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## 3D Printability Study on Commercial Construction Adhesives

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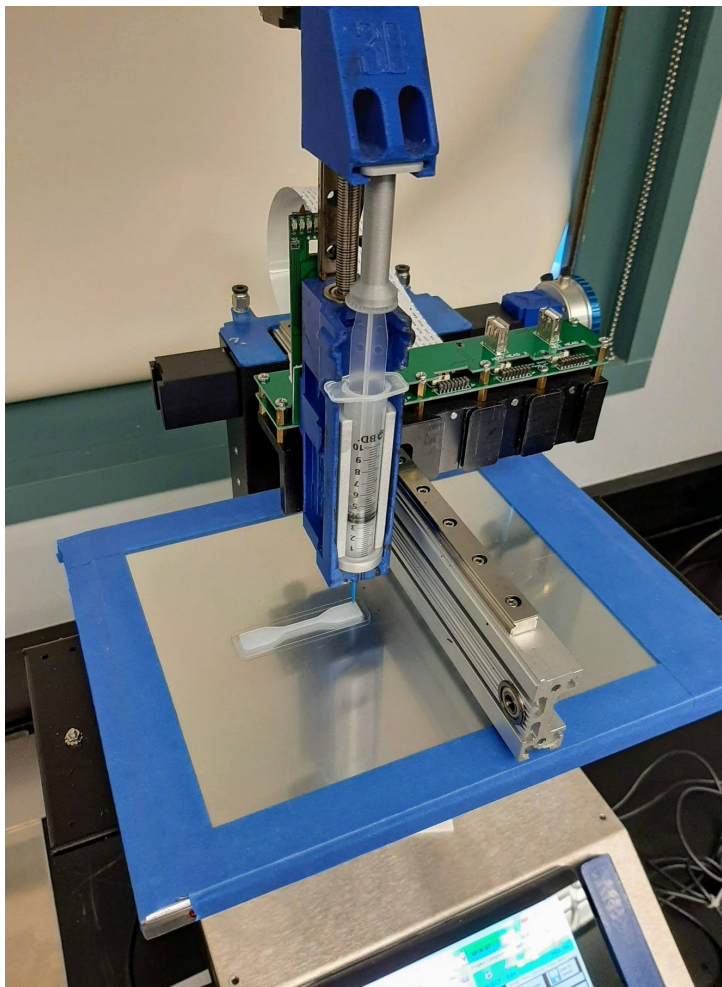
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# 3D Printability Study of Commercial Construction Adhesives

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# 3D Printing

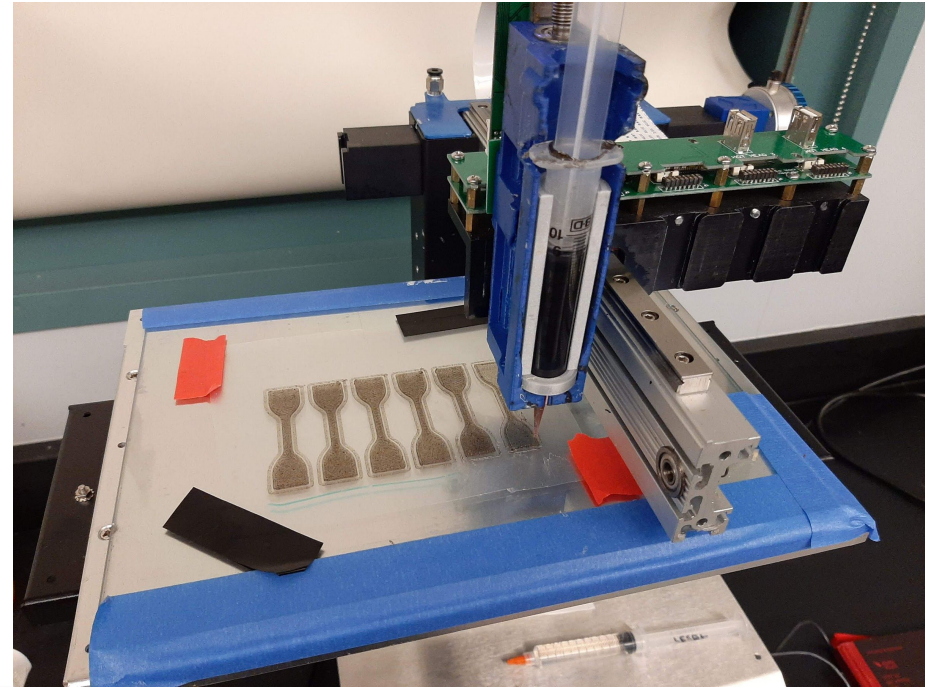
Novel approach to manufacturing complex structures

