# Improved Mold Design for Impact Testing of Stiffened Panels: Enhancing Structural Integrity

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#### Abstract

Reinforced fiber-reinforced composite panels are widely used in aerospace, marine, and other high-strength engineering applications. These panels are formed by bonding a U-profile and a flat plate using adhesive, with their impact resistance and post-damage integrity serving as critical evaluation criteria.

In this study, glass fiber epoxy composite panels were manufactured, and impact tests were conducted. To ensure reliable impact test results, a test mold was designed to securely hold the panels during testing. However, the initial impact test mold caused openings at the panel edges and adhesive bond failures due to the impact. This issue compromised the reliability of the test results, making it difficult to accurately assess the true strength of the panels.

To address these shortcomings, an improved impact test mold was designed. In the new design, mechanical fastening elements and structural reinforcements were incorporated to maintain the structural integrity of the panel after impact and stabilize the adhesive joints. As a result, the accuracy of the data obtained from impact tests was significantly improved. Experiments conducted using the modified test mold were compared with those from the initial mold, demonstrating that the new design provided more reliable results.

### Keywords

Stiffened panels, impact test, molding design, structural integrity, fiber reinforced composites.

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