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Ref. T2/4.2

MSC/Circ.1162
20 May 2005

GENERAL PRINCIPLES AND RECOMMENDATIONS FOR KNOWLEDGE, SKILLS AND TRAINING FOR OFFICERS ON WING-IN-GROUND (WIG) CRAFT OPERATING IN BOTH DISPLACEMENT AND GROUND EFFECT MODES

1 The Sub-Committee on Standards of Training and Watchkeeping, at its thirty-sixth session (10 to 14 January 2005), recalled that Interim Guidelines for Wing-In-Ground (WIG) craft had been issued through MSC/Circ.1054 and that amendments to the International Regulations for Preventing Collisions at Sea, 1972, as amended, had been adopted through resolution A.910(22) to reflect the operational aspects of Wing-In-Ground (WIG) craft.

2 The Sub-Committee on Standards of Training and Watchkeeping, at its thirty-sixth session (10 to 14 January 2005) noting that these documents were intended for craft primarily engaged in maritime operations and did not contain the knowledge, skills and training required for officers manning such craft, developed General principles and recommendations for knowledge skills and training for officers on Wing-In-Ground (WIG) craft to primarily assist Member governments in developing their national requirements for qualification and certification of officers on a WIG craft operating in both displacement and ground-effect modes.

3 The Maritime Safety Committee at its eightieth session (11 to 20 May 2005), having considered the recommendations made by the Sub-Committee on Standards of Training and Watchkeeping at its thirty-sixth session, endorsed the General principles and recommendations for knowledge, skills and training requirements for officers on Wing-In-Ground (WIG) craft, as set out in the annex.

4 Member Governments are invited to bring this circular to the attention of all concerned.

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ANNEX

GENERAL PRINCIPLES AND RECOMMENDATIONS FOR KNOWLEDGE, SKILLS AND TRAINING FOR OFFICERS ON WING-IN-GROUND (WIG) CRAFT OPERATING IN BOTH DISPLACEMENT AND GROUND EFFECT MODES

1 Preamble

Recommendations for qualification and certification of officers on a WIG craft were developed taking into account the unique features of this new means of transport, combining ship and aircraft features. The understanding of such unique complexity of a WIG craft was needed to use different combinations of maritime and aviation qualifications and relevant knowledge, skills and training methods. Since WIG craft operate mainly in marine environment, officers have to be provided with knowledge, skills and training, equivalent to those established in the STCW Convention for officers on conventional ships.

These recommendations are intended to assist Member governments to develop their national requirements for qualification and certification of officers on a WIG craft operating in both displacement and ground-effect modes.

2 General principles, recommendations and requirements for qualification of officers on Wing-In-Ground (WIG) craft

.1 Officers on a WIG craft should preferably have a base qualification attained under either the international maritime or aviation qualification systems.

.2 In addition to the base qualification, officers on a WIG craft should undertake training and have demonstrated appropriate knowledge and skills in accordance with these Recommendations, to the satisfaction of the Administration or a body authorized to act on behalf of the Administration.

.3 Completion of these requirements should be signified by issue of a special qualification which takes into account the particular features of a WIG craft, in general and specifically the WIG craft models for which the officer is type-rated, together with any geographic limitations on the officer's operation of a WIG craft.

.4 Where a particular aspect of these Recommendations is not relevant to the WIG craft or operational area for which an officer is certificated, the Administration may waive that aspect provided that details of the waiver are shown on the special qualification issued to the officer.

3 General requirements regarding base qualification

.1 A maritime base qualification referred to in paragraph 2.1 should meet the requirements listed in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended. Similarly, an aviation base qualification should meet the requirements of the International Civil Aviation Organization (ICAO), listed in the Chicago Convention on International Civil Aviation, 1944, as amended.

.2 Base qualification(s) recognized for issue of a special qualification should certify the officer for performance of functions on a ship or aircraft, having approximately equal or higher characteristics of weight, engine power, passenger capacity, range, etc., as the WIG craft for which the officer is certificated. The special qualification should not certify the officer for a higher rank on board a WIG craft than that corresponding to the base qualification(s).

.3 The Administration may reduce the period of seagoing service on conventional ships required for obtaining a certificate of marine base qualification if the candidate is to work only on a WIG craft.

