

DOCUMENT FOR GUIDANCE, 1985

An international maritime training guide

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Joint IMO/ILO Committee on Training in December 1985

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INTRODUCTION

1 Recommendation 39 of the International Conference on the Safety of Life at Sea, 1960, advocates that:

- “(a) Contracting Governments should take all practicable steps, if necessary in co-operation with other Contracting Governments, to ensure that the education and training of masters, officers and seamen in the use of aids to navigation, of life-saving appliances and of authorized devices designed for the prevention, detection and extinction of fires or for preventing or alleviating casualties at sea is sufficiently comprehensive, and also that, by supplementary or refresher courses, or by other appropriate means, such education and training is kept up to date and in step with modern technological developments in this field, and
- (b) within their respective spheres of activity the Organization (IMO) and the International Labour Organisation (ILO) should co-operate closely with each other and with all interested Governments to the above ends.”.

2 To comply with this Recommendation adequate facilities should be provided for the training of masters, officers and seamen in the operation and maintenance of aids to navigation and other devices contributing to safety of life at sea¹. There should be exchanges of information on modern methods and technological advances between all concerned in the shipping industry. In the establishment and review of training schemes, ship-owners' and seafarers' organizations should be fully consulted. The satisfactory completion of appropriate training courses should be among the qualifications required for the grant of appropriate certificates.

3 While the provisions in this *Document for Guidance* are directed primarily towards those engaged in the deck and engineering departments it should be noted that certain sections, notably section 10 (Fire prevention and fire fighting), section 11 (Personal survival and life-saving), section 16 (Training and qualifications of officers and ratings serving on ships carrying oil, chemicals or liquefied gases in bulk) and section 17 (First aid

¹ The word *safety*, when used in this Document, should be interpreted as an all-embracing word, covering all aspects of safety mentioned in Recommendation No. 39.

and medical care) are applicable to all departments aboard ship, including catering staff.

4 Reference in the sections of this Document to training for ratings also applies to general purpose (or similar) ratings in countries where, by industrial agreement, ships may be manned by such ratings. Training given should be appropriate to the duties they may be required to perform.

5 The appendices to the sections give more detailed guidance on matters which should be covered in training programmes and examinations. It is impracticable to be more specific as technology and training requirements need frequent updating.

6 The stage of training and certification when the detailed guidance should be included in training programmes or examinations should be in accordance with the minimum requirements of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978 and other relevant international conventions and recommendations or, where international requirements or recommendations do not exist, as decided by the Administration.

7 Reference to the 1978 STCW Convention, the 1978 STW Conference resolutions and other IMO and ILO conventions and resolutions are given in each section for the guidance of the users of this Document.

8 Without prejudice to any existing higher training requirements, the following guidance, which is derived from information supplied by Governments and summarized by IMO and ILO, is not intended to be minimum requirements or standards which will suit all countries. It is not theoretical but is based on experience; it has been, in some measure, put into actual operation by one or more States and is submitted in the belief that it will be of practical assistance when national schemes and requirements for safety training are instituted, amended or developed. It is put forward by the Joint IMO/ILO Committee on Training in the form of guidance for two reasons:

- .1 the actual content of necessary safety training is constantly and rapidly changing; and
- .2 the special circumstances of different countries and different trades may justify some differences in method and application.

9 Systematic training is essential in all countries and it is intended that this guidance achieves a very wide measure of general application. It should be of particular use to those countries instituting or revising their maritime training programmes.

10 Some items of shipborne equipment remain unchanged in basic design and function for many years; others undergo changes. Where such changes occur that substantially affect the operational and maintenance requirements, it is recommended that courses be established at training centres or by the equipment manufacturers which provide updating of the seafarers' existing knowledge of similar equipment to ensure that they are capable of using the new or modified equipment safely and correctly.

SECTION 1 – RADAR NAVIGATION

Ref: 1978 STCW Convention – regulation II/2, appendix, paragraphs 4 and 19(c)
1978 STCW Convention – regulation II/4, appendix, paragraph 3
IMO resolution A.482(XII)
IMO resolution A.483(XII)

1 Radar observation and plotting

1.1 It should be ensured that training in the use of radar is available. Such training is usually given by special courses or is included in the curriculum of basic courses in nautical education. In all cases such training should conclude with an examination to ensure that an adequate standard is reached.

1.2 These courses are principally intended for candidates for certification as officers in charge of a navigational watch. The courses should be designed to enable officers to obtain a full and proper training in all aspects of the operation and the use of marine radar including the use of radar information for navigation and collision avoidance. It is considered that, before entering such courses, candidates should have completed a minimum period of service in the deck department on board ship in order fully to appreciate some of the problems involved. In order to qualify for the issue of a first certificate of competency as a deck officer, a candidate should have attended an officially approved or organized course and be able to produce a certificate recognized by the appropriate Administration to that effect. Records of radar observer certificates issued should be held by a competent authority which should be responsible for entering particulars of the certificate in the officer's service record or on his certificate of competency. Where no radar observer certificates are issued, the examination for the certificates of competency should require at least a similar standard of proficiency. More detailed guidance is set out in appendix 1 to this section.

2 Automatic radar plotting aids (ARPA)

2.1 Deck officers required to serve in ships fitted with ARPA should be trained in the proper use of this equipment, to ensure they understand the basic principles of the operation of ARPA, including its capabilities, limitations and possible errors. This training should be additional to training in radar observation and plotting as outlined in section 1.1 and appendix 1 which should be a prerequisite to such ARPA training. More detailed guidance is set out in appendix 2 to this section.

3 Radar and ARPA simulator training

3.1 As far as is practicable, training courses on marine radar and ARPA simulators should be available for all deck officers, particularly masters and senior officers. The syllabus should be approved by the Administration concerned. Officers who complete the course should be issued with a certificate or an endorsement on their certificates of competency. More detailed guidance is provided in appendix 3 to this section.

4 Radar and ARPA maintenance

4.1 Adequate training in the maintenance of shipborne radar and ARPA should be provided.

APPENDIX 1

Training in radar observation and plotting – syllabus for recommended training programme

1 General

1.1 The following training programme should be undertaken to fulfil the minimum training requirements of paragraph 4 of the appendix to regulation II/2 and paragraph 3 of the appendix to regulation II/4 of the 1978 STCW Convention. In order to achieve the practical aims of this programme, demonstrations of, and practice in, radar observation should be undertaken where appropriate on functional marine radar equipment, including the use of simulators or other effective means approved by the Administration. Plotting exercises should preferably be undertaken in real-time in order to increase awareness of the hazards of the improper use of radar data and improve plotting techniques to achieve a standard of radar plotting commensurate to that necessary for the safe execution of collision avoidance manoeuvring under actual seagoing conditions. Both the capabilities and limitation of radar as an aid to navigation and collision avoidance should be dealt with.

2 Theory

2.1 *Factors affecting performance and accuracy*

2.1.1 Elementary understanding of the principles of radar; range and bearing measurement. Characteristics of the radar set which determine the quality of the radar display; the radar antenna; polar diagrams; the effects of power radiated in directions outside the main beam, non-technical description of the radar system including variations in the features encountered in different types of radar sets. Performance monitors. Equipment factors which affect maximum and minimum detection ranges and accuracy of information.

2.1.2 Marine radar performance specification (Assembly resolutions A.222(VII) and A.477(XII)).

2.1.3 Effects of the siting of the radar antenna, shadow sectors and arcs of reduced sensitivity, false echoes, effects of antenna height on detection ranges, etc. Siting radar units and storing spares near magnetic compasses; magnetic safe distance.

2.1.4 *Radiation hazards.* Safety precautions to be taken in the vicinity of antenna and open waveguides.

2.2 *Detection of misrepresentation of information including false echoes and sea returns*

2.2.1 A knowledge of the limitations to target detection is essential to enable the observer to estimate the dangers of failure to detect targets. The following factors should be emphasized:

- .1 performance standards of the equipment;
- .2 brilliance, gain and video processor control settings;
- .3 radar horizon;
- .4 size, shape, aspect and composition of targets;
- .5 effects of the motion of the ship in a seaway;
- .6 propagation conditions;
- .7 meteorological conditions, sea clutter and rain clutter;
- .8 anti-clutter control settings;
- .9 shadow sectors; and
- .10 radar-to-radar interference.

2.2.2 Factors which might lead to faulty interpretation: false echoes, effects of nearby pylons and large structures, effects of power lines crossing rivers and estuaries, echoes from distant targets occurring on second or later traces.

2.2.3 Aids to interpretation: corner reflectors, radar beacons. Detection and recognition of land targets; the effects of topographical features; effects of pulse length and beamwidth. Radar conspicuous and inconspicuous targets; factors which affect the echo strength from targets.

3 Practice

3.1 Setting up and maintaining displays

3.1.1 The various types of radar display mode; unstabilized ship's head-up relative motion, ship's head-up and north-up stabilized relative motion, true motion.

3.1.2 The effects of errors on the accuracy of information displayed; effects of compass errors on stabilized and true motion displays, effects of log errors on a true motion display, effects of inaccurate speed settings on a true motion display.

3.1.3 Methods of detecting inaccurate speed settings on true motion controls. Effects of receiver noise limiting ability to display weak echo returns, effects of saturation by receiver noise, etc. Adjustments of operational controls; criteria which indicate optimum points of adjustment, importance of proper sequence, etc. Effects of maladjusted controls, detection of maladjustments and correction of controls:

- .1 affecting detection ranges;
- .2 affecting accuracy.

3.1.4 Dangers of using radar equipment with maladjusted controls.

3.1.5 Need for frequent regular checking of performance, relationship of performance indicator to range performance of the radar set.

3.2 Range and bearing

3.2.1 Methods of measuring ranges; fixed range markers, variable range marker. Accuracy of each method and the relative accuracy of the different methods. How range data are displayed; ranges at stated intervals, digital counter, graduated scale, etc. Methods of measuring bearings; rotatable cursor on transparent disc covering the display, electronic bearing cursor and other methods. Bearing accuracy. Inaccuracies due to: parallax, heading marker displacement, centre maladjustment; how bearing data are displayed; graduated scale, digital counter, etc.

3.2.2 Need for regular checking of the accuracy of ranges and bearing, methods of checking for inaccuracies and correcting or allowing for inaccuracies.

4 Plotting techniques and relative motion concepts

4.1 Practice in manual plotting techniques including the use of reflection plotters should have the objective of establishing a thorough understanding of the interrelated motion between own ship and other ships, including the effects of manoeuvring to avoid collision. At the preliminary stages of this training, simple plotting exercises should be designed to establish a sound appreciation of plotting geometry and relative motion concepts. The degree of complexity of exercises should increase throughout the training course until the trainee has mastered all aspects of the subject. Competence can best be enhanced by exposing the trainee to real-time exercises performed on a simulator or using other effective means.

4.2 Identification of critical echoes

4.2.1 Position fixing by radar from land targets and sea marks.

4.2.2 Accuracy of position fixing by ranges and by bearings.

4.2.3 Importance of cross-checking accuracy of radar against other navigational aids.

4.2.4 The importance of recording ranges and bearings at frequent and regular intervals when using radar as an aid to collision avoidance.

4.3 Course and speed of other ships

4.3.1 Different methods by which course and speed of other ships can be obtained from recorded ranges and bearings:

- .1 unstabilized relative plot;
- .2 stabilized relative plot; and
- .3 true plot.

4.3.2 Relationship between visual and radar observations; detail, accuracy of estimates of course and speed of other ships. Detection of changes in movements of other ships.

4.4 Time and distance of closest approach of crossing, meeting or overtaking ships

4.4.1 Use of recorded data to obtain:

- .1 measurement of closest approach distance and bearing;
- .2 time to closest approach.

4.4.2 The importance of frequent, regular observations.

4.5 *Detecting course and speed changes of other ships*

4.5.1 Effects of changes of course or speed by other ships on their tracks across the display.

4.5.2 Delay between change of course or speed and detection of that change.

4.5.3 Hazards of small changes as compared with substantial changes of course or speed in relation to rate and accuracy of detection.

4.6 *Effects of changes in own ship's course and speed or both*

4.6.1 On a relative motion display; effects of own ship's movements, effects of other ships' movements; advantages of compass stabilization of a relative display.

4.6.2 Effects of changes in own ship's course and speed or both on a true motion display.

4.6.3 Effects of inaccuracies; of speed and course settings on a true motion display, of compass stabilization data driving a stabilized relative motion display.

4.6.4 Effects of changes in course or speed by own ship on tracks of other ships on the display.

4.6.5 Relationship of speed to frequency of observations.

5 Application of the International Regulations for Preventing Collisions at Sea

5.1 Relationship of the Regulations for Preventing Collisions at Sea to the use of radar.

5.2 Action to avoid collision; dangers of assumptions made on inadequate information and the hazards of small alterations of course or speed. The advantages of safe speed when using radar to avoid collision. The relationship of speed to closest approach distance and time and to the manoeuvring characteristics of various types of ships.

