders about program contents and the general conditions associated with training of Engineering Officers while enrolled at Transport Canada Marine Safety and Security (TCMSS) approved Engineering Officer Education and Training (EOET) Program, offered by TCMSS approved/recognized institutions.
- (2) To provide information to the TCMSS recognized institution (RI) outlining the requirements of the EOET programs, Operational and/or Management level, that the RI must meet before TCMSS can grant approval.

1.2 SCOPE

- (1) The training of engineering officers at RIs leading to TCMSS Engineering certification at various levels.
- (2) Compliance with:
 1. *Marine Personnel Regulations (MPR), as amended, made pursuant to the Canada Shipping Act, 2001 (CSA2001).*
 2. *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended (STCW Convention), and the Seafarers' Training, Certification and Watchkeeping Code, as amended (STCW Code).*
 3. *Regulation 5 of chapter II of the International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel, 1995 (STCW-F).*

1.3 EFFECTIVE DATE

This document enters into force on July 1st 2013.

1.4 AUTHORITY

The *Marine Personnel Regulations (MPR)*, as amended, made under the *CSA2001* (2001, c. 26).

2. GENERAL

2.1 OVERVIEW

These full time *EOET programs* provide the basic education and training required for a student to be able to pursue a rewarding career as a seagoing Engineering Officer at various levels. The core curricula meet the requirements of the *MPR*, as amended, as well as the 2010 amendments to the STCW Convention and Code and the Regulation 5 of Chapter II of the STCW-F Convention.

2.2 OBJECTIVES OF THE PROGRAM

- (1) Provide an educational and training program leading to an *EOET* training certification that is acceptable to TCMSS office and the shipping industry in general.
- (2) Provide a source of well trained for success in a career as an engineering officer on board vessels at an operational and/or management level.
- (3) Provide successful candidates with required qualifications, which TCMSS will accept for exemptions from certain requirements under the *MPR* needed to obtain an Engineering certificate of competency issued by TCMSS at the operational and management levels.

2.3 ADMISSION PRE-REQUISITES

2.3.1 OPERATIONAL LEVEL

- (1) Since the minimum age for certification is 18 years under the STCW Convention, as amended, it is recommended that the entry age is to be at least 16 years.
- (2) Qualifications for entry to an EOET program at the Operational level are at the discretion of each RI, and should be based on which level of **pre-program education** will prepare students to cope with the standard of technology inherent within the program. In general, RIs should consider a high school diploma with a mathematics /science background a minimum requirement for entry into the program.

2.3.2 MANAGEMENT LEVEL

- (1) EOET program at the management level is principally intended for certification as chief engineer officer and second engineer officer on ships powered by main propulsion machinery of 3000 kW propulsion power or more.
- (2) Entrants to the EOET program at the management level should have successfully completed a program/course covering the minimum standards required to obtain a certificate of competency as an officer in charge of an Engineering Watch in accordance with Regulation III/1 of the 2010 amendments to the STCW Convention and the Code (see latest published IMO Model Course No.: 7.04-Officer in charge of an Engineering Watch).

