



Innovative Inserts for Sandwich Composite Panels OTT 1851

Applications

Aerospace, automotive, marine, construction, energy, biomedical, and recreational sports equipment.

Target Problems

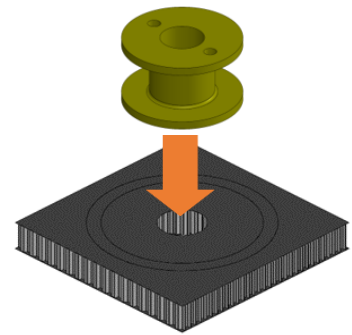
Standard inserts used to connect sandwich composite panels can experience premature joint failure due to stress concentrations caused by abrupt changes in stiffness. They often require post-cure machining and may not provide sufficient contact with panel components, which can limit strength and performance.

Solution

This technology uses additively manufactured inserts that are integrated into sandwich composite panels during the cure cycle. The insert geometry enables improved flow and distribution of potting material, enhances adhesion to the facesheets, and allows gradual changes in stiffness to reduce stress concentrations. The result is a fastening solution that provides higher strength, improved structural performance, and reduced post-processing requirements.

Key Benefits

- High Temperature Performance: Thermal stable and durable in extreme environments
- Increased Maximum Force: >200% in single-lap shear tests and >50% in pull-through tests compared with standard inserts.
- Superior Energy Absorption: Improvement of >550% in single-lap shear tests and >60% in pull-through tests compared with standard inserts.
- Enhanced Stiffness: >7% increase in stiffness in panels connected with these inserts, contributing to better load distribution and reduced risk of joint failure.



About this Technology

The inserts are manufactured using additive manufacturing methods that enable internal features not available with standard inserts. These features allow potting material to flow around the insert and into adjacent core regions while enabling the panel facesheets to overlap and adhere to the insert. The design also allows stiffness to be adjusted gradually, helping reduce stress concentrations within the joint.

Stage of Development

Experimental and numerical analyses have been completed to quantify improvements.

Partnering Opportunity

This invention is looking for partner apps with manufacturers that fabricate sandwich composite components.

Intellectual Property

Patent pending. Protected and managed by the UWM Research Foundation.

About the Inventor(s)

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