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Finite Element Modeling of T-joint in Sandwich Panels under Pull-off Loads

S. M. R. Khalili and A. Ghaznavi

ABSTRACT

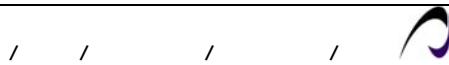
One of the disadvantages of sandwich panels is their joints, which usually decrease the efficiency of sandwich structures. The T-joint is one the most common joint for sandwich panels. This paper deals with the numerical study of the T-joint under static loading. The results of FEM analysis are validated by the experimental results available in the literatures. In general, the failure load predicted by the FEM is in good agreement as compared with the experimental results. In the modeling of the adhesive between joint components, contact elements and cohesive zone material model are used. In addition, damage and core shear failure of the base panel are modeled by using a written macro code in the ANSYS software. Therefore, both failure modes of sandwich panel joint are investigated. In addition, the effect of the joint geometry and material of the core of sandwich panels on failure modes and failure load are studied. Finally, the results show that changing the material of the core of the sandwich panel increases the joint failure load.

KEYWORDS : T-joint, Sandwich panel, Failure modes, Finite element analysis, Adhesive joint

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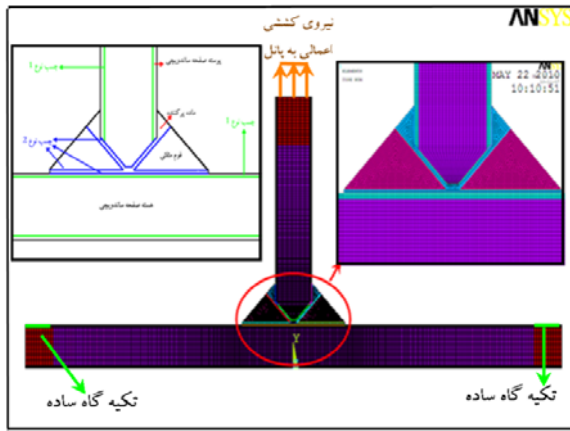
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 E_i () ()
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| V_{SP} | S(MPa) | G_{xy} (MPa) | Y(MPa) | E_x (MPa) | X(MPa) | E_y (MPa) | |
|----------|--------|----------------|--------|-------------|--------|-------------|------------------------------|
| / | / | | | | | | L1 Vinylester infusion [12] |
| / | / | | | | | | Crestomer I152 PA [12] |
| / | / | | / | | / | | Divinycell HD250 PVC [13,12] |
| / | / | | / | | / | | Divinycell H100 PVC [13,12] |
| / | / | | / | | / | | Divinycell H160 PVC [11] |
| / | / | | / | | / | | Divinycell H250 PVC [10] |
| / | / | | | | | | Divinycell HCP70 PVC [12] |

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$$p = k_n u_n (1 - d) \quad ()$$