3. REQUIREMENTS

3.1 MARINE PERSONNEL REGULATIONS

- (1) Provisions are made in the *MPR* to allow for an approved *EOET program* that leads towards certification as an engineering officer under the *Canada Shipping Act, 2001*. This publication outlines the requirements of such programs. Depending on the contents and duration of the program attended, graduate candidates of an approved *EOET program (Operational or Management level)* are entitled to exemptions and credits from certain qualifying service and examinations on certain subjects that are mandatory for earning an engineering officer certification at the operational or management level.
- (2) Graduate candidates applying for engineering certificates at the operational level must present the following valid documents:
 - a training certificate attesting the successful completion of the *EOET program*
 - a training certificate for the required Marine Emergency Duties (MED)”
 - a training certificate for the required Propulsion Plan Simulator (PPS)”
 - a training certificate for the required Marine 1st Aid”
 - a training certificate for the Leadership and Teamworking Skills training including Engine-room Resource Management (ERM), Level 1”
 - a training certificate for the Maritime English Language
 - a Training Record Book completed by the candidate and reviewed by the RI
 - documentary evidence for the mandatory 6 months of sea service on board vessels of 750 kW or more propulsion power
- (3) As the Practical Skills Training requirements are included in the approved EOET program at the operational level, candidates applying for engineering certificates will not be required to show separate training certificates for this requirement.
- (4) “Marine Emergency Duties (MED)”, “Propulsion Plan Simulator (PPS)” and “Marine 1st Aid” training are not listed in this document because they are identified in separate TCMSS’s Publications.
- (5) An RI approved for engine room base simulators may integrate the mandatory simulator training and examination into its EOET program and award the applicable training certificates for the engine room simulator in addition to a graduation diploma. RIs choosing to integrate “MEDs”, “Maritime English Language”, “Leadership & Teamworking skills level 1 & 2” and “Marine advanced 1st Aid” in their EOET programs, must provide a separate training certificate for each course in addition to the graduation diploma.

3.2 OTHER LEGAL REQUIREMENTS

- (1) While not covered specifically in this document, a candidate must submit the following before TCMSS can issue an engineering certificate:
 - (a) Proof of Canadian Citizenship or permanent resident status as defined in subsection 2(1) of the *Immigration and Refugee Protection Act*.
 - (b) A valid medical certificate issued in accordance with the *MPR*.

4. PROGRAMS APPROVAL CONDITIONS

4.1 ACCESS TO PROGRAM LOCATION AND SUITABLE ACCOMMODATIONS

- (1) To be considered for approval, an RI has to be serviced by public transport and have suitable student accommodations and meal facilities within commuting distance from all program delivery sites.

4.2 TRANSPORT CANADA APPROVED TEACHERS OR INSTRUCTORS

- (1) Teachers and Instructors must be qualified in the tasks they teach and be appropriately trained in instructional techniques and training methods as set out in section A-I/6 of the 2010 STCW Code.
- (2) Teachers and Instructors teaching marine engineering specific subjects "**Engineering knowledge, motor, steam and general**" must hold a Certificate of Competency issued in conformity with the STCW Convention, as amended, and equivalent to the level of TCMS's exemptions granted in each program.
- (3) Teachers and Instructors teaching non-specific marine engineering subjects must either be qualified as above or hold provincially recognized qualifications for the subjects and expertise in the subject areas they teach.
- (4) Teachers and Instructors must be approved, on an annual basis, by the Director, Marine Personnel Standards and Pilotage (Director -AMSP) in Ottawa, ON.

4.3 SUITABLE TEACHING ENVIRONMENT AND FACILITIES

- (1) Relevant latest published IMO Model Courses for various approved EOET programs should be considered as a guide with respect to required standards for maintaining teaching facilities, equipment and teaching aids. At a minimum, any institution wishing approval of its EOET programs must provide the following services/facilities to their students:
 - (a) Classrooms, lecture and study rooms suitable for teaching technical subjects.
 - (b) Workshops with sufficient modern equipment needed to deliver the practical portions of the program.
 - (c) A learning resource centre and library with enough marine texts to allow independent study on marine engineering subjects.
 - (d) Recreational facilities at or close by the facility to allow students the opportunity to relax between or after classes.
 - (e) Enough regular access to vessels and ships to cement the practical aspects of the program and course material.

4.4 COMPLIANCE WITH THE DETAILED PROGRAM CONTENTS OUTLINED IN THIS PUBLICATION

- (1) Since program objectives are regulatory requirements,
 - (a) RIs wishing approval from the Director- AMSP to deliver an EOET program, must keep in mind that program contents, outlined in this publication, is **the minimum standard** for the required number of hours and subject areas.
 - (b) An RI should use the latest relevant IMO published Model Course for each course/program it offers as a guide and apply the principle of continuous improvement and review client feedback to keep the courses/programs up to date.
- (2) RIs must issue a distinct training certificate, attesting the successful completion of the program contents to;
 - (a) Each graduate candidate who has completed an EOET Program for “Officers in charge of an Engineering Watch, IMO Model Course No.: 7.04”; or
 - (b) Each graduate candidate who has completed an EOET Program for “Chief Engineer Officers and Second Engineer Officers, IMO Model Course No.: 7.02”.

