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IMPROVEMENT OF MICROPROCESSOR CONTROL OF RAILWAY DECELERATION WAGON DECELERATION DEVICES

Toshbaev Zohid Bahron o'g'li
Tashkent State Transport University
Tashkent State Transport University, address: Republic of Uzbekistan, Tashkent, 100167, Odil Eshonkhodjaev street 1.
ass:E-mail: zohid1988887777@gmail.com

Saidov Doston Nuriddin ugli
Tashkent State Transport University
Tashkent State Transport University, address: Republic of Uzbekistan, Tashkent, 100167, Odil Eshonkhodjaev street 1.
ass:E-mail: doston.saidov.96@mail.ru

Khamdamova Lola Olimjon qizi
Tashkent State Transport University. 3rd year student, Junior Research Fellow, Tashkent Chemical Technology Research Institute Uzbekistan, Tashkent
http//:@xamdamovalolajon.@gmail.com

ANNOTATION.

Improving the automation and telemechanics control devices of the railway qualifying hill remains one of the most pressing issues today. Several works have been done on the development and modernization of hill automation. However, in the railway sorting fleet, based on the automated microprocessor control method, it is a device that monitors the interruption of routes and approaching the wagon decker, how much weight, how fast it falls and how long the wheel pairs in the wagon decelerator.

Keywords: (YXQ) arrow count sensors, (YUN) high point, (VS) wagon decelerator.

INTRODUCTION

The speed of the process software complex in railway transport, in which the complex automation system known for the existing sorting is interconnected, is low, that is, the principle of operation is less reliable than traffic safety. The system needs to be improved, given that rapid control and distribution with an automated system and interactive microprocessor control are not interrelated to the wagon decelerator.

Railway Sorting Hill Automation and Telemechanics Control Device Improvement Device In the railway sorting park based on an automated microprocessor control method, a device has been created that monitors the movement routes approaching the wagon separator and how much weight and how fast the descent process. The sorting station is used to control the wagon decelerators on each parking lot of the hill.

On the basis of the system developed by the device for the improvement of automation and telemechanics control devices of the railway sorting hill, the time intervals of the process of sorting wagons from the rolling stock and connecting them to the composition at the sorting station have been reduced. The device also commands the wagon decelerators to release the movement from the top at the sorting station, using sensors that calculate how long the wheel pair is compressed and the arrows that warn of the movement approaching the wagon decelerator (OXQ). Sensors are installed at the sorting station to determine the speed at which the movement released from the hill comes to the car decelerators.