5.3 The importance of radar observation reports being well defined; radar reporting procedures.

5.4 Use of radar in clear weather, to obtain an appreciation of its capabilities and limitations, compare radar and visual observations and obtain an assessment of the relative accuracy of information.

5.5 The need for early use of radar in clear weather at night and when there are indications that visibility may deteriorate. Comparison of features displayed by radar with charted features. Comparison of the effects of differences between range scales.

APPENDIX 2

Training in automatic radar plotting aids (ARPA)

1 General

1.1 In addition to the minimum knowledge of radar equipment required by paragraph 4 of the appendix to regulation II/2 and paragraph 3 of the appendix to regulation II/4 of the 1978 STCW Convention, masters, chief mates and officers in charge of a navigational watch on ships carrying ARPA should be capable of demonstrating, to the satisfaction of the Administration, a knowledge of the fundamentals and operation of ARPA equipment and the interpretation and analysis of information obtained from this equipment.

1.2 Training facilities should include simulators or other effective means approved by the Administration capable of demonstrating the capabilities, limitations and possible errors of ARPA. In introducing this training programme, Administrations should pay due regard to the phasing in of the implementation of the carriage requirements specified in the amendments to regulation V/12 of the 1974 SOLAS Convention.

1.3 The facilities mentioned above should provide a capability such that trainees undergo a series of real-time exercises where the displayed radar information, at the choice of the trainee or as required by the instructor, is either in the ARPA format or in the basic radar format. Such flexibility of presentation will enable realistic exercises to be undertaken, providing for each group of trainees the widest range of displayed information available to the user and thus consolidating his ability to use effectively either basic radar or ARPA systems.

1.4 The ARPA training programme should include all items listed in paragraphs 3 and 4 below.

2 Training programme development

2.1 Where ARPA training is provided as part of the general training requirements specified in the appendices to regulations II/2 and II/4 of the 1978 STCW Convention, masters, chief mates and officers in charge of a navigational watch should understand the factors involved in decision making based on the information supplied by ARPA in association with other navigational data inputs, having a similar appreciation of the operational aspects and of system errors of modern electronic navigational systems. This training should be progressive in nature commensurate with responsibilities of the individual and the certificates issued by Administrations under regulations II/2 and II/4 of the 1978 STCW Convention.

3 Theory and demonstration

3.1 The possible risks of over-reliance on ARPA

3.1.1 Appreciation that ARPA is only an aid to navigation and that its limitations, including those of its sensors, make over-reliance on ARPA dangerous, in particular using it to keep a look-out. Need to comply at all times with the basic principles to be observed in keeping a navigational watch (regulation II/1 of the 1978 STCW Convention) and operational guidance for officers in charge of a navigational watch (resolution 1 of the 1978 STW Conference).

3.2 The principal types of ARPA systems and their display characteristics

3.2.1 Knowledge of the principal types of ARPA systems in use; their various display characteristics and an understanding of when to use ground or sea stabilized modes and north-up, course-up or head-up presentations.

3.3 IMO performance standards for ARPA

3.3.1 An appreciation of the IMO performance standards for ARPA (resolution A.422(XI)), in particular the standards relating to accuracy.

3.4 Factors affecting system performance and accuracy

3.4.1 Knowledge of ARPA sensor input performance parameters – radar, compass and speed inputs; effects of sensor malfunction on the accuracy of ARPA data.

3.4.2 Effects of the limitations of radar range and bearing discrimination and accuracy; the limitations of compass and speed input accuracies on the accuracy of ARPA data.

3.4.3 Knowledge of factors which influence vector accuracy.

3.5 *Tracking capabilities and limitations*

3.5.1 Knowledge of the criteria for the selection of targets by automatic acquisition.

3.5.2 Factors leading to the correct choice of targets for manual acquisition.

3.5.3 Effects on tracking of “lost” targets and target fading.

3.5.4 Circumstances causing “target swop” and its effects on displayed data.

3.6 *Processing delays*

3.6.1 The delays inherent in the display of processed ARPA information, particularly on acquisition and re-acquisition or when a tracked target manoeuvres.

3.7 *When and how to use the operational warnings, their benefits and limitations*

3.7.1 Appreciation of the uses, benefits and limitations of ARPA operational warnings; correct setting, where applicable, to avoid spurious interference.

3.8 *System operational tests*

3.8.1 Methods of testing for malfunctions of ARPA systems including functional self-testing.

3.8.2 Precautions to be taken after a malfunction occurs.

3.9 *Manual and automatic acquisition of targets and their respective limitations*

3.9.1 Knowledge of the limits imposed on both types of acquisition in multi-target scenarios, effects on acquisition of target fading and target swop.

3.10 *When and how to use true and relative vectors and typical graphic representation of target information and danger areas*

3.10.1 Thorough knowledge of true and relative vectors; derivation of targets’ true courses and speeds.

3.10.2 Threat assessment; derivation of predicted closest point of approach and predicted time to closest point of approach from forward extrapolation of vectors, the use of graphic representation of danger areas.

3.10.3 Effects of alterations of course or speed or both of own ship or targets or both own ship and targets on predicted closest point of approach and predicted time to closest point of approach and danger areas.

3.10.4 Effects of incorrect vectors and danger areas.

3.10.5 Benefit of switching between true and relative vectors.

3.11 *When and how to use information on past position of targets being tracked*

3.11.1 Knowledge of the derivation of past positions of targets being tracked, recognition of historic data as a means of indicating recent manoeuvring of targets and as a method of checking the validity of the ARPA's tracking.

4 Practice

4.1 *Setting up and maintaining displays*

4.1.1 The correct starting procedure to obtain the optimum display of ARPA information.

4.1.2 Choice of display presentation; stabilized relative motion displays and true motion displays.

4.1.3 Correct adjustment of all variable radar display controls for optimum display of data.

4.1.4 Selection, as appropriate, of required speed input to ARPA.

4.1.5 Selection of ARPA plotting controls, manual and automatic acquisition, vector and graphic display of data.

4.1.6 Selection of the time scale of vectors and graphics.

4.1.7 Use of exclusion areas when automatic acquisition is employed by ARPA.

4.1.8 Performance checks of radar, compass, speed input sensors and ARPA.

4.2 *System operational tests*

4.2.1 System checks and determining data accuracy of ARPA including the trial manoeuvre facility by checking against basic radar plot.

4.3 *When and how to obtain information from ARPA display*

4.3.1 Demonstrate ability to obtain information in both relative and true motion modes of display, including:

- identification of critical echoes;
- speed and direction of target's relative movement;
- time to, and predicted range at, target's closest point of approach;
- course and speeds of targets;
- detecting course and speed changes of targets and the limitations of such information;
- effect of changes in own ship's course or speed or both; and
- operation of the trial manoeuvre.

4.4 *Application of the International Regulations for Preventing Collision at Sea*

4.4.1 Analysis of potential collision situations from displayed information, determination and execution of action to avoid close quarter situations in accordance with International Regulations for Preventing Collisions at Sea.

APPENDIX 3

Radar and ARPA simulator course

1 Introduction

Radar is an aid to navigation and when properly used, will provide information of value to safe navigation. However, a number of serious collisions have occurred as a result of misinterpretation of the information provided by radar.

2 Objectives

To provide facilities for officers to appreciate how radar and ARPA can be safely used to avoid collisions at sea, their limitations and the hazards of failing to recognize those limitations.

3 The radar and ARPA simulator course

3.1 Outline

The course consists of a series of collision avoidance and navigational exercises in which ships, navigational marks and land are indicated on a marine radar display, the movements of ships being controlled by a marine radar simulator.

3.2 Equipment

3.2.1 The simulator should include two or more stations, each with separate helm and engine controls (each station is referred to as “own ship”). In addition, for demonstrating ARPA, the simulator should be capable of simulating 20 or more ship targets.

3.2.2 In view of the increasing number of high-speed surface craft and the expense of trying to adapt existing simulators to take account of this, it is advisable for consideration to be given to the inclusion of a high-speed facility for “own ship” and at least one target when placing an order for a new simulator.

3.2.3 Each “own ship” radar display, together with its control panel, should be installed in a room or cubicle which should also have a plotting table, plotting instruments, reflection plotter, plotting charts, etc.

3.2.4 At least one of the “own ship” radar displays shall be of a type which complies with the IMO Performance Standards for Automatic Radar Plotting Aids (ARPA) (IMO Assembly resolution A.422(XI)). The simulator input to the ARPA display shall be such that the ARPA display is capable of being used by the trainee to achieve the practical objectives for ARPA training as laid down in appendix 2.

3.2.5 The display may be one employing an integrated ARPA or a separate ARPA display may be provided in addition to a marine radar display.

3.2.6 An “X/Y” plotter or other graphic terminal with recording facilities should be provided.

3.3 Length of course

The course should be of sufficient duration to provide for introduction, explanation of the course, demonstration of equipment and a critical review of what the course has achieved in addition to the exercises for collision avoidance and related discussions for each. It has been found that, with the instructional equipment available and with the methods of instruction so far used, about 36 hours adequately covers the course requirements. The length of the course must, however, be related to the number of students and the type of equipment available.

3.4 *Plan of course*

3.4.1 The course should be designed for mature students with seagoing experience, masters and deck officers, many of whom will have extensive experience in the use of radar. The environment in which the course is conducted must be conducive to learning through participation rather than formal classroom teaching or lectures.

3.4.2 Each student in turn should take part in a number of collision avoidance exercises in which the student will be required to observe the movements of ships as seen on a radar display and form an appreciation of the collision risks involved and actions taken by those ships to avoid collision. The actions taken by “own ships” to avoid collision will be the responsibility of each student in turn.

3.4.3 Following every exercise there should be discussion amongst all the students when the exercise should be analysed and actions taken criticised.

3.4.4 Discussions may be followed by demonstrations of the effects of any alternative actions which could have been taken or which were suggested in the discussion. Demonstrations to compare other types of display presentation with that used in the exercise may also be held.

3.4.5 Students should be divided into groups of two or three for each exercise, at least one member of each group being designated master and one the observing officer. Designations should be changed to allow every student at least one turn in command of the “own ship” display.

3.5 *Exercises*

3.5.1. Exercises should be realistic and include those factors which have been criticised by courts, the effects of the collision regulations and other factors involved in the use of radar and ARPA as aids to avoid collision. There should be a clear lesson to be learned from every exercise.

3.5.2 One or more of the following factors should be included in each exercise so that when an error of judgment occurs such factors will be emphasized:

- .1 the effects of incomplete or inaccurate information, including the limitations of ARPA data;
- .2 the hazards of making assumptions or acting on scanty information;
- .3 hazards of an unsafe speed;

- .4 the effects of speed and distance on the time available to fully appreciate the developing collision situation, take positive action and correct that action if it is found to be inadequate;
- .5 the hazards of failing to comply with those rules of the collision regulations which apply in poor visibility;
- .6 the advantages of keeping a running plot of a developing situation and the precautions needed if information which can only be obtained from a plot is incomplete or not available; and
- .7 and the dangers of small and cumulative alterations of course or speed or both.

3.5.3 Each exercise with the discussion that follows, and any necessary demonstration, should be planned to occupy not more than one half day. No exercise should continue after decisions have been taken and the dangerous situation has been resolved.

3.5.4 It is essential that all exercises should be clear and uncomplicated. Many of the serious collisions in which the use made of radar has been criticised have, in retrospect, appeared to have occurred after an approach unhampered by other traffic. Any complications which arose were due to the actions of one or both of the ships which collided. Nearly all these serious collisions occurred after a period of approach which commenced where the two ships were ahead or nearly ahead of each other and steering courses within 30° of being reciprocals. The various errors of judgement made during the approach period are of types which would not occur if the collision regulations had been followed.

3.5.5 Exercises based on typical collision cases, which also involve application of the collision regulations are instructive, indicate clearly lessons in the safe use of radar and provide a sound base for discussion. To consolidate correct passage planning and watchkeeping procedures required for effective navigation control in confined waters with heavy traffic, intensive ARPA exercises should be included which involve the approaches to and passage through such waters. However, such tactical exercises which are so complex as cannot be readily analysed using radar only should be avoided in “own ships” not provided with ARPA facility.

3.5.6 It is sometimes advantageous to have an initial exercise during which students are encouraged to use the techniques they have been using at sea, even to make mistakes. After the exercise, plotting techniques should be briefly explained and students observing on the ARPA display or displays should be encouraged to plot, in order to confirm ARPA output data.