Can quickly update manufacturing process and produce custom designs

Uses 3D models and G-code to construct part

Energy efficient and low material waste

Allows for use of filaments, resins, powders, and pastes

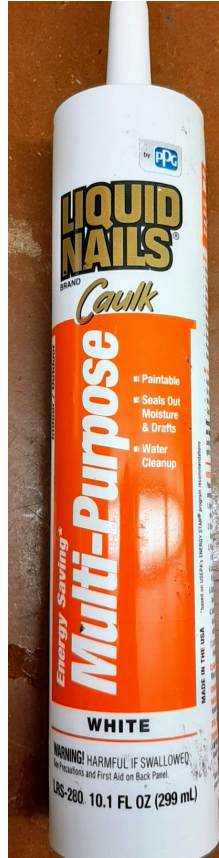
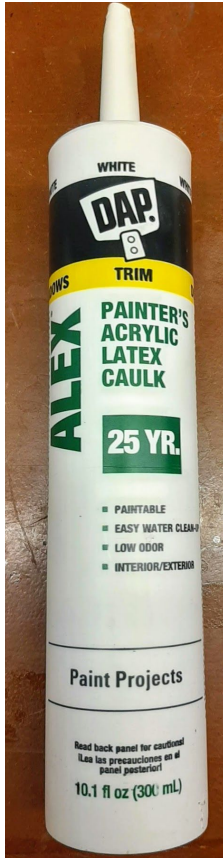


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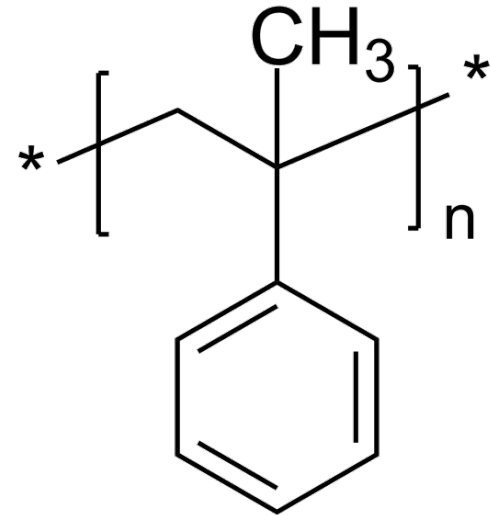
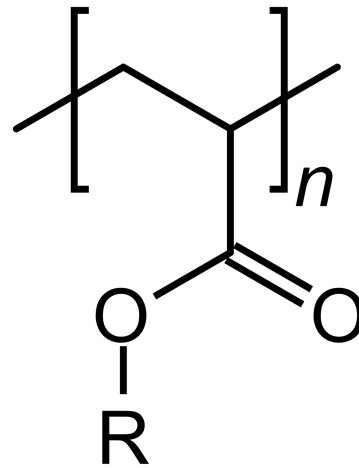
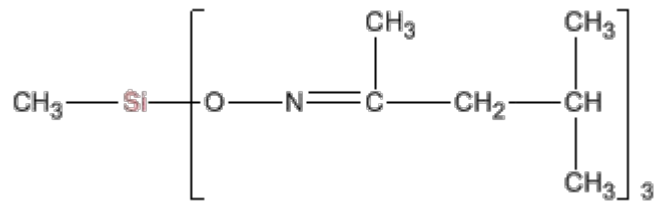
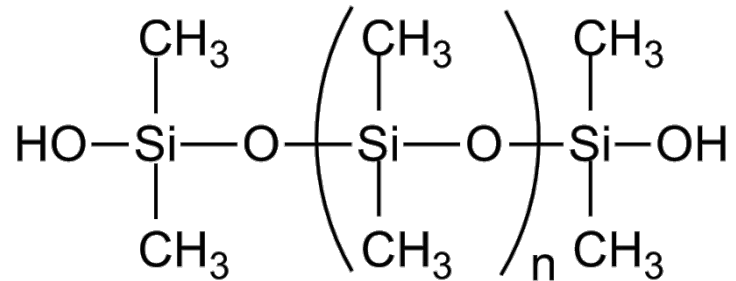
# Commercial Adhesives