4.5 PASS/FAIL CRITERIA

- (1) All courses within the program must include sufficient evaluation of each student. As a minimum standard, a student must achieve an aggregate pass mark of 60% to successfully complete each course.
- (2) RIs must hold final examinations in the following subjects:
 - (a) Applied Mathematics.
 - (b) Industrial Chemistry.
 - (c) Applied mechanics.
 - (d) Thermodynamics.
 - (e) Electrotechnology.
 - (f) Automation, Control and Instrumentation.
 - (g) Naval Architecture including stability and ship construction.
 - (h) Technical Drawing or Blueprint interpretation and sketching.
 - (i) Marine Law and Ship’s Business.
- (3) For the examinations identified in (2) above, the pass mark for these final examinations must be 60%. RIs must not award a training certificate for the EOET Program to any student not achieving the 60% pass mark or higher in each final examination.

4.6 COURSE ATTENDANCE AND INTAKE LIMITATIONS

- (1) The RI shall have a strict policy about the amount of time the student must attend classes. Normally this policy should expect students to attend all classes, lectures and workshops to a rate of 90% attendance in the program. This means that TCMSS:

- (a) Will not consider students with attendance levels less than 90% as having completed the EOET program.
 - (b) Will not grant credit for any examination required under *MPR* to students with attendance levels less than 90%.
 - (c) The Manager, TCMSS Engineering Certification (Manager-AMSPE) **may** allow out of the ordinary arrangements, involving additional seagoing service or a special project as ways to overcome a lower than 90% attendance to a specific course. The RI's EOET program coordinator must propose and support such arrangements.
- (2) When the school year is complete, all RIs must send an annual attendance report for each student registered with an EOET program to the Manager- AMSPE.
 - (3) Class sizes for lectures and audiovisual instruction should be limited to not more than 24 in order to allow the instructor to give adequate attention to individual trainees.
 - (4) Class sizes for Practical Skills Training, Practical Demonstrations, Open Water Drills and Pool Exercises should be limited to not more than 12 to each instructor/supervisor.

4.7 QUALITY SYSTEM

- (1) RI must operate under a quality system that conforms to the standards identified in Section A I/8, STCW Code, as amended- Part A and recommended guidance identified in Section B-I/8, STCW Code, as amended-Part B of the STCW Convention, as amended.

5. CREDITS FOR GRADUATES

5.1 EOET PROGRAM “OFFICERS IN CHARGE OF AN ENGINEERING WATCH - IMO MODEL COURSE NO.: 7.04”

- (1) Graduate candidates from the EOET program at the Operational level may receive credits for the following requirements of the *MPR, as amended*:
 - (a) The following examinations at the vessel Operational Level:
 1. Applied Mathematics
 2. Industrial Chemistry
 3. Applied Mechanics
 4. Thermodynamics
 5. Electrotechnology
 6. Naval Architecture
 7. Technical Drawing
 8. Maritime English language
 - (b) Training certificate for Practical Skills for Marine Engineers.

5.2 EOET PROGRAM “CHIEF ENGINEER OFFICERS AND SECOND ENGINEER OFFICERS, IMO MODEL COURSE NO.: 7.02”

- (1) Graduate candidates from the EOET program at the management level may receive credits for the following requirements of the *MPR, as amended*:
 - (a) The following examinations at the management level:
 1. Applied Mechanics
 2. Thermodynamics
 3. Electrotechnology
 4. Naval Architecture
 5. Technical Drawing

5.3 SEAGOING SERVICE

- (1) The experience required to obtain a certificate of competency as a Fourth-class Engineer, Motor Ship or Steamship or a Watchkeeping Engineer Officer, Motor or Steam Vessel, Domestic, is addressed in the *MPR*.
- (2) Graduate candidates from the *approved EOET at the Operational level* must acquire at least 6 months of sea service on board one or more vessels of 750 kW or more propulsion power, performing engine room duties under the supervision of a qualified Engineer Officer.

