

3D printed modular beams which can be assembled without formwork

DESCRIPTION OF INVENTION

Currently, reinforced concrete structures are made up of profiles that are built along the entire length of the piece, thus requiring expensive installations, making it difficult to transport as they require large vehicles which may have difficulty accessing certain areas.

There is a need for hybrid structures in which the polymeric profile is divided into segments, with the corresponding benefits that are obtained, which is precisely what the present invention provides.

The main novelty of the present hybrid structure is that the polymeric profile consists of multiple longitudinal segments assembled together, being able to be assembled and concreted in the place where the structure will be installed. This configuration is easy to transport and assemble, reducing the manpower for its execution, while eliminating the need for expensive formwork and

heavy transport vehicles with difficult access to some places.

These polymeric segments can be manufactured by any of the known techniques such as, for example, injection, moulding, pultrusion, 3D printing, etc.

Additive deposition technology, also known as 3D printing, is considered the one with the most advantages when defining complex geometries within the segments. Likewise, this technology avoids the chemical fumes that are produced in the usual methods by the use of resins, which improves the health of workers, while easily allowing the use of recycled polymeric materials, which reduces the carbon footprint. This profile acts as permanent formwork that once concreted the piece collaborates in the structural function of the system.

BUSINESS APPLICATIONS

- Architecture, building and civil engineering sector.
- Hard-to-reach places such as rural areas or in developing countries

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

- Less weight (80%) than concrete or metal beams.
- Avoids the use of large cranes or trucks for transport and installation purposes.
- Time and cost savings in manpower and material.
- Eliminates the need for expensive formwork and falsework.
- They can be printed and assembled on site, making it easy to install anywhere, no matter how difficult the access may be.
- Use of recycled plastics as plastic raw materials achieving a more sustainable construction.

STATE OF TECHNOLOGY DEVELOPMENT

Laboratory prototype

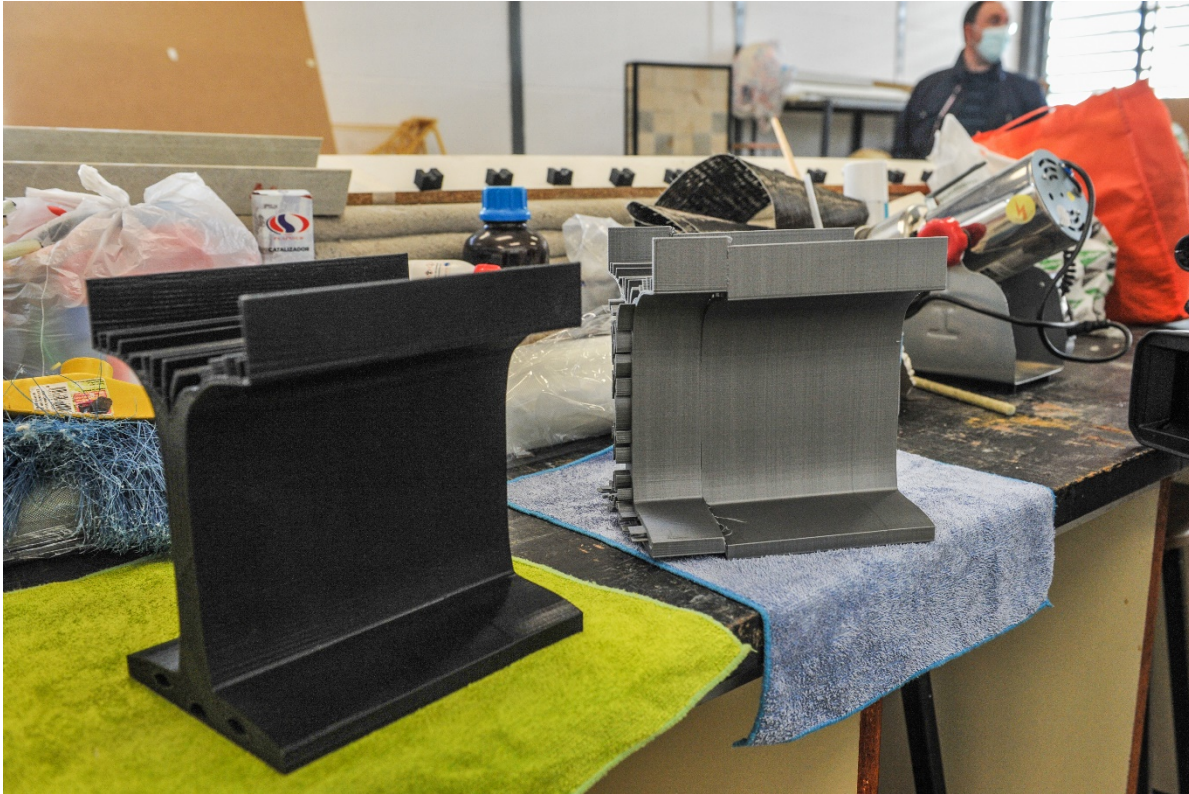
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Patent pending: 201830878

Priority date: 10/09/2018

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