

Development of an Industry Standard For the Cost of Mechanized Work of Road Equipment During the Repair of Roads

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Abstract:

At present, the study of the development of an industry standard for mechanized costs of road construction machines, as well as single-bucket excavators used in the repair of roads, is an urgent task for the industry operating these equipment. Departmental construction labor costs for the mechanization of modern mechanisms and equipment in the repair of roads include the main technological operations in the above production, and they are carried out mainly on modern mechanisms and machines. However, individual technological operations are carried out in repairs, as well as artificially created structures using manual labor. The investigated "Departmental building codes" are established for mechanized work during the repair of roads.

Keywords: repair, departmental norms, machines and mechanisms, excavator, highways, mechanized costs.

Introduction.

The study and development of the sectoral cost rate for mechanized work for road construction and special machines used in the repair of roads is an urgent task for the road industry.

The construction norms of labor costs for the mechanization of modern road equipment in the repair of roads include the main technological operations in the above production, and they are carried out mainly on modern road equipment. However, some technological operations during the repair of roads are performed by manual labor. The developed industry cost rate for mechanized work is set for mechanized work in the repair of roads.

The developed branch "Departmental construction standards" are the main regulatory document for the planning and operation of modern road equipment in the repair of roads, ensuring the quality of work, completion on time and increasing the efficiency of work. Departmental building codes allow road companies to justify the costs of modern road construction equipment.

The main indicators of road works during the repair of roads are determined and set according to the classifier; identified road construction equipment used in the repair of roads; The technical and operational indicators of road construction equipment used in the repair are revealed and the results of the experimental timing work are presented. [2,5,7,11,12,13,14,15,16,17,18,19]

A methodology has been developed to create an industry standard for the cost of mechanized work of road-building machines used in the repair of roads. The calculation and development of industry-specific cost standards for mechanized work for road equipment used in the repair of roads.

Methods and Results

Calculation of the norms of labor intensity of compacting machines

The operating performance of compacting machines is calculated by the formula:

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$$\Pi_3 = \frac{(b-a) \cdot l_y \cdot h_k \cdot k_{3,K}}{\left(\frac{l_y}{1000 \cdot V_{h,T}} + t_y\right) \cdot n} \cdot k_B \cdot k_T, \text{ m}^3/\text{s}$$

where, b – width of the strip to be compacted in one pass, m;

a – track overlap width, m ($a = 0,2 \div 0,3$ m);

l_{np} – passage length, m ($l_y = 50 \dots 100$ m);

h_T – thickness of the compacted layer in a dense body, m;

$k_{3,K}$ – sealing safety factor depending on the type of materials;

k_B – intra-shift time utilization rate, $k_B = 0,75$;

k_T – coefficient of transition from technical productivity to operational, $k_T = 0,60$;

n – number of passes on one track;

t_{np} – time spent on moving to the next track, h ($t_c = 0,005$ s);

$V_{p,c}$ – working speed, km/h. [1,3,6,10,20,21,22,23,24,25,26]

Table 1. The coefficient of adjustment of the labor intensity of vibratory rollers depending on the thickness of the layer

Layer thickness, cm	25	30	35	40	50	60
k_k	1,25	1,13	1,0	0,88	0,62	0,41

Table 2. Correction factor for pneumatic rollers in soil compaction

Layer thickness, cm	25	30	35	40	50	60
k_k	1,36	1,24	1,0	0,88	0,77	0,53

Currently, in the road industry enterprises, when repairing roads, modern road equipment from a leading company and companies from developed countries of the world is widely used.

The developed industry cost rate for mechanized work for road equipment used in the repair of roads, when laying bases and coatings using old coating materials are presented in table 1. [4,8,9]

Table 3. Road technicians when laying base and pavement using old pavement materials

1000 m ²	Laying the base and pavement using old pavement materials	Road cutter	to 1,0 m	Mach.-hour	1,98	Wirtgen WR-1900, PANTERA SF 210
		Resackler hot	2,44	Mach.-hour	4,04	Wirtgen WR-2500
		Smooth rollers	10 t	Mach.-hour	2,10	XCMG XD82, HAMM HD 110, HAMM GRW10, DYNAPAC, BOMAG BW-154

		Pneumatic rollers	18 t	Mach.-hour	2,34	SHANTUI SR14 MPA, DYNAPAC CA 511D, HAMM GRW18, ДУ-84, СС 222 CHF
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Conclusion

As a result of the study of the development of the industry standard of mechanized costs for road equipment used in the repair of roads, according to the results of the study, industry standards of mechanized costs for road equipment used when laying bases and pavements using old pavement materials have been developed. Industry standards for mechanized costs for road equipment used in the repair of roads, when laying foundations and coatings using old coating materials have been developed.

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