.4 For the purposes of these recommendations, WIG craft may be classified by maximum take-off weight (displacement) as follows:

- up to 10 tonnes (small);
- from 10 tonnes up to 500 tonnes (medium); and
- more than 500 tonnes (large).

.5 The base qualifications of officers on WIG craft of Types A and B (as defined in the Interim Guidelines for a WIG craft (MSC/Circ.1054)) should preferably be marine qualifications e.g., as master, chief mate, officer in charge of a navigational watch etc.

.6 Aviation base qualifications are not preferred for officers on Type A WIG craft but can be accepted where the Administration is satisfied that the candidate possesses the required knowledge and skills. It should be noted that IMO and ICAO (MSC 77/21/1) have agreed that operations in fly-over mode rest within joint maritime/aviation jurisdiction, while those in flight mode are within aviation jurisdiction.

.7 For service on WIG craft of Types A and B, officers having an aviation base qualification should have satisfactorily completed an approved course of marine training and received a certificate, according to the requirements of the 1978 STCW Convention, at least in following areas of marine knowledge:

- GMDSS Radio (General Operators' Certificate (GOC) or Restricted Operators' Certificate (ROC) as appropriate);
- ARPA;
- ECDIS;
- AIS
- Basic and/or Advanced Fire fighting;
- Survival;
- First aid and/or medical training;
- Human Factors /Bridge Resource Management;
- High-Speed Craft operations;
- Passenger handling; and
- Planning and conduct of local pilotage.

4 General requirements for a special qualification taking into account the specific features of a Wing-In-Ground (WIG) craft

.1 The quantity and content of training provided for the officer and the special qualification reflecting the knowledge and skills attained should cover all aspects of the officer's performance of operational and safety functions on a WIG craft.

.2 The required period of seagoing service on a WIG craft for the candidate to obtain the special qualification for officer on a WIG craft should be sufficient to ensure his satisfactory performance of the safety functions on a WIG craft and should be commensurate with aviation standards.

.3 To obtain the special qualification, an officer should be trained and assessed on at least the following areas of special knowledge:

- WIG craft aerodynamics and hydrodynamics;
- WIG craft structure, construction and maintenance;
- WIG craft seamanship;
- High-speed, low altitude navigation;
- Displacement, transitional and planning modes;
- Take-off and landing in various conditions;
- Cruise flight in ground effect mode;
- Ramping and amphibian mode (for amphibious WIG craft);
- Berthing and towing;
- Distribution of weight (passengers/ cargo, inertia, and stability);
- Extreme situations;
- Propulsors, engines and machinery of WIG craft;
- WIG craft instrumentation (flight, navigation, communications, engines, etc.);
- WIG craft systems (fuel, electrics, hydraulics, air conditioning, plumbing, etc.);
- WIG craft life-saving and emergency systems and procedures;
- Human factors in WIG craft operation (alertness, anticipation, risk awareness, etc.);
- Rules relating to crew qualifications and their validity;
- Rules relating to medical fitness and its validity;
- Operational rules;
- Departure checks;
- Crew personal human factor checks;
- Refueling/bunkering;
- Loading and unloading of passengers and cargo; and
- Documentation.

.4 Details of these requirements, presented as an example for the officer in charge of a navigational watch for Types A and B medium size WIG craft operating in both displacement and ground-effect modes are given in the attached table. It should also be noted that the corresponding requirements for small and large WIG craft have not yet been developed.

TABLE

Specification of minimum standard of competence for officers in charge of a navigational watch on Wing-In-Ground (WIG) craft of takeoff weight from 10 tonnes up to 500 tonnes

