

# Sifat mekanik komposit sandwich woven s-glass dengan matriks epoxy dan inti polyurethane foam = Mechanical properties of sandwich composite woven s-glass with epoxy matrix and polyurethane foam core

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Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20411911&lokasi=lokal>

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## Abstrak

Komposit sandwich merupakan material yang mempunyai potensi tinggi dalam aplikasi rancang bangun struktur ringan karena memiliki perbandingan strength to weight yang tinggi. Penelitian ini dilakukan untuk mencari sifat mekanik dari komposit sandwich dengan kulit kombinasi serat woven S-glass dan epoxy dan inti dari polyurethane foam. Material dibuat menjadi dua jenis orientasi S-glass yang berbeda yaitu  $0^{\circ}/90^{\circ}/\text{PU}/0^{\circ}/90$  dan  $0^{\circ}/90^{\circ}/\text{PU}/-45^{\circ}/+45^{\circ}$ . Material dibuat dengan menggunakan metode hand lay up dan vacuum bagging. Uji mekanik yang dilakukan adalah uji tekuk dan uji tekan arah edgewise. Penelitian ini memberikan hasil bahwa komposit sandwich jenis  $0^{\circ}/90^{\circ}/\text{PU}/0^{\circ}/90$  memiliki sifat mekanik yang lebih baik dibandingkan dengan jenis  $0^{\circ}/90^{\circ}/\text{PU}/-45^{\circ}/+45^{\circ}$ , dengan nilai kekuatan geser inti ( $74,38 \pm 3,55$ ) kPa, nilai kekuatan tekuk ( $1,22 \pm 0,02$ ) MPa, dan nilai kekuatan tekan ( $222,96 \pm 8,98$ ) kPa, serta kerusakan patahan pada citra SEM.

*Sandwich composite is a material with high potential in light weight structure because of high strength to weight ratio. Research was done to find the mechanical properties of sandwich composite with S-glass and epoxy combination skin and polyurethane foam core. The sample is divided into two different S-glass orientation,  $0^{\circ}/90^{\circ}/\text{PU}/0^{\circ}/90$  and  $0^{\circ}/90^{\circ}/\text{PU}/-45^{\circ}/+45^{\circ}$ . The sample was made by hand lay up and vacuum bagging method. Flexural test and edgewise compressive test were used to determine the mechanical properties of the sample. From the result of the mechanical test, we know that sandwich composite  $0^{\circ}/90^{\circ}/\text{PU}/0^{\circ}/90$  has a better mechanical properties than  $0^{\circ}/90^{\circ}/\text{PU}/-45^{\circ}/+45^{\circ}$ , with ( $74,38 \pm 3,55$ ) kPa core shear stress, ( $1,22 \pm 0,02$ ) MPa facing bending stress, and ( $222,96 \pm 8,98$ ) kPa facing compressive stress, also with a fracture in SEM image.*