

ABSTRAK

Panel sandwich dengan *trapezoidal corrugated core* memiliki rasio kekuatan terhadap berat yang tinggi sehingga berpotensi digunakan pada struktur ringan. Kinerja panel sangat dipengaruhi oleh kualitas sambungan dan parameter pengelasan, khususnya jarak titik dan diameter elektroda. Penelitian ini bertujuan menganalisis pengaruh kedua parameter tersebut terhadap kekuatan bending, mengidentifikasi mode kegagalan sambungan, serta menentukan *transverse shear modulus* pada *trapezoidal corrugated core*. Landasan teori penelitian meliputi konsep panel sandwich, *trapezoidal corrugated core*, *Resistance Spot Welding* (RSW), *dissimilar welding*, uji bending berdasarkan ASTM C393, dan analisis *Two-way ANOVA*, dengan pendekatan *transverse shear modulus* Magnucka-Blandzi dan Magnucki. Penelitian menggunakan metode kuantitatif eksperimental dengan material Aluminium 1100, galvanis, dan Stainless Steel 304. Data diperoleh melalui pengelasan MIG dengan metode RSW pada variasi jarak titik 12, 6, dan 3 cm serta diameter elektroda 0,6; 0,8; dan 1,0 mm, kemudian diuji menggunakan *three-point bending* dan dianalisis secara statistik. Hasil menunjukkan jarak titik berpengaruh signifikan terhadap *maximum force* ($p=0,010$), sedangkan diameter elektroda ($p=0,127$) dan interaksinya ($p=0,148$) tidak signifikan. Kombinasi 0,8 mm dan 3 cm menghasilkan *maximum force* tertinggi sebesar 0,96740 kN. Kegagalan terutama terjadi pada sambungan *face sheet–core*, sedangkan *transverse shear modulus* sebesar 0,530 MPa. Dengan demikian, jarak titik merupakan parameter paling dominan dalam menentukan kekuatan bending panel.

Kata kunci: panel *sandwich*, *trapezoidal corrugated core*, MIG Spot, kekuatan bending, *transverse shear modulus*.

ABSTRACT

Sandwich panels with trapezoidal corrugated cores offer a high strength-to-weight ratio, making them promising for lightweight structural applications. The performance of sandwich panels is strongly influenced by joint quality and welding parameters, particularly welding point spacing and electrode diameter. This study aims to investigate the effects of these parameters on bending strength, identify the failure mode of the welded joints, and determine the transverse shear modulus of the trapezoidal corrugated core. The theoretical framework includes sandwich panels, trapezoidal corrugated cores, Metal Inert Gas (MIG) welding, Resistance Spot Welding (RSW), dissimilar welding, bending testing, and two-way Analysis of Variance (ANOVA), with the transverse shear modulus calculated using the analytical approach of Magnucka-Blandzi and Magnucki. An experimental quantitative method was employed using aluminum 1100, galvanized steel, and stainless steel 304. Data were obtained through MIG welding combined with RSW using welding point spacings of 12, 6, and 3 cm and electrode diameters of 0.6, 0.8, and 1.0 mm, followed by bending tests and statistical analysis. The results show that welding point spacing significantly affects the maximum force ($p = 0.010$), while electrode diameter ($p = 0.127$) and its interaction with spacing ($p = 0.148$) are not statistically significant. The combination of a 0.8 mm electrode diameter and 3 cm point spacing produced the highest maximum force of 0.96740 kN. Failure primarily occurred at the welded joints between the face sheet and core, while the calculated transverse shear modulus was 0.530 MPa. Thus, welding point spacing is the most influential parameter in determining the bending strength of the sandwich panel.

Keywords: *sandwich panel, trapezoidal corrugated core, MIG Spot, bending strength, transverse shear modulus.*