3.5.7 The designated master of “own ship” must have absolute discretion to use any technique to obtain radar or ARPA information and manoeuvre “own ship”.

3.5.8. Comments and criticism should be reserved until the exercises are completed and it should then, preferably, come from members of the class rather than from the lecturer.

3.6 Discussion

3.6.1 After each exercise the class should be assembled for discussion. Records of the exercise should be used, at this time, for analysis.

3.6.2 The discussion should be informal. It should be opened by the lecturer with a brief explanation and analysis of the exercise but the lecturer should not seek to impose his views. The lecturer should, by guiding the discussion, encourage students to criticise the action taken by “own ships”, generally air their views and listen to the comments of fellow students.

3.6.3 Discussion can be fostered by creating the right atmosphere; this is more readily achieved round a table on which models can be manoeuvred to illustrate a point being made than in formal classroom surroundings.

3.6.4 When there are suggestions in favour of alternative avoiding action, the effects of such action can be demonstrated on the radar displays with the aid of the simulator.

3.6.5 Only by free and full discussion of the significant points and lessons illustrated in the exercise can real benefit be obtained from the course.

3.6.6 Experimentation and much effort will be required of the person in charge of the course in order to evolve the best techniques for stimulating and sustaining discussion.

SECTION 2 – INTERNATIONAL REGULATIONS FOR PREVENTING COLLISIONS AT SEA

Ref: 1978 STCW Convention – regulation II/2 appendix,
paragraph 3
1978 STCW Convention – regulation II/3 appendix,
paragraph 1
1978 STCW Convention – regulation II/4 appendix,
paragraph 4
1978 STCW Convention – regulation II/6,
paragraph 2(d)(iv) and (vii)

1 Deck officers should be trained to ensure they have a thorough knowledge of the International Regulations for Preventing Collisions at

Sea and their practical application to enable them to be in charge of a navigational watch.

2 Deck ratings should be trained to make sure they have sufficient knowledge of the International Regulations for Preventing Collisions at Sea to enable them to make proper reports to the officer in charge of a navigational watch.

SECTION 3 – PRACTICE OF NAVIGATION AT SEA

*Ref: 1978 STCW Convention – regulation II/1
1978 STCW Convention – regulation II/2, appendix,
paragraph 2
1978 STCW Convention – regulation II/3, appendix,
paragraph 1
1978 STCW Convention – regulation II/4, appendix,
paragraphs 1 and 2
1978 STW Conference resolution 1*

The syllabus for the training of deck officers in the practice of navigation should be appropriate to the trading area and size of the vessel in which the officer may be employed and include the subjects set out in the appropriate regulations of the 1978 STCW Convention referenced above.

SECTION 4 – ELECTRONIC POSITION-FIXING SYSTEMS AND ECHO SOUNDERS

*Ref: 1978 STCW Convention – regulation II/2 appendix,
paragraph 2(b) (iii)
1978 STCW Convention – regulation II/3 appendix,
paragraph 1 (b)
1978 STCW Convention – regulation II/4 appendix,
paragraphs 5 and 6*

Courses for the deck officer certificates referenced above should include the theory and use of appropriate electronic navigational aids. Such matters should be included in courses for first or subsequent certificates. More detailed guidance is set out in the following appendix.

APPENDIX

Training in operating electronic position-fixing systems and echo sounders

1 Electronic position-fixing systems

1.1 The general principles underlying electronic position-fixing systems in common use.

1.2 Fundamental differences between the various systems. The method of utilizing these systems to obtain the ship's position.

1.3 Appreciation of the capabilities, limitations and possible errors. Sources of errors, including errors for which a reliable correction can be determined and applied. The method of applying such corrections.

2 Echo sounding

2.1 The general principles of echo sounders.

2.2 The functions of echo-sounding equipment including transmission, reception and method of recording or displaying depth information.

2.3 The reliability of the depth information provided.

2.4 The danger of exclusive reliance on depth information from echo sounders.

SECTION 5 – RADIO DIRECTION-FINDERS

Ref: 1978 STCW Convention – regulation II/2, appendix,
paragraph 2(b)(iii)
1978 STCW Convention – regulation II/3, appendix,
paragraph 1(b)
1978 STCW Convention – regulation II/4, appendix,
paragraph 6

It should be ensured that appropriate training in the theory and use of electronic direction-finders is given to those who may be required to maintain or use this equipment. In addition, there should be a practical

test of the users' ability to operate the instrument and apply the information correctly. More detailed guidance is set out in the following appendix.

APPENDIX

Radio direction-finders

- 1 A general knowledge of the various types of radio direction-finding equipment and systems.
- 2 Rotating loop and goniometer systems.
- 3 Maximum and minimum signals. Sense.
- 4 Quadrantal error. Calibration.
- 5 Sunset and sunrise effects. Land effect.
- 6 A general knowledge of shore-based radio direction-finding systems.
- 7 Use of radio direction-finding equipment for search and rescue purposes.

SECTION 6 – AIDS TO NAVIGATION, e.g. BUOYS, NAVIGATIONAL MARKS, LIGHTVESSELS, etc.

*Ref: 1978 STCW Convention – regulation II/2
appendix, paragraph 2(b) (iii)
1978 STCW Convention – regulation II/3 appendix,
paragraph 1 (a) (i)
1978 STCW Convention – regulation II/4 appendix,
paragraph 2
1978 STCW Convention – regulation II/6,
paragraphs 2(d) (iv)*

- 1 The knowledge required of a deck officer for the certificates referenced above should be such that the officer is able to ascertain, on sighting a navigational mark, what action, if any, needs to be taken. More detailed guidance on the course of instruction for deck officers is set out in the appendix.

2 Deck ratings should be trained to ensure they have sufficient knowledge of navigational marks to enable them to make proper reports to the officer in charge of a navigational watch.

APPENDIX

Aids to navigation, e.g. buoys, navigational marks, lightvessels, etc.

1 The principles and rules of the International Association of Lighthouse Authorities (IALA), Maritime Buoyage system, System “A” or System “B” or both, as appropriate for the area of operation of the ships for which the officers are being trained.

2 Where further information can be obtained, e.g. charts, light lists, sailing directions.*

3 The danger of placing implicit reliance upon floating navigational aids.

4 The danger of approaching navigational aids too closely.

SECTION 7 – METEOROLOGY

Ref: 1978 STCW Convention – regulation II/2 appendix,
paragraph 2
1978 STCW Convention – regulation II/3 appendix,
paragraph 1 (a) (xi)
1978 STCW Convention – regulation II/4 appendix,
paragraph 7

In order to provide deck officers with a knowledge of meteorology necessary for the safe operation of the ship, training for the certificates referenced above should include, but not necessarily be limited to, the subjects set out in the following appendix.

*Until the IALA Maritime Buoyage System is universally implemented, this item should include where information can be obtained on national buoyage systems.

APPENDIX

Meteorology

- 1 Meteorological terms and definitions.
- 2 Meteorological instruments.
- 3 The principles of general circulation of the atmosphere.
- 4 Winds, cyclonic and anticyclonic pressure systems, storms, tropical storms, fog, fronts, etc.
- 5 Preparing and interpreting weather messages and charts.
- 6 Practical use of weather information, including weather routing and information on ice formation and conditions.

SECTION 8 – MAGNETIC AND GYRO-COMPASSES

*Ref: 1978 STCW Convention – regulation II/2, appendix, paragraph 5
1978 STCW Convention – regulation II/3, appendix, paragraph 1(a)(iv)
1978 STCW Convention – regulation II/4, appendix, paragraphs 8 and 9
1978 STCW Convention – regulation II/6, paragraph 2(d)(iii) and (v)*

1 The theory of both magnetic and gyro-compasses should be included in the courses and examinations for masters' and deck officers' certificates referenced above. The magnetic compass has remained unchanged for many years, whereas the gyro is still developing and there are many types. It is recommended that courses should be conducted by the makers of each type of gyro-compass and, if possible, that deck officers should attend the course appropriate to the gyro-compass they will use, although the general theory and use of gyro-compasses will have been covered in their certificate examination.

2 The practical use of magnetic and gyro-compasses and automatic pilot should be included in all training programmes for ratings who perform bridge watchkeeping duties.

3 More detailed guidance on the curriculum for deck officers and ratings training programmes is set out in the following appendices.

APPENDIX 1

Deck officers – magnetic and gyro-compasses**1 Magnetic compass**

1.1 A simple magnet. Poles of a magnet. The laws of attraction and repulsion. The molecular theory of magnetism as applied to ferromagnetic materials. The concept of magnetically “hard” and “soft” iron. The shape of the magnetic field round a magnet. The meaning of the terms “intensity of magnetization”, “magnetic susceptibility” and “permeability”. (No mathematical formulae required.)

1.2 The earth’s magnetic field. The earth’s magnetic poles. Magnetic equator. The earth’s total magnetic force. Angle of dip. Horizontal and vertical components. Magnetic variation. (No mathematical formulae required.).

1.3 The effect of constraining a compass needle to the horizontal plane. The effect of introducing a disturbing magnetic force into the vicinity of a compass needle.

1.4 Field strength, magnetic moment of a magnet, the period of a suspended magnet vibrating in the earth’s magnetic field.

1.5 Magnetic compasses. The method of determination and compensation by means of components of the effects of the ship’s magnetic field on the magnetic compass. The approximate coefficients A, B, C, D and E and their use. Conditions which might produce coefficients A and E. Constants λ and μ . The ship’s multiplier. Methods of obtaining a table of deviations. Analysis of a table of deviations to obtain approximate coefficients.

1.6 General principles of magnetic compass siting and correction.

2 Gyro-compass

2.1 A non-mathematical treatment of:

- .1 principle of a free gyroscope, tilt, precession;
- .2 undamped and damped oscillation;
- .3 description of gyro-compass; and
- .4 latitude, course and speed errors; ballistic deflection; rolling errors.

2.2 An appreciation of the systems under the control of the master gyro, including:

- .1 repeaters including direction-finder and radar stabilization;
and
- .2 automatic pilot.

2.3 A knowledge of the operation and of the care of the main types of gyro-compasses.

APPENDIX 2

Deck ratings – magnetic and gyro-compasses

Practical training in:

- .1 helm orders;
- .2 steering by magnetic and gyro-compasses; and
- .3 automatic pilot and an understanding of the change-over procedure from automatic to manual steering and vice versa.

SECTION 9 – COMMUNICATIONS

*Ref: 1978 STCW Convention – regulation II/2 appendix,
paragraph 16
1978 STCW Convention – regulation II/3 appendix,
paragraph 1 (a) (v)
1978 STCW Convention – regulation II/4 appendix,
paragraph 10*

Deck officers should be trained so that they have sufficient knowledge of the Morse code to enable them to transmit and receive messages by Morse light.

They should know the flags of the International Code of Signals and the significance of the more important single-letter signals. They should have knowledge of the signalling procedures set out in the International Code of Signals and how to make use of that publication.

Knowledge of procedures used in radiotelephone communications particularly with respect to distress, urgency, safety and navigational messages.

SECTION 10 – FIRE PREVENTION AND FIRE FIGHTING

Ref: IMO Assembly resolution A.437 (XI)

- 1 It is essential that all seafarers should be instructed in the dangers of fire on ships and the ways in which fires are caused. Basic training in the prevention and extinction of fires should be given as soon as possible in their career, preferably at the pre-sea stage at a shore-based training establishment.
- 2 On board ship there will be compulsory fire drills in accordance with the 1974 SOLAS Convention. Governments should give guidance to masters and owners as to the nature of the fire drills to be carried out, taking into consideration the experience gained from official enquiries into actual casualties.
- 3 Officers and key personnel who may have to control fire-fighting operations should receive advanced training in techniques for fire fighting with particular emphasis on organization, tactics and command.
- 4 Specialized fire-fighting training for seafarers serving in oil, chemical or liquefied gas tankers should be given, as appropriate, in accordance with resolutions 10, 11 and 12 of the 1978 STW Conference.
- 5 Causes of fires in ships should be carefully examined by the competent authorities and any lessons to be learned passed on to training establishments and to ships.
- 6 Guidelines for the content of fire-fighting training programmes are given in the following appendices.

APPENDIX 1

Basic training of crews in fire fighting

- 1 Basic fire-fighting training should include at least the following theoretical and practical elements included in the following paragraphs.
- 2 **Theory**
 - 2.1 The three elements of fire and explosion (the fire triangle):
 - .1 fuel;
 - .2 oxygen; and
 - .3 source of ignition;

2.2 Ignition sources:

- .1 chemical;
- .2 biological; and
- .3 physical.