$$\tau_y = k_t u_y (1 - d) \quad ()$$

$$\tau_z = k_t u_z (1 - d) \quad ()$$

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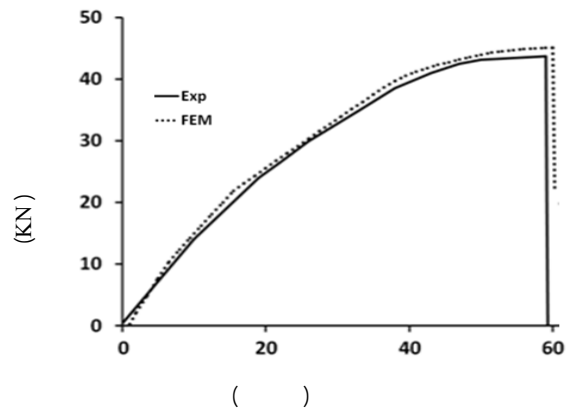
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|---|---|----------------------|
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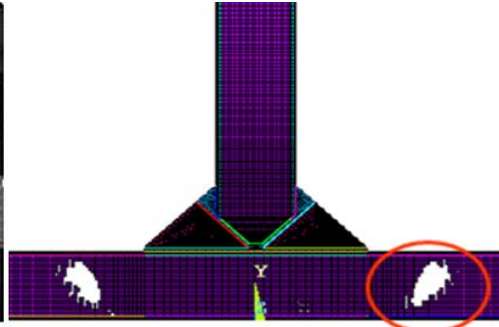
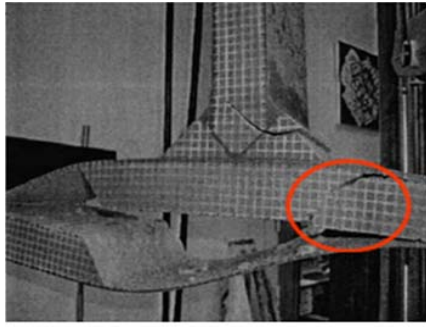
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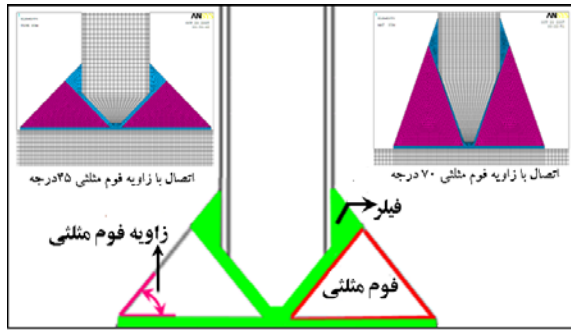
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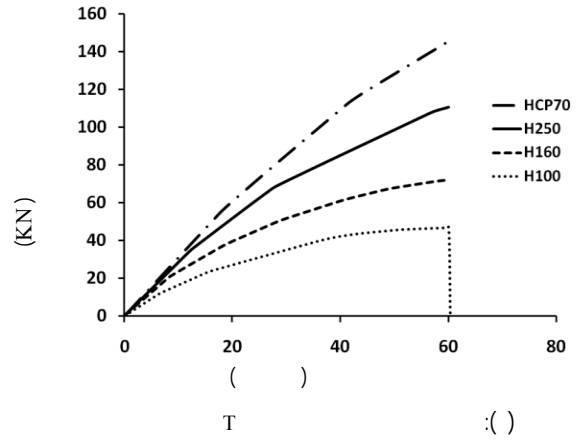
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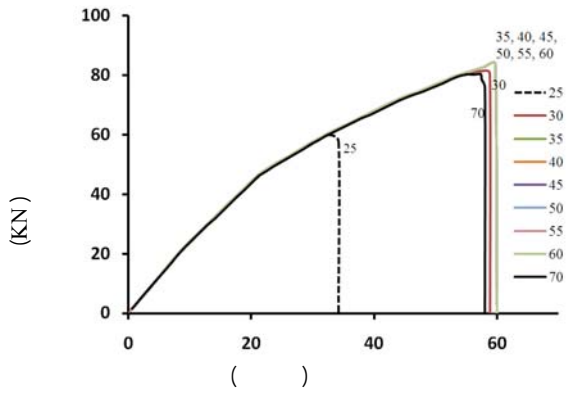
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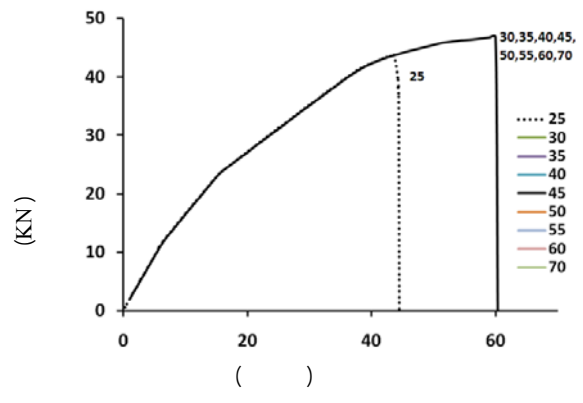
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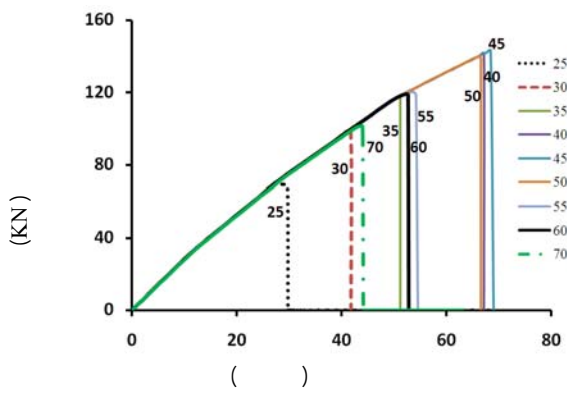




