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QUASI-STATIC BEHAVIOR OF GLASS FIBER/UNSATURATED POLYESTER RESIN/ORGANOCLAY NANOCOMPOSITES

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Nanocomposite specimens were made by hand lay-up method with the dimensions of 150mm×150mm in 4 layers, containing 0, 1.5 and 3(wt%) nanoclay. X-ray diffraction analysis and TEM confirmed intercalation and exfoliation of the nanoclay in the unsaturated polyester resin system used. Quasi-static perforation test were carried out to characterize the progressive damage mechanism during penetration and perforation as well as to assess the changes in energy absorbing mechanism due to dynamic effects for all specimens tested, also these test results were used to develop some understanding of penetration and perforation behavior of composite specimens considering hemispherical Tip projectile's geometry. The quasi-static perforation tests were conducted using a surface-hardened steel indenter with hemispherical tip, shank of length 15.5 mm, and a total length of 20 mm and diameter of 8.7mm. Figures for quasi-static force as a function of indenter displacement for various specimens obtained, all specimens show generally three distinct regions, inclusive penetration, perforation, and residual frictional force. The latter is being associated with indenter's shank surface as a result of contact with the specimen as it moves through the thickness. Results for quasi-static showed higher performance for specimens containing nanoclay in three distinct regions.