

Mechanical Performance of Sandwich Square Honeycomb Structure from Sugar Palm Fibre

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Abstract : This study focus on the compression and tensile properties of new and recycle square honeycombs structure from sugar palm fibre (SPF) and polylactic acid (PLA) composite. The end data will determine the failure strength and energy absorption for both new and recycle composite. The control SPF specimens were fabricated from short fibre co-mingled with PLA by using a bra-blender set at 180°C and 50 rpm consecutively. The mixture of 30% fibre and 70% PLA were later on the hot press at 180°C into sheets with thickness 3mm consecutively before being assembled into a sandwich honeycomb structure. An INSTRON tensile machine and Abaqus 6.13 software were used for mechanical test and finite element simulation. The percentage of error from the simulation and experiment data was 9.20% and 9.17% for both new and recycled product. The small error of percentages was acceptable due to the nature of the simulation model to be assumed as a perfect model with no imperfect geometries. The energy absorption value from new to recycled product decrease from 312.86kJ to 282.10kJ. With this small decrements, it is still possible to implement a recycle SPF/PLA composite into everyday usages such as a car's interior or a small size furniture.

Keywords : failure modes, numerical modelling, polylactic acid, sugar palm fibres

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