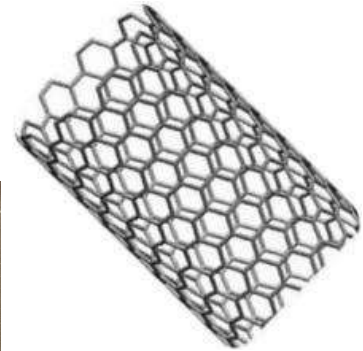
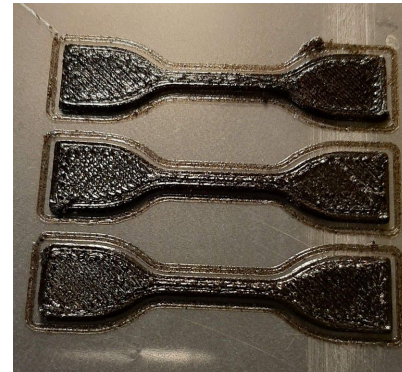
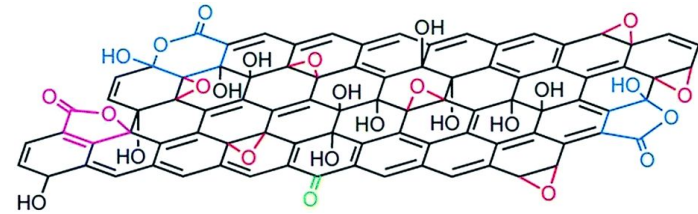
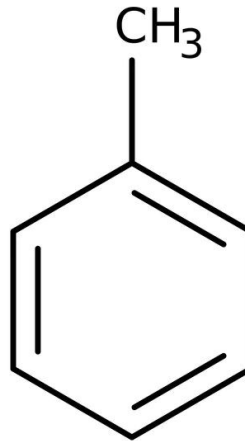
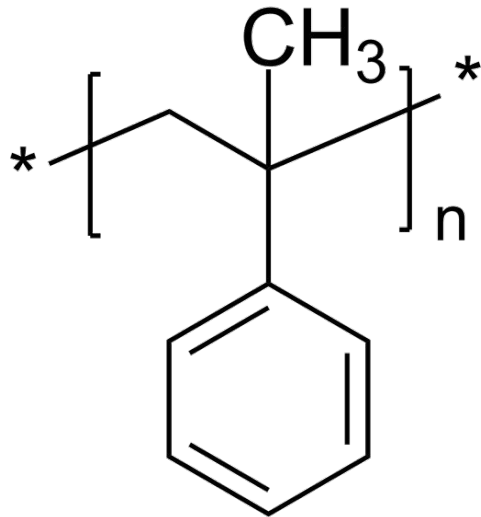
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# Chemistry



