“Completing the Cycle” with Hardwood CLT: Innovation in material development and utilization

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Abstract
The New River Train Observation Tower design-build project utilizes custom-fabricated hardwood cross-laminated timber to construct an ADA accessible viewing tower in Radford, Virginia. The project showcases hardwood CLT research that positions the engineered biomaterial as a potential key asset for circular carbon economies and low-carbon construction. The study investigated the local sourcing, pressing, CNC fabrication, prefabrication, and exterior utilization of hardwood CLTs made with low-grade, locally-sourced Yellow Poplar. The project is the first example of prefabricated hardwood CLT construction in the United States and serves as an initial full-scale exterior test of fabrication and decay-prevention processes for the building product. Natural preservatives including a pine-tar-linseed-oil mix and wax were used to protect the CLT. BIM technologies such as Revit and Tekla were used to optimize the fabrication, shipment, and on-site assembly processes. The project illustrates that the upcycling and distributed manufacturing of locally-sourced, engineered biomaterials can provide novel architectural opportunities while enhancing local economies.

Keywords: Cross-laminated timber, Low-carbon construction, Design/Build, Materials + Construction Techniques

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