2.3 Flammable materials:

- .1 flammability;
- .2 ignition point;
- .3 burning temperature;
- .4 burning speed;
- .5 thermal value;
- .6 lower flammable limit (LFL);
- .7 upper flammable limit (UFL);
- .8 flammable range;
- .9 inerting;
- .10 static electricity;
- .11 flashpoint; and
- .12 autoignition.

2.4 Fire hazard and spread of fire:

- .1 by radiation;
- .2 by convection; and
- .3 by conduction.

2.5 Reactivity.

2.6 Classification of fire and applicable extinguishing agents.

2.7 Main causes of fire on board ships:

- .1 oil leakage in engine-room;
- .2 cigarettes;
- .3 overheating (bearings);
- .4 galley appliances (stoves, flues, fryers, hotplates, etc.);
- .5 spontaneous ignition (cargo, wastes, etc.);

- .6 hot work (welding, cutting, etc.);
 - .7 electrical apparatus (short circuit, non-professional repairs);
and
 - .8 reaction, self-heating and autoignition.
- 2.8 Fire detection:
- .1 fire and smoke detection systems; and
 - .2 automatic fire alarm.
- 2.9 Fire-fighting equipment:
- .1 fixed installations on board and locations:
 - .1.1 fire mains, hydrants,
 - .1.2 international shore connection,
 - .1.3 smothering installations, carbon dioxide (CO₂), foam,
 - .1.4 halogenated hydrocarbons,
 - .1.5 pressure water-spray system in special category spaces, etc.,
 - .1.6 automatic sprinkler system,
 - .1.7 emergency fire pump, emergency generator,
 - .1.8 chemical powder applicants, and
 - .1.9 general outline of required and available mobile apparatus;
 - .2 fireman's outfits and personal equipment, location on board:
 - .2.1 fireman's outfit, personal equipment,
 - .2.2 breathing apparatus,
 - .2.3 resuscitation apparatus,
 - .2.4 smoke helmet or mask, and
 - .2.5 fireproof lifeline and harness;
 - .3 general equipment:
 - .3.1 fire hoses, nozzles, connections, fire axes,
 - .3.2 portable fire extinguishers, and
 - .3.3 fire blankets.

2.10 Construction and arrangements:

- .1 escape routes;
- .2 means for gas-freeing tanks;
- .3 class A, B and C divisions; and
- .4 inert gas systems.

2.11 Ship fire-fighting organization:

- .1 general alarm;
- .2 fire control plans, muster stations and duties of individuals;
- .3 communications, including ship-shore when in port;
- .4 personnel safety procedures;
- .5 periodic shipboard drills; and
- .6 patrol systems.

2.12 Practical knowledge of resuscitation methods.

2.13 Fire-fighting methods:

- .1 sounding the alarm;
- .2 locating and isolating;
- .3 jettisoning;
- .4 inhibiting;
- .5 cooling;
- .6 smothering;
- .7 extinguishing; and
- .8 reflash watch.

2.14 Fire-fighting agents:

- .1 water – solid jet, spray, fog, flooding;
- .2 foam – high, medium and low expansion;
- .3 carbon dioxide (CO₂);
- .4 halogenated hydrocarbons;
- .5 aqueous film forming foam (AFFF); and
- .6 dry chemicals, powder.

3 Practice

3.1 Every seafarer should undergo the following practical training and satisfy the Administration that he possesses ability to:

- .1 use various types of portable fire extinguishers;
- .2 use self-contained breathing apparatus;
- .3 extinguish smaller fires, e.g. electrical fires, oil fires, propane fires;
- .4 extinguish extensive fires with water (jet and spray nozzles);
- .5 extinguish fires with either foam, powder or any other suitable chemical agent;
- .6 enter and pass through with lifeline but without breathing apparatus a compartment into which high expansion foam has been injected;
- 7 fight fire in smoke-filled enclosed spaces wearing self-contained breathing apparatus;
- .8 extinguish fire with water fog, or any other suitable fire-fighting agent in an accommodation room or simulated engine-room with fire and heavy smoke;
- .9 extinguish oil fire with fog applicator and spray nozzles, dry chemical powder or foam applicators; and
- .10 effect a rescue in a smoke-filled space wearing breathing apparatus.

4 Every seafarer should satisfy the Administration that he is aware of the necessity of maintaining a state of readiness on board.

5 The practical training listed should take place in spaces which provide truly realistic training conditions, e.g. simulated shipboard conditions and, whenever possible and practical, should also be carried out in darkness.

APPENDIX 2

Advanced training in fire fighting

Having completed the training outlined in appendix 1, masters, officers and other key personnel who may also have to control fire-fighting

operations should be given additional advanced training which should include the following:

- .1 fire control aboard ships;
- .2 the organization of fire parties;
- .3 training of fire parties;
- .4 fire-fighting procedures at sea;
- .5 fire-fighting procedures in port;
- .6 the hazards associated with the storage and handling of materials (paints, etc.)
- .7 inspection and servicing of fixed fire-extinguishing systems;
- .8 inspection and servicing of fire detection systems;
- .9 inspection and servicing of portable and mobile fire-extinguishing equipment;
- .10 inspection and servicing of other fire-fighting equipment;
- .11 inspection and servicing of breathing apparatus and associated equipment;
- .12 use of water for fire extinguishing, the effect on ship stability, precautions and corrective procedures;
- .13 ventilation control;
- .14 control of fuel and electrical system;
- .15 fire-fighting process hazards (dry distillation, chemical reactions, boiler uptake fires, etc.);
- .16 first aid including cardiopulmonary resuscitation;
- .17 fire investigation and reporting;
- .18 fire fighting involving dangerous goods.

SECTION 11 – PERSONAL SURVIVAL AND LIFE-SAVING

*Ref: 1978 STCW Convention – regulation VI/1
1978 STW Conference resolution 19*

1 It is essential that basic training in personal survival, first aid and the use of survival equipment be given to all seafarers.

2 Training in the use (and maintenance where applicable) of survival equipment and other life-saving appliances should be included, as appropriate, in pre-sea training courses or other relevant shore-based training courses. Films can be a valuable aid in training.

3 On board ship there will be compulsory abandon ship training and drills in accordance with the 1974 SOLAS Convention. Governments should give guidance to masters and owners as to the nature of the drills and musters to be carried out, taking into consideration the experience gained from official inquiries into actual casualties.

4 The use and maintenance of life-saving appliances should form part of the examination syllabus for all deck and engineer officers and also for deck ratings. The use of life-saving appliances should form part of the training of all other seafarers. The 1974 SOLAS Convention requires that there shall be a sufficient number of crew members, who may be deck officers or certificated persons, on board for operating the survival craft and launching arrangements required for abandonment by the total number of persons on board. A certificated person is a person holding a certificate of proficiency in survival craft referenced above or its equivalent.

5 The International Labour Convention on the Certification of Able Seamen, 1946, requires that any rating who is to be rated as an able seaman in any ship shall give evidence of his ability to qualify to hold the special lifeboatmen's certificate provided for in the Safety of Life at Sea Convention, 1929, or in the corresponding provision of any subsequent Convention revising or replacing that Convention. The special lifeboatman's certificate referred to above should be replaced by the certificate of proficiency in survival craft prescribed in chapter VI of the 1978 STCW Convention.

6 Training courses leading to certification of officers and ratings for proficiency in survival craft should include the subjects set out in regulation VI/1 of the 1978 STCW Convention. Pre-sea training of seafarers in personal survival techniques should include instruction as prescribed in resolution 19 of the 1978 STW Conference.

SECTION 12 – EMERGENCY PROCEDURES

*Ref: 1978 STCW Convention – regulation II/2, appendix,
paragraph 12
1978 STCW Convention – regulation II/3, appendix,
paragraph 1(a) (viii)
1978 STCW Convention – regulation II/4, appendix,
paragraph 13*

*1978 STCW Convention – regulation II/6,
paragraph 2(d)(viii)
1978 STCW Convention – regulation III/1, paragraph 5(j)
1978 STCW Convention – regulation III/2, appendix,
paragraph 4(m)
1978 STCW Convention – regulation III/3, appendix,
paragraph 4(k)
1978 STCW Convention – regulation III/4, paragraph 3(e)
1978 STCW Convention – regulation III/6, paragraph 5(b)*

1 It is not possible to give an exhaustive list of measures which should be taken in an emergency. Proficiency in this subject can only be properly obtained on board ship as it is dependent on the individual ship and the organization on board.

2 Basic training should be designed to enable an officer to identify the factors which should affect his decisions, including the planning of emergency procedures.

3 The recommended curricula for the training of deck officers, engineer officers, deck ratings and engine-room ratings are given in the following appendices.

APPENDIX 1

Deck officers – emergency procedures

The curriculum for deck officers training in emergency procedures should include:

- .1 preparation of contingency plans for response to emergencies;
- .2 assessment of damage and damage control;
- .3 precautions when beaching a vessel;
- .4 action to be taken prior to, and after, grounding;
- .5 floating a grounded vessel, with and without assistance;
- .6 action to be taken following a collision;
- .7 temporary plugging of leakages;
- .8 precautions for the protection and safety of passengers in emergency situations;

- .9 limiting damage and salving the ship following a fire or explosion;
- .10 abandoning ship;
- .11 emergency steering including use of auxiliary steering gear, rigging and use of jury steering and the means of rigging a jury rudder, where practicable;
- .12 arrangements for towing and being taken in tow, in an emergency;
- .13 rescuing of persons from a vessel in distress or from a wreck;
- .14 assisting a vessel in distress;
- .15 man overboard procedures; and
- .16 an appreciation of the ways in which action can best be taken when emergencies arise in port. This should include, but not be limited to:
 - .16.1 fire on own or nearby vessel or on adjacent port facilities; and
 - .16.2 need to proceed to sea in the event of an adverse weather forecast or other compelling reason.

APPENDIX 2

Deck ratings – emergency procedures

Deck ratings should have sufficient knowledge of the emergency situations which could arise on board ship. This knowledge should include, but not necessarily be limited to, the following:

- .1 knowledge of the ship's contingency plans for response to emergencies and the deck ratings' relevant duties;
- .2 action to be taken following fire or collision;
- .3 precautions for the protection and safety of passengers in emergency situations;
- .4 abandoning ship;
- .5 rescuing persons; and
- .6 man overboard procedures.

APPENDIX 3

Engineer officers – emergency procedures

1 Engineer officers should have sufficient knowledge of all the engine-room plant and systems as will enable them, as far as possible, to maintain the integrity of the engine-room and, as necessary, the continued operation of the plant. They should also have knowledge of methods available to make port upon failure of various components of the main and auxiliary prime movers or steering equipment.

2 This knowledge should include, but not necessarily be limited to, the following:

- .1 isolation of main engine units in the event of malfunction and the action necessary to continue safe operation;
- .2 alternative service systems for main engines and auxiliaries;
- .3 action to be taken in the event of ingress of seawater into the engine-room;
- .4 procedure to be followed in the event of partial or total electrical failure;
- .5 abandon ship procedures and emergency escape routes;
- .6 emergency steering, change-over to local or alternative remote control or controls;
- .7 the correct use of personal safety equipment during emergencies;
- .8 organization of engine-room personnel and facilities to assist in damage control when and where necessary;
- .9 effective emergency procedures in the event of fire; and
- .10 procedures to follow to minimize the after-effects of fire or explosion in the engine-room.

APPENDIX 4

Engine-room ratings – emergency procedures

1 Engine-room ratings whose duties may require it should have sufficient knowledge of all the engine-room plant and systems, and be

aware of emergency procedures to be followed, to enable them to assist in maintaining as far as possible the integrity of the engine-room and, as necessary, the continued operation of the plant.

2 This knowledge should include, but not necessarily be limited to, the following:

- .1 action to be taken in the event of ingress of seawater into the engine-room;
- .2 abandon ship procedures and emergency escape routes;
- .3 the correct use of personal safety equipment during emergencies; and
- .4 procedures to be followed in the event of fire.

SECTION 13 – SHIP MANOEUVRING AND HANDLING

Ref: 1978 STCW Convention – regulation II/1
1978 STCW Convention – regulation II/2, appendix,
paragraph 7
1978 STCW Convention – regulation III/1,
paragraphs 5 and 6

The training and theoretical knowledge required of deck officers and engineer officers should, as appropriate, include the subjects set out in the following appendices.

