

Specialty description

05.02.10 – MATERIALS AND CONSTRUCTIONS DIAGNOSTICS

I. Specialty Definition

The area of science and technology which studies influence of mechanical and temperature factors, physical and chemical factors of environment (including radiation) on structure and mechanical properties of materials, on load-carrying ability of constructions. The area develops methods of objective estimation of current and critical states, of materials and constructions failure development processes with designing of equipment for diagnostics and analysis (including software).

II. Research Areas

Application of modern methods of mathematical physics, computational mathematics, theory and statistical methods of variate analysis for quantitative description of interaction of physical fields with real materials and their effect on stressed state of elements of constructions.

Development of physical and mathematical models of influence of load characteristics and physical and chemical factors of environment on informative parameters of non-destructive testing; evaluation of parameters' validity.

Investigation of influence of operational factors and environment characteristics on operating life of constructions, estimation of parameters for evaluation of changes in materials' structure during their operational life.

Study of materials' and constructions' ageing processes, changes of mechanical properties of materials, development of methods of prevention and reduction of influence of mentioned changes on operational characteristics of constructions' elements, development of methods of evaluation and improvement of structural strength and durability of constructions and their elements.

Development and implementation of experimental methods and instrumental means of stressed state study and non-destructive testing of materials, diagnostics of strength, reliability and durability of constructions' elements.

Development of methods of data obtaining, processing and transmission for information about defects and stressed state of objects, development of software for computer-based systems for stresses and deformations evaluation, monitoring of technical state of objects.

Development and implementation of analytical, informational, experimental and diagnostic systems for decision making about structural strength of objects using information about defects and possible operating regimes.

Development of experimental methods and technical means of measurement of residual and operational stresses, deformations and structural strength of welded constructions. Development of methods and algorithms for reliability and validity control of diagnostic systems, their calibration and certification.

III. Area of Scientific Degree

Technical sciences

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