

Guidance regarding training of radio personnel in the Global Maritime Distress and Safety System (GMDSS).

GUIDANCE ON TRAINING OF RADIO OPERATORS RELATED TO THE FIRST-CLASS RADIOELECTRONIC CERTIFICATE

General

1 Before training is commenced, the requirements of medical fitness, especially as to hearing, eyesight and speech, should be met by the candidate.

2 The training should be relevant to the provisions of the STCW Convention, the provisions of the Radio Regulations annexed to the International Telecommunication Convention (Radio Regulations) and the provisions of the International Convention for the Safety of Life at Sea (SOLAS) Convention, currently in force, with particular attention given to provisions for the global maritime distress and safety system (GMDSS). In developing training requirements, account should be taken of at least the knowledge and training listed in paragraphs 3 to 14 hereunder.

Theory

3 Knowledge of the general principles and basic factors necessary for safe and efficient use of all the sub-systems and equipment required in the GMDSS sufficient to support the practical training provisions given in paragraph 13.

4 Knowledge of the use, operation and service areas of the GMDSS sub-systems, including satellite system characteristics, navigational and meteorological warning systems and selection of appropriate communication circuits.

5 Knowledge of the principles of electricity and the theory of radio and electronics sufficient to meet the guidance given in paragraphs 6 to 10 below.

6 Theoretical knowledge of GMDSS radiocommunication equipment, including narrow-band direct-printing telegraphy and radiotelephone transmitters and receivers, digital selective calling equipment, ship earth stations, emergency position-indicating radio beacons, marine antenna systems, radio equipment for survival craft together with all auxiliary items, including power supplies, as well as general knowledge of the principles of other equipment generally used for radio navigation, with particular reference to maintaining the equipment in service.

7 Knowledge of factors that affect system reliability, availability, maintenance procedures and proper use of test equipment.

8 Knowledge of microprocessors and fault diagnosis in systems using microprocessors.

9 Knowledge of control systems in the GMDSS radio equipment including testing and analysis.

10 Knowledge of the use of computer software for the GMDSS radio equipment and methods for correcting faults caused by loss of software control of the equipment.

Regulations and documentation

- 11 Knowledge of:
- .1 the SOLAS Convention and the Radio Regulations with particular emphasis on:
 - .1.1 distress, urgency and safety radiocommunications,
 - .1.2 avoiding harmful interference, particularly with distress and safety traffic, and
 - .1.3 prevention of unauthorized transmissions;
 - .2 other documents relating to operational and communication procedures for distress, safety and public correspondence services, including charges, navigational warnings, and weather broadcasts in the Maritime Mobile Service and the Maritime Mobile Satellite Service;
 - .3 use of the International Code of Signals and the IMO Standard Marine Communication Phrases.

Watchkeeping and procedures

- 12 Knowledge of and training in:
- .1 communication procedures and discipline to prevent harmful interference in the GMDSS subsystems;
 - .2 procedures for using propagation prediction information to establish optimum frequencies for communications;
 - .3 radiocommunication watchkeeping relevant to all GMDSS sub-systems, exchange of radiocommunication traffic, particularly concerning distress, urgency and safety procedures and radio records;
 - .4 use of the international phonetic alphabet;
 - .5 monitoring a distress frequency while simultaneously monitoring or working on at least one other frequency;
 - .6 ship reporting systems and procedures;
 - .7 radiocommunication procedures of the IMO Merchant Ship Search and Rescue Manual (MERSAR); and
 - .8 radio medical systems and procedures.
 - .9 causes of false distress alerts and means to avoid them*

Practical

- 13 Practical training, supported by appropriate laboratory work, should be given in:
- .1 correct and efficient operation of all GMDSS sub-systems and equipment under normal propagation conditions and under typical interference conditions;