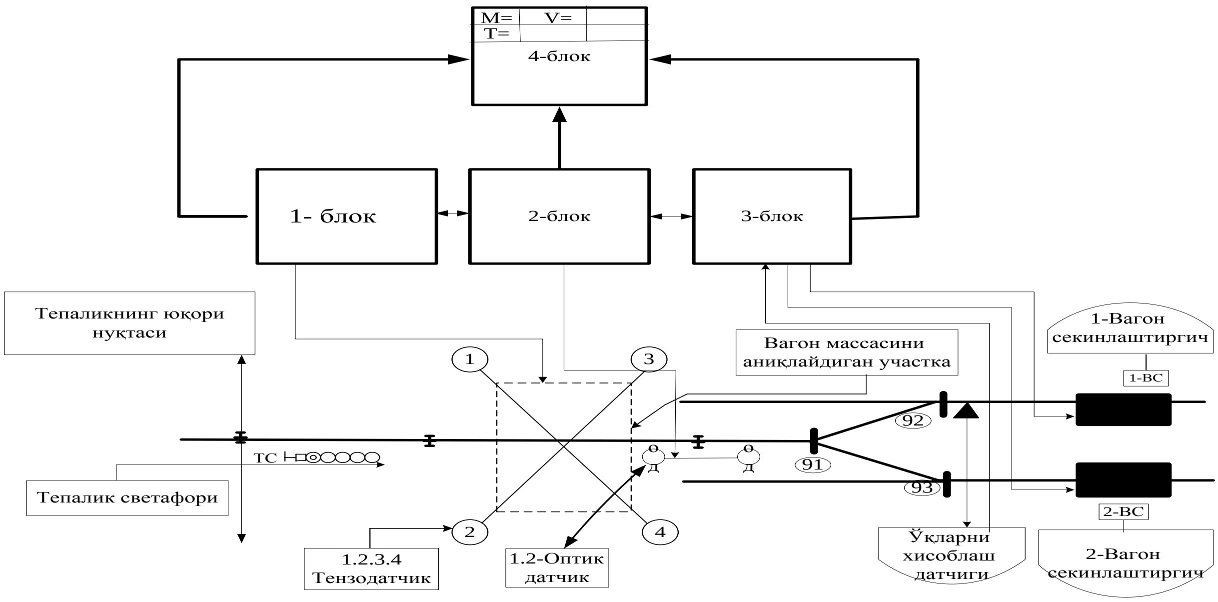

Figure 1. Scheme of improvement of automation and telemechanics devices of the sorting hill

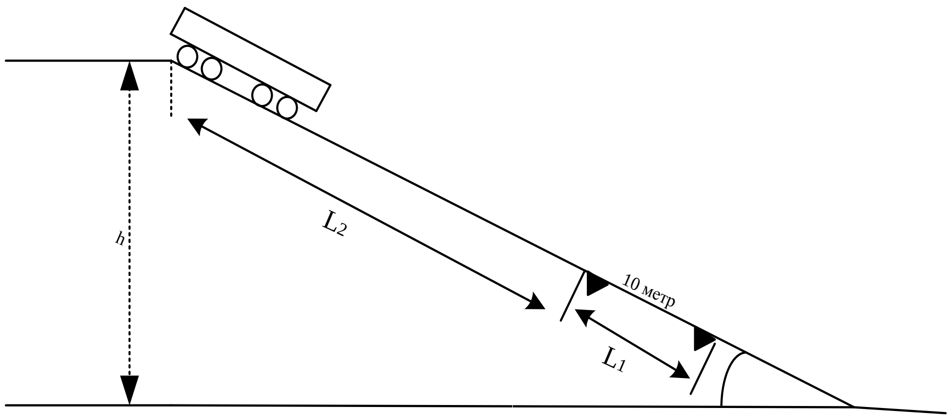

Figure 2. Scheme of intermediate distances at the descent of the hill

$$mgH = \frac{mv_1^2}{2} + L_2(F_{ishq} + F_{h.q}) \quad (1).$$

m the mass of the wagon;

F_{ishq} rolling friction force between the rail and the wheel pair;

$F_{h.q}$ the resistance of the air to the type of interruptions

L_1 the distance between two optical sensors is 10 meters;

L_2 the distance from the top of the hill to the first sensor;

$$V_1 = \sqrt{\frac{2\cdot(mgH - L_2\cdot(F_{ishq} + F_{h.q}))}{m}} \quad (2).$$

t the time taken to cover the distance between the two sensors;

$$t \approx m \cdot v \cdot k \quad (3)$$

We will have a formula.

Here

V_1 – the speed achieved by the wagon at the distance from the top to the first sensor;

k – deceleration coefficient;

$$V = \frac{2L_1}{t} - v_1 \quad (4)$$

deceleration coefficient;

$$t = k \cdot m \cdot \left(\frac{2L_1}{t} - \sqrt{\frac{2\left(mgH - L_2\left(F_{ishq} + F_{h.q}\right)\right)}{m}}\right) \quad (5)$$

