Automatization of the Constructive Process: a Systematic Study of the 3D Concrete Printing Technology (Contour Crafting)

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Extended Abstract

One of the innovations which already take place in different kinds of industries around the world is the 3D printing. It consists of printing a solid object based on a digital model. This process is already known for making it possible to craft complex shapes with little waste of material, or no waste at all.

When taking a closer look in the Brazilian scenario, more specifically in the field of civil construction, despite the growth seen in the last decades in this field, the technological innovations have not taken place in the current processes. This becomes clear when comparing Brazil with the USA and Europe [1]. One of the reasons behind this scenario is the lack of knowledge among professionals.

Technologies such as Contour Crafting, Concrete Printing and D-Shape have brought 3D printing to the construction processes [2], and already make progress. In Austin, Texas, for example, two companies have built a 35m² house in 48 hours [3], with plans to build 100 houses with the same technology in a community based in El Salvador, in the year of 2019. The cost of the construction was of approximately US$33,000.

The possibility of using cheap and quick methods to provide housing for communities brings an opportunity for Brazil to solve its housing deficit. According to IBGE [4], around 5% of the Brazilian population lives in subnormal conglomerates.

The researches brought within this study aim to present techniques of 3D printing which are currently available for construction works and make a comparison between these, to verify the advances obtained by the 3D printing technologies, to point out the advantages and disadvantages of the Contour Crafting method in relation to the other concrete 3D printing methods and to analyze the current scenario in the implementation of the Contour Crafting technology in Brazil for building popular housing.

This study will be made under the research methodology of Systematic Literature Revision (SLR), based on the studies presented by Morandi and Camargo [5], Piña [6] and Mariano e Santos [7]. This methodology is divided in three steps: Search, Eligibility and Codification; Quality Evaluation, and Results Synthesis.

The Search, Eligibility and Codification step provides a research strategy to help search the best sources among all the sources available. The Quality Evaluation step focuses on the verification of the credibility of such sources. The Results Synthesis step aims to reach new knowledge by establishing a relationship between the several results found within the researches.

Based on this, a comprehensive search on the Scopus search engine will be made to identify the articles, then high impact journals in the area of automation in construction with top rankings will be selected and classified, and finally a deep analysis of the article content will be conducted considering the development of the research on the discipline.

References

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