Function: Navigation at the operational level

Column 1	**Column 2**	**Column 3**	**Column 4**
COMPETENCE	**KNOWLEDGE, UNDERSTANDING AND PROFICIENCY**	**METHODS FOR DEMONSTRATING COMPETENCE**	**CRITERIA FOR EVALUATING COMPETENCE**
Aerodynamic and hydrodynamic principles applicable to WIG craft	Knowledge of theoretical base of aero- and hydro-dynamic theory of WIG craft. Classification of supporting forces, aero-hydro static and dynamic forces. Understanding of physics of planning, formation of a lift force on a wing, static and dynamic air cushion, the phenomenon of a ground effect and the effect of altitude on its action. Knowledge of operational modes of a WIG craft and the forces acting on structural elements of WIG craft in the various modes. Knowledge of basics of buoyancy, stability, subdivision, resistance, seaworthiness, maneuverability, roll and motion stability of WIG craft.	Examination	Correct understanding of fundamental theory and the skill to competently apply that knowledge in the operation of a WIG craft.
Structure, construction and maintenance of WIG craft	Knowledge of all structural elements of a WIG craft and of the factors influencing their maintenance in working condition. Knowledge of the general arrangement of a WIG craft, including the location and function of significant components and accessibility / maintenance requirements. Knowledge and operation of WIG craft engines, machinery and systems including fuel, electrics, hydraulics, air conditioning, steering, control surfaces and, where fitted, air cushion supplementation. Knowledge of refueling/bunkering operations.	Examination	Skill to competently apply the required knowledge in the operation of a WIG craft. Plant, auxiliary machinery, equipment and control systems are operated in accordance with technical specifications and within safe operating limits at all times.

Column 1	Column 2	Column 3	Column 4
COMPETENCE	**KNOWLEDGE, UNDERSTANDING AND PROFICIENCY**	**METHODS FOR DEMONSTRATING COMPETENCE**	**CRITERIA FOR EVALUATING COMPETENCE**
Features of planning and conduct of a voyage and position determination	*Navigation of a WIG craft* Within the framework of present laws, skill to plan a voyage and to conduct local pilotage taking account of the features of a WIG craft, including operational modes, controllability in each mode, high speed, capability of movement on shallow water and outside of shipping lanes established for conventional ships, seaworthiness and weather limitations, WIG craft-specific hazards (e.g. bird strike), etc. Skill in a cruise mode to quickly determine the position using all methods of position-fixing and navigation for which the WIG craft is fitted, both traditional and electronic, including terrestrial, celestial and satellite-based types. Knowledge of legal status of WIG craft relative to conventional craft within both maritime and aviation jurisdictions and of operational precautions in place to cover the jurisdictional interface. *Control systems on a WIG craft* Knowledge of control systems of engines and propulsors, and control surfaces for attitude, altitude and heading including rudders, flaps, ailerons, etc. Knowledge of automatic control systems. Knowledge of operational procedures and change-over from manual to automatic control and vice-versa. Adjustment of controls for optimum performance. *Meteorology* Ability to obtain and apply the relevant meteorological information taking into account the operational limitations of a WIG craft.	Examination and assessment of evidence obtained from one or more of the following: 1. approved in-service experience 2. approved training WIG craft experience 3. approved simulator training, where appropriate 4. approved laboratory equipment training	The information obtained from navigational charts and publications is relevant, interpreted correctly and properly applied. All potential navigational hazards are accurately identified. Ability to use all available methods of position fixing for which the WIG craft is equipped. The primary method selected for fixing the WIG craft's position is the most appropriate to the prevailing circumstances and conditions. The position is determined within the limits of acceptable instrument/system errors. The reliability of the information obtained from the primary method of position fixing is checked by other available methods at appropriate intervals. Calculations and measurements of navigational information are accurate. Selection of operational modes permissible according to the certification of both the officer and the type categorization of the WIG craft. Selection of the most suitable control mode and settings for the prevailing weather, sea and traffic conditions and intended manoeuvres. Meteorological information is correctly obtained, interpreted and applied.

