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LIFTING DEVICE IN THE FORM OF A LIFTING PLATFORM FOR MAINTENANCE OF TRANSPORT EQUIPMENT

M.V. Kozhukhova, T.K. Balgabekov, O.T. Balabaev, D.K. Sarzhanov

The working properties of the car, in the process of its operation, gradually deteriorate. This is due to wear of the parts, as well as corrosion and fatigue of the material from which they are made. There are failures and malfunctions in the car, which are eliminated during maintenance and repair.

In carrying out these works, inspection and handling equipment is used. This is due to the fact that when performing, for example, the full amount of work on TS-1 and TS-2 side is 10-20% of the work, bottom 40-45%, top 40-45% of the work [1].

Nowadays, one lift among the fundamental equipment at auto-repair must withstand the heavy weight of car. Therefore, the strong lift which is easy to make repairs on cars is the indispensable equipment. The durability of lifts due to each configuration can be estimated on the background of study results and the data to be contributed to the development of new lift for car with safety and durability can be accumulated ultimately [2].

According to the generally accepted classification of automobile lifts, they are divided into: stationary and mobile; Single column, two-post, three-post, four-post, multi-post, scissor and parallelogram type [3].

As part of the master's dissertation work, a four-post lift of a balcony type for servicing and repairing cars was developed [4]. The given lift provides simultaneous carrying out of works on various levels (from above and from below the car).

The lift belongs to the field of lifting and transport equipment and can be used for car repair work. The technical result of the proposed invention is to increase the efficiency of repair work in the form of the ability to store tools and spare parts. This technical result is achieved by the fact that in the considered balcony type elevator for cars, the following changes have been introduced: in the enclosures of the side balcony areas, sliding boxes made in the form of four sections are mounted [4].

For a higher accuracy of determining the rational design parameters of the improved elevator design, a detailed study was conducted with the development of a digital model in the Solid Works software environment that allows analyzing the efficiency of the device.

The process of conducting a survey of the elevator assembly (Figure 1) on the voltage in Solid Works "Simulation" was made after the construction of all the details of the balcony lift separately.

To conduct experiments in the Solid Works software environment, the first step is to specify the material of all the parts and components of the elevator, in our case it is St3ps steel, which is the most common on the market. The program specifies the type of attachment of nodes- "Fixed geometry", the load on the selected surface and its direction. After starting the research, we get the result with the characteristics tables and diagrams (Figure 2).

According to the experimental data obtained, the dependences of the internal stress on the applied force were found, and the maximum loads that the structure was able to withstand were determined.

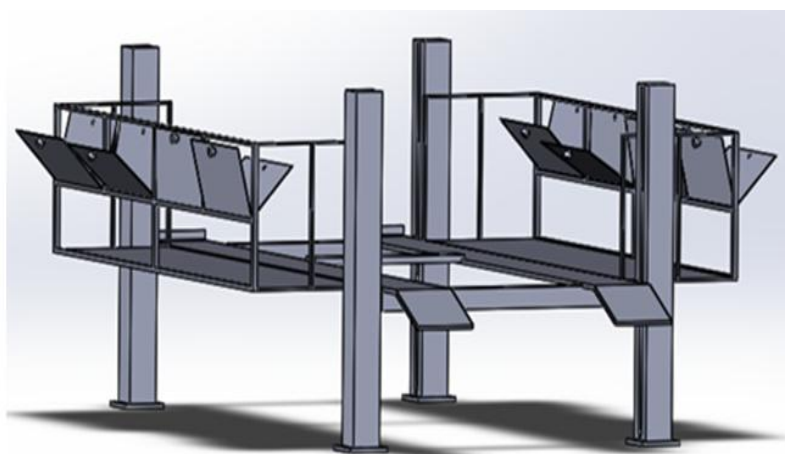


Figure 1 – 3D model of a four-post lift of a balcony type

According to the diagram, it is evident that the modulus of elasticity is not exceeded, that is, no deformation of the metal occurs from the specified load, hence the main technical characteristic of the hoist is the load-carrying capacity (Figure 2). It can also be considered the reduction of the metal capacity of the structure as a whole, or the relief of some of the elevator assemblies that are not bearing and "responsible" by replacing St3pc steel with other lightweight materials. The above is the basis for further work on the design of this lift.

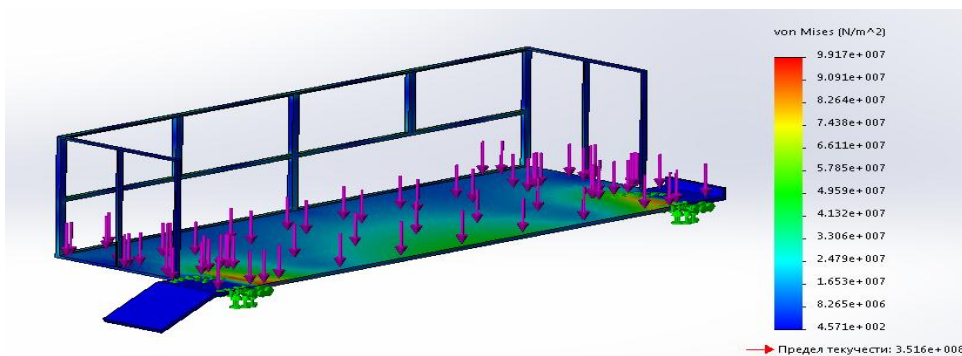


Figure 2 – Study diagram for load and deformation of the balcony platform and lifting platform of the lift

The obtained test data provides a wide range of works to improve this elevator design for designers and developers. Thus, further improvement of the design of the balcony-type elevator will allow the development of vehicle repair technologies to new levels.

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