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INCREASING THE AVAILABILITY OF ROLLING STOCK BY ACCELERATING THE PAINTING PROCESS

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Annotation
Improving the availability of a locomotive by reducing the time spent on painting.

Keywords: availability factor, overhaul, alternative workshop, rotating drum, telescopic crane, "P" shaped stand.

Introduction

The locomotive is the main component of any train, be it a passenger train or a freight train, and in general the entire railway infrastructure. This is the main element of the entire mechanism, which, in fact, is the steering wheel of the train, controlling it and making the train move along the rails.

Based on this, it can be assumed that the readiness of the locomotive is a determining factor in fulfilling the transportation task for the railway company and the level of its authority. Increasing the availability of a locomotive can be achieved in several ways. By improving the qualifications of the driver's crew, by reducing administrative and logistical delays and by reducing the time spent on maintenance. The most used method is to reduce the time spent on maintenance. The development of a paint shop would speed up and simplify the painting process. In the course of the implementation of this article, two new paint shops were developed, as an alternative to the existing ones.

1. The traditional method of painting the body of locomotives.

Locomotive body painting is carried out in the amount of major overhaul-2. After dismantling the necessary electrical and mechanical equipment, the body is prepared for painting both from the inside and from the outside.

Considering the fact that the electric locomotive is the head of the train, its appearance must be impeccable. In this case, painting an electric locomotive will be not only a necessary element of decorative design, but also protection. The front of an electric locomotive is always covered with special paints that reflect light, thereby creating an additional warning about an approaching train.

As in the case of conventional wagons, the painting of an electric locomotive takes place in several main stages. Below we will consider how the body of an electric locomotive is painted.

Initially, it is necessary to prepare the surface of the electric locomotive for the process of applying new paint. To do this, it is worth removing all traces of old paint and rust with special care. To do this, you need to use metal brushes or grinders with special attachments. Given the large volume of work, several specialists are often involved in the preparatory stage at once.

After the surface of the electric locomotive is cleaned of traces of old paint, rust and dust, it is necessary to treat the surface with powerful air currents several times with the help of special devices. This will help remove residual metal dust that forms when working with a grinder or wire brush.

After that, the surface is treated with special detergents. They help to significantly reduce the level of fat on the surface, which will contribute to high-quality coloring. Then the electric locomotive is treated with white alcohol using a uniform spray over the entire surface.

Fig. 1. Preparation of the VL80s electric locomotive for painting

Painting of an electric locomotive. It should be noted right away that several types of paint with different shades and properties are used to paint an electric locomotive. Initially, an electric locomotive is painted in a single paint layer, which will be the main one. It is applied using spray guns in even layers in a room where the air temperature is not lower than 18 ° -20 ° C.

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After the paint layer is applied to the entire surface of the electric locomotive, the electric locomotive is treated with a stream of heated air with the help of special wind turbines to get rid of excess paint and make a more uniform paint layer. After that, the electric locomotive goes for drying.

Fig. 2. Body painting of the VL80s electric locomotive.

Drying of an electric locomotive. Drying of a freshly painted electric locomotive should take place in a special sealed room in which the air temperature exceeds 30 ° C and gradually rises to 80 ° C.

Fig. 3. Drying of the VL80s electric locomotive.

It is imperative that the drying room has a low air humidity, otherwise the paint will dry unevenly and diffusion will appear. After the paint has started to dry, the surface of the electric locomotive is poured with powerful streams of hot air in order to cement the drying process.

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Electric locomotive Decoration. After the painted electric locomotive is dried, it is necessary to apply special marks on it with paints of other tones and shades. This process is done manually and is the final stage in the painting process of an electric locomotive.

It is worth noting that the marks are applied with special paints that are capable of reflecting light in the dark, thereby increasing safety on the railway.

All of the above technical processes for painting the locomotive body are carried out in one production line.

