

# 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



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

## 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

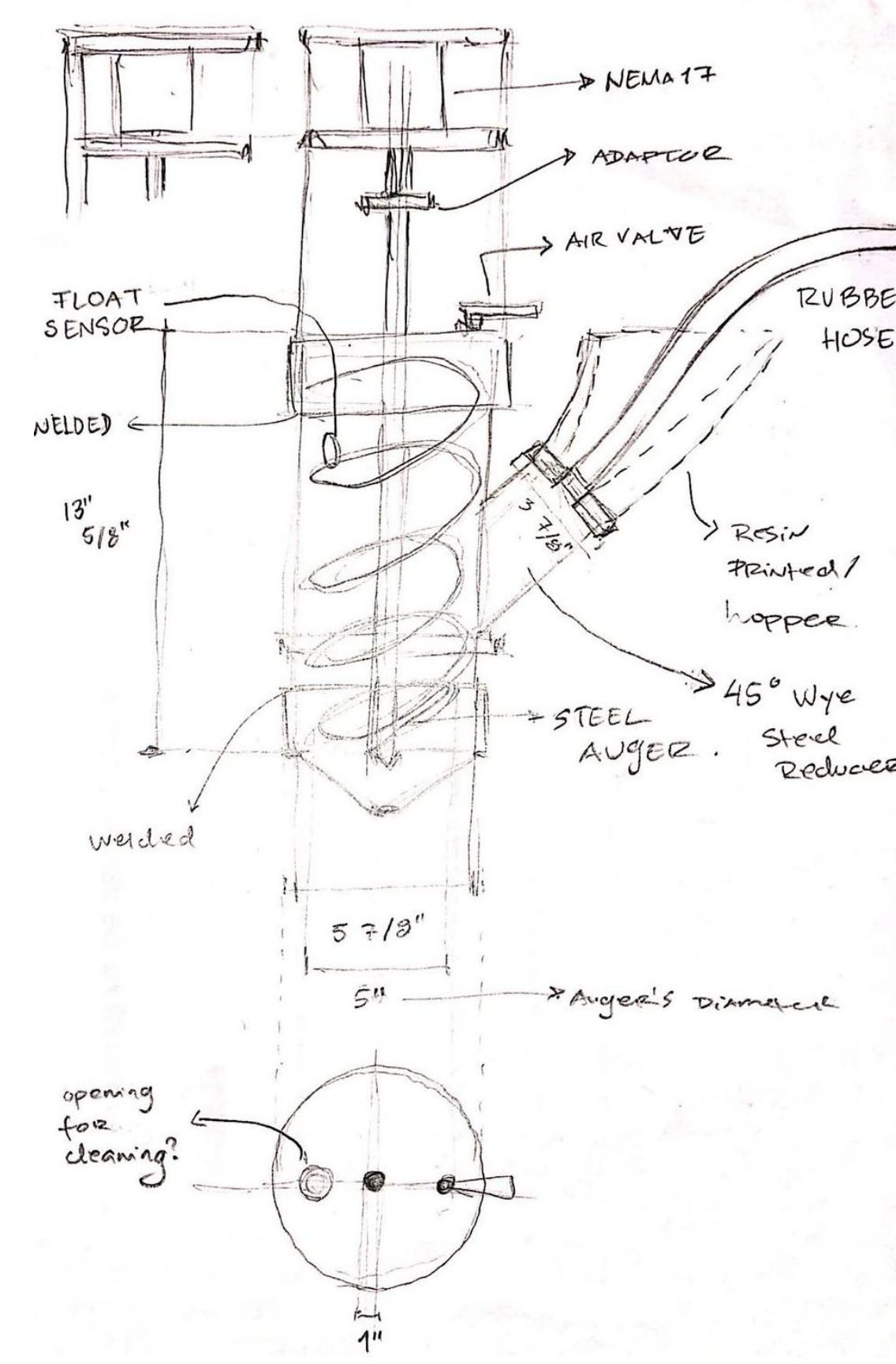