6. MISCELLANEOUS ISSUES

6.1 PROPULSION PLANT SIMULATOR TRAINING

- (1) RIs that integrate the use of a TCMSS approved engine room simulators in their programs are subject to the following conditions:
 - (a) Students in their final year of the approved EOET program at the operational level must be evaluated at the watchkeeping level (PPS Level 1). Any training certificates issued by the RIs to the successful students of the *EOET program at the operational level* shall only be at PPS Level 1.

7. PROGRAM OUTLINE AND MINIMUM COURSE HOURS

7.1 ENGINEERING OFFICER EDUCATION AND TRAINING PROGRAM – MINIMUM INSTRUCTIONAL HOURS UNDER THE 2010 STCW CODE

Subject	Minimum Instructional Hours- as per Latest published IMO Model Course # 7.04 under section A-III/1 for EWO (EOET-III/1)		Minimum Instructional Hours- as per Latest published IMO Model Course # 7.02 under section A-III/2 for C/E/O & 2/E/O (EOET-III/2)		Total Minimum Instructional Hours- combined program (EOET- III/1&III/2)
	Total Hours	Hours per section	Total Hours	Hours per section	Total Hours
Skills Training	338	2.2.2: 50 hrs-	Nil	Nil	338
		3.1.4 to 3.1.7: 140hrs			
		3.2.1 to 3.2.4: 148 hrs			
Materials	25	3.1.1: 15hrs	15	1.2.7: 15hrs	40
		3.1.2: 10hrs			
Mathematics	100	(Appendix 2)	Nil		100
Applied Mechanics (Flds/Hyd/Strengths)	129	Appdx.1: 50hrs-	90	1.2.2: 90hrs	219
		Appdx. 4: 60hrs			
		3.1.3: 19hrs			
Refrigeration & Air Conditioning	50	1.4.1.6.2: 40hrs	10	1.2.5: 10hrs	60
		3.2.3.12: 10hrs			
Naval Architecture including stability and ship construction	104	4.2: 104hrs	95	4.1: 95hrs-	199
Industrial Chemistry	45	(Appendix 5)	Nil		45
Electrotechnology	235	2.1.1: 165hrs	170	2.1.1: 110hrs-	405
		2.2.1: 10hrs		2.1.3: 40hrs	
		2.2.3 to 2.2.6: 60hrs		2.1.4: 20 hrs-	
Automation, Control and Instrumentation	115	2.1.2: 45hrs-	146	2.1.2: 26hrs-	261
		2.1.3: 70hrs-		2.1.5: 10hrs-	
		*note 1		2.2: 110 hrs-	
Marine Computer Science and Networks	70	*note 1	Nil		70
Thermodynamics	110:	Appdx3: 90hrs-	110	1.2.1: 90hrs-	220
		1.4.1.1.1: 20hrs-		1.2.4: 20hrs-	
Technical Drawing or Blue Print Interpretation and sketching	43:	3.2.6: 38 hrs	40	1.1.6: 40hrs-	83
		3.2.7: 5hrs-			

