Concrete Extrusion in Digital Fabrication

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Goals

• Research and development of a concrete extruder for an industrial robotic arm
• Study the rheology requirements for concrete and waste-based concrete materials.
• Evaluating concrete printing to increase resource efficiency in construction

Research Methodology

• Phase 1
  • Develop a gravity-fed extruder to be attached to an industrial robotic arm
  • Evaluate rheology of concrete
• Phase 2
  • Develop extruder with a continuous-flow pump
  • Evaluate waste-based materials to be extruded

Results

• If we can develop an extruder that facilitates the use of waste-base concrete in construction, we can incorporate repurposed waste materials in the building of digitally designed structures.

Figure 1. Example of an existing concrete extruder attached to a robotic arm

Figure 2. Hybrid Extruder Design. Gravity-fed + continuous-flow pump

Figure 3-5. Examples of existing concrete extruders

Figure 6-8. Existing digitally designed printed structures

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