

Assessment on energy absorption of foam core sandwich panels under low velocity impact

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Abstract.

Lightweight foam cores are widely being used as an advanced alternative to improve the overall performance of sandwich structures. The impact resistance and energy absorption capability of lightweight sandwich panels mainly depend on the material properties and geometrical features of facesheets and core. To study the energy absorption capabilities of foam core sandwich panels, low velocity impact tests on panels with polyurethane or polystyrene foam core and aluminum or glass fiber reinforced composite facesheets were carried out. The tests were performed using a drop weight impact tower at different impact velocities ranging between 3.5 m/s and 4.5 m/s. The effects of facesheets and core thickness and type on the energy absorption capabilities of sandwich plates are hereby discussed. The energy absorption assessment is conducted by means of specific parameters such as normalized absorbed energy, specific energy absorption and crush force efficiency. The results show that the sandwich panels with polystyrene foam core are potentially an appropriate candidate for energy absorption applications due to their high absorption capabilities and decrease of the force transferred to the sandwich panel.