

Lecture 3. Lifting machines as a part of transport systems.

Purpose of the lecture: classify the device, principles of operation and technical and operational characteristics of the main machines used in transport and warehouse complexes (TSK);

Keywords: scope of hoisting machines (GPMs), classes, mechanisms

Types of lectures: Classical lecture.

3.1. Purpose, classification and scope of hoisting machines

3.2. Modes of operation of hoisting machines

3.3. Components and parts of hoisting machines

3.1. Purpose, classification and scope of hoisting machines

From the point of view of the Rules of the device and the safe operation of hoisting cranes ПБ 10-382-00 (Rules for cranes) hoisting machines are technical cyclic devices for lifting and moving loads. They are intended for movement of piece, bulk, bulk cargo in warehouses, in production workshops, at construction sites, along with servicing technological units of industrial and energy enterprises along the spatial route.

Hoisting machines (GPMs) are classified as hazardous objects that require increased attention both at the design and manufacturing stage, and in operation.

3.2. Modes of operation of hoisting machines

When calculating cranes and choosing mechanical and electrical equipment, ropes, hooks and other elements for them, their operating conditions (operating modes) should be taken into account. The crane regulations currently in force have established that the classification groups (operating modes) of cranes and their mechanisms should be adopted according to the international standard ISO 4301/1.

The operating mode is determined for the crane as a whole and for its mechanisms as a whole. The assignment of a crane to a particular classification group depends on the class of its use, which is characterized by the maximum number of operating cycles for a given service life, and on the loading regime of the crane, which characterizes its use in carrying capacity. The crane regulations set 10 classes for their use (U0 - U9) and 4 loading modes (Q1 – Q4).

3.3. Components and parts of hoisting machines

Cranes are universal hoisting machines, which include a skeleton in the form of a metal structure and several crane mechanisms installed on it. The type of cranes used in industry, construction and transport is extremely diverse.

The drive of the hoisting machine includes an engine, an intermediate gear and control equipment. GPM uses internal combustion engines, electric and combined (diesel-electric, electro-hydraulic, electro-pneumatic, etc.).

The following factors affect the choice of drive type for a particular machine:

- correspondence of engine properties to a preset bench press work;
- the nature of the existing external loads on the machines;
- the cost of manufacturing and operating the machine with this type of drive;
- the possibility of using one or another type of energy;
- ease of operation of the machine;
- features of the operating conditions of the machine.

Questions:

1. What are the leading organizations in the field of design and safe operation of the GPM.
2. How is it customary to classify bridge-type cranes?

Literature and resources

1. Zhuravlev N.P., Malikov O.B. Transport and cargo complexes: Textbook. allowance. - M.: Route, 2016.-- 232 p.
2. Boyko N.I., Cherednichenko S.P. Transport and cargo systems and warehouses: textbook / N.I. Boyko, S.P. Cherednichenko. - Rostov n / a.: Phoenix, 2007.-- 400 p.
3. Transport and cargo systems. Textbook / A.S. Balalaev, I.A. Baburova, A. Yu. Kostenko. - Khabarovsk: Publishing house of FVGUPS, 2015.-- 101 p.
4. 4. Complex mechanization and automation of loading and unloading operations: Textbook / Ed. Timoshina A.A. and Machulsky I.I.-M.: Route, 2013.- 400 p.

Internet resources:

1. Abdikerimov, G.S. Logistic management of cargo transportation and terminal and warehouse activities [Text]: A textbook for specialists / G.S. Abdikerimov, S.Yu. Eliseev, V.M. Nikolashin, A.S. Sinitsyna, O.B. Malikov // M: FGBOU "Educational-methodical / center for education in railway transport". - 2013.-- 428 p. <https://e.lanbook.com/reader/book/59016/#1>
2. Balalaev A.S., Leontiev R.G. Transport and logistics interaction in multimodal transportation: monograph. - M.: FGBOU "Educational-methodical center for education in railway transport", 2012. - 268 p. - <http://e.lanbook.com/view/book/58896/page58/>
3. Design of loading and unloading devices and warehouses: Method. instructions / compiled by V.A. Bolotin, E.K. Korovyakovsky, N.G. Yankovskaya. - SPb.: FSBEI HPE PGUPS, 2015.- 38 p.
Available online: Additional educational material and Internet sources used to complete the assignments of lectures, seminars, CDS, will be available on your page in the Univer.kaznu system.