

Assisted construction of non-standard wooden walls and envelope structures by parametric modeling

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Abstract. We introduce a parametric modeling method in the field of computer-aided architectural conception, which aims to produce non-standard wooden walls and envelopes with CNC machinery. This method explores the application of polygonal cellular structures (as patterns) on facade and envelope interventions for new and old projects. We innovate by bringing the 3D production environment complexity into the conception model to improve the production of manifold woodworking items by CNC (Computer Numerical Control) 3D fabrication. A recent experimentation, tests the entire workflow from parametric modeling to production of two full-scale prototypes. The results prove the range of inputs offered by the method to be functional, though it needs various improvements in order to optimize parametric modeling and digital fabrication procedures. Future research will focus on treating a wider range of joints via parametric modeling and deal with joint creation regardless wall deformation to expand the morphological approach of non-standard wooden walls design.

Keywords: Non-standard walls, Computer-aided architectural design, Wood construction, Parametric modeling, CNC fabrication, Mass customization.