Engineering knowledge, motor, steam and general	446	1.1.1 to 1.1.3: 11hrs--	418	1.1.1to 1.1.5: 75hrs	864
		1.4: 388 hrs		1.1.7: 85 hrs -	
		1.5+ 15 hrs-3.2.5: 32hrs		1.2.3: 7hrs-	
				1.2.6: 10 hrs -	
				1.3.1 to 1.3.5: 168hrs	
				1.4: 10hrs-	
				3.1 to 3.3: 63hrs- <i>*STW43/WP.7: +40-</i>	
Communication	20	-1.4.2: 5hrs	Nil		20
		-1.3: 15hrs			
		<i>*note 2</i>			
Maritime English	20	1.2: 20hrs	Nil		20 <i>*note 3</i>
		<i>*note 2</i>			
Marine Law and Ship's Business	31	4.1: 12hrs-	92	4.2.1 to 4.2.8: 73hrs-	123
		4.6: 19hrs		4.2.9: 12 hrs	
		<i>*STW 43/WP.7: +6hrs</i>		4.3: 5hrs	
MEDs and Marine Advanced First Aid	MEDs as per TP 4957:	Competencies: 4.3,4.4,4.8	MEDs as per TP 4957:	Competencie s: 4.3, 4.4	<i>*note 3</i>
	Marine 1st aid as per TP 13008.	Competency: 4.5			
PPS Training	34	1.1.1 to 1.1.3: 12hrs-	30	1.3.1: 10hrs-	64 <i>*note 3</i>
		1.4.3: 22 hrs		1.3.3: 20hrs-	
		Level 1-as per TP 10935		Level 2-as per TP 10935	
Leadership and Team working Skills Training	45	1.1.4: 7hrs-	36	4.5: 36hrs	81 <i>*note 3</i>
		4.7: 38hrs-		<i>*STW43/WP.7: +9-</i>	
		<i>*STW43/WP.7: +14-</i>			
	Level 1- including ERM	Level 2- including managerial skills			
	<i>Option of Simulator training: NO</i>	<i>Option of Simulator training- YES</i>			
Total Hours	1960		1252		3212

Note 1: RIs may choose to combine the *Automation, Control and Instrumentation* course and the *Marine Computer Science and Networks* course of the *EOET* program at the *Operational level*. A suitable reduction of instructional hours may be achieved.

Note 2: RIs may choose to combine the *Communication* course and the *Maritime English Language* course of the *EOET Program* at the *Operational level*. A suitable reduction of instructional hours may be achieved.

Note 3: As “*MEDs*”, “*Maritime English Language*”, “*Leadership and Teamworking Skills Level 1 & 2*” and “*PPS level 1 & 2*” training can be taken as standalone courses and if RIs that include any of these trainings as an integral part of their *EOET* programs should see an increase in the total hours for their programs. It is recommended to deliver training in “*Leadership and Teamworking Skills level 1 & 2*” in the final phase of their respective programs.

7.2 SEA TRAINING EXPERIENCE ON VESSELS AND DOCUMENTARY EVIDENCE - EOET PROGRAM AT THE OPERATIONAL LEVEL

- (1) One of the conditions for receiving a training certificate for successfully completing the *approved EOET program at the operational level* is to present documents attesting the completion of at least 6 months of approved sea service onboard vessels powered by main propulsion machinery of 750 kW or more performing engine-room duties under the supervision of the chief engineer officer or a qualified engineer officer. This sea service must be properly documented throughout its duration and locations.
- (2) A Training Record Book for Engineers (TRBE), as specified in TP 13721 or an equivalent program's approved Sea Training Manual must be fully completed.
 - (a) Trainees who cannot complete certain tasks required in the TRBE due to the type of vessel or because equipment was not carried on board the vessel, must complete additional assignments on those particular tasks.
 - (b) The RI must determine the additional assignments the trainee must complete to ensure that he or she achieves each required knowledge/competence.
 - (c) These assignments are to be part of the TRBE submitted to the TCMSS office when applying for engineering certification.
- (3) Documentary evidence must identify each specific knowledge covered during the sea training period and it must also clearly indicate which specific knowledge/competence of the table A-III/1 of section A-III / 1 of STCW Code, as amended-Part A, is covered during the sea training period.