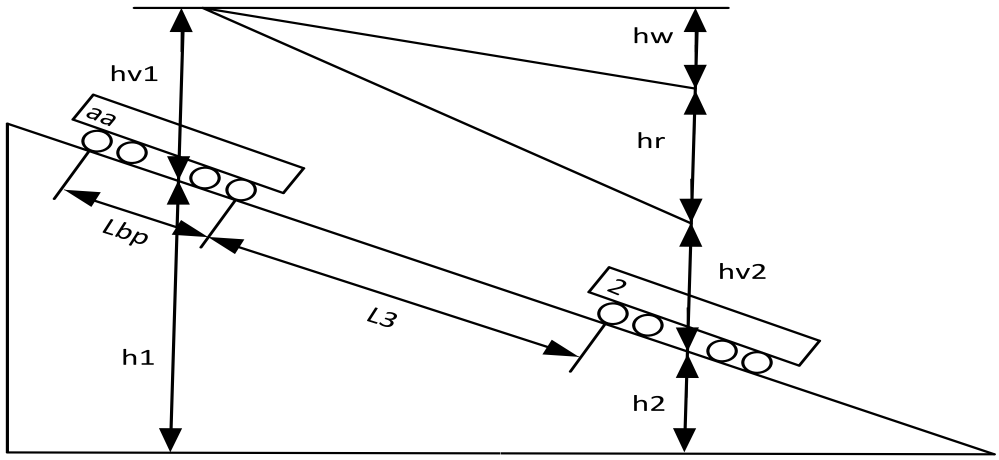

Figure 3. Scheme of the first elements in the descending part of the hill

$$m_{ўрт} = \frac{(m_1 + m_2 + m_3 + m_4)}{4} \quad (6)$$

1. The average value of the weights of the wagons (m1, m2, m3, m4) is calculated by means of 4 tenzo sensors installed to measure the weight of the wagon to the Yun of the sorting peak.

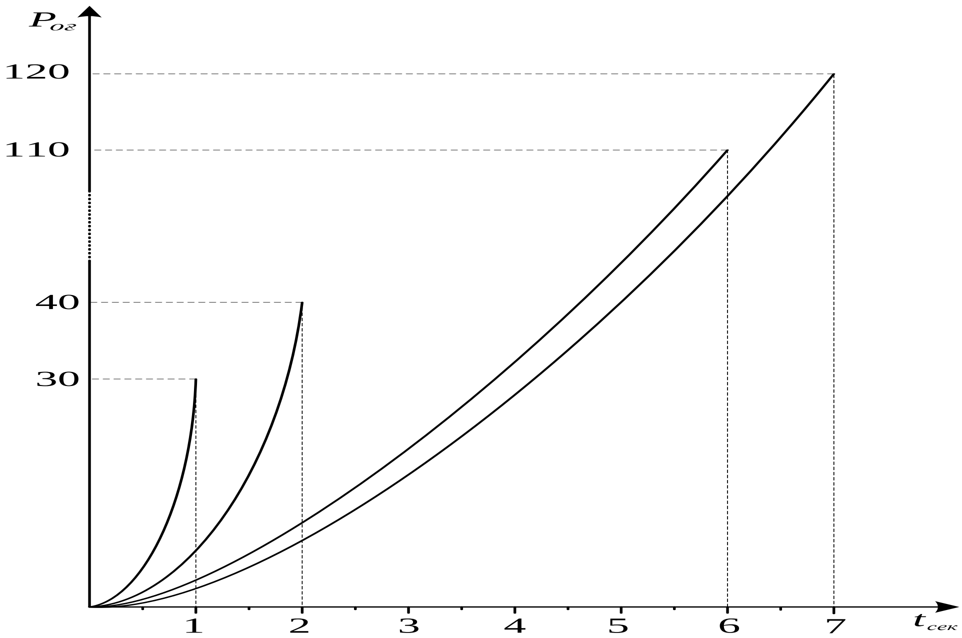

Figure 4. Graph of correlation of wagon deceleration time relative to wagon weight

The dependence of the deceleration time of the wagon on the weight of the wagon is calculated in accordance with the dependence of the following expression.

$$t_{сек} \approx \{P_{огир}, v_0, v_B, n_0^п, l_я, l_ё\} \tag{7}$$

Table 1 Wagon weight decelerator time duration table

т/р	Q_x, [т]	$t_{сек}$, [сек]
1	23=<30	3
2	<=40	4
3	<=50	5
4	<=60	5
5	<=70	6
6	<=80	6
7	<=90	6
8	<=100	6
9	<=110	7
10	<=120	7

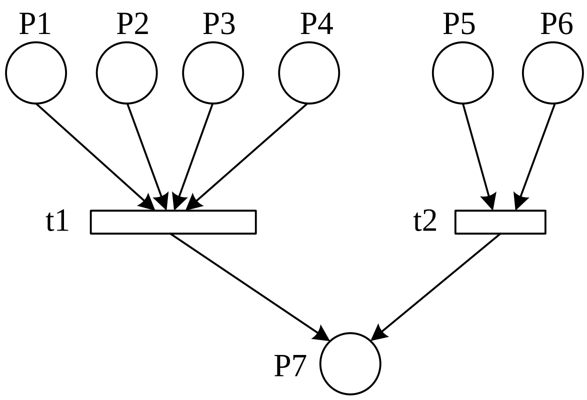

Figure 5. Petri network modeling of the interdependence of automation and telemechanics devices of the sorting peak.