Figure 2. Hybrid Extruder Design. Gravity-fed + continuous-flow pump

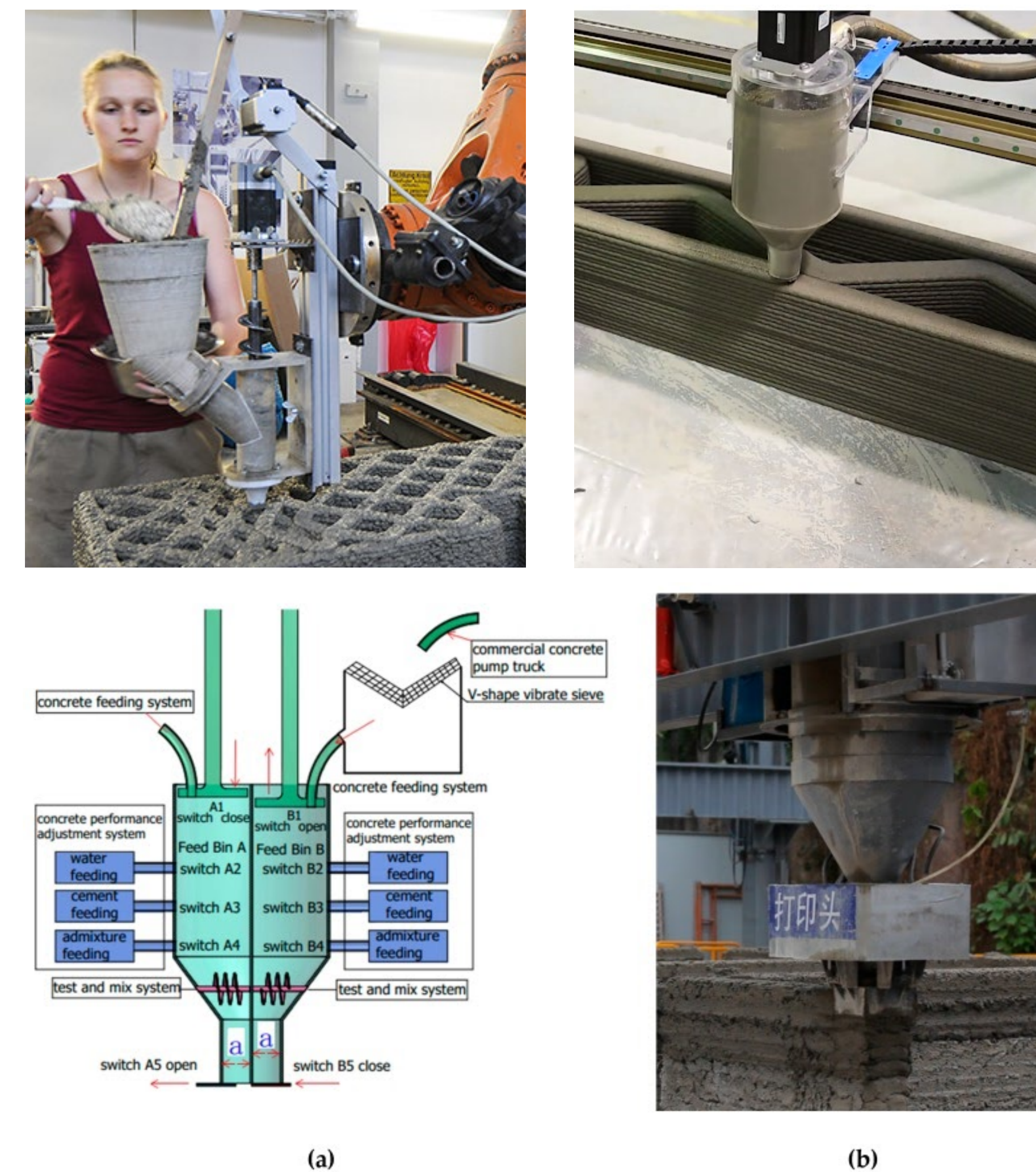


Figure 3-5. Examples of existing concrete extruders

