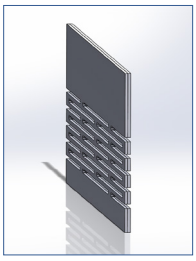
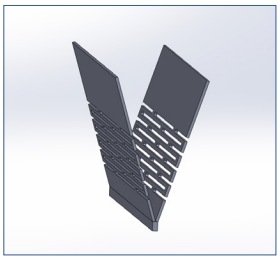
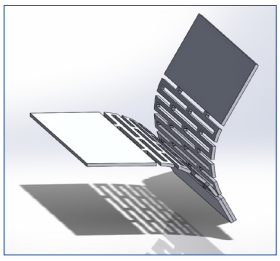
Lamina Emergent Torsional (LET) Joint

BYU #2009-101

DESCRIPTION

Researchers at BYU developed a torsional joint assembly formed from a planar material sheet that comprises a plurality of contiguous segments. The contiguous segments include at least two parallel hinge segments, each being coupleable to a loading structure; and at least a first connecting element that connects the hinge segments one to another, the connecting element extending substantially orthogonally to the hinge segments.

PROBLEM SOLVED

Part of the challenge in designing compliant mechanisms is finding suitable joints that provide the needed motion and force-deflection characteristics. The LET Joint is made from a single planar layer but provides rotational motion out of that plane, it is capable of large angular deflection, and is well suited to both macro and micro applications. The symmetry of the joint allows each individual torsional bar to go through less than the total joint motion, thus reducing the stress in each torsional member.

KEY ADVANTAGES

- ***Can be fabricated from a single layer of material, reducing the manufacturing costs***
- ***Allows for high flexibility and lower stress in the torsional members***
- ***Reduces off-axis loading on adjacent links***

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APPLICATIONS

Potential applications include: compliant mechanism applications where large deflections are desired, and micro-electro-mechanical systems (MEMS) such as torsional hinges, long flexible segments, folded-beam suspensions, and others.

IP STATUS:
US Patent 9157497

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BYU TECHNOLOGY transfer

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