Analysis of Faults in the Mechanical Part of Railway Weight Checking Wagons

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ABSTRACT

In this article, the problem is relevant, such as extending the service life of 640-VPV weighing wagons operated on the territory of the Republic of Uzbekistan. The analysis of the technical condition of the weighing wagon metal structures revealed defects that could affect their service life.

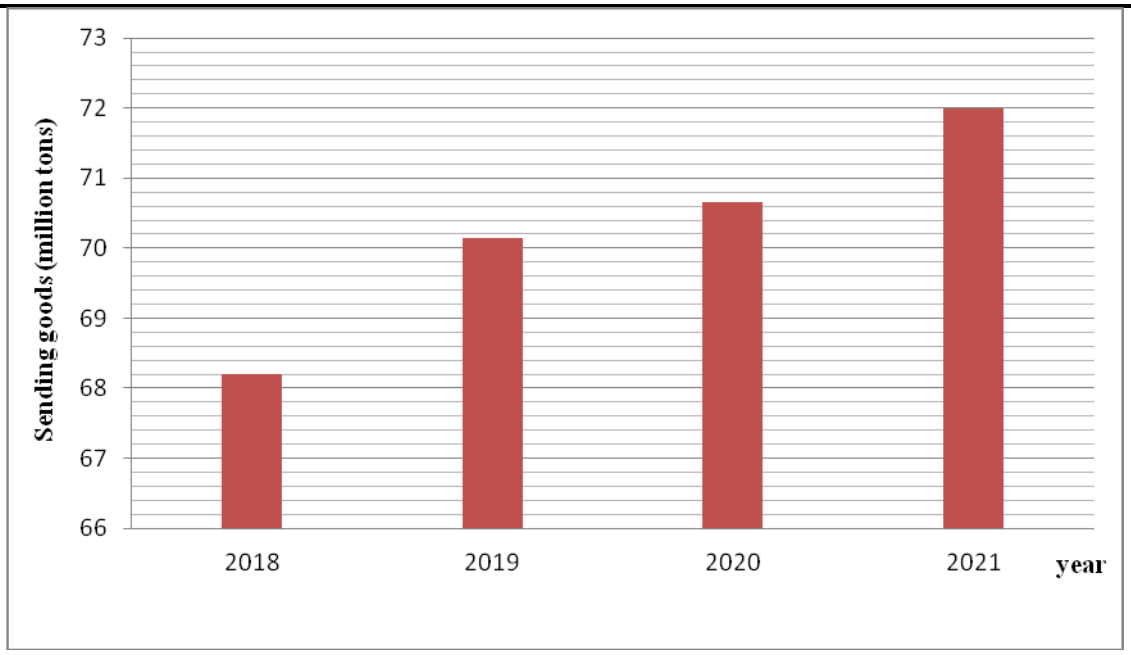
Keywords: Railway, six-axle wagon, pivot beam, longitudinal beam, longitudinal beam, freight wagon.

Introduction.

One of the conditions for the gradual development of railway transport in the independent Republic of Uzbekistan is the replenishment of the fleet of freight and passenger wagons with modern domestically produced wagons that meet international standards, as well as extending their service life for the optimal use of existing wagons. [1-3].

The implementation of projects to improve the design of freight and passenger wagons will ensure stable and uninterrupted operation of the wagons of the factories of the republic.

As far as we know, a wagon is designed to check the railway scales, which periodically checks the readings of the scales located at the stations. It is very important to accurately measure the weight of the rolling stock by railway scales located at the stations. In particular, the fact that railway scales do not accurately measure the weight of rolling stock negatively affects the following important things: wagongo documents, economic factors, control of falling loads on the rails, derailment, and so on. From this it can be seen that the railway scales must be regularly inspected with the weights of the scales [4]. But the scale had to be visually analyzed to make sure that the wagons were repaired at the last depot 10 years ago and used again. Evaluation of the results of the analysis solves such an urgent problem as extending their service life.