*see COM/Circ.127 – Guidelines for avoiding false distress alerts

- .2 safe operation of all the GMDSS communication equipment and ancillary devices, including safety precautions;
- .3 adequate and accurate keyboard skills for the satisfactory exchange of communications;
- .4 operational techniques for:
 - .4.1 receiver and transmitter adjustment for the appropriate mode of operation, including digital selective calling and direct-printing telegraphy,
 - .4.2 antenna adjustment and re-alignment, as appropriate,
 - .4.3 use of radio life-saving appliances, and
 - .4.4 use of emergency position-indicating radio beacons (EPIRBs);
- .5 antenna rigging, repair and maintenance, as appropriate;
- .6 reading and understanding pictorial, logic and circuit diagrams;
- .7 use and care of those tools and test instruments necessary to carry out at-sea electronic maintenance;
- .8 manual soldering and desoldering techniques, including those involving semiconductor devices and modem circuits and the ability to distinguish whether the circuit is suitable to be manually soldered or desoldered,
- .9 tracing and repair of faults to component level where practicable, and to board/module level in other cases;
- .10 recognition and correction of conditions contributing to the fault occurring;
- .11 maintenance procedures, both preventive and corrective for all GMDSS communication equipment and radio navigation equipment; and
- .12 methods of alleviating electrical and electromagnetic interference such as bonding, shielding and bypassing.

Miscellaneous

- 14 Knowledge of and/or training in:
 - .1 the English language, both written and spoken, for the satisfactory exchange of communications relevant to the safety of life at sea;
 - .2 world geography, especially the principal shipping routes, services of rescue co-ordination centres (RCCs) and related communication routes;
 - .3 survival at sea, the operation of lifeboats, rescue boats, liferafts, buoyant apparatus and their equipment, with special reference to radio life-saving appliances;
 - .4 fire prevention and fire-fighting with particular reference to the radio installation;

- .5 preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical, radiation, chemical and mechanical hazards;
- .6 first aid, including heart-respiration revival techniques; and
- .7 co-ordinated universal time (UTC), global time zones and the international date line.

GUIDELINE REGARDING TRAINING OF RADIO OPERATORS RELATED TO THE SECOND-CLASS RADIOELECTRONIC CERTIFICATES

General

15 Before training is commenced, the requirements of medical fitness, especially as to hearing, eyesight and speech, should be met by the candidate.

16 The training should be relevant to the provisions of the STCW Convention, and the SOLAS Convention currently in force, with particular attention given to provisions for the Global Maritime Distress and Safety System (GMDSS). In developing training requirements, account should be taken of at least the knowledge and training listed in paragraphs 17 to 28 hereunder.

Theory

17 Knowledge of the general principles and basic factors necessary for safe and efficient use of all the sub-systems and equipment required in the GMDSS sufficient to support the practical training provisions given in paragraph 27 below.

18 Knowledge of the use, operation and service areas of the GMDSS sub-systems, including satellite system characteristics, navigational and meteorological warning systems and selection of appropriate communication circuits.

19 Knowledge of the principles of electricity and the theory of radio and electronics sufficient to meet the requirements specified in paragraphs 20 to 24 below.

20 General theoretical knowledge of GMDSS radiocommunication equipment, including narrow-band direct-printing telegraph and radiotelephone transmitters and receivers, digital selective calling equipment, ship earth stations, emergency position-indicating radio beacons, marine antenna systems, radio equipment for survival craft together with all auxiliary items, including power supplies, as well as general knowledge of other equipment generally used for radio navigation, with particular reference to maintaining the equipment in service.

21 General knowledge of factors that affect system reliability, availability, maintenance procedures and proper use of test equipment.

22 General knowledge of microprocessors and fault diagnosis in systems using microprocessors.

23 General knowledge of control systems in the GMDSS radio equipment including testing and analysis.

24 Knowledge of the use of computer software for the GMDSS radio equipment and methods for correcting faults caused by loss of software control of the equipment.

Regulations and documentation

25 Knowledge of:

.1 the SOLAS Convention and the Radio Regulations with particular emphasis on

.1.1 distress, urgency and safety radiocommunications,

- .1.2 avoiding harmful interference, particularly with distress and safety traffic, and
- .1.3 the prevention of unauthorized transmissions;
- .2 other documents relating to operational and communication procedures for distress, safety and public correspondence services, including charges, navigational warnings, and weather broadcasts in the Maritime Mobile Service and the Maritime Mobile Satellite Service; and
- .3 use of the International Code of Signals and the IMO Standard Marine Communication Phrases.

