

**Resolution A.703(17)**  
*Adopted on 6 November 1991*  
*(Agenda item 10)*

**TRAINING OF RADIO PERSONNEL IN THE GLOBAL MARITIME  
DISTRESS AND SAFETY SYSTEM (GMDSS)**

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

CONSIDERING the 1987 amendments to the Radio Regulations, the 1988 amendments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS), and the 1991 amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW), for introduction of the global maritime distress and safety system (GMDSS),

NOTING that the 1991 amendments to regulation IV/2 of the STCW Convention require that, in determining the appropriate level of knowledge and training for certification of GMDSS radio personnel, the Administration shall also take into account the relevant recommendations of the Organization,

NOTING ALSO that resolutions 14 and 15 of the International Conference on Training and Certification of Seafarers, 1978, concerning the training and certification of radio officers and radiotelephone operators do not apply to radio personnel on ships operating in the GMDSS,

NOTING FURTHER that resolution A.702(17) on radio maintenance guidelines for the GMDSS related to sea areas A3 and A4 includes provisions permitting Administrations to approve at-sea electronic maintenance qualifications which are equivalent to those recommended for holders of certificates specified by the Radio Regulations,

RECOGNIZING the need for developing recommendations on training for radio personnel in ships operating in the GMDSS,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-ninth session,

1. ADOPTS:
  - (a) the Recommendation on Training of Radio Operators related to the First-Class Radioelectronic Certificate, set out in annex 1;
  - (b) the Recommendation on Training of Radio Operators related to the Second-Class Radioelectronic Certificate, set out in annex 2;
  - (c) the Recommendation on Training of Radio Operators related to the General Operator's Certificate, set out in annex 3;
  - (d) the Recommendation on Training of Radio Operators related to the Restricted Operator's Certificate, set out in annex 4; and
  - (e) the Recommendation on Training of Personnel Performing Maintenance of the GMDSS Installations Aboard Ships, set out in annex 5;
2. RECOMMENDS Governments to take account of the appropriate recommendation set out in the annexes to the present resolution on the training of radio personnel for ships operating in the GMDSS;

3. INVITES the Maritime Safety Committee to keep the present resolution under review in consultation or association with other international organizations, as appropriate, particularly with the International Labour Organisation and the International Telecommunication Union, and to bring any future amendments to the attention of all Governments concerned;
4. AUTHORIZES the Maritime Safety Committee to keep the annexed recommendations under review and to adopt, when appropriate, amendments thereto.

## Annex 1

### **RECOMMENDATION ON TRAINING OF RADIO OPERATORS RELATED TO THE FIRST-CLASS RADIOELECTRONIC CERTIFICATE**

#### **1 GENERAL**

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

**2.1** The training should be relevant to the provisions of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 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) then in force, with particular attention to provisions for the global maritime distress and safety system (GMDSS). In developing training requirements, account should be taken of knowledge of the following items, which is not an exhaustive list.

#### **2 THEORY**

**2.1** Knowledge of the general principles and basic factors necessary for safe and efficient use of all the subsystems and equipment required in the GMDSS sufficient to support the training requirements listed in the practical section of this annex.

**2.2** Knowledge of the use, operation and service areas of the GMDSS subsystems, including satellite system characteristics, navigational and meteorological warning systems and selection of appropriate communication circuits.

**2.3** Knowledge of the principles of electricity and the theory of radio and electronics sufficient to meet the requirements specified in 2.4, 2.5, 2.6, 2.7 and 2.8 below.

**2.4** 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 radionavigation, with particular reference to maintaining the equipment in service.

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

**2.6** Knowledge of microprocessors and fault diagnosis in systems using microprocessors.

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

**2.8** 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.

### **3 REGULATIONS AND DOCUMENTATION**

The operator should have 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;
  - .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 Navigational Vocabulary.

### **4 WATCHKEEPING AND PROCEDURES**

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 radiocommunications watchkeeping relevant to all GMDSS subsystems, exchange of radiocommunications 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 position-reporting systems and procedures;
- .7 communication procedures of the IMO Merchant Ship Search and Rescue Manual (MERSAR), using radiocommunications;
- .8 radio medical systems and procedures.

