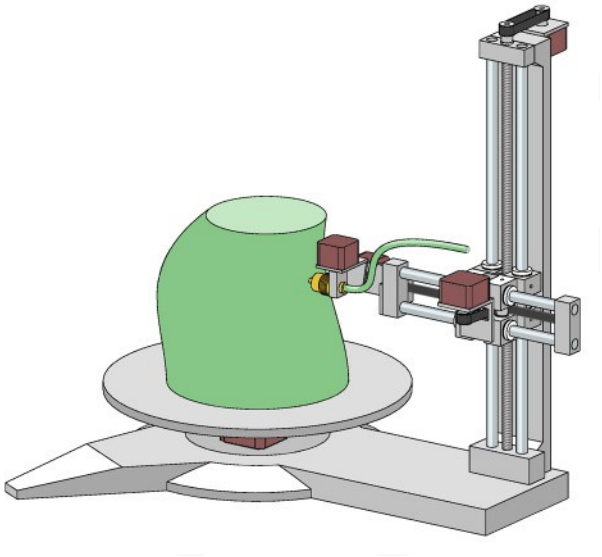
UNIVERSITÀ DEGLI STUDI DI TRIESTE

AN ADDITIVE MANUFACTURING DEVICE FOR MANUFATURING A THREE-DIMENSIONAL OBJECT

A revolution in 3D printing



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Brief description

Traditional Fused Deposition Manufacturing (FDM) 3D printing works by deposition of planar layers of termoplastic polymers. The resulting components are prone to delamination which occurs between these layers. The hybrid 3D printer we propose exploits a 2-phase approach, where a core is initially printed in the usual way (from the top), and subsequently acts as a substrate for the deposition of material on its side, with a revolving motion.

Innovative aspects and main advantages

By adding 2 axis to the print-head, and exploiting a cartesian-revolving kinematics, this revolutionary approach allows FDM technology to overcome inter-layer delamination. It is exceptionally well suited to be implemented in concert with the most recent techniques for long fibers composite 3D printing, providing unparalleled strength-to-weight ratios, especially in loosely revolved geometries.

Applications

Turbine blades, rotating shafts, pipelines, and presurrized tanks, for example, have geometries that get along extremely well with this technology, and often require either the high strength and low weight that it is able to deliver. All of this within the realm of additive manufacturing, suited for reduced lead-time production and prototyping.

Potential market

Small-scale production of high strength/weight ratio components, for example in isolated areas (Antarctica, disaster-struck communities, ISS), where supplying and delivery costs are too high or where access is entirely hindered.

Development status

Principle evaluation and testing, prototipation of a print head, development of a machine prototype. Currently waiting for patent approval.

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