APPENDIX 1

Training of deck officers in ship manoeuvring and handling

The training and theoretical knowledge required of deck officers should include the following:

- .1 manoeuvres when approaching pilot vessels or stations with due regard to weather, tide, headreach and stopping distances;
- .2 handling a ship in rivers, estuaries, etc. having regard to the effects of current, wind and restricted water on the response to the helm;

- .3 manoeuvring in shallow water, including the reduction in keel clearance due to the effect of squat*, rolling and pitching;
- .4 interaction between passing ships and between own ship and nearby banks (canal effect);
- .5 berthing and unberthing under various conditions of wind and tide with and without tugs;
- .6 choice of anchorage, anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used;
- .7 dragging, clearing fouled anchors;
- .8 dry-docking, both with and without damage;
- .9 management and handling of ships in heavy weather, including assisting a ship or aircraft in distress, towing operations, means of keeping an unmanageable ship out of a sea trough, lessening drift and use of oil;
- .10 precautions in manoeuvring for launching boats or liferafts in bad weather;
- .11 methods of taking on board survivors from lifeboats or liferafts;
- .12 ability to determine the manoeuvring and engine characteristics of major types of ships with special reference to stopping distances and turning circles at various draughts and speeds;
- .13 the importance of navigating at reduced speed to avoid damage caused by own ship's bow or stern wave;
- .14 practical measures to be taken when navigating an ice or conditions of ice accumulation on board; and
- .15 the use of, and manoeuvring in, traffic separation schemes.

*Squat: The decrease in clearance beneath a ship which occurs when the ship moves through the water and is caused both by bodily sinkage and by change of trim. The effect is accentuated in shallow water and is reduced with a reduction in ship's speed.

APPENDIX 2

Training of engineer officers in ship manoeuvring and handling

- 1 Engineer officers should be aware of the necessity of effective communications between bridge and engine-room and rapid response to bridge orders and the limitation to this speed of response imposed by the characteristics of the machinery.
- 2 Engineer officers should have sufficient knowledge including, but not necessarily limited to, the following:
 - .1 various means of shipboard communication;
 - .2 preparation of the plant for manoeuvring;
 - .3 alternative methods of engine control;
 - .4 transient characteristics of the propulsion plant and emergency overriding actions under conditions of extreme danger to the vessel or personnel; and
 - .5 safe procedures during manoeuvring and handling under normal or abnormal conditions.

SECTION 14 – SHIP CONSTRUCTION AND STABILITY

Ref: 1978 STCW Convention – regulation II/2, appendix, paragraph 8
 1978 STCW Convention – regulation II/3, appendix, paragraph 1(a)(x)
 1978 STCW Convention – regulation II/4, appendix, paragraphs 15 and 17
 1978 STCW Convention – regulation III/2, appendix, paragraphs 3(i) and 4(m)
 1978 STCW Convention – regulation III/3, appendix, paragraphs 3(k) and 4(k)

The training of deck and engineer officers should be designed to give them a knowledge of ship construction and stability to ensure the safe operation of the ship and should include the subjects set out in the following appendix.

APPENDIX

Ship construction and stability

- 1 Terms and definitions used in ship construction.
- 2 Typical methods of ship construction including some knowledge of specialized carriers.
- 3 Basic principles of ship construction and the theories and factors affecting trim and stability to maintain a stable ship at all times.

SECTION 15 – CARGO HANDLING AND STOWAGE

Ref: 1978 STCW Convention – regulation II/2, appendix,
paragraph 10
1978 STCW Convention – regulation II/4, appendix,
paragraph 18

The stowage and handling of cargo have an important bearing on safety and the training of deck officers should include a knowledge of the subjects set out in the following appendix.

APPENDIX

Cargo handling and stowage

- 1 International regulations and recommendations pertaining to stowage of cargo, e.g. chapter VI, Carriage of Grain, of the 1974 SOLAS Convention (the “IMO Grain Rules” (resolution A.264(VIII)); the International Convention on Load Lines, 1966; the IMO Code of Safe Practice for Solid Bulk Cargoes (other than grain); and the International Maritime Dangerous Goods Code.
- 2 General precautions with, and methods of, stowage and securing of cargoes.
- 3 Bulk cargoes such as coal, grain, ores, etc. Their tendency to shift. The influence of stowage on stability and stress. Stowage factors, moisture content, maxima and minima, for safe carriage. Pulsing effects with ore concentrates; petroleum products.

- 4 Carriage of dangerous and hazardous cargoes; a knowledge of how to obtain information on their inherent dangers; the officer should be aware of the need to apply more detailed information available on board ship.
- 5 Carriage of deck cargoes and their influence on stability.
- 6 The piping systems a deck officer will generally have to deal with.
- 7 Prevention of damage by cargo to ensure the safety of the ship.
- 8 Preparation of cargo compartments, bilges, strums, etc., before receiving cargo, including cleaning of tanks, drainage of holds and tanks.
- 9 Methods and safeguards when fumigating holds.
- 10 Practical knowledge of the calculation and maintenance of stability during loading, discharging, ballasting and bunkering operations and while making a sea passage; effect of free surfaces and icing on stability.
- 11 Precautions before entering enclosed or contaminated spaces.
- 12 The labelling and marking requirements of the International Maritime Dangerous Goods Code and the existence of other international instruments on this subject.
- 13 Methods of cargo handling using ship's gear.
- 14 Handling and stowage of heavy weights.
- 15 Rigging, loading and discharging gear (various types used).

SECTION 16 – TRAINING AND QUALIFICATIONS OF OFFICERS AND RATINGS SERVING ON SHIPS CARRYING OIL, CHEMICALS OR LIQUEFIED GASES IN BULK

Ref: 1978 STCW Convention – regulation V/1
1978 STCW Convention – regulation V/2
1978 STCW Convention – regulation V/3
1978 STW Conference resolution 10
1978 STW Conference resolution 11
1978 STW Conference resolution 12

- 1 Special training should be given to all officers and ratings serving in ships which carry oil, chemicals or liquefied gases in bulk. Additional

training should be given to those officers and ratings who have specific responsibilities in connection with the carriage of these cargoes. The training courses given should be of adequate duration and include practical demonstration and instruction.

2 Guidelines on the training which should be given are set in the following appendices.

APPENDIX 1

Training of officers and ratings serving on oil and chemical tankers

1 Officers and ratings having specific duties in connection with the cargo and cargo equipment should undergo training divided into two parts. A general part concerning the principles involved and the other part on the application of those principles to ship operation. Any of this training may be given at sea or ashore. Such training should be supplemented by practical instruction at sea and, where appropriate, in a suitable shore-based installation. All training should be given by properly qualified personnel.

2 All other persons employed on these ships should undergo training on board ships and, where appropriate, ashore, which should be given by qualified personnel experienced in the characteristics and handling of oil and chemical cargoes and safety procedures.

APPENDIX 2

Training of officers and ratings serving on liquefied gas carriers

1 Basic training in the carriage of liquefied gases should be given to all officers and ratings serving in this type of ship. Additional training should be given to those persons who have specific duties and responsibilities in connection with the cargo and cargo equipment.

2 The above training should be divided into two parts:

- .1 supervised instruction conducted in a shore-based facility or on board a specially equipped liquefied gas carrier having

training facilities and special instructors for this purpose. The training should deal with the principles involved and the application of these principles to ship operation; and

- .2 supplementary shipboard training and experience where in the principles learned are applied to a particular type of liquefied gas carrier and cargo containment system.

SECTION 17 – FIRST AID AND MEDICAL CARE

Ref: 1978 STCW Convention – regulation II/2, appendix, paragraph 13
1978 STCW Convention – regulation II/3, appendix, paragraph 1(a)(xiii)
1978 STCW Convention – regulation II/4, appendix, paragraph 19
1978 STCW Convention – regulation II/6, appendix, paragraph 2(d)(i)
1978 STCW Convention – regulation III/2, appendix, paragraph 4(k)
1978 STCW Convention – regulation III/3, appendix, paragraph 4(i)
1978 STCW Convention – regulation III/4, paragraph 3(g)
1978 STCW Convention – regulation III/6, paragraph 2(c)(i)
1978 STCW Convention – regulation IV/1, appendix, paragraph (d)
1978 STCW Convention – regulation IV/3, appendix, paragraph (d)
1978 STCW Convention – regulation VI/1(e)(vi) and appendix, paragraphs 14 and 16
1978 STW Conference resolution 9, annex, paragraph 1(c)
1978 STW Conference resolution 10, annex II, paragraph 2
1978 STW Conference resolution 11, annex II, paragraph 2
1978 STW Conference resolution 12, annex I, B, paragraph 4(b)(iii)
1978 STW Conference resolution 19, annex, paragraphs 1(i)(ii) and 1(j)
IMO Assembly resolution A.438 (XI)

Attention is drawn to the existence of the following international documents:

- .1 International Medical Guide for Ships (IMGS), prepared jointly by ILO, IMO and WHO;

- .2 medical section of the International Code of Signals*;
- .3 Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG), prepared jointly by ILO, IMO and WHO; and
- .4 resolution on medical and first aid training for ship personnel (Annex 2 to the Report of the fifth session of the Joint ILO/WHO Committee on the Health of Seafarers (Geneva, September 1981)).

1 All seafarers should be trained to take immediate action at the scene of an accident pending the arrival of a person with first aid skills or the person in charge of medical care on board. Such training should ensure that all seafarers are able, in accident situations, to assess both the needs of any casualties and the hazards to themselves. More detailed guidance for training in basic immediate action is given in appendix 1 to this section. Training should also include basic instruction in healthy living and personal hygiene.

2 All officers should be trained in first aid skills. Such training should also be given to specified ratings. More detailed guidance is given in appendix 2 to this section.

3 Masters, chief mates and any other persons required to be in charge of medical care aboard ship should be given more advanced medical training based on the IMGS and the ILO/IMO/WHO Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) or similar national medical guides. The training should enable them to participate effectively in co-ordinated schemes for medical assistance to ships at sea, including medical advice by radio, and to provide the sick or injured with a satisfactory standard of medical care for the period during which they are likely to remain on board. More detailed guidance is given in appendix 3 to this section.

4 Whenever possible, this more advanced training course should include practical training in a hospital so as to provide casualty, diagnostic and nursing experience under the medical staff of the hospital.

5 As trained persons may not regularly use the full extent of their acquired medical knowledge on board the ships on which they serve, it is desirable for persons in charge of medical care on board ship to attend periodically short courses designed to update and refresh their medical knowledge.

*Extracts of this section are included in the document listed under .1.

6 It is recommended that seafarers who have completed the more advanced medical training and such other seafarers as may be required by a national administration should undergo refresher courses to maintain and update their knowledge at approximately 5-year intervals.

7 Such refresher training should cover the principal elements of medical first aid, including life-saving measures, and should also encompass relevant recent developments in medical care and diagnosis.

APPENDIX 1

Syllabus for training in basic immediate action on encountering an accident or other medical emergency on board ship

The first basic level of instruction should be given to all seafarers for service on seagoing ships early in their vocational training, and preferably during pre-sea training if given, to enable them to take immediate action upon encountering an accident or other medical emergency. The following syllabus is intended to enable any crew member to take basic immediate action at the scene of an accident or other medical emergency until the arrival of a person with first aid skills or the person in charge of medical care on board.

1 General principles

The trainee should be capable of following the sequence of immediate measures to be taken in cases of emergency.

Emergency checklist:

- Assessment of accident situation.
- Assessment of own hazard.
- Unconsciousness.
- Respiratory arrest.
- Cardiac arrest.
- Severe bleeding.
- Rescue of casualty.
- Notification of emergency.

2 Body structure and functions

The trainee should have an understanding of the structure and functions of the human body relevant to this level of training.

3 Positioning of casualty

The trainee should be capable of applying the appropriate procedure of positioning in an emergency, including the:

- recovery position; and
- resuscitation position.

4 The unconscious casualty

The trainee should be capable of recognizing the signs and hazards of unconsciousness and applying the appropriate measures, including:

- keeping air passage clear;
- positioning of an unconscious casualty;
- action in the case of respiratory or cardiac arrest; and
- no food, liquid or other substances by mouth.

5 Resuscitation

The trainee should be capable of recognizing the necessity of immediate resuscitation and applying it alone and with the assistance of a further person for a minimum period of ten minutes, including:

- control of respiration;
- function of reclined position of head;
- mouth-to-mouth respiration;
- mouth-to-nose respiration; and
- cardiac arrest: methods of and limiting factors relating to cardiac massage including cardiopulmonary resuscitation (CPR)

6 Bleeding

The trainee should be capable of recognizing the hazards of bleeding and of applying the appropriate basic measures, including:

- internal/external bleeding;
- shock (see paragraph 7 below);

- external pad and pressure to site;
- positioning of patient; and
- application and dangers of tourniquet.

7 Management of shock

The trainee should be capable of recognizing the main reasons for and signs of shock and applying the appropriate measures of basic shock management, including:

- recognition: colour of face; pulse – rate and character; and
- most essential measures of shock management, including stopping of bleeding, protection from cooling, early intake of ample fluids if patient is conscious, positioning of patient, no smoking, no alcohol and no active rewarming.