8. MINIMUM STANDARD OF COMPETENCE FOR OFFICERS IN CHARGE OF AN ENGINEERING WATCH REQUIRED UNDER PART A OF THE 2010 STCW CODE TABLE III/1

8.1 GENERAL

- (1) Subject to section 8.2 & 8.3 below, a TCMSS approved *EOET program for Officers in charge of an Engineering Watch* is to be delivered in accordance with the latest published “IMO Model course No. 7.04 “*Officer in charge of an Engineering Watch*”. It must cover the minimum standard of competence for officers in charge of an engineering watch in a manned engine-room or as designated duty engineers in a periodically unmanned engine-room as specified in *section A-III/1 of the 2010 STCW Code- Part A*.
- (2) While preparing lesson plans for the course under function 4 of the “IMO Model No. 7.04-“*Officer in charge of an Engineering Watch*”, on Marine law and Ship’s Business, RIs should consider using the contents as specified in Chapter 11 - “*Marine Law and Ship’s Business*” of this document to cover National Legislations.
- (3) The required *Maritime English language* course under *section A-III/1 of the 2010 STCW Code* must align with the latest published “IMO Model course No.: 3.17 - *Maritime English*”.
- (4) Marine Computer Science and Networks course with contents as specified in Chapter 10 of this document should be part of the *EOET program at the operational level*.
- (5) While preparing lesson plans for ship construction and Naval Architecture, elements of theoretical knowledge and basic principles involved in the subject as specified in paragraph 3.11 of the Appendix to the *Regulation II/5 of the STCW-F, i.e. “Fishing vessel construction, including stability and damage control”* must be included and is to be aligned with the latest published “IMO Model course No.: 7.07-*Chief and 2nd Engineer Officer of fishing vessel*”.

8.2 SKILLS TRAINING AND SEA GOING SERVICE

- (1) Training programs that attempt to equip a person for a career at sea, cannot disregard the necessary “On the Job Training” that is a requirement of the MPR and the 2010 STCW Convention and the STCW Code section A-III/1.
- (2) Trainees of TCMSS *approved EOET Program at the operational level* are required to complete combined workshop skill training and an approved seagoing service of not less than 12 months as part of an TCMSS approved training programme. This includes onboard training that meets the requirements of section A-III/1 of the 2010 STCW Code and is documented in an approved training record Book for engineers (TRBE).

- (a) The contents of the sea training manual or TRBE shall conform to the Model Training Record Book for Candidates as Officers in Charge of an Engineering Watch or Designated Duty Engineers” published by the International Maritime Organization STCW.7/Circ.3, December 1, 1996.They must also meet the requirements of section A-III/1 of the 2010 STCW Code, Part A or as specified in “TP 13721- Training Record Book”.
- (3) During the required seagoing service on board vessels powered by main propulsion machinery of 750 kW propulsion power or more, trainees must perform engine-room watchkeeping duties under the supervision of the chief engineer officer or a qualified engineer officer for a period of at least six months.
- (4) RIs must include the practical skills and knowledge required under the STCW-F, as specified in paragraph 4.4 of the Appendix to the Regulation 5 of Chapter II of the STCW-F, i.e. “Maintenance of fish catch handling equipment and deck machinery on board a fishing vessel” in addition to the practical skills training required under the section A-III/1 of 2010STCW Code-Part A

8.3 REQUIREMENTS ONBOARD TRAINING

- (1) Approval of sea training manual by TCMSS office:
 - (a) The Sea Training Manual or TRBE the trainees of the EOET Program at the operational level will use while at sea must be included in the program documentation and is subject to the approval by TCMSS.
- (2) Officer of Primary Interest (OPI)
 - (a) RIs shall have an OPI who is responsible for the sea training portions of the program.
 - (b) The OPI must sign off on individual sea training manuals as satisfactory before TCMSS office will accept the manual as a part of the mandatory six months of approved seagoing service.
- (3) Integration with classroom portions
 - (a) Experience at sea must be matched to the classroom portions of the program, where practical.
- (4) MPR set minimum sea service at 6 months.
 - (a) Applicants for certification as a 4th Class Engineer Officer must show discharge books and testimonials together with a sea training book/manual or training record book that clearly shows that they have 6 months approved sea going service on board ships powered by main propulsion machinery of 750 kW propulsion power or more, performing engine-room watchkeeping duties under the supervision of the chief engineer officer or a qualified engineer officer.
 - (b) Sea service must be on operational vessels that will expose the candidate to a normal range of watchkeeping engineer officer and engine room duties. Service on laid up vessels will not be accepted; however sea service on vessels with a few days either loading or unloading or under repair will be accepted as normal vessel operation.
 - (c) A graduate from an approved EOET program at the operational level, who wishes to be examined for a 4th Class Engineer Officer, or a Watchkeeping Engineer Officer (Domestic), Steam Certificate at the same time as the 4th Class