Watchkeeping and procedures

26 Training should be given in:

- .1 communication procedures and discipline to prevent harmful interference in the GMDSS subsystems;
- .2 procedures for using propagation prediction information to establish optimum frequencies for communications;
- .3 radiocommunication watchkeeping relevant to all GMDSS sub-systems, exchange of radiocommunication traffic, particularly concerning distress, urgency and safety procedures and radio records,
- .4 use of the international phonetic alphabet;
- .5 monitoring a distress frequency while simultaneously monitoring or working on at least one other frequency;
- .6 ship reporting systems and procedures;
- .7 radiocommunication procedures of the IMO Merchant Ship Search and Rescue Manual (MERSAR); and
- .8 radio medical systems and procedures.
- .9 causes of false distress alerts and means to avoid them*

Practical

27 Practical training, supported by appropriate laboratory work, should be given in:

- .1 correct and efficient operation of all GMDSS sub-systems and equipment under normal propagation conditions and under typical interference conditions;
- .2 safe operation of all the GMDSS communication equipment and ancillary devices, including safety precautions;
- .3 adequate and accurate keyboard skills for the satisfactory exchange of communications;
- .4 operational techniques for:

*see COM/Circ.127 – Guidelines for avoiding false distress alerts

- .4.1 receiver and transmitter adjustment for the appropriate mode of operation, including digital selective calling and direct-printing telegraphy,
- .4.2 antenna adjustment and re-alignment, as appropriate,
- .4.3 use of radio life-saving appliances, and
- .4.4 use of emergency position-indicating radio beacons (EPIRBs);
- .5 antenna rigging, repair and maintenance, as appropriate;
- .6 reading and understanding pictorial, logic and module interconnection diagrams;
- .7 use and care of those tools and test instruments necessary to carry out at-sea electronic maintenance at the level of unit or module replacement;
- .8 basic manual soldering and desoldering techniques and their limitations,
- .9 tracing and repair of faults to board/module level;
- .10 recognition and correction of conditions contributing to the fault occurring;
- .11 basic maintenance procedures, both preventive and corrective, for all the GMDSS communication equipment and radio navigation equipment; and
- .12 methods of alleviating electrical and electromagnetic interference such as bonding, shielding and bypassing.

Miscellaneous

28 Knowledge of, and/or training in:

- .1 the English language, both written and spoken, for the satisfactory exchange of communications relevant to the safety of life at sea;
- .2 world geography, especially the principal shipping routes, services of rescue co-ordination centres (RCCs) and related communication routes;
- .3 survival at sea, the operation of lifeboats, rescue boats, liferafts, buoyant apparatus and their equipment, with special reference to radio life-saving appliances;
- .4 fire prevention and fire-fighting with particular reference to the radio installation;
- .5 preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical, radiation, chemical and mechanical hazards;
- .6 first aid, including heart-respiration revival technique; and
- .7 co-ordinated universal time (UTC), global time zones and international date line.

GUIDANCE REGARDING TRAINING OF RADIO OPERATORS RELATED TO THE GENERAL OPERATOR'S CERTIFICATE

General

29 Before training is commenced, the requirements of medical fitness, especially as to hearing, eyesight and speech, should be met by the candidate.

30 The training should be relevant to the provisions of the STCW Convention, the Radio Regulations and the SOLAS Convention currently in force, with particular attention given to provisions for the Global Maritime Distress and Safety System (GMDSS). In developing training requirements, account should be taken of at least the knowledge and training listed in paragraphs 31 to 36 hereunder.

Theory

31 Knowledge of the general principles and basic factors necessary for safe and efficient use of all the sub-systems and equipment required in the GMDSS sufficient to support the practical training provisions given in paragraph 35 below.

32 Knowledge of the use, operation and service areas of the GMDSS sub-systems, including satellite system characteristics, navigational and meteorological warning systems and selection of appropriate communication circuits.

