

Innovative Reinforcement for 3D Printing of Concrete

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PennState



Fabricated prototype beams

Technology Summary

The Penn State inventors have developed a 3D printing method to efficiently produce efficiently structurally reinforced concrete prototypes based on an innovative reinforcing concept. The inventors performed various stress tests that demonstrated enhanced ductility, durability and flexural behavior of the fabricated beams. The inventors showed that right after printing the beams could be cut cleanly and reproducibly into individual subsections. Additionally, the inventors fabricated concrete blocks. Performance test on the cast-in-place concrete blocks demonstrated favorable mechanical, compressive and strength characteristics.

Application & Market Utility

3D printing extends to customized concrete beams, blocks, slabs, walls, and other structural components as well as entire buildings. 3D printing increases construction efficiencies and reduces of waste and labor savings from the higher productivity and quicker construction.

The disclosed invention enables curved components and other unique designed components, whether for load-bearing structural or non-load bearing aesthetic purposes. Examples of which include hollow, T-, U- and solid shapes. The inventors demonstrated enhanced ductility, durability and flexural behavior of the fabricated beams. The composite gains its strength from strong bonded interlocking between and integration of adjacent filaments and layers through innovative reinforcement.

Next Steps

Seeking licensing opportunities and research funding.

TECHNOLOGY READINESS LEVEL

4-7

Seeking

Investment | Licensing | Research

Keywords

- Concrete
- Additive Manufacturing
- 3D Printing
- Robotic Construction
- Structural Components and Buildings

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