# Nanocomposites



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# Methods

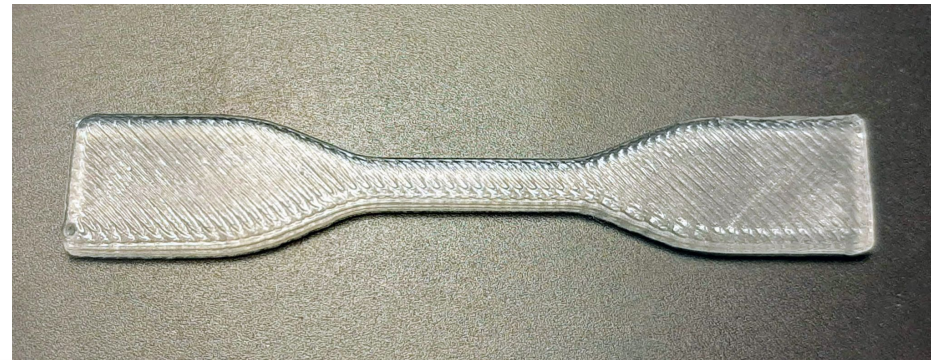
Simplify 3D

Hyrel Engine SR

10cc syringes with Luer-lock connectors

Nordson EFD smoothflow tips

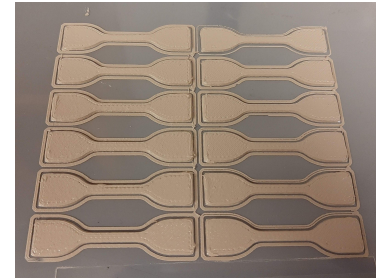
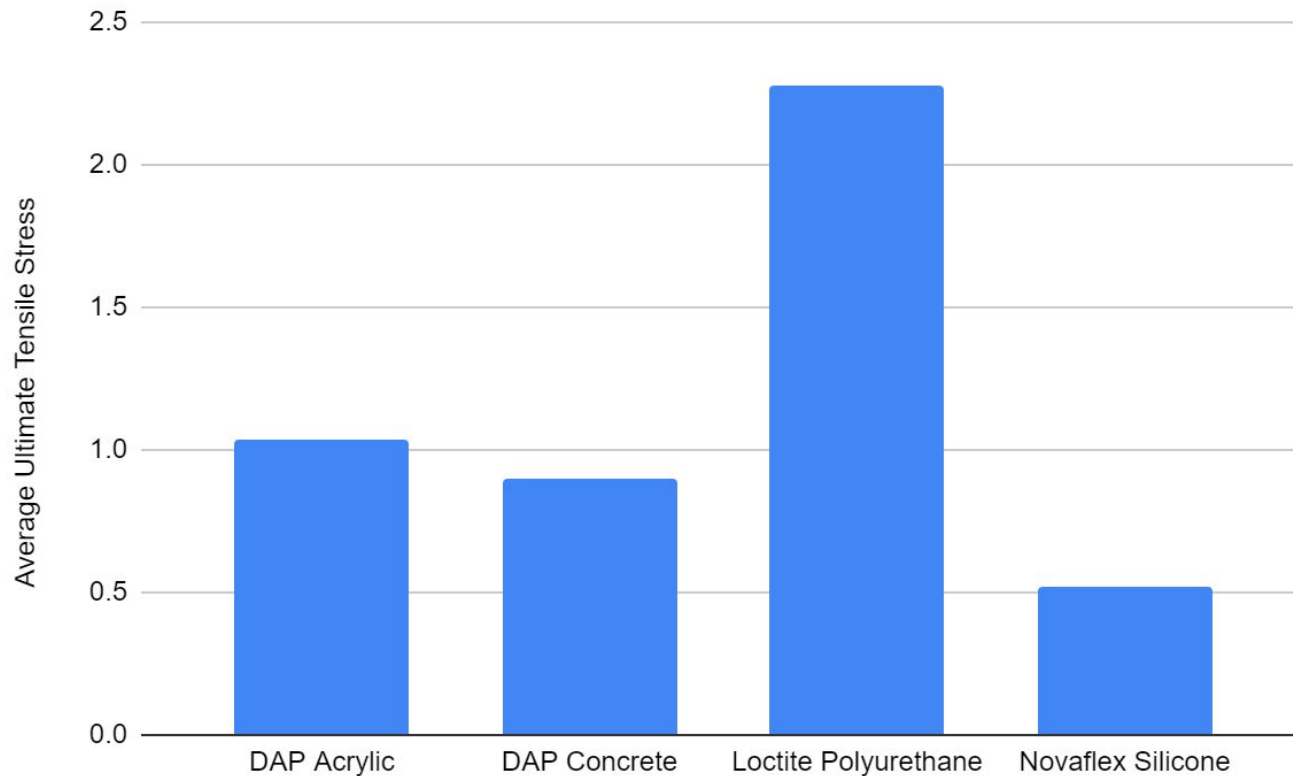
Tensile Testing



