

Plug Repairs of Marine Glass Fiber / Vinyl Ester Laminates Subjected to Uniaxial Tension

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Glass fiber/vinyl ester composite laminates are currently being used and proposed for the hulls, bulkheads, and superstructures of large ships. This thesis examines the effectiveness of the repair of such laminates using glass fiber/vinyl ester chopped strand mat plugs to fill circular holes.

The stress distributions around circular holes in various glass fiber/vinyl ester woven roving laminates subjected to uniaxial tension are calculated before and after repairs using plug materials of different fiber volume fractions. The orthotropic laminates ranged from balanced to unidirectional woven rovings, and the chopped strand mat plug fiber volume fractions ranged from 0 to 0.40.

The effectiveness of the plug in reducing the laminate stresses increased monotonically with increasing fiber volume fraction, reducing the maximum laminate stress to about 60% of the unrepaired laminate stress at a plug fiber volume fraction of 0.40.

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