Tensegrity Lattices for Structural Applications

Tensegrity lattices for meta-materials and structural applications allow for the building of stronger structures that can be severely deformed without losing their load bearing ability

A Georgia Tech inventor has developed a technology aimed at strengthening structural systems primarily composed of bars and strings. The technology is a method for constructing three-dimensional tensegrity lattices from truncated octahedron elementary cells. The required space-tiling translational symmetry is achieved by performing recursive reflection operations on the elementary cells. The resulting geometry has the fundamental tensegrity property of generating isolated compression regions, which in turn provide the ability for tensegrity lattices to undergo severe formation without permanent deformation, making them good candidates for shock absorption applications.

Summary Bullets

- Can be severely deformed and still not suffer permanent deformities
- Provides high energy absorption while making possible to recover the geometry after impact
- Concept can be immediately applied to larger structures

Solution Advantages

- Can be severely deformed and still not suffer permanent deformities
- Provides high energy absorption while making possible to recover the geometry after impact
- Concept can be immediately applied to larger structures
- Commercial application across a variety of different fields

Potential Commercial Applications

- Helmets for athletes, soldiers, etc.
- Bumpers/Crash-resistant structures
- Planetary landing gear (extraterrestrial or for traditional air travel)
- Most large structures
- Athletic, military, vehicular, and construction field

Background and More Information

Due to lack of adequate symmetries on traditional tensional integrity, or tensegrity unit cells, the design of 3D tensegrity lattices has remained an elusive goal, forcing engineers to rely on the more traditional polyhedrons when building columns, beams or plates. Tensegrity structures are essential to modern construction methods as, even in their current form, they allow for severe deformation while still maintaining load-bearing capacity. For the first time researchers have introduced 3D tensegrity lattice that can be used in the construction of complex 3D tensegrity structures.

Inventors

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IP Status

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Publications

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Images

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