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SURFACE DEGRADATION MONITORING CAUSED BY CAVITATION EROSION AFTER CORROSION IN MARINE ENVIRONMENT

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ABSTRACT
Monitoring cavitation erosion in materials is crucial for their performance in environments characterized by severe fluid flow conditions. Materials such as metals, ceramics, and composites, commonly used in these applications, must possess specific mechanical properties to effectively resist cavitation erosion. Additionally, various environmental factors, including different chemical solutions, can significantly alter a material's response to cavitation. In this study, the impact of a marine environment was investigated using a prepared NaCl solution, following the standard procedure of ISO 11130:2017 (E), to evaluate its influence on further the cavitation erosion exposure of materials. Cavitation erosion tests were performed on steel samples (42CrMo4) after immersing them in the NaCl solution for 120 days. An ultrasonic vibratory test, conducted according to the ASTM G-32-16 standard, was employed to assess the material's erosion resistance. To evaluate the extent of cavitation damage, various methods were utilized, including monitoring mass loss and calculating the mass loss rate, as well as conducting image analysis to quantify pit dimensions, the number of pits, and overall degradation levels. The results provide valuable insights into the relationship between material properties, environmental exposure, and cavitation erosion, with implications for the design and selection of material for use in marine and intensive fluid flow applications.