## Results

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

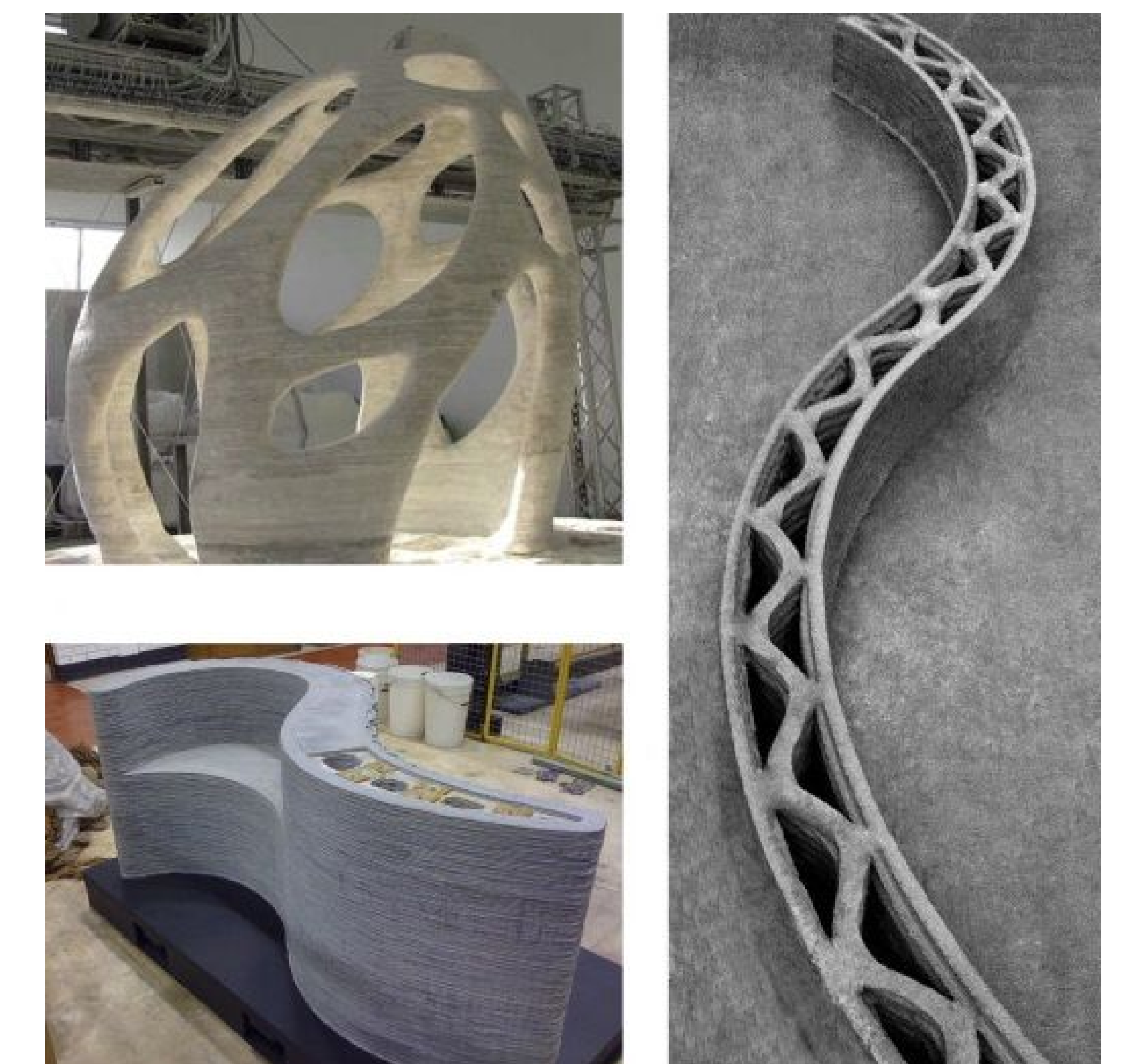


Figure 6-8. Existing digitally designed printed structures



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