Regulations and documentation

33 Knowledge of:

- .1 the SOLAS Convention and the Radio Regulations with particular emphasis on:
 - .1.1 distress, urgency and safety radiocommunications,
 - .1.2 avoiding harmful interference, particularly with distress and safety traffic, and
 - .1.3 prevention of unauthorised transmissions;
- .2 other documents relating to operational and communication procedures for distress, safety and public correspondence services, including charges, navigational warnings, and weather broadcasts in the Maritime Mobile Service and the Maritime Mobile Satellite Service; and
- .3 use of the International Code of Signals and the IMO Standard Marine Communication Phrases.

Watchkeeping and procedures

34 Training should be given in:

- .1 communication procedures and discipline to prevent harmful interference in the GMDSS sub-systems;
- .2 procedures for using propagation prediction information to establish optimum frequencies for communications;

- .3 radiocommunication watchkeeping relevant to all GMDSS sub-systems, exchange of radiocommunication traffic, particularly concerning distress, urgency and safety procedures and radio records;
- .4 use of the international phonetic alphabet;
- .5 monitoring a distress frequency while simultaneously monitoring or working on at least one other frequency;
- .6 ship reporting systems and procedures;
- .7 radiocommunication procedures of the IMO Merchant Ship Search and Rescue Manual (MERSAR); and
- .8 radio medical systems and procedures.
- .9 causes of false distress alerts and means to avoid them*

Practical

35 Practical training should be given in:

- .1 correct and efficient operation of all GMDSS sub-systems and equipment under normal propagation conditions and under typical interference conditions;
- .2 safe operation of all the GMDSS communications equipment and ancillary devices, including safety precautions;
- .3 accurate and adequate keyboard skills for the satisfactory exchange of communications; and
- .4 operational techniques for:
 - .4.1 receiver and transmitter adjustment for the appropriate mode of operation, including digital selective calling and direct-printing telegraphy,
 - .4.2 antenna adjustment and re-alignment as appropriate,
 - .4.3 use of radio life-saving appliances, and
 - .4.4 use of emergency position-indicating radio beacons (EPIRBs).

Miscellaneous

36 Knowledge of, and/or training in:

- .1 the English language, both written and spoken, for the satisfactory exchange of communications relevant to the safety of life at sea;
- .2 world geography, especially the principal shipping routes, services of rescue co-ordination centres (RCCs) and related communication routes;
- .3 survival at sea, the operation of lifeboats, rescue boats, liferafts, buoyant apparatus and their equipment, with special reference to radio life-saving appliances;

*see COM/Circ.127 – Guidelines for avoiding false distress alerts

- .4 fire prevention and fire-fighting with particular reference to the radio installation;
- .5 preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical, radiation, chemical and mechanical hazards;
- .6 first aid, including heart-respiration revival technique; and
- .7 co-ordinated universal time (UTC), global time zones and international date line.

GUIDANCE REGARDING TRAINING OF RADIO OPERATORS RELATED TO THE RESTRICTED OPERATOR'S CERTIFICATE

General

37 Before training is commenced, the requirements of medical fitness, especially as to hearing, eyesight and speech, should be met by the candidate.

38 The training should be relevant to the provisions of the STCW Convention, the Radio Regulations and the SOLAS Convention currently in force, with particular attention given to provisions for the Global Maritime Distress and Safety System (GMDSS). In developing training guidance, account should be taken of at least the knowledge and training listed in paragraphs 3~ to 44 hereunder.

Theory

39 Knowledge of the general principles and basic factors, including VHF range limitation and antenna height effect necessary for safe and efficient use of all the sub-systems and equipment required in the GMDSS in sea area A1, sufficient to support the training guidance given in paragraph 43 below.

40 Knowledge of the use, operation and service areas of the GMDSS sea area A1 sub-systems, e.g. navigational and meteorological warning systems and the appropriate communication circuits.

Regulations and documentation

41 Knowledge of:

- .1 those parts of the SOLAS Convention and the Radio Regulations relevant to sea area A1, with particular emphasis on:
 - .1.1 distress, urgency and safety radiocommunications,
 - .1.2 avoiding harmful interference, particularly with distress and safety traffic, and
 - .1.3 prevention of unauthorized transmissions;
- .2 other documents relating to operational and communication procedures for distress, safety and public correspondence services, including charges, navigational warnings and weather broadcasts in the Maritime Mobile Service in sea area A1; and
- .3 use of the International Code of Signals and the IMO Standard Marine Communication Phrases.

