



TRANSIENT DYNAMIC RESPONSE AND FAILURE OF COMPOSITE STRUCTURE UNDER CYCLIC LOADING WITH FLUID STRUCTURE INTERACTION

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- Objectives of thesis

To understand the effect of Fluid Structure Interaction of composite in contact with water under dynamic cyclic loading

- Research ideas

Experiments are conducted to measure the degree of effect of FSI in submerged condition. Displacement controlled fatigue cyclic loading on E-glass laminate is performed in both air and water environments with varied frequencies to analyze the structural behavior and failure pattern of composites under FSI.

- Results

The results of the experiment show significant FSI effects on the fatigue failure lifecycle of the composite under high frequency loading of 2Hz, 5Hz and 10Hz. The degree of FSI effect of the 5Hz and 10Hz cyclic loading is significantly higher than 2Hz cyclic loading and the FSI effect varies for 5Hz and 10Hz, with 5Hz loading exhibiting a higher impact on the composite.

- Benefits/potential applications of the research

The knowledge gained from the investigation will benefit ongoing research into understanding the dynamic response and failure mechanism of the composite structures under FSI. The insights and suggestions for follow-on studies will contribute to the development of future life prediction modeling or tools that will help to prevent premature failures in the design of composite vessel—particularly a naval ship—where survivability is vital.

