Keywords: spine, lumbar, transpedicular system, fixation, stress-strain state, cortical tissue, spongy tissue, articular cartilage.

Influence of the geometry of the running track on its contact interaction with a spherical piston of a hydrovolumetric drive / N.B. Skripchenko, A.V. Tkachuk, N.N. Tkachuk, E.I. Kasay, B.I. Kryliuk // Bulletin of NTU "KhPI". Series: Machines and CAD. – Kharkiv: NTU "KhPI", 2015. – № 31(1140). – P. 81-100. – ISSN 2079- 0775.

A modification of the boundary element method has been developed for the analysis of the relation between the geometry of the running track and its contact interaction with a spherical piston of a hydrovolumetric drive. A parameterized model provided information about the influence of the geometrical profile of the running track and the compliance of the rough contact layer upon the distribution of the contact pressure. Characteristic configurations of contact areas and contact pressure distributions have been identified

Keywords: contact interaction, contact pressure, compliance, roughness, boundary element method.

Methods, tools and technologies of discrete-continual strengthening of surface layers of machine parts / N.A. Tkachuk, N.L. Belov, A.I. Sheyko, S.A. Kravchenko, E.K. Posvjatenko, V.V. Shpakovskyi, S.S. Dyachenko, V.G. Goncharov, I.V. Ponomarenko, V.M. Sheremet // Bulletin of NTU "KhPI". Series: Machines and CAD. – Kharkiv: NTU "KhPI", 2015. – № 31(1140). – С. 100-110. **–** ISSN 2079-0775.

In this work new concept and methods are proposed based on the set-theoretic approach for resource improving for series of engines and special equipment by creating new technologies to strengthen surfaces of parts. A number of fundamental and applied problems are solved. The concept of generalized parametric modeling of complex mechanical systems under fuzzy criteria, process analysis and synthesis of new technology are worked out. The materials, modes and options for strengthening processes, corunduming and ion bombardment are scientifically grounded with the creation and design and technological solutions in the design and maintenance of engines and units of special equipment.

Keywords: technology of surface strengthening, resource improving, discrete strengthening, corunduming, ion bombardment.

Running strength and dynamic tests of the wagon-platform/ A.D Chepurnoy, A.V. Litvinenko, R.I. Sheychenko, R.V. Graborov, M.A. Chuban// Bulletin of NTU "KhPI". Series: Machines and CAD. – Kharkiv: NTU "KhPI", 2014. – № 31(1140). – P. 111-128. – ISSN 2079-0775.

The article describes the method and results of running strength and dynamic tests of the wagon-platform model 13-9975 carried out to verify compliance with the experimental dynamic stresses in the main load-bearing elements of the wagon when it moves, and the indicators of the quality of running to the requirements of normative and technical documentation. The developed scheme of loading the long wheelbase wagon-platform, taking into account the features of its design, perception and transfer loads during the exploitation. The performance driving characteristics of the car when driving with different modes of loading and different rates for specific areas of railway track are resented and evaluated. The conclusion to satisfy the criteria of dynamism, safety and durability requirements for structures of this type was done.

Keywords: wagon-platform, experiment, test, strain gauge, assessment of dynamism, strength assessment, state of stress, dynamic parameters

Numerical study of stress-strain state of a human femur affected disease - osteomielit / V.M. Shimon, O.V. Veretelnyk, A.A. Sheregiy, M.V. Shimon // Bulletin of NTU "KhPI". Series: Machines and CAD. – Kharkiv: NTU "KhPI", 2015. – № 31(1140). – P. 128-135. – ISSN 2079- 0775.

This paper presents results of stress-strain state study of human leg with the defeat of disease femur. The study looked at various models describing the different state of the femur: the intact condition of the femur, defeat affected by osteomyelitis and defeat affected by osteomyelitis with external locking structure. According to results the field study were obtained equivalent stress and compared the maximum values of equivalent stress and total displacement for the components models.

Keywords: human femur, osteomyelitis, finite element method, the stress-strain state, total displacement.

ЗМІСТ