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Resource and diagnostic models PROHNOZUVANNYATEHNICHNOHO OF MACHINES FOR WORKS Forestry

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In the article the features of analytical approaches to the systematic recovery machines for Forestry work.

Recovery, performance, forestry machine.

Formulation of the problem. Ability to perform mode ρ is defined as a system $S_r(t_\rho)$, Meaning that $\rho = \rho(S_r(t_\rho))$ Where r - relative availability.

If given Θ_ρ , t_ρ 1 $\rho(S_r(\Theta_\rho))$ $> \rho(S_r(t_\rho))$ And given the resources (state resources are used in the management readiness) $V(\Theta_\rho)$ Then there are two problems.

1. Translate system $S_r(\Theta_\rho)$ in $S_r(t_\rho)$ during $\left|\Theta_\rho, t_\rho\right|$ If the necessary resources $V(S_r(\Theta_\rho); S_r(t_\rho); \left|\Theta_\rho, t_\rho\right|) \le V(\Theta_\rho)$. At that resources must be used optimally. A concept of optimal defined before.
2. Let $V(S_r(\Theta_\rho); S_r(t_\rho); \left|\Theta_\rho, t_\rho\right|)$ $> V(\Theta_\rho)$. Then you must choose the profile that belongs to the same stage of recovery, the closest to a given extent regime determined.

Analysis of recent research. Regardless of the type of problem in its present condition interpretation presence information $S_r(t), t \in (0, T]$ [1]. You also need to have a forecast of $S_r(t), \Theta; t$ $< T$ [2], in order to provide a certain response to specific alternative development condition and necessary information on $V(t)$ [3], the forecast cost for each alternative resources development $S_r(t)$ [4], because at any moment can be executed or will be necessary to perform its volume of work on maintenance of readiness [5].

The purpose of research. Thus, the willingness of the machine can be defined as a state from which the system can move with a certain probability to any regime. What belongs to the selected subset of modes in the presence of a certain amount of resources.

Results. Taking an objective definition of research. You can highlight the challenges associated with maintaining readiness:

- Definition of authenticity identification status $S_r(t)$;
- Definition of real state (resource) $V(t)$;
- Definition of reach $S_r(t_\rho)$, $S_r(\Theta_\rho)$;
- Calculation of necessary resources $V(S_r(\Theta_\rho);S_r(t_\rho);|\Theta_\rho,t_\rho|)$;
- Construction of hypotheses about the ways of $S_r(t),\Theta;t<T$;
- Developing solutions for the distribution and assignment of resources;
- Development of process solutions implementation and use of resources;
- Management of the transfer process $S_r(\Theta_\rho)$ in $S_r(t_\rho)$;
- Informing management about $S_r(t)$.

Willing thus a function of time, state machine for rehabilitation work and Forestry Resources. Each mode of the system is typical bringing specific set of means that when using them or provide input to the new (subsequent) treatment, or of the current (set) mode. Such a system of means is integral structure with mechanical means, energy and information links. Then, readiness is determined by knowledge of the structure of means, their characteristics, etc. In other words, you must have a model system of means and have all ranges of attributes. This information may be recorded in the data on qualified personnel or knowledge base of information support systems and support decision making.

Thus the technical readiness of the machine determines the possibility of achieving the purpose for which the system was created, that is, to achieve a certain effect. Lowering the level of preparedness lowers the efficiency or effectiveness of the machine leads in some cases to losses that exceed not only the cost of means of support or readiness of the system, but the cost of the facility, where such a system is installed.

The level of technical readiness can be characterized appointment residual resource of technical components of the facility, representing an installation units, machinery and other equipment that provides performance machines Forestry works according to purpose. An important condition for the reliability of technical readiness assessment is to identify patterns of resource consumption intensity of conditions and modes of operation by means of a special resource testing, targeted collection and processing of experimental data on the results of diagnostic operations.

In this case, the overall assessment of a formalized statement of the problem and design technical readiness can be achieved through resource-diagnostic model of technical condition (TC RDM) as follows.

Suppose there is a function changes TS object or discrete parameter t, which is characterized by a set or vector of features w, which includes some diagnostic feature space W. Let us assume that there is generally some resolving extrapolating measurement results $w_1 ... w_x$ at times t1 ... ..tx. forming a plurality $T_k = (t_1 .... t_n), W(T_k) = (w_1 ... w_x)$.

denote $w(1/T_k)$ a process that can predict the interval (t_x, t_{x+1}) Obtained by extrapolation rules. Then, under the condition existence region Ω_x in a space that meets the operational state of the object, for all $t \in (t_x, t_{x+1})$ At all $w(t/T_k) = \Omega_x$, TC will also meet efficiency facility. To assess the impact of conditions denote the vector of external influences $g(t)$ And parameter vector object denoted by a.