Engineer Officer, or a Watchkeeping Engineer Officer (Domestic), Motor Certificate, must have acquired at least 2 months of sea service on board steam powered vessels. These 2 months of sea service can be part of the 6 months mandatory sea service (i.e. 2 months steam, 4 months motor).

9 MINIMUM STANDARD OF COMPETENCE FOR CHIEF ENGINEER OFFICERS AND SECOND ENGINEER OFFICERS REQUIRED UNDER PART “A” OF THE 2010 STCW CODE TABLE III/2

9.1 GENERAL

- (1) Subject to section 9.2 below, TCMSS approved EOET program for chief engineer officers and second engineer officers is to be delivered in accordance with the latest published “IMO Model Course No.: 7.02-*Chief Engineer Officer and second Engineer Officer*”. It must cover the minimum standard of competence for Chief Engineer Officers and Second Engineer Officer on ships powered by main propulsion machinery of 3000 kW propulsion power or more as specified in section A-III/2 of the 2010 STCW Code-Part A.

9.2 CANADIAN NATIONAL LEGISLATION

- (1) While preparing lesson plans for the course under function 4 of the “IMO Model Course No.: 7.02-*Chief Engineer Officer and Second Engineer Officer*”, on *Marine law and Ship’s Business*, RIs should consider using the contents as specified in Chapter 11-*Marine Law and Ship’s Business* of this document to cover Canadian Maritime Legislations for implementing International Agreements and Conventions as required under competence 4.2.9 of the IMO Model Course No.:7.02.

10. MARINE COMPUTER SCIENCE AND NETWORKS

10.1 GENERAL

- (1) Computer based control systems are replacing many of the traditional tasks carried out by engine room personnel. Modern vessels are being equipped with a range of such control systems – from propulsion systems that are reliant on microprocessor based controls, through alarm and monitoring functions down to complex control circuitry that operate cranes and other deck machinery. Engineers today need to be fully conversant with the principles of this labour saving technology and also have the knowledge and ability to troubleshoot and carry out repairs to these types of systems.
- (2) While listed as a separate course, the marine computer science and networks course may be integrated with the automation, control and instrumentation course as many of the topics cover the same basic elements. Course hours can be greatly reduced by integrating these two courses.

10.2 SUBJECT AREAS

The following subject areas must be included:

- (1) Computer and other microprocessor based applications on board vessels – general
- (2) Computer internal and external hardware
 - (a) Power supplies
 - (b) Process cards
 - (c) Input – output cards
 - (d) Monitors
 - (e) Input devices
- (3) Operating systems and computer languages
 - (a) Common languages and their usages
 - (i) Typical commands
- (4) Networks
 - (a) Purpose
 - (b) Types
 - (c) Hardware
 - (d) Communication protocols
- (5) Trouble shooting of hardware and software faults
 - (a) Theoretical
 - (b) Practical

10.3 COMMON APPLICATIONS

- (1) Ships' internal communication systems using microprocessor based systems
- (2) Fire detection systems using microprocessor based systems
- (3) Alarm, monitoring and activation systems using microprocessor based systems and networks.
- (4) Vessel propulsion control systems
 - (a) Multiple control locations
 - (b) Dynamic positioning control
 - (c) "Joystick" control.
- (5) Remote control systems for deck machinery, cranes and other miscellaneous shipboard applications.

11. MARINE LAW AND SHIP'S BUSINESS

11.1 GENERAL

- (1) While there are references to certain regulations and the enabling legislation in the other courses that make up the EOET program, this course should give a broad overview of the regulatory regime under which vessels operate in Canada and worldwide. The course should concentrate on how the various Acts, Regulations and International Conventions affect the operation of the engine room, its staff, and vessels in general.

