Training Circular No. 28 of 2005

No:11-TR(81)/2005 **Dated:27th December, 2005**

Subject : Requirement of Officer of the Watch - Ship Manoeuvering Simulator (OOW-SMS) and Bridge Team Work for Maritime Institutes imparting pre-sea training to the nautical and polyvalent cadets

Maritime Safety and high manpower efficiency is the utmost concern to the Directorate General of Shipping.

2. The Directorate General of Shipping has taken a policy decision that the Officer of the Watch - Ship Manoeuvring Simulator (OOW-SMS) training should be made mandatory for all pre-sea training institutes for nautical and polyvalent cadets. **This training shall be mandatory in all nautical & polyvalent pre-sea courses w.e.f. 1st July 2006.**

3. The Full Mission type, Officer of the Watch Ship Manoeuvring Simulator shall meet the following standards of simulation:-

(a) It should be suitable for the selective objectives and training tasks

(b) It should be capable of simulating the operating capabilities of shipboard equipment and include the capabilities,
limitations and possible errors of such equipments.

(c) It should have sufficient behavioural realism to follow a trainee to require the skills appropriate to training objectives.

(d) It should provide a controlled operating environment, capable of producing a variety of conditions, which may include
emergency, hazardous or unusual situations relevant to the training objectives.

(e) It should provide an interface through which a trainee can interact with equipments, the simulated environment and, as
appropriate, the instructor.

(f) It should permit the instructor to control, monitor and record exercises for the effective debriefing of the trainees.

4. The Officer of the Watch - Ship Manoeuvring Simulator (OOW-SMS) shall meet the standards as stipulated in para 3 and the guidelines of specifications as per the **Annexure** attached.

5. The simulator shall have DGS approval.

6. This issues with the approval of the Director General of Shipping and Secretary to the Government of India.

Sd/-
(Naresh Salecha)
Sr. Dy.Director General of Shipping

ANNEXURE

SPECIFICATIONS FOR THE OFFICER OF THE WATCH -SHIP MANOEUVRING SIMULATOR (OOW-SMS) FOR MARITIME TRAINING INSTITUTE IMPARTING PRE-SEA TRAINING TO THE NAUTICAL AND POLYVALENT CADETS

1. Simulator specifications: The simulator consisting of a ship station with instruments of navigation as listed below, as well as display of target ships and surroundings as seen from a wheel house.

1.1 Equipment and consoles to be installed, mounted and arranged in a ship-like manner.

1.2 A separate control for instructor with equipment necessary to monitor the activities in the wheel house effectively.

1.3 The equipment installed in the simulator shall have a similar functionality to corresponding equipment used on board.

1.4 If any equipment does not correspond to the specific make, the applicable IMO performance standard (functionality requirement) for such equipment shall be followed.

1.5 If such a performance standard does not exist, then the functionality of equipment shall, as a minimum, be the same as for any recognized genuine equipment of that type, in use on board ships.

1.6 Equipment as fitted shall resemble the behavioral characteristic for example; accuracy, reaction time and other limitations, related to corresponding equipment in use on board ships.

1.7 User manuals for the simulator equipment and operational control shall be available to the learners for use during exercise.

2. Ship types and Areas:

2.1 The simulator shall include mathematical models of at least 4 types of own ship. The model shall resemble accurately the behavioural characteristic of an actual ship of that size, power and type, and realistically behave as per the hydrodynamic effects of wind, current and

swell.

2.2 The simulator shall be able to present at least 10 different types of targets each equipped with mathematical models, which account for motion, drift and steering angle according to forces induced by current, wind and wave.

2.3 The simulator shall be able to provide at least 4 international geographical visual areas for exercise which include open sea and high density traffic areas.

3. Detailed Specification:

3.1 Visualization:

3..1.1 At least 5 channel visualization of high resolution XGA graphics, about 60 degree horizontal field of view.

3.1.2 The visual screen size 5 X 3 ft. The visual system shall present all navigation marks as displayed on ECDIS and paper charts for that area.

3.1.3. The visual system shall show objects with sufficient realism (detailed enough to be recognized as in real life) The visual system shall replicate movements of all own ships according to 6 degrees of motion freedom.

3.1.4 The simulator shall provide a realistic visual scenario by day, dust or night, including variable meteorological visibility, changing in time. It shall be possible to create a range of visual conditions, from clear to dense fog.

3.1.5 It shall be possible to take accurate bearing of objects seen on the screen.

3.1.6 It shall be possible to use magnified views of the observation.

3.1.7 The visual system shall present at least 25 degree of vertical field view.

3.1.8 There should be proper correspondence between the visual picture, radar and ECDIS.

3.2 Simulator Capabilities:

3.2.1 The model shall realistically simulate own ship hydrodynamics in open water conditions,

including the effect of wind forces, wave forces, tidal stream and currents.

3.2.2 The model shall realistically simulate own ship hydrodynamics in restricted waterways including shallow water and bank affects and interaction with own ships.

3.2.3 The simulator shall provide an own ship engine sound reflecting the power output.

3.2.4 The target ship shall be equipped with navigational lights, ships and sound signal acceding to the ‘Rule of the Roads’. The signal should be individually controlled by the instructor and the sound signal shall be directional and fade with range.

