

Prototype Test Plan (Nozzle Material Test)

Product Description	A device made of a substance to control the direction and flow of depositing concrete.
Objectives	To find the most robust material against concrete.
Techniques	Generate a list of different materials to use for a nozzle design. Build/use nozzles with that material, take the dimensions, the overall smoothness of the material, prior to using. Pour (32fl-oz) through the nozzle, then retake the same measurements and feel for the overall smoothness again.
Success Criteria	A set of calculations are formulated for relating the before and after dimensions of the nozzle used.
Resources	The nozzle designs are replicated from already established 3D concrete printers. The design could be produced in-house or bought from outside sources.
Schedule	The experiment setup includes measurements,, mixing concrete, and experimenting. A procedure time estimate is 3 hours. The lab should be performed in the CET lab so that concrete can be used safely.
Special Considerations	Cement is a general irritant, a filter mask, eye protection, gloves, and sleeves should be worn.

Not only are we looking to keep the shape of the nozzle as the concrete is extruded, we want the dimensions to stay the same as it cures. Possibly having nozzles that compact the concrete as it extruded, may help. We want an efficient nozzle that can be robust against concrete. To keep its shape and have a good life expectancy. After 100 gallons of concrete go through it the nozzle should still be the same.