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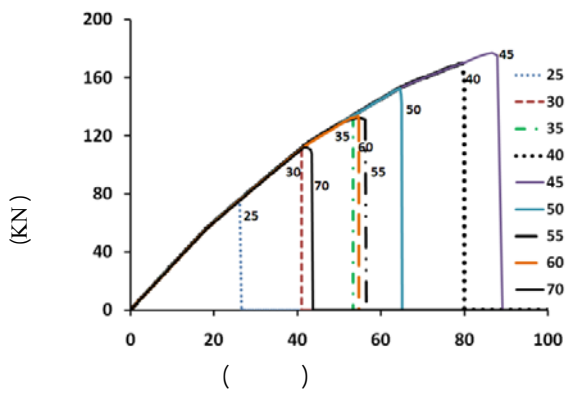


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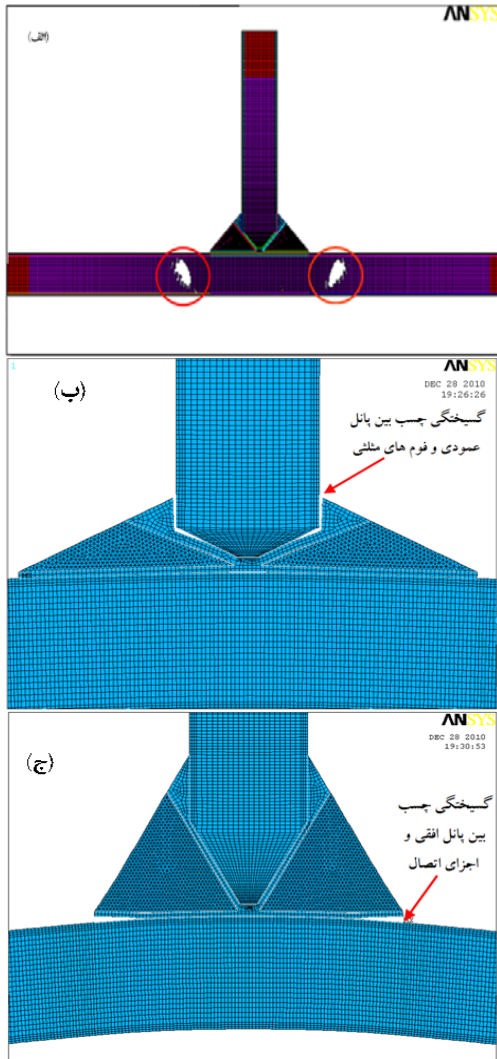
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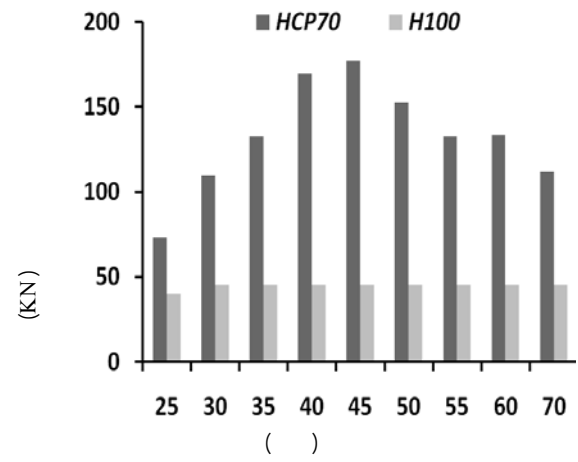
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