1-graph. Dynamics of wagongo volumes

1- The dynamics of the volume of shipments shows that the demand for weight wagons is growing from year to year. Wagon for checking scales - performs mechanized control of various types of scales, thereby ensuring the accuracy and precision of the scales. The screening process is mechanized as much as possible. The wagon is brought to the scales for inspection using a locomotive [5-7]. The weight control wagon type 640-VPV (Fig. 1) is designed on the basis of a six-axle gondola wagon with a carrying capacity of 93-95 tons, with standard forging tools and brakes, which allows it to operate at speeds up to 120 km per hour and allows you to add to the train. The 640-VPV weight checking wagon is a self-propelled unit equipped with standard equipment and mechanisms, designed to test wagon scales with a maximum load of 150 tons and 200 tons [5-7].

Table 1. Technical characteristics of the weighing wagon

№	**Technical characteristics**	Value
1	Total weight of model weights and weighing trolleys, t	80
2	Number of exemplary weights of the 4th grade, pcs.	38
3	Mass of an exemplary weight of the 4th category, kg	2000±0,2
4	Number of weight verification trolleys, pcs.	2
5	Weight of the weighing trolley, kg	2000±0,2
6	Maximum load on the weighing trolley, t	40
7	The base of the weighing trolley, mm	980
8	Travel speed of the weighing wagon from its own drive, m / min	23
9	Boom extension speed of telpher, m / min	30

10	Speed of movement of the weighing trolley, m / min	24
11	The most possible removal of the weighing trolley from the wagon, m	30
12	Weight of a wagon with exemplary equipment, t	127
13	Wagon width, mm	3220
14	Carriage base, mm	10440
15	Wagon length along the coupling axes of the automatic coupler, mm	16400
16	The construction of the wagon is designed for speed, km / h	120

Fig. 1. The 640-VPV type weight-checking wagon.

Railway scales located at carriage stations intended for checking railway scales are subject to inspection four times a year in accordance with the instructions. A special certificate for railway scales is issued after inspection by a wagon intended for inspection of railway scales. There are 11 railway scales in our country.

Main Part.

Visual analyzes were carried out to assess the technical condition of five of the eleven 640 VPV type wagons intended for checking railway scales used in the railway system.

An analysis of the literature shows that the following faults are observed in the body elements of composite wagons: bending and curvature of beams under the action of static and dynamic loading, internal and external cracks, corrosion and collapse of the body walls [8-10].

Inspection of the body from the outside (Fig. 2) revealed the presence of traces of corrosion under the paint layer of the side wall lining sheets. The body needs to be cleaned of the old layer of paint and brew places of rust. There are almost no defects in the body pillars and its front (rear) sidewalls.

Welds between studs and crossbeams and between side wall cladding and studs must be checked and welded.

Inspection of the interior of the scale wagons showed that the wooden floor needed 100% replacement, and the monorails (double) needed repair. The base of the monorail should be restored by placing corner (corner) No. 50. Due to wear processes, the rollers of the bogie inside the wagon must be replaced

Figure 2. technical condition during visual analysis of the weight wagon type 640-VPV

For safety reasons, the insulation resistance and dryness must be checked. The flexible power cord protection needs to be replaced according to the standard.Scales 640-VPV-271 are corroded under the influence of corrosion at the junction of the test wagon traverse with the beam-beam .The bottom sheet of the 640-VPV-271 large-scale test wagon of the black beam beam has an overlay on the weld .By the time of inspection, the thickness of the metal deposit is 30% of the nominal value. The expansion joints of the slab must intersect at the openings for the columns.
External and internal factors affect the failure of the scales in the elements of the test wagon [8-10] .

External factors: air temperature, humidity, wind

Due to the fact that railway scales are operated in various conditions in test wagons, corrosion (cracking) occurs in the metal structures of the loading elements of the wagon from the effects of air temperature, air humidity, and wind.

Internal factors: Deformation under load, loss of metal properties. Deformation under load leads to the fact that metals lose their properties.

III. Conclusion.

The cited literature and visual analysis show that defects under the influence of external and internal factors were observed on the outer and inner parts of the scale body of the steel scale, on the body skin of the spinal, pivot, rear, and intermediate beams. This will shorten the life of the wagon. This is a technical extension of the service life of the wagons. Evaluation of visual analyzes indicates the need to develop specifications for extending the service life of railway scales.

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