Additive manufacturing of reinforced concrete members

Summary

Additive manufacturing of concrete members is already a reality. However, this new-technology is still far from replacing the traditional cast-procedure. The challenge is how to place the reinforcement inside the structural members. One of the most promising ways is through the use of reinforcing meshes. The main goal of the PhD thesis is precisely to develop a method to automate the placement of steel reinforcing meshes inside 3D-printed concrete members. In addition, low carbon concrete mixtures will be developed and studied, as well as optimization of reinforced concrete members geometry, taking advantage of additive manufacturing potential, both with the aim of improving sustainability.

The PhD-thesis will then focus on the required developments to take 3D-printing from the laboratory to the industry with clear advantages in terms of sustainability (less-volume, less-waste), productivity (less-workmanship, less-labour interruptions) and design possibilities (since no formwork is required, there are almost no geometric restrictions.

Keywords

3D printing, reinforcement, sustainability issue, construction.

Prototypes of vertical reinforcement.

Prototypes of horizontal reinforcement.

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