8 Burns and scalds, accidents caused by electric current

The trainee should be capable of recognizing the signs of burns and scalds and accidents caused by electric current, and applying the appropriate measures, including:

- burns and scalds – cool area as quickly as possible;
- chemical burns – removal of clothes, rinsing with ample water;
- chemical burns of eyes – rinsing of eyes with ample water; and
- electric current accidents – hazards of rescuer, isolation of casualty, protection from collapse, control of vital functions.

9 Rescue and transportation of casualty

The trainee should be capable of applying appropriate transportation alone or with the assistance of a third person, taking into account confined spaces and differing heights on board, including:

- temporary ad hoc aids for transport;
- stretcher transport;
- transport on a chair;
- transport with a triangular cloth;
- transport as illustrated in IMGS; and
- hazards of transport in cases of injury of pelvis and spine.

10 Other topics

The trainee should be capable of improvising bandages by means available, and of using the bandaging materials in the emergency kit.

The trainee should be aware of the dangers of entering enclosed spaces – dangerous gases, lack of oxygen, etc., – and should be capable of taking necessary precautions.

APPENDIX 2

Syllabus for elementary training in immediate effective action in the case of accidents or illnesses likely to occur on board ship

This second level training syllabus is intended to give specified crew member or members elementary training in medical care to enable them to take immediate effective action in the case of accidents or illnesses likely to occur on board ship. The syllabus is intended to equip specified crew member or members with knowledge of first aid, and is based on the assumption that there may also be on board a person with more advanced training in medical care and techniques (i.e. to the level of appendix 3). The identity or rank of the “specified crew member or members” may vary according to national arrangements, but under certain systems of certification all officer trainees are required to undergo training in first aid at first certificate level. The syllabus is intended to cover the subjects contained in the first aid section of the IMGS or similar national medical guide.

Bearing in mind that seafarers are a flexible and mobile workforce, often moving between many different types of trades, the following training is intended for personnel regardless of the type of ship or trade in which they may be engaged.

1 Basic immediate action

It is assumed that trainees will have successfully completed the basic immediate action training in appendix 1. The opportunity should be taken to repeat and emphasize the major points.

2 First aid kit

The trainee should be familiar with the contents of the first aid kit as required by national regulations, and their use.

3 Body structure and function

3.1 *The skeletal system*

The trainee should be capable of recognizing the function of the skeletal system, the major parts of the skeleton and the different kinds of bones, by means of chart or a dummy or both*.

3.2 *The muscular system*

The trainee should be capable of recognizing the major muscles of the human body, by means of chart or a dummy or both*.

3.3 *The cardiovascular system*

The trainee should be capable of recognizing the physiological function of blood; the location and function of the heart, arteries and veins; the arterial pressure points on dummy* or human being; and should be aware of the circulatory system and the heart as a pump.

3.4 *The respiratory system*

The trainee should be capable of recognizing the location and function of the lungs (gas exchange, respiratory rate (composition of inspired/ expired air)).

3.5 *The digestive system and abdomen*

The trainee should have an elementary knowledge of the digestive system and abdominal organs.

4 Toxicological hazards on board

4.1 *Toxicological hazards, dangerous cargo*

The trainee should be aware of the regulations to be observed for the transport of dangerous cargo on board according to the IMO IMDG Code. He should be capable of taking the appropriate first aid action in cases of dangerous cargo accidents.

4.2 *Poisoning and chemical burns*

The trainee should be capable of recognizing the actions of toxic substances on the human body, symptoms, and how to apply appropriate

*Reference to use of chart or a dummy does not exclude other suitable means of demonstrating the subject e.g. audio-visual aids.

first aid measures, including:

- use of the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) or its national equivalent;
- symptoms and clinical aspects of poisoning;
- first aid in the case of poisoning by ingestion, inhalation or skin contact;
- therapy in the case of acid and caustic solutions swallowed; and
- acid and caustic burns, symptoms and treatment.

5 Examination of patient

The trainee should be capable of detailed casualty observations, based upon medical precepts, including:

- a diagnosis consisting of a large variety of individual facts partly obtainable from medical history, specific questions, physical examination; and
- means of information: history, general appearance and examination.

6 Spinal injuries

The trainee should be capable of recognizing the symptoms of spinal injuries, possibly complicated by unconsciousness and of applying the appropriate first aid measures, including:

- control of sensitivity and movement in extremities; and
- rescue transport and treatment in the case of suspected fracture of the spine.

7 Burns, scalds, effects of heat and cold

The trainee should be capable of recognizing the signs of burns and scalds, heatstroke, hypothermia and frostbite and of applying the appropriate first aid measures, including:

- definition, complications and therapy of the general condition of burns;
- burns/scalds: difference between burns and scalds (first, second and third degree), sterile dressing, first aid;
- effects of heat: proper positioning in shade, increased fluid requirement, careful cooling of body; and

- hypothermia and frostbite: possibilities of re-warming, difference between burn and frostbite, damage of tissue, first aid.

8 Fractures, dislocations and muscular injuries

The trainee should have a practical first aid knowledge of how to diagnose and treat fractures, dislocations and muscular injuries, including:

- types of fracture; open, closed, complicated and greenstick;
- treatment and immobilization of injured part;
- special requirements for treating pelvic and spinal injuries; and
- symptoms and therapy of sprains, strains and dislocations.

9 Medical care of rescued persons, including distress, hypothermia, and cold exposure

The trainee should have basic knowledge and skill in the case of rescued persons and be capable of recognizing problems in their care, with particular regard to hypothermia, including:

- hypothermia: rescue and care of hypothermic persons, precautions against heat loss, effect of wind and humidity;
- congelation (cold injury, immersion foot, etc.);
- seasickness: cause, therapy;
- sunburn: cause, therapy, prophylaxis, effect; and
- dehydration and nutrition in rescue situations: frequent errors, hazards.

10 Radio-medical advice

The trainee should be aware of the availability of radio-medical advice and methods of obtaining such advice.

11 Pharmacology

The trainee should be capable of recognizing the main terms of general pharmacology; he should be capable of recognizing the basic principles of antibiotics, antiseptics, analgesics and chemotherapeutics and how to apply them.

12 Sterilization

The trainee should be capable of recognizing the terms “disinfection” and “sterilization” and to apply appropriate measures.

13 Cardiac arrest, drowning and asphyxia

The trainee should understand the causes and treatment of cardiac arrest, asphyxia and drowning, including:

- ability to apply mouth-to-mouth resuscitation and knowledge of occasions when it cannot be used; and
- ability to apply CPR and a knowledge of limiting factors relating to its use.

APPENDIX 3

Syllabus for more advanced medical training based on the International Medical Guide for Ships (IMGS) or similar national guides

This third level training syllabus is for more advanced medical training based on the IMGS or similar national medical guides and enables specified crew member or members to participate effectively in co-ordinated schemes for medical assistance on ships at sea and to provide the sick or injured with a satisfactory standard of medical care while they remain on board.

Where practicable, this training may include practical training at a hospital or similar establishment.

1 First aid

It is assumed that trainees will have successfully completed the first aid training prescribed in appendix 2. The opportunity can be taken to revise and reinforce the major points, including:

Body structure and function
Toxicological hazards on board
Examination of patient

In addition to the contents of appendix 2, this section should include:

- simple laboratory tests; measure of urine volume, use and evaluation of sticks, collection of blood for smear, preparation of urethral smear; and

- additional emphasis should be given to the concepts of clinical examination and medical history taken under seagoing conditions, with particular emphasis on the importance of radio-medical advice.

2 Care of casualty

2.1 Head and spinal injuries

The trainee should be capable of recognizing the symptoms of head and spinal injuries; care of an unconscious casualty (no anaesthetics/sedatives); rescue, transport and treatment in the case of suspected spinal fracture, hazard of paralysis.

2.2 Injuries of ear, nose, throat and eyes

The trainee should be capable of recognizing symptoms of injuries in this region and applying the appropriate treatment, including:

- diagnosis, cause, treatment of ear, nose and throat injuries; and
- injuries of the eye region, injuries of the external eye, aftercare, removal of loose foreign bodies through the use of moistened cotton bud or loop.

2.3 External and internal bleeding

The trainee should be capable of recognizing the cause, the symptoms and dangers of internal and external bleeding and of applying appropriate measures.

2.4 Burns, scalds and frostbite

The trainee should be capable of recognizing the signs of burns, scalds and frostbite, possible complications, and of applying the appropriate treatment, including:

- definition, complications and treatment of burns; general aspects, first aid, further treatment (sterile dressing, shock prophylaxis, fluid balance, antibiotic prophylaxis), pain relief;
- burns/scalds; difference between burns and scalds (first, second and third degree), first aid, further treatment; and
- frostbite; difference between burns and frostbite, damage to tissue, first aid, further treatment.

2.5 Fractures, dislocations and muscular injuries

The trainee should have a practical knowledge of how to diagnose and treat fractures, dislocations and muscular injuries, including:

- types of fracture; open, closed, complicated and undisplaced fractures;
- methods to be employed for the immobilization of the injured part, prevention of infection;
- special requirements for treating pelvic and spinal injuries; and
- cause, symptoms and treatment of sprains, strains and dislocations.

2.6 Wounds, wound healing and infection

The trainee should be capable of recognizing the different kinds of wounds, the approximate course of wound healing and should be able to apply the different techniques of wound treatment, preventive measures and treatment of infection, including:

- types of wound;
- wound healing;
- prevention of infection; aseptic procedures, wound cleaning, stopping of bleeding, dressing, immobilization and tetanus prevention; and
- infected wounds; inflammation, sources of infection and treatment.

2.7 Pain relief

The trainee should be capable of recognizing the general principles of pain relief and anaesthesia and of applying simple procedures, including:

- non-medicinal relief; psychological, relaxation, positioning, cooling and warmth;
- medicinal treatment; application, risks of abuse, characteristics of remedies; and
- non-invasive local anaesthesia.

2.8 Techniques of sewing and clamping

The trainee should be capable of applying simple technical measures to stop bleeding and to close wounds, including:

- surgical arrest of bleeding and ligature; and
- surgical treatment of wound, sutures and removal of sutures, setting and removal of clamps.

2.9 *Management of acute abdominal conditions*

The trainee should be capable of recognizing the signs and symptoms of acute abdominal conditions, such as but not limited to appendicitis, peritonitis, intestinal obstruction, acute urinary retention, abdominal trauma and of applying emergency treatment and recognizing the need for radio-medical advice.

2.10 *Minor surgical treatment*

The trainee should be capable of undertaking minor surgical treatment of localized skin infections and injuries and applying the appropriate dressing and medication.

2.11 *Dressing and bandaging*

The trainee should be capable of applying simple dressings, bandages and tubular gauze dressings.

3 **Aspects of nursing**

3.1 *The trainee should be capable of recognizing the general principles of nursing, including:*

- observation of patient;
- patient's behaviour;
- cardinal symptoms; skin, respiration, excretion, pulse, blood pressure, body temperature; and
- recording of body temperature and other clinical information.

3.2 *Nursing care*

The trainee should be familiar with simple nursing care, including control of pain, injections (subcutaneous and intramuscular only), washing and cold sponging.

4 **Diseases**

4.1 *Medical conditions and emergencies*

The trainee, where necessary with the aid of radio-medical advice, should be capable of recognizing medical emergencies and other conditions likely to be encountered on board ship and affecting the following systems:

- disorders of mental and central nervous system;

- disorders of digestive system and abdominal organs;
- diseases of heart, cardiovascular and respiratory system;
- diseases of genito-urinary system;
- diseases of eyes, skin and ear, nose and throat;
- diseases of musculo-skeletal system and joints;
- poisoning and allergic reactions;
- emergency resuscitative procedures;

The trainee should also be capable of dealing effectively with these conditions, with reference to the IMGS or a similar national medical guide and with radio-medical advice until more expert help becomes available or the patient recovers.

4.2 Sexually-transmitted diseases

The trainee should be capable of recognizing the most important venereal diseases, of performing urethral smear and urine tests and applying the basic medical treatment and of counselling.

4.3 Tropical and infectious diseases

The trainee should be capable of recognizing infectious diseases and of applying the basic medical treatment, including:

- definition and characteristics of infectious diseases;
- diseases caused by viruses (influenza, pneumonia, etc.);
- diseases caused by bacteria (salmonellosis, typhoid, cholera, etc.);
- diseases caused by parasites (dysentery, malaria etc.);
- tropical diseases in addition to malaria; and
- treatment, prevention and isolation, where needed.

Particular emphasis should be placed on the causes, treatment and prevention of gastro-intestinal illnesses on board.

5 Alcohol and drug abuse

The trainee should be capable of recognizing misuse of alcohol, signs of alcohol dependence, withdrawal damage, and of applying appropriate measures.

