



Purpose:

The e-learning module (ELM) is designed for theoretical training of navigators in accordance with Chapter II of the STCW Convention in the part concerning of shiphandling in heavy weather.

The ELM is included in the "*Shiphandling basics*" library.

What is an e-learning module?

E-learning module is the electronic textbook on one or more sections. Theoretical materials can be accompanied by drawings, diagrams, photos, animations and videos. There is a test for assessment of knowledge gained at the end of each section.

Contents:

- Factors affecting the ship in heavy weather
- General information about wind and sea waves
- Weather chart facsimile analysis
- Rule of tropical cyclone avoidance
- Ship preparation for heavy weather navigation
- Influence of heavy weather on ship's seaworthiness
- The choice of course and speed in heavy weather
- Storm sailing of a vessel on a crosswave
- Methods of storming a ship
- Altering a ship's course in stormy conditions
- Ship's anti-icing operations
- Safety procedures for the ship when sailing in a storm
- Actions of the crew in an emergency situation

Target groups

Deck - Management
Deck - Operational

Ship types

Generic



Regulations

Table A-II/2 STCW Code

Competence:	Manoeuvre and handle a ship in all conditions
Knowledge, understanding and proficiency:	Manoeuvring and handling a ship in all conditions, including: .12 management and handling of ships in heavy weather....

Table A-II/3 STCW Code

Competence:	Manoeuvre the ship and operate small ship power
Knowledge, understanding and proficiency:	<i>Ship manoeuvring and handling</i> Knowledge of factors affecting safe manoeuvring and handling.




SHIPHANDLING IN HEAVY WEATHER
Version: 05/2022

Section 1. Factors affecting the ship in stormy weather

Factors affecting the ship in stormy weather.

Heavy weather navigation of modern ships, despite their large size and high technical and seaworthy qualities, remains a difficult and responsible task.

The impact of storm winds and waves can cause major damage to the ship if she is not properly prepared for heavy weather and if maneuvering in heavy weather is accompanied by erroneous actions of the master.



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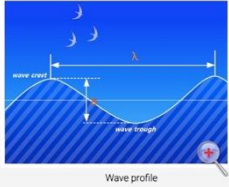
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Section 2. General information about wind and sea waves

The wind makes the sea rough. The following main elements and characteristics of waves are distinguished:

- Wave profile is a section line of a rough sea surface by a vertical plane in the direction of wave propagation. A line intersecting a wave profile so that the total area above and below it are the same is called the profile average wave level.
- Wave crest is the part of the wave that is above the average wave level.
- Wave trough is the part located below the average level.
- Wave crest is the highest point of the crest.
- Wave trough is the lowest point of the wave trough.
- Wave front is a line going along its crest.
- Wave crest length is the length of the crest along the front.



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Section 4. Rule of tropical cyclone avoidance

Let's consider the rules of passing the tropical cyclone in the Northern Hemisphere, in the Southern Hemisphere the picture has a mirror image.

Case 2. If the ship is in the most dangerous (right front) quarter of a tropical cyclone and cannot cross the path of the cyclone in advance, then it is necessary to move away from the center of the cyclone, if possible, bringing the wind to the forward course angles of the starboard side (option "a"), if it is not possible to move away from the center of a tropical cyclone for a considerable distance, then the ship must keep its bow against the wave, with engine in operation (option "b").

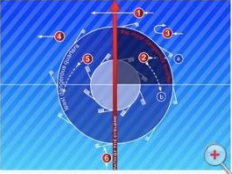


Diagram of ship's maneuvering in the zone of a tropical cyclone in the Northern Hemisphere

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Section 8. Storm sailing of a vessel on a crosswave

An accident is usually preceded by one of the following three phenomena, or a combination of them:

- 1) Significant reduction or loss of lateral stability...
- 2) The main or parametric rolling resonances...
- 3) Capture by a wave, loss of control and spontaneous turn...

Significant reduction or loss of lateral stability when the wave top passes near the midship section. The most dangerous in this regard is the movement on waves, the length λ and the speed of which are close, respectively, to the length L and the speed V of the vessel. In this case, the time t of staying in the zone with reduced (below the dangerous level) stability may be significantly longer than the time required for the ship to incline dangerously.

The main signs of insufficient stability are:



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Section 11. Ship's anti-icing operations

Ship's anti-icing operations.

Icing occurs most intensively during rolling. The amount of icing depends on:

- ship's type (dimensions);
- air and water temperature;
- ship's heading and speed;
- wind and waves direction;
- frequency of deck flooding by water.




Icing

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Section 4. Test tasks



Test of question

What quarter of a cyclone is considered the most dangerous in the Northern Hemisphere?

Choose the correct answer:

- Right rear quarter.
- Left front quarter.
- Right front quarter.
- Left rear quarter.

Attempts: 1

COMMENT

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