### **5 PRACTICAL**

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

- .1 correct and efficient operation of all GMDSS subsystems 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 skill 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;
  - .4.4 use of emergency position-indicating radio beacons (EPIRBs);

- .5 antenna rigging, repair and maintenance, as appropriate;
- .6 reading and understanding of 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 modern 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 the GMDSS communication equipment and radionavigation equipment;
- .12 methods of alleviating electrical and electromagnetic interference such as bonding, shielding and bypassing.

## **6 MISCELLANEOUS**

The operator should have knowledge of, and/or receive 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;
- .7 co-ordinated universal time (UTC), global time zones and international date-line.

## **Annex 2**

### **RECOMMENDATION ON TRAINING OF RADIO OPERATORS RELATED TO THE SECOND-CLASS RADIOELECTRONIC CERTIFICATE**

#### **1 GENERAL**

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

**1.2** The training should be relevant to the provisions of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 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) then in force, with particular attention to provisions for the global maritime distress and safety system (GMDSS). In developing training requirements, account should be taken of knowledge of the following items, which is not an exhaustive list.

## **2 THEORY**

**2.1** Knowledge of the general principles and basic factors necessary for safe and efficient use of all the subsystems and equipment required in the GMDSS sufficient to support the training requirements listed in the practical section of this annex.

**2.2** Knowledge of the use, operation and service areas of the GMDSS subsystems, including satellite system characteristics, navigational and meteorological warning systems and selection of appropriate communication circuits.

**2.3** Knowledge of the principles of electricity and the theory of radio and electronics sufficient to meet the requirements specified in 2.4, 2.5, 2.6, 2.7 and 2.8 below.

**2.4** 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 radionavigation, with particular reference to maintaining the equipment in service.

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

**2.6** General knowledge of microprocessors and fault diagnosis in systems using microprocessors.

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

**2.8** 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.

## **3 REGULATIONS AND DOCUMENTATION**

The operator should have 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;
  - .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 Navigational Vocabulary.

## **4 WATCHKEEPING AND PROCEDURES**

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** radiocommunications watchkeeping relevant to all GMDSS subsystems, exchange of radiocommunications 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 position-reporting systems and procedures;
- .7 communication procedures of the IMO Merchant Ship Search and Rescue Manual (MERSAR), using radiocommunications;
- .8 radio medical systems and procedures.

## 5 PRACTICAL

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

- .1 correct and efficient operation of all GMDSS subsystems 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 skill 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;
  - .4.4 use of emergency position-indicating radio beacons (EPIRBs);
- .5 antenna rigging, repair and maintenance, as appropriate;
- .6 reading and understanding of 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 radionavigation equipment;
- .12 methods of alleviating electrical and electromagnetic interference such as bonding, shielding and bypassing.

## 6 MISCELLANEOUS

The operator should have knowledge of, and/or receive 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;
- .7 co-ordinated universal time (UTC), global time zones and international date-line.

## RECOMMENDATION ON TRAINING OF RADIO OPERATORS RELATED TO THE GENERAL OPERATOR'S CERTIFICATE

### 1 GENERAL

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

1.2 The training should be relevant to the provisions of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 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) then in force, with particular attention to provisions for the global maritime distress and safety system (GMDSS). In developing training requirements, account should be taken of knowledge of the following items, which is not an exhaustive list.

### 2 THEORY

2.1 Knowledge of the general principles and basic factors necessary for safe and efficient use of all the subsystems and equipment required in the GMDSS sufficient to support the training requirements listed in the practical section of this annex.

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

### 3 REGULATIONS AND DOCUMENTATION

The operator should have 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;
  - .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 Navigational Vocabulary.

### 4 WATCHKEEPING AND PROCEDURES

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 radiocommunications watchkeeping relevant to all GMDSS subsystems, exchange of radiocommunications 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 position-reporting systems and procedures;
- .7 communication procedures of the IMO Merchant Ship Search and Rescue Manual (MERSAR), using radiocommunications;
- .8 radio medical systems and procedures.