2. Development of alternative shops for painting the bodies of electric locomotives

Alternative paint shop # 1... This innovative paint shop allows in a short time to carry out all the necessary painting processes in the amount of major overhaul-2 using only 2 workers, a minimum amount of paint and varnish materials. The workshop is equipped with a rotating drum, a telescopic crane and a universal control panel. The rotating drum rotates with the locomotive and enables workers to easily reach any paint surface. And also such a drum allows you to transport the locomotive to the workshops that are located on the side. The telescopic crane also allows you to reach any paint surface by automatically adjusting the position of workers both horizontally and vertically. The universal control panel can control all the equipment that is available in the workshop. That is, one remote control can rotate the drum, control the telescopic crane,

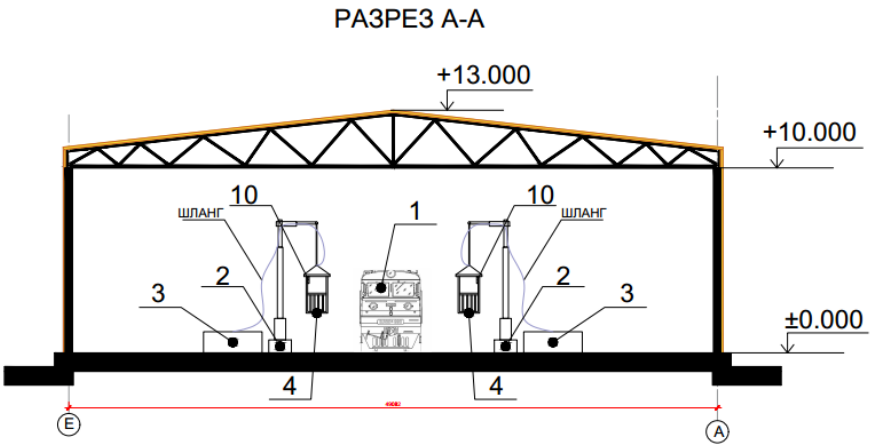

Fig. 4. Alternative paint shop No. 1

where 1 is a locomotive, 2 is a telescopic crane, 3 is a rotating drum, 4 is a workplace, a 5 compressor unit, 6 is a staff equipment room, 7 is a paint and varnish rack, 8 is a tool rack, 9 is a gate. 10-control panel.

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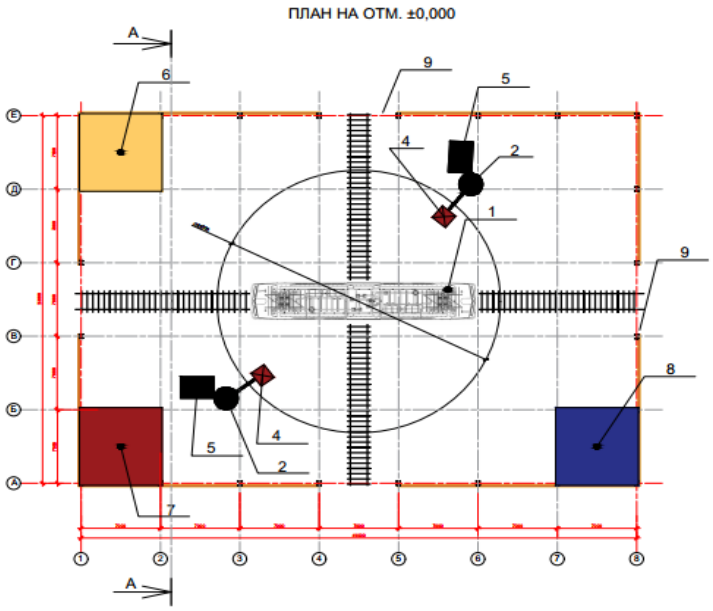

Fig. 5. Alternative paint shop 1

Advantages: it is possible to carry out the painting process with only two workers, all the necessary tools are controlled by a single remote control, it is possible to transport it to the workshops from the side.

Disadvantages: There is no conveyor line, only one locomotive is serviced.

Alternative to paint shop # 2. The second alternative paint shop was built on the basis of the old-style shop. The existing paint shop was modernized by equipping with "P" -shaped auto-paint equipment. This equipment can be controlled remotely.

