



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 shallow and narrow water.

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:

- Brief characteristic of narrows and shallow waters
- Features of shiphandling in narrows and shallow waters
- Essence of the phenomena arising at ship's sailing through narrows and in shallow waters
- Ship's squat when sailing in shallow waters
- Course keeping ability and inertial characteristics in shallow waters and narrows
- Ship-ship hydrodynamic interaction during encounter maneuver's
- Shiphandling and maneuvering when sailing through a channel
- General recommendations when sailing in canal or through narrows

Target groups

Deck - Management
Deck - Operational
Deck - Support

Ship types

Generic

Regulations

Table A-II/1 STCW Code
Competence: Manoeuvre the ship
Knowledge, understanding and proficiency: Ship manoeuvring and handling. Knowledge of: .4 squat, shallow water and similar effects.

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:
.2 handling ship in rivers, estuaries and restricted waters, having regard to the effects of current, wind and restricted water on helm response
.4 manoeuvring in shallow water, including the reduction in under-keel clearance caused by squat, rolling and pitching
.5 interaction between passing ships and between own ship and nearby banks (canal effect).

Table A-II/3 STCW Code
Competence: Manoeuvre the ship and operate small ship power
Knowledge, understanding and proficiency: Ship manoeuvring and handling. Knowledge of factors affecting safe manoeuvring and handling.

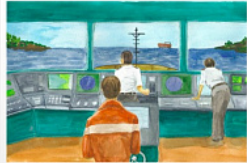
SHIPHANDLING IN SHALLOW AND NARROW WATER
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Section 2: Features of ship's handling in narrow and shallow waters

The congested conditions depend on ship's dimensions and speed, as well as on external factors.

When sailing in congested areas, the watch, including with the help of the ship's radar is strengthened, regardless of visibility conditions. Along with observations, the methods that make it possible to almost continuously monitor the position of the ship (beam distances, enclosing isolines, etc.) are used, sea level fluctuations and the required water depth under the keel are considered, depths and trends in their change are monitored.

Small vessels (pleasure, fishing, yachts, speed boats) may appear near the coast, following courses that differ from those recommended. In such areas, one may find non-standard buoys and beacons installed that have special purpose and are not mentioned in navigation books.



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Section 2: Features of ship's handling in narrow and shallow waters

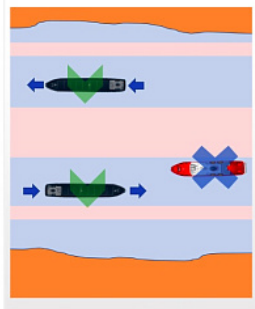
Sailing in the traffic separation scheme (TSS).

When sailing in traffic separation scheme (TSS), information from a coast control station should be constantly received.

If, when sailing in a traffic separation scheme (TSS), you think another vessel is on the wrong side, you should double-check your own position and, even if it is confirmed, proceed with increased caution.

In case of violation of the rules, immediately inform the control station about the fact and the reasons for this violation.

To solve practical problems of ships' handling in special conditions, the navigator must know the theoretical foundations of the ship's behavior in narrow and shallow waters.



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Section 4: Ship's squat when sailing in shallow waters

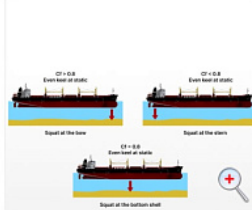
Ship's squat when sailing in shallow waters.

The formation of a single transverse wave lowers the level of the water surface at the sides of the ship, which causes the hull to lower relative to the level of calm water and increase the trim. This phenomenon is called squat.

For most ships with a conventional hull configuration (without a bow bulb), squat with a trim to the stern is typical. High-speed squat with bow trim is typical for large capacity vessels. The results of full-scale test show that for ships with a block coefficient of displacement $C_b > 0.8$, the bow has greater squat than the stern.

When the ship is moving at near-critical speeds, the squat can reach 5-7% of the average draft. In shallow waters, the squat value increases even more due to the suction of the ship's hull to the ground.

Squat depends on the ratio of speed, draft of the ship and the depth of the ship's movement, as well as on the ship's hull form.



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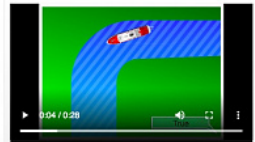
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Section 7: Ship's handling and maneuvering when sailing through a canal

At deviation along the axis of narrow, canal and when approaching the coast, the resistance to the ship's movement increases - a transverse force arises that pushes off the bow of the ship and attracts the stern to the nearest coast, and the closer the ship is to one of the coasts, the greater the water disturbance and the speed of the flow between the shore and the side of the ship and the greater the repulsive and attractive forces, which can lead to a turn of the ship across the narrow.

When the ship is moving with stopped engines, the coast effect is practically not noticeable. When the engine operates astern, the coast effect is opposite - the ship's bow is attracted, the stern is pushed off.



Turning in narrow

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Section 7: Ship's handling and maneuvering when sailing through a canal

Passing by in narrow canal or channel.


Two ships are approaching, keeping to the axis of the canal or channel. The ship speed is reduced in advance to the minimum sufficient one for control. When a distance equal to 2-3 hull lengths remains to the oncoming vessel, both ships vigorously turn the rudder to starboard and move closer to the edge of the canal or channel.

It is not recommended to approach the edge of the canal or channel in advance, at a great distance between the ships, since it is difficult to keep the ship close to the edge for a long time.

At the time when the stems of the ships are leveled, the rudder is turned to port in order to divert the stern and start moving along the oncoming vessel, while increasing the speed of the propeller.

Ships go round each other, making a smooth turn to port.

When the bow approaches the beam amidships of another




Passing by in narrow canal or channel

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Test tasks



COMMENT

Test of question

What is the minimum distance to the operating dredger what your vessel should have slowest speed at?

Choose the correct answer

- 5 cables.
- 10 cables.
- 15 cables.
- She must not reduce speed.

Attempts: 1

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