## **5 PRACTICAL**

Practical training should be given in:

- .1 correct and efficient operation of all GMDSS subsystems 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;
- .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;
  - .4.4 use of emergency position-indicating radio beacons (EPIRBs).

## **6 MISCELLANEOUS**

The operator should have knowledge of, and/or receive 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;
- .7 co-ordinated universal time (UTC), global time zones and international date-line.



## **RECOMMENDATION ON TRAINING OF RADIO OPERATORS RELATED TO THE RESTRICTED OPERATOR'S CERTIFICATE**

### **1 GENERAL**

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

**1.2** The training should be relevant to the provisions of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 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) then in force, with particular attention to provisions for the global maritime distress and safety system (GMDSS). In developing training requirements, account should be taken of knowledge of the following items, which is not an exhaustive list.

### **2 THEORY**

**2.1** 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 subsystems and equipment required in the GMDSS in sea area A1, sufficient to support the training requirements listed in the practical section of this annex.

**2.2** Knowledge of the use, operation and service areas of the GMDSS sea area A1 subsystems, e.g. navigational and meteorological warning systems and the appropriate communication circuits.

### **3 REGULATIONS AND DOCUMENTATION**

The operator should have 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;
  - .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;
- .3** use of the International Code of Signals and the IMO Standard Marine Navigational Vocabulary.

### **4 WATCHKEEPING AND PROCEDURES**

Training should be given in:

- .1** communication procedures and discipline to prevent harmful interference in the GMDSS subsystems used in sea area A1;

- .2 VHF communication procedures for:
  - .2.1 radiocommunications watchkeeping, exchange of radiocommunications 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;
  - .2.3 digital selective calling system;
- .3 use of the international phonetic alphabet;
- .4 ship position-reporting systems and procedures;
- .5 communication procedures of the IMO Merchant Ship Search and Rescue Manual (MERSAR) using VHF radiocommunications;
- .6 radio medical systems and procedures.

## **5 PRACTICAL**

Practical training should be given in:

- .1 correct and efficient operation of the GMDSS subsystems 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;
- .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);
  - .3.4 use of NAVTEX receiver.

## **6 MISCELLANEOUS**

The operator should have knowledge of, and/or receive 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 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.

## **RECOMMENDATION ON TRAINING OF PERSONNEL PERFORMING MAINTENANCE OF THE GMDSS INSTALLATIONS ABOARD SHIPS**

### **1 GENERAL**

**1.1** Reference is made to regulation IV/15, Maintenance requirements, as contained in the 1988 amendments to the 1974 SOLAS Convention concerning radiocommunications for the GMDSS and to 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.”

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

**1.3** Training as recommended below, does not qualify the person to be an operator of GMDSS radio equipment, unless he holds an appropriate radio operator's certificate.

### **2 MAINTENANCE TRAINING EQUIVALENT TO THE FIRST-CLASS RADIOELECTRONIC CERTIFICATE**

**2.1** In determining training equivalent to the maintenance elements of the first-class radioelectronic certificate, knowledge of the items referred to in the following paragraphs contained in annex 1 to the present resolution should be taken into account, but the list should not be considered exhaustive.

#### **2.2 Theory**

2.1, 2.3, 2.4, 2.5, 2.6, 2.7 and 2.8.

#### **2.3 Practical**

5.2, 5.4.1, 5.4.2, 5.4.3, 5.4.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11 and 5.12.

#### **2.4 Miscellaneous**

6.4, 6.5 and 6.6.

### **3 MAINTENANCE TRAINING EQUIVALENT TO THE SECOND-CLASS RADIOELECTRONIC CERTIFICATE**

**3.1** In determining training equivalent to the maintenance elements of the second-class radioelectronic certificate, knowledge of the items referred to in the following paragraphs contained in annex 2 to the present resolution, should be taken into account, but the list should not be considered exhaustive.

#### **3.2 Theory**

2.1, 2.3, 2.4, 2.5, 2.6, 2.7 and 2.8.

#### **3.3 Practical**

5.2, 5.4.1, 5.4.2, 5.4.3, 5.4.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11 and 5.12.

#### **3.4 Miscellaneous**

6.4, 6.5 and 6.6.