Trans-Disciplinary Detail in Mass Timber

David G. Kennedy
Auburn University

Abstract

In Towards a New Architecture, Le Corbusier claims that the field of engineering, through its adherence to the noble fields of Economy and Mathematics, has surpassed the field of architecture in the pursuit of harmonious, meaningful structures. He does not suggest that architects partner with engineers; he only implores architects to cop-opt engineers' ethic to leverage their own field from its current state of "retrogression". Gaining expertise then obviates collaboration. Following this, Corbusier laments the glacial unfolding of architecture through incremental developments in structure and ornament, finding impetus for his cross-disciplinary foray in the previous five decades of material development, namely the "conquests" of steel and concrete. (9) This passage, titled 'Architecture or Revolution' finds resonance today when 'steel and concrete' are replaced by 'mass timber.'

Superficially anachronistic, this return to timber finds its depth not in the invention of the material, but in its reinvention as a medium under the purview of a variety of disciplines, from architecture and engineering to fabrication and materials science. This transdisciplinary thinking has defined mass timber types by their details, i.e., the ways in which they are assembled and joined with other materials. Mass timber is not borne of a fetishization of wood; it is most viable when its use capitalizes on the intrinsic strengths of steel, concrete, and other extant material systems. (Dangel 108) Unlike dimensional, heavy, or linear engineered wood products, mass timber's morphology operates as a function of its detail. This paper argues that, if mass timber is an assemblage of details and a fundamentally trans-disciplinary material, the details, or detail, itself is an acute source of trans-disciplinary interaction.

An emergent material, mass timber is only entering the adolescent stages of its development. Research and pedagogy surrounding mass timber are best focused on examinations of the intrinsic and extrinsic impacts of its detail. This detail manifests across scales; each scale corresponds to a set of disciplines. The cellular scale finds one in the realm of wood anatomy. Here, detail exists as designed by the growing tree, where the primary program is the express motivation to handle currents flowing through- and along them. (Bejan 130) An anisotropic, cellular solid, wood's structures and systems at the cellular scale exhibit analogies for mass timber and may provide insight as to how those systems are best assembled. This paper will examine this and a variety of other scales of detail through coursework and exploratory research. Ultimately, it posits methods by which a trans-scalar, trans-disciplinary examination of mass timber's detail might permit architectural practice, research, and pedagogy that better leverages its latent performance.

Keywords: Materials + Construction Techniques, Pedagogy, Mass Timber, Wood Anatomy

Notes:

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