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ACOUSTIC DIAGNOSTICS OF THE STATE OF A STRUCTURE UNDER HYDROSTATIC PRESSURE

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The article is devoted to the development and verification of a method for evaluating the vibro-acoustic characteristics of underwater vehicles under the influence of external hydrostatic pressure. When operating deep-water structures and equipment, such as diving chambers and underwater structures, it is particularly important to monitor their technical condition to ensure reliability, safety and durability. The presented approach is based on the use of finite element modeling to analyze changes in stiffness and acoustic characteristics of structures caused by the occurrence of stress-strain state under load. The method was tested using the example of a model of a sealed cylindrical shell subjected to controlled loads in a high-pressure chamber to simulate a deep-sea environment. The results demonstrate the possibility of detecting signs of structural integrity changes and assessing the degree of damage through spectral analysis of acoustic radiation. The proposed approach has the potential for non-destructive testing and can be used to diagnose both individual structural elements and complex systems, which expands its practical use in underwater engineering and civil engineering.

Keywords: vibroacoustics, hydrostatic pressure, underwater vehicles, modeling, diagnostics, stress-strain state

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