An Automated Quality Monitoring and Control Method for Concrete 3D Printing / Additive Manufacturing

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BRIEF DESCRIPTION

3D printing of concrete structures is a highly efficient, cheap process. However, imperfections are difficult to detect and can compromise the performance of these structures. UCI researchers have developed a method in which a current sent through the printed structure produces a “fingerprint” that allows the real-time detection of flaws in the concrete structure.

SUGGESTED USES

·Detection of flaws and imperfections in concrete, cementitious materials, and clay

·Control and monitoring of 3D printing process

FEATURES/BENEFITS

·Allows easy detection of flaws and imperfections in concrete, cementitious materials, and clay

·Allows control and monitoring throughout printing process, including adjustment of process and materials

·Increases safety, durability and performance of concrete structures 3D printed

TECHNOLOGY DESCRIPTION

3D-printing of concrete or clay materials is becoming a popular construction tool, as it is fast and cost-efficient. However, 3D printing is known to produce flaws and imperfections which can affect structural performance, safety, and durability in 3D printed concrete, structural materials.. The primary method to detect these flaws is visual inspection of the structure or materials.

The UCI researchers developed a method for printing 3D materials, including concrete, in which a current is sent through the printed materials and the current-dependent output is measured. In this method, a “fingerprint” is created, allowing in situ control and monitoring of the printing process. The fingerprint can show the nature and location of flaws and imperfections. This amazing method is a closed feedback loop, allowing real-time modifications of materials, speed, and even reverse printing to correct imperfections.

STATE OF DEVELOPMENT

Working prototype created>/P>

PATENT STATUS

Country	Type	Number	Dated	Case

CONTACT

Ben Chu
ben.chu@uci.edu
tel: .

INVENTORS

» Li, Mo

OTHER INFORMATION

CATEGORIZED AS

» **Materials & Chemicals**
» Composites
» **Engineering**
» Other
» Robotics and Automation

RELATED CASES

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United States Of America	Published Application	2021-014663	05/20/2021	2020-326	

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5270 California Avenue / Irvine,CA
92697-7700 / Tel: 949.824.2683