

FAILURE OF TRANSPARENT POLYMER COMPOSITE LAMINATED GLASS PANELS UNDER IMPACT LOADING

Ravi Shankar Kalluri

Dr. Sanjeev K. Khanna, Thesis Supervisor

ABSTRACT

Historically, windows and other facilities during hurricanes have experienced significant damage exposing the occupants and the building envelope to uncomfortable and dangerous conditions. A new approach to the design of window glass panels with hurricane damage resistance has been carried out in this research work. This has been achieved by developing transparent fiber reinforced polyester composites as the interlayer in the laminated glass panel. Transparency in the composite interlayer has been achieved by matching the refractive indices of the glass fibers with the polyester resin. The composite interlayer provides a higher strength, stiffness and damage resistance compared to the traditional PVB interlayer. The panels have been evaluated by conducting 3-point bend tests to determine bending stiffness, lap shear tests to determine the bond strength of the adhesive that is being used to bond the interlayer to the glass, and large missile impact loading tests to study their expected damage behavior during a hurricane.