

## Purpose:

The e-learning module is designed for theoretical training of ratings as able seafarer deck in accordance with Chapter II of the STCW Convention in the part concerning of cargo operations.

The ELM is included in the "*Able seaman*" 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:

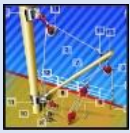
- Purpose and types of cargo handling equipment
- Periodic devices
- Cargo cranes
- Marking of ship's cranes and derricks
- Hatch covers
- Continuous devices
- Vessels with horizontal loading scheme. Ramps

## Target groups

Deck - Support

## Ship types

Generic



## Regulations

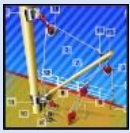
### Table A-II/5 STCW Code

Competence:

Contribute to the handling of cargo and stores

Knowledge, understanding  
and proficiency:

Knowledge of procedures for safe handling, stowage and securing of cargoes and stores, including dangerous, hazardous and harmful substances and liquids.



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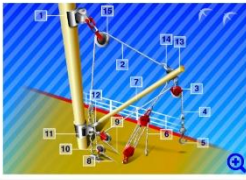
Section 2: Periodic devices

Let's consider the derrick diagram.

The lower end of the derrick (**spur**) has a jaw with two eyes. A ring (**cross-bar**) with four lugs is placed on the upper end of the derrick. Derricks of a welded structure may not have a cross-bar, and lugs are welded to the derrick end to fix the rigging.

For the articulated connection of the derrick spur with the mast, at the latter, at a height of 2 – 2.5 m from deck, a shoe with an eye and a socket is installed.

Derrick end is supported by the **span rope**. By changing the length of the span rope, one can change the angle of the derrick. The span rope consists of a steel wire, the root end of which is attached to the upper lug of the end cross-bar. The second running end of the span rope passes through the **span block** fixed on the mast. Below the span block, a triangular link is attached to the span rope – the span rope triangle. On the other side, a long-link chain is attached to the triangle – a **main strove** and a steel wire – a **traveller**.



**Light load cargo derrick:**

- 1 – mast; 2 – span rope; 3 – cargo block; 4 – cargo runner; 5 – cargo hook; 6 – guy; 7 – derrick; 8 – rope to the winch drum of the cargo derrick; 9 – rope to the drum of the cargo derrick; 10 – topping rope; 11 – shoe; 12 – derrick spur; 13 – derrick end; 14 – cross-bar; 15 – span block.

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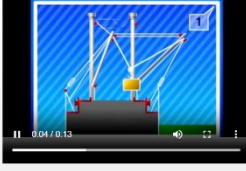
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Section 2: Periodic devices

Let's consider the operation of "married" derricks.

The discharging is performed in the following way. The cargo, hooked on the cargo hook of the "hold" derrick is lifted by its winch above the hold coaming and bulwark. The winch of the "shore" derrick heaves up the slack of its cargo runner and, as it were, "takes the cargo upon itself", at the same time the winch of the "hold" derrick walk out its cargo runner. The cargo begins to move towards the berth and, as soon as it is above the place of unloading, both runners are walked away, and the cargo is lowered onto the berth.

The cargo capacity when using "married" method is almost halved relative to the cargo capacity of each individual derrick due to increase of forces in derricks, runners and guys, especially when the angle between the runners is 120° or more. The disadvantage of this method is that with a change in the place of lifting or stowage of cargo in the hold, a rearrangement of the derricks is required, which takes time.



**Work of "married" light load derricks:**

- 1 – guys; 2 – counter guys; 3 – hook; 4 – jacking; 5 – cargo runners.

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Section 3: Hatch covers

The **folding hatch cover** can be made of one cover that covers the entire hatch. The cover is hinged to the coaming and, when the hatch is open, it takes vertical position, which creates some inconvenience during cargo operations.

Therefore, the folding hatch cover with two covers is more often used, each cover closes only half of the hatch. The cover consists of two parts – sections, hinged to each other. A powerful hydraulic drive is used to open and close the covers.



**Folding hatch cover with hydraulic drive:**

- 1 – leading section; 2 – driven section; 3 – slot for the stopper plank; 4 – driven section roller; 5 – limiting support; 6 – supports; 7 – plunger; 8 – rubber shock absorbers; 9 – end brackets.

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Section 7: Vessels with horizontal loading scheme: Ramps

Cargo from the berth to the deck of the vessel is transported by ramp.

Most ships have their own ramps installed, which are divided into bow, stern and side ramps according to the location on the ship. Preference is given to ramps located at the extremities. On-board ramps are found on ships carrying which are passenger cars.

In recent years, rotary ramps have become increasingly common, which allow cargo operations to be carried out when mooring with any side and extremity.



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Section 2: Periodic devices

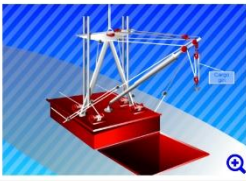
Many multipurpose cargo ships are equipped with one or two **heavy lift derricks** with cargo capacity of up to 40 – 50 tons, and in some cases (on special snags) – up to 300 tons.

Heavy lift derricks are operated using single-derrick method.

Unlike light load derricks, heavy lift derricks have three working movements: lifting the cargo, turning the derrick, and changing the derrick inclination.

The design and rigging of a heavy lift derrick have some features. To reduce the bending of the mast the spur of the derrick does not rest on the mast, but on a special foundation installed on deck. The difference in the design of the derrick end is the presence of a cut-in block installed in a slot, which is made slightly below the cross-bar.

An upper fixed block of multi-pulley tackle – **cargo gin** – is suspended from the lower shackle on the derrick end. A two horned hook with swivels is suspended from the lower movable gin block.



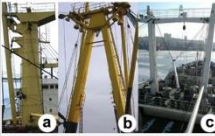
**Heavy lift derrick in operation position**

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Test tasks



Text of question:  
What is the name of the mast marked with the letter "a"?

Choose the correct answer:

- V-shaped.
- Single standing.
- U-shaped.

Attempts: 1 Miss

COMMENT

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