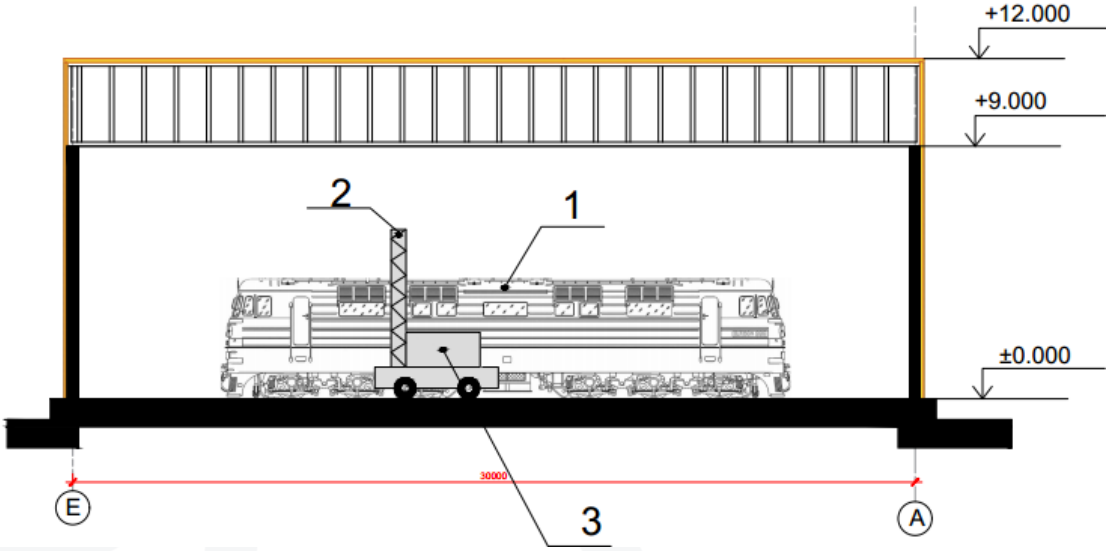

Fig. 6. Alternative paint shop 2

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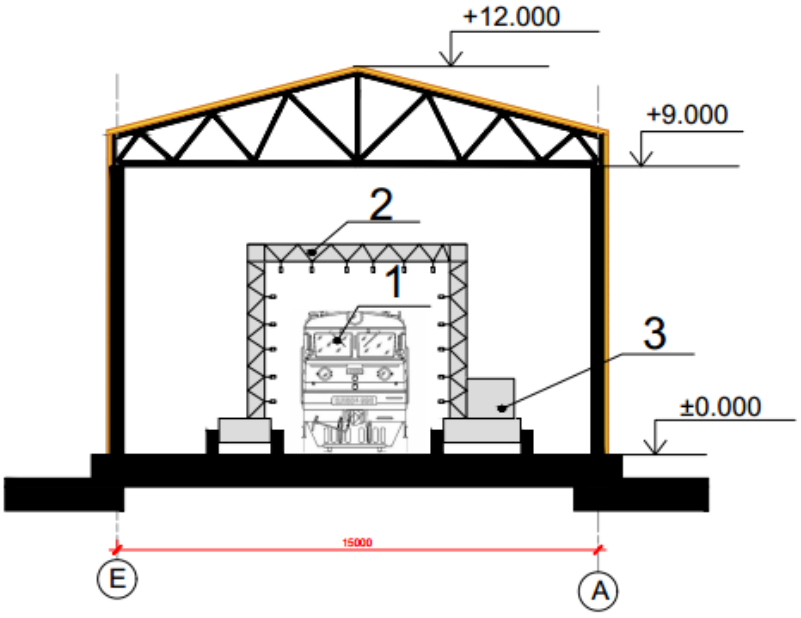

Fig. 7. Alternative paint shop 2

This painting equipment makes it possible to paint locomotives much faster and with better quality without the participation of workers. A compressor unit is connected to this painting equipment. This, in turn, allows the use of "P" shaped equipment and as a sprayer of paint and varnish material and as a sand-jet apparatus. With the help of the compressor we can adjust the pressure of the paint, and with the remote control we can change the color of the paint.

Advantages: you can carry out the painting process remotely, all the necessary tools are configured remotely, all operations are carried out without the participation of working personnel, the possibility of a conveyor line.

Disadvantages: Some painting areas may require staff intervention.

Conclusions

In this way, accelerating the painting process can increase the operational availability of the locomotive and improve the quality of painting. Perhaps some aspects of the proposed paint shop still need some work. In the following works, a more detailed description and detailing of these paint shops is offered.

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