Also agree that the evaluation feature vector W becomes known vector measurement errors $n(t)$. Also, let there vector measurement system W and object b Which provides for the formation of a technical state vector object $u(t)$ using the $w = G(u, n, b)$.

Then change the technical readiness will be characterized by the differential equation: $du/dt = f(u, g, a)$ Which is seen in space $TC - U$. Consequently, there exists a range of acceptable conditions in space U That meets Ω_x.

So you can find $U(T_k)$ That meets $w(T_k)$ And hold extrapolation process $u(t)$ the interval (t_x, t_{x+1}). Similarly, one could argue that the interval TS (t_x, t_{x+1}) reaches limit state (HS), if $u(t) \in \Omega_x$ for all $t \in (t_x, t_{x+1})$.

Posteriori probability of achieving the object boundary condition (HS) will be equal $P(t/T_k) = P(u(t)) \in \Omega_x; t \in (t_x, t)/w(T_k)$. Because the problem is considered in relation to TC forecasting, limit Ω_x must meet the threshold condition.

Posteriori probability distribution function achieve the ultimate state that corresponds to a fixed value process $U(T_k)$ on the set (T_k) equals $P\{(t/u(T_k) = P(u(t)) \in \Omega_x; t \in (t_k, t)/u(T_k)\}$. Then we can write:

$$P(t/T_k) = \int_{\Omega_x^x} P[t/u(T_k)] P[(u(T_k)/w(T_k)] du(T_k), \tag{1}$$

where: x - the number of points in time t1 ... ..tx, which took place measurement process $w(t)$.

With the value of allowable probability of achieving the object limit state - $P_{доп}$ individual or residual life $t_{зал}$ will be determined by inequality $P(t_k + t_{зал})/\Gamma \geq P_{доп}$. Maximum allowable residual life actually can be found from the equation $P(t_k + t_{зал})/\Gamma = P_{доп}$.

The information required to assess technical readiness is mainly a result of observations $w(T_k)$, The values are determined by evaluation of the state vector $\overline{u}((T_k)=(\overline{u},...\overline{u}_x)$Parameters object $\overline{a}$ and measuring system $\overline{b}$. In this case indentyfikatsiya TS by using the ratio $P(t/T_k)=P[(t/\overline{u}(T_k)]$. This assessment is rougher than the score. Which uses a probability distribution function.

The distribution function of the residual life as an indicator of TC and technical readiness will look like: $F_{зал}(t_{зал}/T_k)=1-P(t_к+t_{зал}/T_k)$.

Considered concepts and indicators reflect the structural and technological features of the system and its elements as resursonosiyiv and depend on the adaptability of the system to implement renewable TOR operations.

Conclusion. We can conclude that the considered overall assessment of a formalized statement of the problem acceptable level technical condition in the management of technical readiness of machines for Forestry work makes possible efficient use of resource-developed diagnostic model of technical state of objects and their components and subsystems in the presence of a quantitative impact assessment of conditions and modes of operation intensity expenditures's due and resource estimates actual remaining resources. The use of formal methods and models describing the technical condition of the objects with the creation of special computer-oriented software tools enable developers and operational staff to conduct more accurate assessment of the performance object functions assigned to it and more effectively manage the necessary technical support preparedness against the object of its subsystems.

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Features Considered in Article Analytical approaches for systematic recovery machines for disability lesotehnycheskyh works.

Restoration, disability, Lesnaya machine.

In paper the considered features of analytical approaches to systemacity of restoration of working capacity of mashines for forestry works.

Restoration, working capacity, forest mashine.

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DYNAMIC ANALYSIS OF TRAFFIC bridge cranes

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The paper analyzes the dynamic movement of the bridge crane based mechanical characteristics of the drive motor mechanism for horizontal movement. The task solved by numerical integration of differential equations of motion of the bridge crane. The results of the illustrated graphs that characterize the transition process of overclocking overhead crane.

Crane, truck, dynamic loading, dynamic model, mathematical model, reduced weight, beam crane, optimization.

Formulation of the problem. When using metal bridge crane subjected to significant dynamic loads.

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At various stages of movement is fluctuation bridge crane, end-beams and other cargo units and their components that make up a mechanical system. Note transient dispersal mechanism for moving the bridge. This process is accompanied by the highest values of dynamic loads that directly affects the speed of operations performed, additional power consumption, reliability and tap in case of failure results in additional material costs for repairs. Therefore, further research of these negative factors necessary to conduct a dynamic analysis of the motion of the mechanical system.

Analysis of recent research. The authors of [1] investigated the transverse vibrations of the bridge when it is moving with various provisions of the cart. It used trymasova dynamic model for which is illustrated graphics transients movement of the mechanical system. The authors of this paper have proposed modal regulator [2], which allows extinguish elastic vibrations in a linear model and a model with distributed parameters. For further research dvomasova used a dynamic