The trainee should have a knowledge of potentially addictive drugs and narcomaniacs, including the most frequently encountered substances and their effects on the individual.

The trainee should be aware of the availability and importance of alcohol and drug counselling.

6 Dental care

The trainee should have a basic knowledge of dental care, the principles of mouth hygiene and be capable of applying appropriate emergency treatment, including temporary fillings.

7 Gynaecology, pregnancy and childbirth

The trainee should have basic knowledge of:

- pregnancy; signs, side effects, complications;
- childbirth; course of birth, measures to facilitate birth, care of child and mother, miscarriage; and
- awareness of diseases and disorders peculiar to women.

8 Medical care of rescued persons, including distress, hypothermia and cold exposure

(Revision and reinforcement of paragraph 9 of appendix 2).

9 Death at sea

The trainee should be capable of recognizing the general principles of care of the dying or dead persons, including:

- signs of death, examination of corpse, time of death, keeping corpse on board; and
- burial at sea.

10 External assistance

10.1 Radio-medical advice

The trainee should be capable of putting into use the general principles of radio-medical advice, including:

- how to obtain radio-medical advice;
- national and international radio-medical advice systems;
- modes of contact (telephony, telegraphy, telex, etc.);
- objective of radio-medical advice and the function of advisory services;

- difficulties for the advising doctor; and
- use of the appropriate checklist and the medical section of the International Code of Signals.

10.2 *Transportation of ill and injured*

The trainee should be capable of recognizing the problems of transport of the ill and injured, and of using the approved stretcher. He should also be aware of procedures for helicopter evacuation.

10.3 *Medical care of ill seamen*

The trainee should be capable of recognizing the principles of co-operation with port health authorities or outpatients wards in ports, including:

- language barriers and cultural differences; and
- detailed medical records.

11 **Environmental control on board ship**

11.1 *Hygiene*

The trainee should be capable of recognizing the main principles of shipboard hygiene and health education, including:

- personal hygiene;
- hygiene problems;
- potable water;
- sewage disposal;
- ventilation and air-conditioning;
- food hygiene; and
- aspects of healthy living.

12 **Disease prevention**

12.1 *Disinfection, disinfection, de-ratting*

The trainee should be capable of recognizing the general principles and procedures of protection against transmission of diseases and control of epidemics, including:

- protection against and the control of epidemics;

- regulations regarding waste and sewage disposal; and
- definition and methods of disinfection and de-ratting.

12.2 Vaccinations

The trainee should be aware of different kinds of necessary vaccinations applicable in seafaring and the general principles of protection.

13 Keeping of records, regulations

13.1 Keeping of medical records

The trainee should be familiar with the general principles of the keeping and contents of medical records, including medical log, dangerous drugs register, doctor's reports, reporting to port health authorities, communications with medical doctors in port.

13.2 International and national maritime medical regulations

The trainee should recognize the meaning of international and national health regulations regarding seafaring, including regulations and recommendations from WHO, IMO and ILO.

14 Medicines and medical equipment

The trainee should be familiar with the contents of the ship's medicine chest and the dosage level, side effects and actions of the medicines and drugs which it contains.

The trainee should be familiar with the medical equipment on board and its use.

15 Surgical equipment, instruments and supplies

The trainee should be capable of using the surgical equipment and instruments available on board and of recognizing and applying the appropriate measures of disinfection and sterilization.

SECTION 18 – SEARCH AND RESCUE

Ref: 1978 STCW Convention – regulation II/2, appendix,
paragraph 18
1978 STCW Convention – regulation II/3, appendix,
paragraph 1(a)(xiv)
1978 STCW Convention – regulation II/4, appendix,
paragraph 20

A knowledge of the content and use of the IMO Merchant Ship Search and Rescue Manual (MERSAR), as amended, should be included in the curricula for the training of deck officers.

SECTION 19 – PREVENTION OF MARINE POLLUTION

- Ref: 1978 STCW Convention – regulation II/1, paragraph 11
1978 STCW Convention – regulation II/2, appendix, paragraph 10(h)
1978 STCW Convention – regulation II/3, appendix, paragraph 1(a)(xv)
1978 STCW Convention – regulation II/4, appendix, paragraph 21
1978 STCW Convention – regulation III/1, paragraph 8
1978 STCW Convention – regulation III/2, appendix, paragraphs 4(h), 4(i), 4(j) and 5
1978 STCW Convention – regulation III/3, appendix, paragraphs 4(h) and 5
1978 STCW Convention – regulation III/4, paragraph 3(f)
1978 STCW Convention – regulation III/6, paragraph 3(d)
1978 STCW Convention – regulation V/1, paragraphs 2 and 3
1978 STCW Convention – regulation V/2
1978 STW Conference resolution 8
1978 STW Conference resolution 9, annex, paragraph 3(e)
1978 STW Conference resolution 10, annex, part I, B, paragraph 1(c)
1978 STW Conference resolution 11, annex, part II, paragraph 4
1978 STW Conference resolution 12, annex, part I, A, paragraph 1(d)

The curricula for training ships' officers should include knowledge of the requirements of the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 relating thereto (MARPOL 73/78).

SECTION 20 – MAIN AND AUXILIARY PRIME MOVERS

- Ref: 1978 STCW Convention – regulation III/1, paragraph 5
1978 STCW Convention – regulation III/2, appendix, paragraphs 3 to 5
1978 STCW Convention – regulation III/3, appendix, paragraphs 3 to 5
1978 STCW Convention – regulation III/4, paragraphs 3 to 5

1978 STCW Convention – regulation III/6, paragraphs 3 to 5
1978 STW Conference resolution 9 – annex,
paragraphs 2 and 3

- 1 Engineer officers should have practical knowledge of the preparation, operation and maintenance of the main and auxiliary engines and associated ancillary equipment.
- 2 Engine-room ratings whose duties may require it, should have a sufficient practical knowledge of the preparation, operation and service of the main and auxiliary engines and associated equipment so as to be able to assist the engineer officers in their duties.
- 3 More detailed guidance is set out in the following appendices.

APPENDIX 1

Engineer officers – main and auxiliary prime movers

- 1 Training facilities should include sectional models or simulators, audio-visual training aids, actual equipment and such other training equipment as approved by the Administration. Where possible, tours of manufacturers' plants, workshop instructions and shipyard visits should be used to supplement classroom instruction.
- 2 Engineer officers should have adequate knowledge of procedures and techniques in order to understand the machinery in their charge. These should include the following:
 - .1 *Production of components*

Properties of various materials employed in the production of components and the methods of manufacture of such components.
 - .2 *Construction and assembly*
 - .2.1 Constructional details of the machinery and respective functions of the component parts and their clearances.
 - .2.2 Method of dismantling and assembling the machinery.

.3 *Instruction manuals*

Use of instruction manuals which should be understood and clearly followed for both the operation and maintenance of the machinery.

.4 *Installation on board ship*

.4.1 Machinery seating, chocking, alignment and connection to associated shafting, etc.

.4.2 Fitting of piping.

.5 *Test and trials*

.5.1 Procedures to be carried out prior to start up, during shutdown, no-load trials and full-load conditions.

.5.2 Trials and testing of control equipment and safety devices.

.6 *Safe operating procedures*

.6.1 Knowledge of normal operating pressures and temperatures to maintain safe operating conditions while manoeuvring or at sea.

.6.2 Procedures for safe operation of fuel and combustion systems.

.6.3 Procedures to be carried out during emergency operations.

.6.4 The effective use of safety guards in way of all hot parts and moving parts for the safety of personnel.

.6.5 Procedures to be carried out to ensure that damage to the machinery does not result from overspeeding, overloading or lack of lubrication and cooling.

APPENDIX 2

Engine-room ratings – main and auxiliary prime movers

Engine-room ratings, whose duties may require it, should have a practical knowledge of procedures and techniques in order to understand machinery. These should include the following:

- .1 *Construction and assembly*
 - .1.1 Familiarization with the construction of the machinery and its component parts.
 - .1.2 Methods of dismantling and assembling machinery.
 - .1.3 Understanding of instructional information available to engine-room ratings for the operation and maintenance of machinery.
- .2 *Safe operating procedures*
 - .2.1 Awareness of pressures and temperatures relative to their duties.
 - .2.2 Actions to be taken during emergency operations.
 - .2.3 The effective use of safety guards in way of all hot parts and moving parts for the safety of personnel.
 - .2.4 Precautions to be taken to ensure that damage to the machinery does not result from overspeeding, overloading or lack of lubrication and cooling.

SECTION 21 – BOILERS AND PRESSURE VESSELS

Ref: 1978 STCW Convention – regulation III/4, paragraph 3(b)
1978 STCW Convention – regulation III/6, paragraph 4

1 It is imperative that all personnel involved with the operation of boilers and pressure vessels are made aware of the potential hazards associated with this type of equipment if not properly maintained, particularly with regard to the importance of ensuring that safety devices are operative and are correctly set relative to the safe working pressure of the boiler or pressure vessel.

2 Engineer officers should have practical knowledge of the preparation, operation and maintenance of boilers and other pressure vessels.

3 Engine-room ratings whose duties may require it should have a sufficient practical knowledge of the preparation and operation of boilers and other pressure vessels so as to assist the engineer in their duties.

4 More detailed guidance is set out in the following appendices.

APPENDIX 1

Engineer officers – boilers and pressure vessels

The knowledge of engineer officers should include:

.1 Construction

An understanding of the methods and nature of construction of the various types of boilers, economisers, air heaters, pressure vessels and associated equipment, and knowledge of all the safety devices fitted to each type.

.2 *Boiler fittings, mountings and steam piping*

.2.1 Constructional details of boiler fittings and mountings.

.2.2 Constructional details of steam piping.

.3 *Boiler operation*

.3.1 Safe procedures for raising steam, normal operation and shutdown.

.3.2 Precautions to be taken when coupling boilers and warming through steam lines to avoid water-hammer.

.3.3 Methods of determining water level.

.3.4 Procedures for safe operation of fuel and combustion systems.

.3.5 Procedures for water testing and interpretation of results, together with any remedial action necessary.

.3.6 Boiler uptake fires, their cause and methods of extinction.

.4 *Air receivers and fittings*

.4.1 Constructional details of fittings and mountings.

.4.2 Associated safety devices fitted.

.5 *Other heat exchangers and pressure tanks*

.5.1 Constructional details of pressure vessels.

.5.2 Constructional details of the necessary fittings.

.5.3 Safe operational procedures for putting units into service and taking them out of service.

APPENDIX 2

Engine-room ratings – boilers and pressure vessels

Engine-room ratings, whose duties may require it, should have a basic knowledge of certain procedures and techniques in order to understand the operation and general maintenance of boilers and pressure vessels. These should include the following:

.1 *Construction*

Familiarization with construction of the various types of boilers, economisers, air heaters, pressure vessels and associated equipment and the knowledge of all the safety devices fitted to each type.

.2 *Boiler operation*

- .2.1 Safe procedures for raising steam, normal operation and shutdown.**
- .2.2 Knowledge of dangers and precautions to be taken when coupling boilers and warming through steam lines to avoid water-hammer.**
- .2.3 Methods of determining water level.**
- .2.4 Procedures for safe operation of fuel and combustion systems.**
- .2.5 The use of properly treated boiler water.**
- .2.6 Boiler uptake fires, their cause and methods of extinguishment.**
- .2.7 Operation and location of the various boiler fittings.**
- .2.8 Ability to recognize apparent malfunctions and to promptly report these to the engineer officer in charge of the watch.**

SECTION 22 – PUMPING AND PIPING SYSTEMS

Ref: 1978 STCW Convention – regulation III/4; paragraph 3(c)
1978 STCW Conference resolution 9 – annex,
paragraph 2 (e)

- 1 Engineer officers should have sufficient knowledge to carry out routine pumping operations and to maintain pumping and piping installations.
- 2 Engine-room ratings whose duties may require it should have a sufficient practical knowledge to assist the engineer officer to carry out pumping operations and to maintain pumping and piping installations.
- 3 More detailed guidance is set out in the following appendices.

APPENDIX 1

Engineer officers – pumping and piping systems

The need for rapid and efficient use of pumping systems under all conditions is essential. Engineer officers should have a thorough knowledge of the piping system and pumping units and protective devices involved, including the following:

- .1 *Fire mains*
 - .1.1 Fire main piping for hydrants, sprinkler systems, water curtains, foam generating systems, etc.
 - .1.2 Main and emergency fire and sprinkler pumps, sea suctions, discharge manifolds, including remote control and automatic control of systems.
 - .1.3 Maintenance of the system, including pressure tank safety devices, relief valves, draining of system during cold conditions, etc.
 - .1.4 Pump cross connection fittings and safety features.
- .2 *Bilge pumping*
 - .2.1 Bilge suction piping and fittings including strainers, screw down nonreturn valves, valves and manifolds, etc.
 - .2.2 Main bilge, direct bilge and emergency bilge suction lines and the spaces which they drain.
 - .2.3 Cross connections of pumping systems and safety features.