11.2 CANADIAN MARINE LAWS AND SHIP OPERATIONS

Latest version of the:

- (1) *Canada Shipping Act, 2001* and its Regulations, with specific reference to the following:
 - (a) *Canada Shipping Act 2001*, the powers of the Governor in Council and the Minister of Transport
 - (i) Registration of ships and the various parts of the act
 - (b) *Administrative Monetary Penalties Regulations*
 - (c) *Anchorage Regulations*
 - (d) *Ballast Water Control and Management Regulations*
 - (e) *Cargo, Fumigation and Tackle Regulations*
 - (f) *Crew Accommodation Regulations*
 - (g) *Collision Regulations*
 - (h) *Environmental Response Arrangements Regulations*
 - (i) *Fire and Boat Drills Regulations*
 - (j) *Fire Detection and Extinguishing Equipment Regulations*
 - (k) *Hull Construction Regulations*

- (l) *Hull Inspection Regulations*
- (m) *Large Fishing Vessel Inspection Regulations*
- (n) *Life Saving Equipment Regulations*
- (o) *Load Line Regulations*
- (p) *Marine Machinery Regulations*
- (q) *Marine Personnel Regulations*
- (r) *Safe Working Practices Regulations*
- (s) *Safety Management Regulations*
- (t) *Shipping Casualties Reporting Regulations*
- (u) *Ship's Elevator Regulations*
- (v) *Small Fishing Vessel Inspection Regulations*
- (w) *Small Vessel Regulation*
- (x) *Tackle Regulations*
- (y) *Towboat Crew Accommodation Regulations*
- (z) *Vessel Certificates Regulations*
- (aa) *Vessel Clearance Regulations*
- (bb) *Vessel Pollution and Dangerous Chemicals Regulations*
- (cc) *Vessel Registration and Tonnage Regulations*
- (dd) *Voyage Data Recorder Regulations*
- (2) Canada Labour Code with specific reference to *Maritime Occupational Health and Safety Regulations*
- (3) *Arctic Waters Pollution Prevention Act*
- (4) Criminal Code, as it relates to the operation of a ship

11.3 SHIP'S BUSINESS

- (1) Marine Insurance
 - (a) A general knowledge of marine insurance and its interrelationship with charter parties, bills of lading and the various Acts, Regulations and International Conventions that deal with marine commerce as it relates to vessels
 - (b) Statutory and contractual requirements as to sea worthiness
- (2) International Maritime Organization (IMO), International Labour Organization (ILO), Safety of Life at Sea convention (SOLAS) and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978, as amended.
 - (a) A general knowledge of the international conventions and agreements that affect world shipping
 - (b) Specific knowledge of the various parts of the international conventions that affect the operation of the engine room of a vessel

As an example: Chapter VIII of the STCW Code part A that refers to the standards regarding watchkeeping.

- (3) Pollution Prevention and the Protection of the Environment.
 - (a) A knowledge of the methods and aids to prevent pollution of the environment by ships
 - (i) Effects of marine pollution on the environment.
 - (ii) Canadian regulations and international conventions (MARPOL) to be observed to prevent pollution to the marine environment.
- (4) International Safety Management Code (ISM)
 - (a) Knowledge of the requirements of the code and the impact on engine room operations
 - (b) Case study of an ISM system in operation.
- (5) Purchasing, contracting and accounting methods
 - (a) Controlling budgets and finance
 - (b) Project management – planning and running of vessel refits/drydocks
 - (c) Supervision of trades and contractors
 - (d) Dealing with Representatives, shore suppliers, and agencies
 - (i) Transport Canada inspectors
 - (ii) Classification Society surveyors
 - (iii) Shore superintendents
- (6) Miscellaneous
 - (a) Crew welfare and training – company appraisal systems etc
 - (b) Interdepartmental relationships on a ship
 - (c) Crew representation and rights under the *Canada Shipping Act, 2001*
 - (d) Official Log Books
 - (e) Communication methods: Ship – Shore