Table 2 Conditions of tenso and optical sensors

т/р	Pi	Circumstances
1	P1	The first tenzo sensor position
2	P2	The state of passing the wagon wheel pair over the second tenzo sensor
3	P3	The condition of passing a pair of wagon wheels over the third tenzo sensor
4	P4	The state of passage of the wagon wheel pair over the fourth tenzo sensor
5	P5	The position of the wagon wheel pair on the first optical sensor
6	P6	The position of the wagon wheel pair on the second optical sensor
7	P7	Compressed mode of the decelerator

Table 3 Switching tenso and optical sensors from one state to another

т/р	ti	Transitions
1	t1	Sending the weight of the wagon wheel pair on the 1st, 2nd, 3rd and 4th tenzo sensors to slow down the wagon
2	t2	The second optical sensor is sent to the wagon deceleration speed of the wagon wheel pair over the sensors

The cases R1, R2, R3 and R4 shown in Figure 5 and Table 2 represent the state of the tensorsensors, respectively. The passage of the wagon wheel pairs on the tenzo sensor allows an accurate calculation of the wagon weight. Cases R5 and R6 represent the case for optical sensors to determine wagon speed. If either of the cases R5 and R6 is equal to 0, the measured value of the wagon speed is not given to the wagon decelerator R7.

Through the transitions t1 and t2 given in Table 3, the transition conditions of the values transmitted from the thesis and optical sensors are checked.

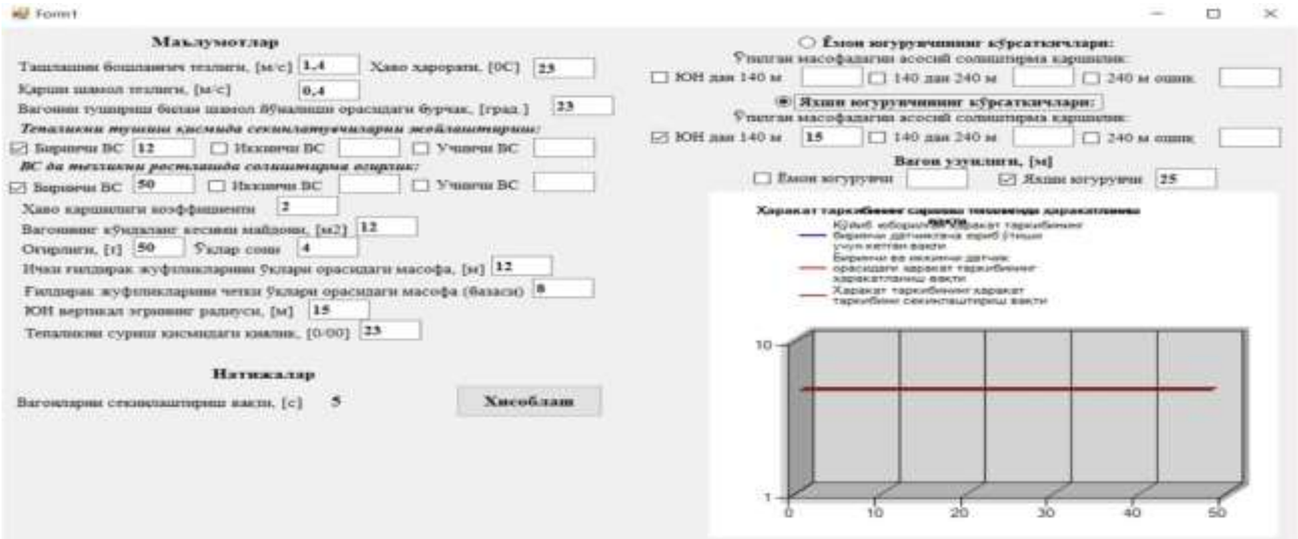

Figure 6. Interface of automated software for calculating the time of the car breaker

Scientific research has shown that it is possible to calculate the deceleration times, taking into account the performance of the wagon released from the sorting hill..

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