Column 1	Column 2	Column 3	Column 4
COMPETENCE	**KNOWLEDGE, UNDERSTANDING AND PROFICIENCY**	**METHODS FOR DEMONSTRATING COMPETENCE**	**CRITERIA FOR EVALUATING COMPETENCE**
Maintain a safe navigational watch	*Watchkeeping* Thorough knowledge of the content, application and intent of the International Regulations for Preventing Collisions at Sea, the rights and responsibilities of a WIG craft in relation to other vessels. Knowledge of features of watchkeeping on a WIG craft. Knowledge of effective procedures of WIG craft bridge team work. Knowledge of capabilities of WIG craft to diverge from traditional patterns of ships operations and operational areas. Skill to assess a situation and to decide upon an acceptable solution. Knowledge of the dangers of, or associated with, manoeuvres unique to WIG craft. The use of routeing in accordance with the General Provisions on Ships' Routeing. Knowledge of use of radio for safe operations under the GMDSS, including VHF as available.	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training WIG craft experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	Knowledge and skills on watchkeeping to ensure a level of safety on a WIG craft equivalent to that required in the STCW Code. GOC or ROC as appropriate.
Use of radar and ARPA (Automatic Radar Plotting Aids), Electronic Charts Display and Information Systems (ECDIS) and Automatic Identification of Systems (AIS)	*Radar and electronic navigation* Knowledge of the fundamentals of radar, ARPA, ECDIS and AIS as installed on a WIG craft. Ability to operate such aids and to interpret and analyse information obtained from this equipment, including the following: *Performance including:* .1 factors affecting performance and accuracy .2 setting up and maintaining displays .3 detection of misrepresentation of information, false echoes, sea return, etc., racons and SARTs	Assessment of evidence obtained from approved radar simulator, ARPA, ECDIS and AIS simulator training plus in-service experience	Information obtained from radar, ARPA, ECDIS and AIS is correctly interpreted and analysed taking into account the limitations of the equipment and prevailing circumstances and conditions. Knowledge and skills ensure level of safety a WIG craft, equivalent to that required in the STCW Code.

Column 1	Column 2	Column 3	Column 4
COMPETENCE	**KNOWLEDGE, UNDERSTANDING AND PROFICIENCY**	**METHODS FOR DEMONSTRATING COMPETENCE**	**CRITERIA FOR EVALUATING COMPETENCE**
	Use including: 1. range and bearing; course, speed and identity of other ships; time and distance of closest approach of crossing, meeting, overtaking ships 2. identification of critical echoes; detecting course and speed changes of other ships; effect of changes in own craft's course or speed or both 3. application of the International Regulations for Preventing Collisions at Sea 4. plotting techniques and relative and true motion concepts 5. parallel indexing Knowledge of principal types of ARPA/ECDIS/AIS on a WIG craft, their display characteristics, performance standards and the dangers of over reliance on ARPA/ECDIS/AIS. Ability to operate and to interpret and analyse information obtained from displays, including: 1. system performance and accuracy, tracking capabilities and limitations, and processing delays 2. use of operational warnings and system tests 3. methods of target acquisition and their limitations 4. true and relative vectors, graphic representation of target information and danger areas 5. deriving and analysing information, critical echoes, exclusion areas and trial manoeuvres		
Respond to emergencies	*Emergency procedures* Knowledge of precautions to be taken for the protection and safety of WIG craft passengers in emergency situations. Knowledge of action to be taken in emergency landing. Knowledge of arrangements for towing and being towed. Knowledge of initial action to be taken following a collision or a grounding; initial damage assessment and control.	Examination and assessment of evidence obtained from one or more of the following: 1. approved in-service experience 2. approved training WIG craft experience 3. approved simulator training, where appropriate 4. practical training	The type and scale of the emergency is promptly identified. Initial actions and, if appropriate, manoeuvring of the craft are in accordance with contingency plans and are appropriate to the urgency of the situation and nature of the emergency.

