

DEVELOPMENT AND MANUFACTURING OF HIGHLY DAMAGE RESISTANT FIBER GLASS REINFORCED WINDOW PANELS FOR BUILDINGS IN HURRICANE PRONE AREAS

Severe windstorms such as hurricanes result in extensive damage to building envelopes and the interior due to the effects of flying debris impacts and fluctuating wind pressures. It is proposed to develop and manufacture a *new fiber-glass reinforced transparent laminated glass window* to greatly alleviate this problem of breakage of the glass panels, especially the inner glass plies. The proposed glass panel will consist of an outer glass ply, a fiber glass reinforced plastic (polyester) ply, and an inner glass ply. Subsequent to materials development, which is the first focus of the study, the reinforced panels will be subjected to extensive testing and fracture analysis under simulated windstorm conditions.

The goal is to obtain maximum toughness and an optimized glass composite panel, which is highly damage resistant, lighter and cheaper than the present panels. These new toughened panels along with an appropriate glazing system will be highly resistant to impact damage during severe weather conditions.

Objectives (Capabilities)

- Develop a transparent glass fiber reinforced polyester composite panel
- Determine interphase properties using nano-mechanical characterization techniques
- Develop laminated window glass panels
- Perform impact and fracture tests on the laminated window panels.
- Determine mechanical response of laminates to simulated hurricane conditions.

Application areas/Agencies

- Civil infrastructure
- Transport industry
- Improving fundamental understanding of composite material behavior
- Save lives and prevent property damage during high speed wind storms

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