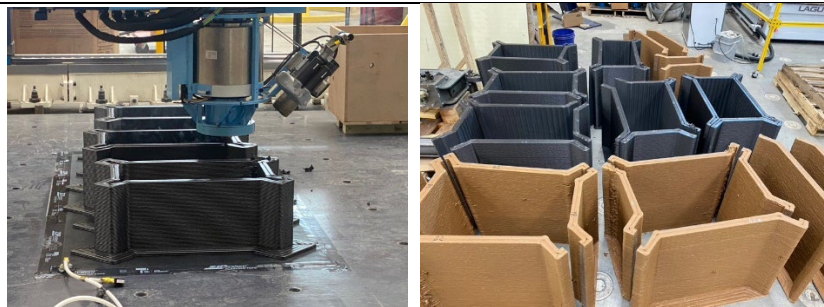


UTC Project Information – Project # 2.18	
Project Title	Recycling Large-scale 3D-printed polymer composite precast concrete forms
University	University of Maine
Principal Investigator	Roberto A. Lopez-Anido
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Funding Source(s) and Amounts Provided (by each agency or organization)	UMaine (Phase I) \$328,615
Total Project Cost	\$328,615
Agency ID or Contract Number	69A3551847101
Start and End Dates	01 January 2022 – 31 August 2024
Brief Description of Research Project	<p>Large-scale thermoplastic composite extrusion-based 3D printing has been used in research labs and is moving into industry. One significant use of large-scale 3D printing has been to make forms for manufacturing precast concrete parts. Once the forms have been used for casting concrete parts, there is an opportunity to reuse the material and recycle the thermoplastic composite. Ideally, the 3D printed thermoplastic composite can be recycled into feedstock pellets that can be used again for 3D printing newer parts. However, the process of recycling 3D printed concrete forms is not well-established. Efficient ways of removing debris, cutting the 3D printed parts into smaller pieces, and pelletizing need to be figured out. The degradation in material properties with each recycling needs to be characterized and if necessary, a suitable ratio of a mix between virgin and recycled polymer needs to be determined. The cost of recycling needs to be evaluated and compared to the cost of the 3D-printed material.</p>
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	 <p style="text-align: center;">3D printing of CF-ABS formwork CF-ABS and WF-aPLA formwork parts</p>
Impacts/Benefits of Implementation	Recycling 3D printed forms for precast concrete will be better understood. After concrete casting, the 3D printed forms will become an asset to be recycled rather than waste to dispose of. The environmental benefits in terms of energy use and recycling will be better understood.
Web Links <ul style="list-style-type: none"> • Reports • Project website 	Alan LeBihan, 3D printed formworks for window openings in the precast concrete Litewall panels. Session: Industrial Application Case Studies Presentations, Day 2: Large-Area Additive Manufacturing & Business Use Cases, Manufacturing Renew3D , Orono, ME, May 23-24, 2022