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MANAGEMENT OF THE TIRE WEAR PROCESS OF THE "BLACK BOX" TYPE AT ROAD TRANSPORT ENTERPRISES

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ABSTRACT

This article describes the rate of wear of vehicles and how to control during an operation period Uzbekistan and increase the economic performance of enterprises.

Keywords: M-1 (Maintenance-1), CTP (Control Technical Point), the wear of tire, intensity, black box, operation.

INTRODUCTION

Interpret a model of the tire wear rate process in the form of a "black box"

It is advisable to use a functional model that mimics the behaviour of the original to describe the process of tire wear. Function is one of the most important aspects of the essence of a system as a specific method of sustainable behaviour for a particular system. The functional approach is characterized by a seemingly ambiguous abstraction: firstly, by separating the system from its material composition, by separating its internal structure, and secondly by emphasizing the system's functional relationships with the environment. A complex mathematical system is seen as a unit of three objective principles: essence, the structure of internal relations, and functional relationships with the environment. A functional approach to systems does not completely eliminate the essence of the latter, but allows us to approach the disclosure of their essence.

METHODOLOGY

A generalized abstract method of operation of a model that is common and theoretically developed in cybernetics is the "black box". This internal structure is understood as a system unknown to the observer, but it can check the inputs (influencing factors-X) and results (response to function-Y) of this system. The functional model of the "black box" must match it in terms of input and output, i.e., with the same input effects, to determine the object-like reaction at the inputs.

It should be noted that the concept of "unknown to the observer" should be considered on at least two levels. First, the internal structure and mechanism of operation can still study systems that are not known to any researcher reliably. Second, the "black box" principle can be applied in research, the result of which is not to explain the operation of objects, but to achieve a certain state in X and Y; the latter is specific to research conducted with limited time resources. This approach allows you to temporarily remove yourself from some complex phenomena (e.g., physicochemical) that occur in the system under study, and significantly accelerates the solution of a number of practical problems (management, optimization, etc.) [8].

Thus, in the IDEF0 notation, a first-level context diagram representing a graphical model of the tire processing process in Erwin Process Modeler's CASE environment was constructed.

Pressure, road conditions and weight load, regulatory documents and diagnostic equipment are the control elements of the process, and technical personnel and process equipment are its mechanisms. Controls regulate and control the effects of adverse factors on the intensity of wear, and mechanisms are a means of taking measures to suppress these effects. Here the existence of controls and mechanisms applies only to the factors being controlled, viz. for internal pressure. There may be controls for uncontrollable factors (e.g., maximum tire load set by the manufacturer), but they cannot be affected by mechanisms.

DISCUSSION

In the first stage, the regression equation is selected. The a priori is set by the experimenter. It is important to keep in mind that in addition to factors and indicators, a model can have levels and combinations of these factors - a type of precision that provides a more detailed response surface and, as a result, a more complete picture. Influence of factors on tire wear intensity.

In mathematical language, the problem is structured as follows: you need to have some idea of the response function

$$Y = \varphi(x_1, x_2, ..., x_n), \quad (3)$$

where Y is the process parameter (response function) to be optimized, x_n is the independent variable that can be changed when setting up the experiments.

The end result of the model is a geometric image corresponding to the response function, which is called the response surface [4]. This surface may have a different appearance depending on the selected model that most accurately describes the processIf the system needs a model to describe the behaviour of the system (but not to explain the mechanism of events) and the researcher does not have hypotheses based on the basic laws of nature, then he can be satisfied with the hypothesis selected from the principle. simplicity, i.e., accepting polynomials, degree series, Fourier series, trigonometric polynomials, and others as an approximate function. In many sources, the description of the behaviour of the system is reduced to the description of the model in the form of an n- level polynomial. In addition, rotating central composition planning (AMCR) involves the use of a secondary polynomial [2].

Accordingly, the equation for the k factors will take the form:

$$Y = b + \sum_{i=1}^{k} b_i x_i + \sum_{i<1}^{k} b_{ij} x_i x_j \sum_{i=1}^{k} b_{ii} x_i^2 + \dots + \varepsilon, \qquad (4)$$

where - b_0 is free term, b_i is linear effects, b_{ij} is double interaction effects, b_{ii} is quadratic effects, x_i, x_j, x_i^2 are factors, ε is reflect the influence of random factors in this system calculation of the results of the evaluation of coefficient models based on the experimental data.

The regression coefficients are equal to the partial products of the Taylor series:

$$b_i = \frac{\partial \varphi}{\partial x_i} \qquad (5)$$

$$b_{ij} = \frac{\partial^2 \varphi}{\partial x_i \partial x_l} \qquad (6)$$

$$b_i = \frac{1}{2} \frac{\partial^2 \varphi}{\partial x_i^2} \qquad (7)$$

Experimental data can be used to calculate statistical estimates of regression coefficients and to obtain a model for the estimated output value.

As mentioned earlier, it is more appropriate to develop separate two-factor regression models for each route than to develop a universal three-factor model that evaluates each route. In this case, the regression model takes shape [1].

$$Y = b_0 + \ b_1 x_1 + b_b x_2 + b_{11} x_1^2 + b_{22} x_2^2 + b_{12} x_1 x_2 \qquad (8)$$

CONCLUSION

Construction of experimental planning matrix:

The experiment planning matrix is constructed depending on the number of factors considered in the regression model and the type of design. An experiment planning matrix is a matrix of variability levels of factors that are modified in a certain way to account for a combination of factor variations and the appropriate value of the statistical response. An experimental planning matrix is needed to determine the points of collection (obtaining a response value) of statistical data about an object with a combination of known factors and with minimal experiments. The experiment scheduling matrix for a two-factor model would be as follows.

In the experimental planning matrix, two x_1 and x_2 vector columns are constructed, the remaining vector columns (except x_0) x_1 and x_2 vector columns are determined by multiplication or squaring.

The core of the plan is formed using two levels of variables (in this case -1 and +1) and the number of points is determined by the number of factors in the formula

$$N = 2^k \quad (9)$$

where k is the number of factors being studied.

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