NORMALISATION OF RELIABILITY INDICATORS FOR HYDROPNEUMATIC UNITS

Fatieieva N., Fatyeyev O., Poliakov V.
National Technical University «Kharkiv Polytechnic Institute», Kharkiv

An important issue that must be taken into account when designing hydropneumatic units is the distribution of normalised reliability indicators. The specific forms of requirements and the choice of the nomenclature of reliability indicators are based on expert analysis.

Very often, reliability requirements for newly developed systems are set based on the achieved level of reliability of analogous or upgraded systems. In this case, statistical data on the achieved reliability characteristics of the main components of the system are used in addition to expert assessments. The output characteristic of system reliability can be, for example, productivity, accuracy, speed, load capacity, etc. When setting the optimal level of reliability, it is necessary to conduct a comparative analysis of the change in the output characteristic depending on the level of reliability.

The object of normalisation may be the normative values of reliability indicators themselves; control levels of reliability indicators; normative values of the confidence level with which the control levels of reliability indicators should be confirmed. The distribution of reliability requirements between system elements is based on the assumption that system elements fail independently of each other, and the failure of any element leads to a system failure, i.e. the system consists of elements connected in series and the failure rate is constant.

We will analyse the methods of distribution of reliability norms and use them for hydropneumatic units constructed using formalised algorithms for the synthesis of hydropneumatic unit schemes.

Summing up the results of the analysis, it can be noted that for hydropneumatic units obtained by the method of the standard positional structure, the distribution of normalised reliability indicators at the design stage should be made by two methods: the method of proportional distribution and the method of distribution of reliability requirements taking into account the relative vulnerability of elements. For hydropneumatic units implemented by the minimisation method, the distribution of normalised reliability indicators at the design stage should be made by the method of distribution of reliability requirements taking into account the relative vulnerability of the elements [1].

Using the methods of distribution of normalised reliability indicators already at the design stage, it is possible to obtain the proper reliability of hydropneumatic units.

References:

1. Fatieieva N., Fatyeyev O., Poliakov *V.* Reliability of hydropneumodrives for metal cutting equipment. *Bulletin of the National Technical University "KhPI". Series: Hydraulic machines and hydraulic units.* Kharkiv: NTU "KhPI". *2023. No. 1. P. 56–59.* doi: 10.20998/2411-3441.2023.1.09