



## An innovative Fabrication Process from Rolled Helicoidal Steel Strips

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### Abstract

“Metal Euplectella Folie” is a prototype which explores an innovative design and manufacturing method for free-form architecture. Four 40m long by 0.4m wide by 1.5mm thick steel sheets, each cut to a unique pattern and then spiral-wrapped, form a sculptural tube assembled without the need for any adjustment, plans or jigs.

This experimental construction is inspired both by the structural concept of the deep-sea sponge “Euplectella Aspergillum” - a thin-walled shell stiffened by helicoidal fins - and by the industrial process for fabricating helicoidal pipes - manufactured by wrapping a continuous strip of constant width. By adopting a strip of variable width, a new range of potential forms may be explored.

This shaping process takes advantage of the property of developable surfaces that allows complex three-dimensional objects to be formed from flat cut shapes by simple bending.

**Keywords:** Developable surfaces, elastic bending, spiral tube, architectural geometry, innovative process