Column 1	Column 2	Column 3	Column 4
COMPETENCE	**KNOWLEDGE, UNDERSTANDING AND PROFICIENCY**	**METHODS FOR DEMONSTRATING COMPETENCE**	**CRITERIA FOR EVALUATING COMPETENCE**
	Appreciation of the procedures to be followed for rescuing persons from the sea, assisting a ship in distress, responding to emergencies which arise in port.		
Respond to a distress signal at sea	*Participation of a WIG craft in search and rescue* Appreciation of assistance that a WIG craft can provide in a search and rescue incident. Knowledge of the contents of the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manuals.	Examination and assessment of evidence obtained from practical instruction	The distress or emergency signal is immediately recognized. Contingency plans and instructions in standing orders are implemented and complied with.
Transmit and receive information by visual signalling	*Visual signalling* Ability to transmit and receive signals by Morse light. Ability to use the International Code of Signals.	Examination and assessment of evidence obtained from practical instruction	Communications within the operator's area of responsibility are consistently successful.
Manoeuvre the WIG craft	*WIG craft manoeuvring and handling* Knowledge of: 1. methods of a WIG craft control and maneuvering in displacement, transitional and planing modes in various weather conditions 2. methods of WIG craft control during takeoff and landing in various weather conditions 3. methods of WIG craft control and maneuvering in cruise flight under ground effect in various weather conditions 4. methods of WIG craft control and manoeuvring over land, landing on water and while returning from water to shore (for amphibious WIG craft only) 5. influence of displacement (takeoff weight), center of gravity position, wind, sea state, methods of control by propulsors and by control surfaces during takeoff/landing, on turning circle diameter and on stopping distance of WIG craft in various operational conditions 6. manoeuvres and procedures for the rescue of person overboard and rendering assistance to a survival craft 7. proper procedures for anchoring, berthing and mooring	Examination and assessment of evidence obtained from one or more of the following: 1. approved in-service experience 2. approved training WIG craft experience 3. approved simulator training, where appropriate 4. approved training on a manned scale craft model where appropriate	Safe operating limits of WIG craft propulsion, steering and power systems are not exceeded in normal manoeuvres. Appropriate choice of modes of WIG craft operation, change of its course, altitude and speed promotes maintenance of safety of operation. WIG craft is operated and maintained within a safe operating envelope.

Function: Passenger operations, cargo handling and stowage at the operational level

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	METHODS FOR DEMONSTRATING COMPETENCE	CRITERIA FOR EVALUATING COMPETENCE
Monitor the safety of passengers during embarkation, seating, conduct of voyage and disembarkation. Monitor the loading, stowage, securing, care during the voyage and the unloading of cargoes	*Embarkation, accommodation and disembarkation of passengers. Cargo handling, stowage and securing* Knowledge of the rules of embarkation, accommodation and disembarkation of passengers on a WIG craft. Knowledge of human factors relating to passengers. Knowledge of the effect of passengers and cargo, including heavy items, on the air- and sea-worthiness and stability of the craft on the water. Knowledge of the safe handling, stowage and securing of cargoes on a WIG craft including bulk cargoes and dangerous, hazardous and harmful cargoes and their effect on the safety of life and of the craft. Ability to establish and maintain effective communications during embarkation, seating and disembarkation of passengers and the loading, securing and discharging of cargoes.	Examination and assessment of evidence obtained from one or more of the following: 1. approved in-service experience 2. approved training WIG craft experience 3. approved simulator training, where appropriate	Passengers and cargo operation are carried out in accordance with the cargo plan or other documents and established safety rules/regulations, equipment operating instructions and shipboard stowage limitations. The handling of dangerous, hazardous and harmful cargoes complies with international regulations and recognized standards and codes of safe practice. Communications are clear, understood and consistently successful.

Function: Controlling the operation of the craft and care for persons on board at the operational level

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	METHODS FOR DEMONSTRATING COMPETENCE	CRITERIA FOR EVALUATING COMPETENCE
Inspect and report defects and damages to WIG craft, including structure, external and internal openings and their means of closure, cargo spaces, machinery, systems and equipment	Ability to conduct pre-departure checks. Knowledge of, and ability to explain where to look for damage and defects most commonly encountered due to: 1. loading and discharging operations 2. corrosion and other structural degradation and 3. severe weather conditions. Ability to state which parts of the WIG craft are to be inspected each time in order to cover all parts within a given period of time. Ability to identify those elements of the craft structure which are critical to the safety of the WIG craft. State the causes of corrosion and other structural degradation in components of WIG craft and how such degradation can be identified and prevented. Knowledge of procedures on how the inspections shall be carried out. Ability to explain how to ensure reliable detection of defects and damages.	Examination and assessment of evidence obtained from one or more of the following: 1. approved in-service experience 2. approved training WIG craft experience	The inspections are carried out in accordance with laid down procedures and defects and damage are detected and properly reported. Where no defects or damages are detected, the evidence from testing and examination clearly indicates adequate competence in adhering to procedures and ability to distinguish between normal and defective or damaged parts of the WIG craft.