.3 *Discharge overboard*

- .3.1 Use of oily-water separators in conjunction with bilge and ballast discharge overboard.
- .3.2 Monitoring of discharge with a view to compliance with regulations regarding pollution of the sea, coastal waters, inland and harbours.
- 3.3 Use of holding tanks for containing wastes until able to pump into shore facilities.

.4 *Boiler feed systems, where appropriate*

- .4.1 Source of supply of feed water.
- .4.2 Storage tanks, feed pumps, pre-heaters, feed water treatment.
- .4.3 Control of feed pumps by automatic and safety devices and emergency make-up feed.
- .4.4 Precautions to prevent boiler water contamination through drain and fuel systems.

.5 *Ballasting and deballasting*

- .5.1 Procedures which are followed for stability reasons when ballasting or deballasting of cargo, fuel or ballast tanks under the direction of the officer in charge of loading.
- 5.2 Precautions to be taken when pumping out tanks or other spaces which have contained any material which could constitute a pollutant or fire hazard.

.6 *Liquid cargo pumping systems*

- .6.1 Safety precautions for entering cargo pump-rooms on board tankers; the use of safety equipment and special tools.
- .6.2 Procedures to be followed for reasons of safety and stability of the ship when cargo pumping or transferring fuel under the direction of the officer in charge.

.7 *Oil fuel and lubricants*

- .7.1 The use of pumping equipment, instrumentation and the care to be taken when bunkering or transferring oil to avoid spillage or fire hazard.

- .7.2 Pertinent government regulations covering these systems.
- .7.3 Procedures to be adopted when treating or centrifuging fuel or lubricating oils.
- .7.4 Importance of maintaining systems tight and in a clean condition. Recognition of the potential hazards associated with oil leakage and gas accumulation in confined spaces.
- .7.5 Lubricating oil contamination, sources and effects on machinery.
- .7.6 Safety and shutoff devices associated with fuel oil and lubricating oil systems.
- .8 *Compressed air systems*
 - .8.1 Operation and maintenance of compressed air piping and fittings, including safety valves, bursting discs, water traps, reducing valves, etc.
 - .8.2 Knowledge of the importance of properly securing and supporting the piping and the use of flexible sections of pipe.
- .9 *Piping systems*

Recognition of the importance of expansion pieces and the proper securing and support of piping and the use of flexible sections of pipe.
- .10 *Evaporators, where appropriate*

Types and correct operating conditions, including testing of water produced.

APPENDIX 2

Engine-room ratings – pumping and piping systems

Engine-room ratings, whose duties may require it, should have a sufficient knowledge to perform their duties on the piping systems, pumping units and protective devices involved, including the following:

.1 *General*

- .1.1 Methods of measuring pipe and pipe fittings.
- .1.2 Methods of replacing pipes and pipe fittings.
- .1.3 Knowledge of the importance of expansion pieces and the proper securing and support of piping and the use of flexible sections of pipe.
- .1.4 Procedures to be followed in pump servicing.

.2 *Fire mains*

Procedures to be taken in starting up and placing fire pumps on line.

.3 *Bilge, ballast, freshwater and sanitary pumps*

The function, operation and servicing of these pumps.

.4 *Boiler feed systems, where appropriate*

- .4.1 Source of supply of feed water.
- .4.2 Storage tanks, feed pumps, pre-heaters.
- .4.3 Methods of providing normal and make up feed
- .4.4 Precautions to prevent boiler water contamination.
- .4.5 Operation and servicing of boiler equipment necessary for the supply of water to the boilers.

.5 *Liquid cargo pumping systems*

- .5.1 Safety precautions for entering cargo pump-rooms
- .5.2 The use of safety equipment and special tools.

.6 *Oil fuel and lubricants*

- .6.1 Operation of the fuel oil system, including the procedures of storage and transfer of fuel oil.
- .6.2 Hazards involved and precautions to be taken against flashbacks, the accumulation of oil in furnaces and in bilges, on floor plates and on tank tops, leaks in fuel oil heaters and pipe connections, choked strainers and faulty burner tips.
- .6.3 Principles of operation of lubricating systems.
- .6.4 Safety and shutoff devices associated with fuel oil systems.

- .7 *Evaporators, where appropriate*
Types and correct operating conditions.
- .8 *Protection of the marine environment*
Precautions to be taken to prevent pollution of the marine environment.

SECTION 23 – AUTOMATIC AND REMOTE CONTROL SYSTEMS

Ref: 1978 STCW Convention – regulation III/1, paragraphs 5(g) and 6 (b) (ii)
1978 STCW Convention – regulation III/2, appendix, paragraph 3(h)
1978 STCW Convention – regulation III/3, appendix, paragraph 3(j)

- 1 Engineer officers should have knowledge relating to the characteristics and operation of automatic and remote control systems. Instruction manuals should be understood and closely followed both for the operation and maintenance of the system.
- 2 Engine-room ratings, whose duties may require it, should have a general knowledge of the characteristics in the operation of automatic and remote control systems.
- 3 More detailed guidance is provided in the following appendices.

APPENDIX 1

Engineer officers – automatic and remote control systems

The engineer officers should understand the overall concepts of automatic control and remote control in order to be familiar with the following:

- .1 *Operation*
 - .1.1 The components on the bridge and in machinery spaces.

- .1.2 The manual overrides and how to bring them into effect quickly when required to do so.
- .1.3 All the control and monitoring systems and the ability to read and interpret the information they provide.
- .2 *Electric*
 - .2.1 Normal and emergency power supply and distribution.
 - .2.2 Switching arrangements for main propulsion and auxiliary machinery including standby and emergency equipment.
 - .2.3 Control and monitoring systems.
- .3 *Electronic*
 - .3.1 Main and standby supply and distribution.
 - .3.2 Control arrangements for main propulsion and auxiliary machinery including standby and emergency equipment.
 - .3.3 Control and monitoring systems.
- .4 *Hydraulics*
 - .4.1 Main and standby hydraulic power and servo-mechanism units.
 - .4.2 Operation, calibration, testing, maintenance and cleanliness of the system.
- .5 *Pneumatics*
 - .5.1 Main and standby pneumatic units and servo-mechanisms.
 - .5.2 Operation, calibration, testing, maintenance, cleanliness and dryness of system.

APPENDIX 2

Engine-room ratings – automatic and remote control systems

Engine-room ratings should be aware of the:

- .1 overall concept of automatic and remote control systems;

- .2 types of control equipment in use relative to their duties; and
- .3 hazards associated with automatic and remote control systems.

SECTION 24 – ELECTRICAL EQUIPMENT AND INSTALLATIONS

*Ref: 1978 STCW Convention – regulation III/1, paragraphs 5(g) and 6(b)(ii)
1978 STCW Convention – regulation III/2, appendix, paragraphs 3(g) and 4(c)
1978 STCW Convention – regulation III/3, appendix, paragraphs 3(i) and 4(c)*

- 1 Those responsible for electrical equipment and installations should have an adequate level of knowledge to be able to interpret and control their operation. They should be capable of detecting failures, effecting repairs and performing routine maintenance.
- 2 Engine-room ratings should be made aware of the dangers associated with electrical installations and equipment.
- 3 More detailed guidance is provided in the following appendix.

APPENDIX

Electrical equipment and installations

Those responsible for electrical equipment and installations should have the necessary knowledge of the various items of equipment for which they are responsible. They should be competent to run generating plants and be familiar with the protective devices associated with them. They should have adequate knowledge of and be familiar with the following:

- .1 **Generation**
 - .1.1 **Operation of AC and DC generators and paralleling of generators.**

- .1.2 Generator instrumentation and control.
- .1.3 Protection of generators.
- .1.4 Automatic starting of emergency generators.
- .1.5 Batteries – construction, care and maintenance.
- .1.6 Battery chargers, charging of batteries and the precautions to be taken, in particular, when batteries are on charge.
- .2 *Distribution*
 - .2.1 Switchboards, wiring and protective devices.
 - .2.2 Circuit breakers and fuses.
 - .2.3 Distribution of power from main and emergency switchboards and distribution panels.
 - .2.4 Shore connections.
- .3 *Electrical systems*

The construction, operation and maintenance of the power, control, alarm, monitoring and communication systems.
- .4 *Personal protection*

The use of adequate protective equipment and clothing and the safety precautions to be taken.

SECTION 25 – USE OF TOOLS

Ref: 1978 STW Conference resolution 9 – annex, paragraph 2(c)

- 1 Engineer officers should be proficient in the use of tools and equipment provided for the maintenance and repair of machinery on board ship.
- 2 Engine-room ratings should be aware of the types of tools provided for the maintenance and repair of machinery on board ship and those whose duties may require it, should be proficient in their use.
- 3 More detailed guidance is provided in the following appendices.

APPENDIX 1

Engineer officers – use of tools

It is essential that engineer officers should have a sound knowledge of the types of tools, equipment and their use in the maintenance and repair of ship's machinery. Knowledge should include, but not be limited to, the following:

- .1 Safe use and proper care of hand tools.
- .2 Safe use and proper care of portable power tools.
- .3 Safe use and proper care of workshop power tools such as lathes, drilling machines, grinding machines, milling machines, etc.
- .4 Safe use and proper care of oxyacetylene and electric arc-welding equipment.
- .5 Procedures involved in the use of special tools and equipment for specific overhaul or maintenance tasks.
- .6 Safe use of all lifting devices, including chain blocks and overhead cranes.
- .7 The observance of safe working practices in:
 - .7.1 use of staging;
 - .7.2 opening up, dismantling and re-assembling of machinery parts; and
 - .7.3 use of standard warning devices in work areas or where applicable.

APPENDIX 2

Engine-room ratings – use of tools

It is essential that engine-room ratings, whose duties may require it, should have a sound knowledge of the types of tools and their use in the maintenance and repair of ships' machinery. Knowledge should include, but not be limited to, the following:

- .1 Safe use and proper care of hand tools.

- .2 Safe use and proper care of portable and workshop power tools.
- .3 Safe use of lifting devices.
- .4 The observance of safe practices in:
 - .4.1 use of staging;
 - .4.2 display of warning signs; and
 - .4.3 opening, dismantling and re-assembling of machinery parts.

SECTION 26 – ABLE SEAMAN’S CERTIFICATE

In addition to the requirement for an able seaman to hold an appropriate certificate of proficiency in survival craft (see section 11) any training leading to qualification for an able seaman certificate should include, but not necessarily be limited to, the subjects contained in the following appendix.

APPENDIX

Able seaman’s certificate

- 1 Knowledge of magnetic and gyro-compasses, methods of changing over from automatic pilot to hand steering and vice versa (appendix 2 to section 8).
- 2 The ability to steer and understand helm orders.
- 3 The ability to keep a proper lookout and report bearings both relative and true (sections 2 and 6).
- 4 Streaming, reading and hauling in a patent log.
- 5 Ship cleanliness and personal hygiene.
- 6 Knowledge of ropes and wires, and the ability to make common knots and splices.
- 7 Basic principles of fire fighting and use of fire-fighting equipment (appendix 1 to section 10).
- 8 First aid, health hazards and personal safety.
- 9 Emergency procedures (appendix 2 to section 12).

SECTION 27 – MARITIME LAW

*Ref: 1978 STCW Convention – regulation II/2, appendix,
paragraph 14
1978 STCW Convention – regulation III/2, appendix,
paragraph 5*

1 Deck and engineer officers should possess a knowledge of international maritime law embodied in international agreements and conventions as they affect their specific obligations and responsibilities, particularly those concerning safety and the protection of the marine environment.

2 The extent of knowledge of national maritime legislation is left to the discretion of the Administration but should include national arrangements for implementing international agreements and conventions.

SECTION 28 – SHIP MANAGEMENT

*Ref: 1978 STCW Convention – regulation II/2, appendix,
paragraph 15
1978 STCW Convention – regulation III/2, appendix,
paragraph 6*

Masters and officers should be given training to achieve a standard of knowledge appropriate to their respective duties in personnel management, organization, shipboard welfare and training on board ships.

SECTION 29 – HUMAN RELATIONSHIPS AND SOCIAL RESPONSIBILITIES

Ref: 1978 STW Conference resolution 22.

1 Seafarers' training programmes should include the basic principles of human relationships and social responsibilities.

2 Such training should include guidance as to the particular social aspects of seagoing employment and point out the need for good human relationships on board ships.