Watchkeeping and procedures

42 Training should be given in:

- .1 communication procedures and discipline to prevent harmful interference in the GMDSS sub-systems used in sea area A1;
- .2 VHF communication procedures for:
 - .2.1 radiocommunication watchkeeping, exchange of radiocommunication traffic, particularly concerning distress, urgency and safety procedures and radio records,

- .2.2 monitoring a distress frequency while simultaneously monitoring or working on at least one other frequency, and
- .2.3 the digital selective calling system;
- .3 use of the international phonetic alphabet;
- .4 ship reporting systems and procedures;
- .5 VHF radiocommunication procedures of the IMO Merchant Ship Search and Rescue Manual (MERSAR); and
- .6 radio medical systems and procedures.
- .7 causes of false distress alerts and means to avoid them*

Practical

43 Practical training should be given in:

- .1 correct and efficient operation of the GMDSS sub-systems and equipment prescribed for ships operating in sea area A1 under normal propagation conditions and under typical interference conditions;
- .2 safe operation of the relevant GMDSS communication equipment and ancillary devices, including safety precautions; and
- .3 operational techniques for:
 - .3.1 use of VHF, including channel, squelch, and mode adjustment, as appropriate,
 - .3.2 use of radio life-saving appliances,
 - .3.3 use of emergency position-indicating radio beacons (EPIRBs), and
 - .3.4 use of NAVTEX receiver.

Miscellaneous

44 Knowledge of, and/or training in:

- .1 the English language, both written and spoken, for the satisfactory exchange of communications relevant to the safety of life at sea,
- .2 services of rescue co-ordination centres (RCCs) and related communication routes;
- .3 survival at sea, the operation of life boats, rescue boats, liferafts, buoyant apparatus and their equipment, with special reference to radio lifesaving appliances;
- .4 fire prevention and fire-fighting with particular reference to the radio installation;

*see COM/Circ.127 – Guidelines for avoiding false distress alerts

- .5 preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical, radiation, chemical and mechanical hazards; and
- .6 first aid including heart-respiration revival technique.

GUIDANCE REGARDING TRAINING OF PERSONNEL PERFORMING MAINTENANCE OF THE GMDSS INSTALLATIONS ON BOARD SHIPS

General

45 Reference is made to the maintenance requirements of SOLAS Convention regulation IV/15, and to IMO resolution A.702(17) on Radio maintenance guidelines for the GMDSS related to sea areas A3 and A4 which includes in its annex the following provision:

"4.2 The person designated to perform functions for at-sea electronic maintenance should either hold an appropriate certificate as specified by the Radio Regulations, as required, or have equivalent at-sea electronic maintenance qualifications, as may be approved by the Administration, taking into account the recommendations of the Organization on the training of such personnel."

46 The following guidance on equivalent electronic maintenance qualifications is provided for use by Administrations as appropriate.

47 Training as recommended below, does not qualify any person to be an operator of GMDSS radio equipment who does not hold an appropriate Radio Operator's Certificate.

Maintenance training equivalent to me First-Class Radioelectronic Certificate

48 In determining training equivalent to the elements of the listed First-Class Radioelectronic Certificate:

- .1 the theory content should cover at least the subjects given in paragraphs 3 to 10;
- .2 the practical content should cover at least the subjects given in paragraph 13; and
- .3 the miscellaneous knowledge included~should cover at least the subjects given in paragraph 14.

Maintenance training equivalent to the Second-Class Radioelectronic Certificate

49 In determining training equivalent to the maintenance elements of the Second-Class Radioelectronic Certificate:

- .1 the theory content should cover at least the subjects given in paragraphs 17 to 24;
- .2 the practical content should cover at least the subjects given in paragraph 27; and
- .3 the miscellaneous knowledge included should cover at least the subjects given in paragraph 28.