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# Tensile Properties

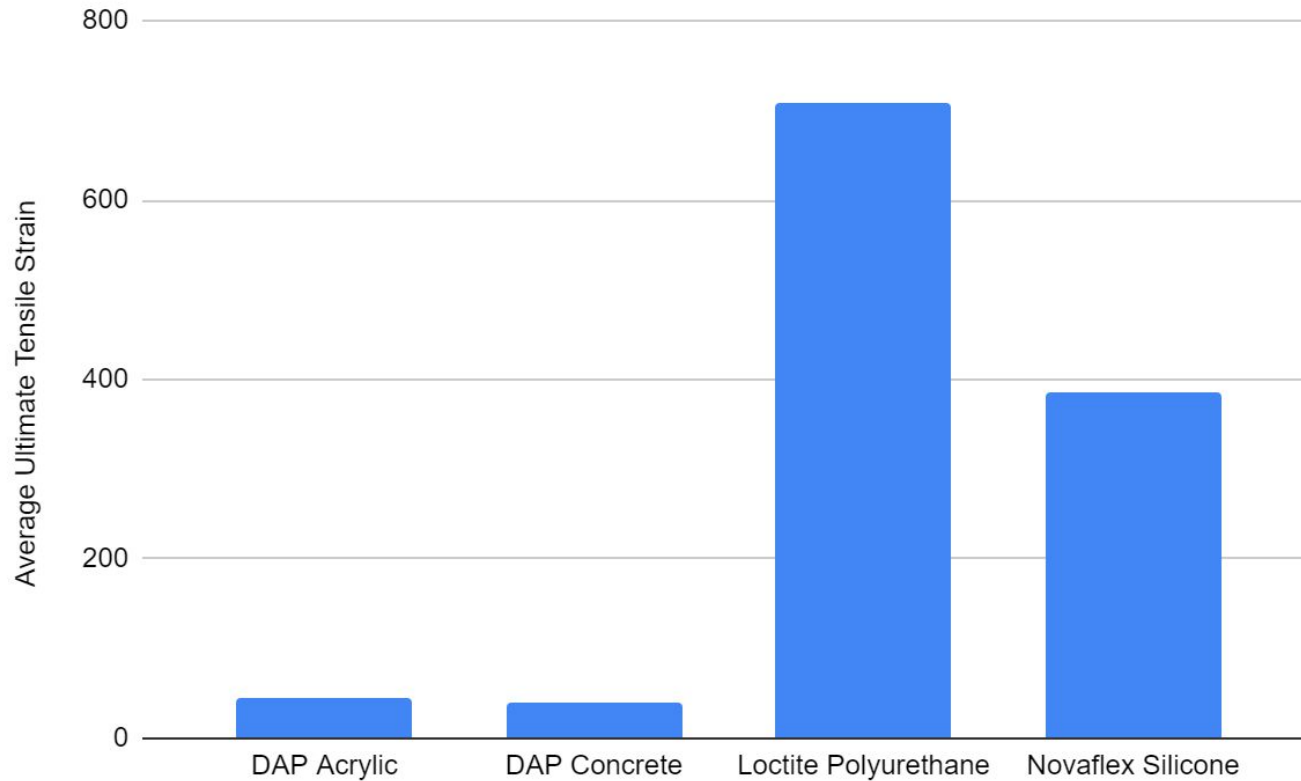


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# Tensile Properties



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# Remaining Tensile Testing

Gorilla adhesive

Liquid Nails caulk

Lexel adhesive

DAP acrylic silicone hybrid



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# Issues

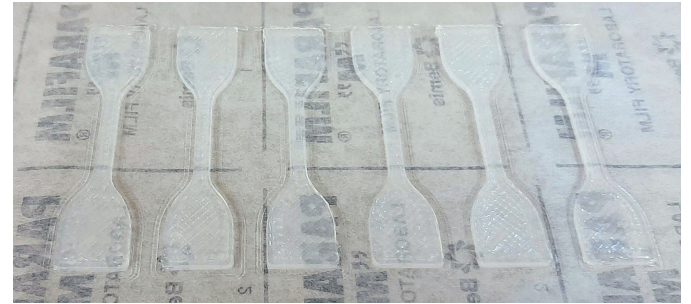
High viscosity of some materials

Unspecified chemistry

Nozzle blockage from large particles

Extrusion rates vary between materials

Air bubbles in syringe



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# Future Work

Finish aging study

Collect conductivity data

Finish mechanical characterization

Compression, dynamic mechanical analysis

Compare printed samples to molded samples

Compare commercial samples to pure polymers



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