3.2.5 The simulator shall be able to present at least 10 target ships. At the same time, where the instructor shall be able to program voyages routes for each target ship individually.

3.2.6 The simulator shall be capable of providing environmental sound (for example; wind) according to condition simulated.

3.2.7 The simulator shall include the depth according to chart used, reflecting water level according to tidal water situation.

3.2.8 The simulator shall provide waves, variable in direction and strength.

3.3 Own Ship Control Station:

The following shall be provided as hardware panels and shall be installed, mounted and arranged in a manner that it would physically resemble the front panel of ship’s navigating bridge. The hardware panel should have operational resemblance to actual ship-board equipment.

3.3.1 Propulsion control for controlling own ship’s engine ahead and stern.

3.3.2 Steering control: There shall be provision for the following, at or near the console

.1 Steering wheel

.2 steering motor

.3 hand steering

.4 compass repeater able to depict gyro and / or magnetic headings

.5 gyro failure alarm

.6 auto-pilot

3.3.3 Engine Alarm Panel: Giving audible and visual alarm in the case of:

.1 start fail

.2 shut-down

4. Radar set and automatic radar plotting aides (ARPA):

4.1 ARPA

4.1.1 21" screen with the facility to simulate Radar. The radar shall be capable of being operated in sea stabilized relative motion
mode and sea and ground stabilized true motion modes.

4.1.2 The Radar Simulation Equipment shall be capable of generation of interface, noise, radar / ARPA failure, yawing, clutter, spurious echoes, blind sector, parallel index lines.

4.1.3 The ARPA simulation equipment shall incorporate the facilities for:

.1 manual and automatic target acquisition

.2 past track information

.3 use of exclusion areas

.4 vector / graphic time and data display

.5 trial manoeuvres

4.2 ECDIS:

4.2.1 21" colour screen: Vector chart should be available for the exercise. It should be possible to edit existing areas and be able to generate chart data base of any area and scale if

desired, at a later stage. Normal feature of ECDIS system should be available including chart scaling and zooming, review, selected layer, route planning and monitoring.

4.3 Chart table with paper chart and publications: Chart table will resemble a ship chart table with minimum dimension of 4 X 3 ft. Paper chart and publications provided shall be appropriate for the areas in use.

4.4 Indicators:

4.4.1 Own ship station shall have at least the following indicators:

.1 Wind direction and speed indicator

.2 Rudder angle indicator

.3 Rate of turn indicator

.4 RPM / Pitch indictor

.5 Clock (exercise time indicator)

.6 Depth indicator

.7 Speed Log Indicator

5 Ship's horn: To be provided on the wheel house consol as a push button.

6 The following equipment shall be simulated:

6.1 Electronic Navigation Aids: Global position system. Simulation of all facilities of a standard GPS receiver shall be available. This shall include display in latitude, longitude, course and speed over ground by the own ship, UTC, normal navigational calculation functions such as; great circle, rum line sailing, way points, alarms for X-track error, etc.

6.2 Echo-sounder: Simulation of complete echo-sounder shall be provided.. Facility to change gain adjustment, change over from DBS to DBK and vice versa etc., shall be provided. Alarm for shallow water depth shall be provided.

6.3 Sound Signal Generator :Ship's whistle and fog signals. Facilities shall be provided to

general fog signals manually or automatically operated by own ships independently, as well as for each target separately by the instructor console. The fog signals should be interactive and the intensity and the direction at own ship station shall correspond to relative range and position of the station generating the sound signal. The fog signal shall be capable of generating the sound signals of the following:

.1 vessel making way through water

.2 vessel making no way through water

.3 vessel restricted in her ability to maneuver

.4 vessel at anchor

.5 vessel aground

.6 vessel not under command

6.4 Navigation lights and shapes display: Full set of navigation, Christmas tree lights and shapes shall be made available, which the own ship can select for display depending upon the prevailing circumstances.

7 **Instructor:** The instructor and the assessor shall be able to:

Start, halt, reset in time and place, and restart an exercise

7.4 Visually observe the trainees and their actions and follow the proceedings of an exercise by any method.

7.5 Change the operating environment during the running of an exercise, viz. shall be able to alter the wind (direction and force), swell (direction and height), current (direction and rate), cloud cover, and state of visibility.

7.6 Communicate with the trainees

7.7 A Display (minimum 19" monitor) providing a global view of the criteria simulation scenario The display plots ship’s tracks, target movements and also provides a tool for altering the parameters of the various ships.

7.8 Be able to view the own ship radar as set and operated by the trainee

7.9 Activate simulation of failures in real time in the following equipment:

.1 Navigation lights

.2 Gyro compass including insertion of error

.3 Speed log failure or insertion of error

.4 Echo sounder

.5 Radar

.6 ARPA

.7 GPS (including degrading of signal quality)

.8 Auto pilot

.9 Engine

7.10 It shall be possible to replay a full exercise showing the actions performed by the trainees.

Instructor shall be able to create exercises where one or more own ship stations can be interactive within the exercise or to be able to run them independently and in differing areas, if so required