

4. Nutt G.J., "Evaluation Nets for Computer Systems Performance Analysis." FJCC, AFIPS PRESS, Vol. 41, 1972, pp. 279–286.

5. V. Kazymyr, O. Prila, A. Usik, D. Sysa, "New paradigm of model-oriented control in IoT," 2019.

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**Maksymenko V. V.**, a 4th year student, group ZV-171  
Scientific supervisor – **Prybytko I. O.**, PhD, associate professor  
Language supervisor - **Sikaliuk A. I.**, PhD, associate professor  
*Chernihiv Polytechnic National University (Chernihiv, Ukraine)*

### HOISTING MACHINES

There was a need for hoisting machines a lot of years ago. It was difficult to meet the needs of the automotive industry. Nowadays, in various industries, manipulators are used to perform technological tasks.

Most of the market products in Ukraine remained domestic. However, young engineers who have created new products are already competing with world markets. As well as abroad, in Ukraine the factories produce a variety of hydraulic hoisting and transport equipment. So, we will consider in details how the market for this type of equipment has developed.

First, you should pay attention to the Spanish type of the crane "Grua Portatil Para Taller" [1] (fig. 1-a) with its advantages and disadvantages. Since now in the XXI century they continue to improve or manufacture from scratch technologies borrowed from ancient times and domestic original solutions of complex tasks for hoisting and moving loads [2].

A portable Spanish crane is used for hoisting to a height. It has a rotating mechanism, a universal A-frame made of welded steel channels and a three-point bracket that allows the unit to stand securely on uneven floors. The low platform of such a crane can be placed under the front of any vehicle, and the vehicle engine can be returned to its place using a worm winch. However, the portable hoist has disadvantages: the complexity of the structure; overall dimensions; the cable and carriages are subject to wear when the cable slides over the flange if the carriage is not positioned; if the cable slips out of the groove, it can become stuck between the carriage and the tongue, making it nearly impossible to free the parts without damage.

We will consider three types of new generation cranes, taking into account the disadvantages and advantages of each separately.

Norco 78600B 3T Capacity Air / Hydraulic Floor Crane (fig. 1-b) [3]. The advantages are the following: a comfortable boom position and lengthening of the legs provide maximum stability; the boom returns 10 ° to the right or left if the base cannot be centered under load; the floor lock prevents the crane from moving during operation. The disadvantages include the following points: only a qualified operator can work with the structure; high cost; the complexity of the design; difficulty in repair (you must contact the manufacturer Norco Industries directly) used only on a hard, level surface; the load can swing, which causes the crane to overturn; many storage requirements; sold to official companies in series.

"Canbuilt Arm Hydraulic Crane Model №5200" (fig. 1-c) [4]. Canbuilt Manufacturing is a division of Sayco Distributors Ltd., a Canadian company founded in 1969 and headquartered in Toronto. The advantages of such a crane: double control - pneumatic / manual hydraulics; the "flow base" allows the legs to be fully retracted or even installed from the back for unobstructed lifting; versatility; counterweight addition; provides parallel and horizontal lifts; compactness;

articulated lifting platform. The disadvantages are the high cost and the complexity of the design for manufacturing.

"Canbuilt lifting system Model №4200" (fig. 1-d) [4]. Advantages are the following: high tensile strength Gr; relatively low weight of the structure; simplicity of design; wide rear wheel rack for greater stability under load; space saving function; descent control system; combines the best systems from the previous analogs №3275 and №3276. Among the shortcomings, there is a significant cost price.



*Fig. 1 - Types of cranes*

Currently, on their basis, engineers produce cranes with interesting solutions to the disadvantages that were in domestic hoisting machines. Therefore, it can be stated with confidence that this topic has been disclosed, but not completely, since development in this direction continues and does not stand still.

### References

1. Hoisting machine: Grua Portatil Para Taller Julio. URL: <https://www.eltallerderolando.com/2014/10/13/grua-portatil-para-taller-julio-1950.pdf>. (access date: 02.03.2021).
2. Григоров О. В., Петренко Н. О. Вантажопідйомні машини : навч. посіб. Харків : НТУ "ХПІ", 2005. 304с.
3. When safety depends on performance. URL: <https://www.norcoindustries.com/products/model/78600-3-ton-air-hyd.html.pdf>. (access date: 07.03.2021).
4. Not just an engine crane. URL: <https://www.canbuilt.com/products.php?cat=14&subcat=39.pdf>. (access date: 09.03.2021).