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	METHODS FOR DEMONSTRATING COMPETENCE	CRITERIA FOR EVALUATING COMPETENCE
Maintain seaworthiness of the WIG craft	*WIG Craft stability* Working knowledge and application of stability, trim and stress tables, diagrams and stress calculating equipment. Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy. Understanding of the fundamentals of watertight integrity. *WIG Craft construction* General knowledge of the principal structural members of a WIG craft and the proper names for the various parts.	Examination and assessment of evidence obtained from one or more of the following: 1. approved in-service experience 2. approved training WIG craft experience 3. approved simulator training, where appropriate	The stability conditions comply with the intact stability criteria applicable to the WIG craft under the Interim Guidelines for WIG craft under all conditions of loading. Actions to ensure and maintain the watertight integrity of the WIG craft are in accordance with accepted practice.
Ensure compliance with pollution prevention requirements	*Prevention of pollution of the marine environment and anti-pollution procedures* Knowledge of the precautions to be taken to prevent pollution of the marine environment. Anti-pollution procedures and all associated equipment.	Examination and assessment of evidence obtained from one or more of the following: 1. approved in-service experience 2. approved training WIG craft experience	Procedures for monitoring WIG craft operations and ensuring compliance with MARPOL requirements are fully observed.
Prevent, control and fight fires on board	*Fire prevention and fire-ftghting appliances* Knowledge of fire prevention. Ability to organize fire drills. Knowledge of classes and chemistry of fire.	Assessment of evidence obtained from approved fire-fighting training and experience in accordance with STCW Code A-VI/3.1 to 3.4	The type and scale of the problem is promptly identified and initial actions conform with the emergency procedure and contingency plans for the WIG craft. Evacuation, emergency shut-down and isolation procedures are appropriate to the nature of the emergency and are implemented promptly.

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	METHODS FOR DEMONSTRATING COMPETENCE	CRITERIA FOR EVALUATING COMPETENCE
	Knowledge of fire-fighting systems on a WIG craft. Knowledge of action to be taken in the event of fire including fires involving oil and fuel systems.		The order of priority, and the levels and timescales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem.
Operate life-saving appliances	*Life-saving* Ability to organize abandon WIG craft drills and knowledge of the operation of survival craft and their launching appliances and arrangements, and their equipment including radio life-saving appliances, satellite EPIRBs, SARTs, immersion suits and thermal protective aids. Knowledge of survival at sea techniques.	Assessment of evidence obtained from approved training and experience in accordance with STCW Code A-VI/2.1 to 2.4	Actions in responding to abandon WIG craft and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards.
Apply medical first aid	*Medical aid* Practical application of medical guides and advice by radio, including the ability to take effective action based on such knowledge in the case of accidents or illnesses that are likely to occur during WIG craft operation.	Assessment of evidence obtained from approved training in accordance with STCW Code A-VI/4.1 to 4.3	The identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life.
Monitor compliance with legislative requirements	Basic working knowledge of the relevant IMO Conventions concerning safety of life at sea protection of the marine environment. Knowledge of the crew qualification, medical and validity requirements. Knowledge of the operational rules for WIG craft. Knowledge of the documentation required for WIG craft operation.	Assessment of evidence obtained from examination or approved training	Legislative requirements relating to safety of life at sea and protection of the marine environment are correctly identified.

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	METHODS FOR DEMONSTRATING COMPETENCE	CRITERIA FOR EVALUATING COMPETENCE
Security	Ensure the security of WIG craft operations both on board the WIG craft and at bases and embarkation points.	Examination and assessment of evidence obtained from examination or approved training in accordance with ISPS Code requirements for Ship Security Officer (SSO)	Security is ensured on operations both on board the WIG craft and at bases and embarkation points.
Understand and apply Human Factors for WIG craft operations	Understanding and application of Human Factors for WIG craft operations including: 1. Fatigue management and maintaining alertness 2. Need for anticipation in high-speed operation 3. Risk awareness and assessment 4. Application of Bridge Resource Management with other officers, crew and personnel involved in WIG craft operation 5. Crew personal Human Factor checks.	Assessment of evidence obtained from examination or approved training	An understanding of both the existence and underlying causes of Human Factors and of the appropriate operating principles and procedures that will enable the WIG craft officer to minimize their effects.