

TIMBER SUPER-BLOCK

Course Description:

The studio will explore the potentials of mass-timber as a sustainable technology and catalyst for novel architecture in the design of a speculative super-block complex at the Seaport Innovation District of Boston, MA. It recognizes wood as an abundant and renewable natural resource that sequesters carbon when it grows and how the utilization of mass-timber on large-scale architecture can make it a carbon sink, rather than source. Thus, reducing the greenhouse gas steering global climate change in an impactful way. Furthermore, mass-timber has tectonic and aesthetic qualities beyond traditional building materials, presenting a design opportunity to change how we see and experience our built environment.

To captivate and inform the public of mass-timber and its environmental benefits, a large mixed-use complex utilizing the technology is proposed adjacent to The Innovation and Design Building (IDB). The eight-story, 1.4 million square foot building was originally constructed in 1918 by the U.S. Department of Defense to accommodate nearly 50,000 workers that repaired and disassembled naval ships at its bordering dry dock, as well as warehoused and distributed military supplies. Today, the building is a hub for companies and entrepreneurs pioneering the innovation economy, which includes architecture and design studios, technology firms, and specialized research/development and manufacturing facilities. To accompany the IDB as a creative and economic anchor to the Innovation District, each student will design a timber mid-rise building (approximately 100,000 sf - 150,000 sf) and collectively form a densely spaced, linear aggregate that mimics the super-block condition of its prominent neighbor. The new block will be further defined by an interconnecting loggia at the base perimeter of each building to serve as a dynamic public thoroughfare for leisure and exchange. The IDB and Timber Super-Block will complement each other, establishing an iconic urban center and platform for the progressive use of mass-timber that affirms the initiative of the district.

Work Plan:

Part 1 - Research

As a prelude, students will conduct material and precedent research as a critical basis for their design projects. Beginning with material research, they will investigate the following: (1) carbon absorption and storage in the cellular growth of trees; (2) process of harvest to mass-production of timber, as well as identification of common wood species used; and (3) environmental benefits of using mass-timber systems: CLT and Glulam.

After this in-depth overview of what makes timber a sustainable material, students will learn about contemporary mass-timber architecture. This includes: (1) Lifecycle Tower One by Herman Kaufmann + Partner ZT GmbH; (2) Bullitt Center by Miller Hull; (3) Tamedia Office Building by Shigeru Ban Architects; (4) Wood Innovation Design Centre by Michael Green Architecture; and (5) Sara Kulturhus Centre by White Arkitekter. In groups, students will dissect each precedent, performing a comprehensive analysis of primary systems - structure, environmental, building envelope and assemblies, and building service - at various two- and three-dimensional drawing scales, while evaluating integrative decision making in its design.

Part 2 - Design

Transitioning from precedent research, students will be required to apply their specific analysis as a kit-of-parts into the design of a timber mid-rise building at an assigned site/lot. Given the limited access to professional engineers and consultants, the kit-of-parts extracted from the precedents serve as a default, prescribing design components and parameters that are technically feasible. At the same time, the precedents serve as a benchmark for the high degree of architectural resolution that is expected in the end. Essentially, the level of detail in the analysis drawings is what is required of each student's design project.

During the design process, creative deviation is expected while maintaining the underlying principles of the precedent projects. The development of conceptual ideas related to emphasizing the unique inherent properties of wood, as well as exploring various methods of its use in arts and crafts, will support this effort. Additionally, the idiosyncratic features and forces of existing site conditions will play a role.

The timber mid-rise building will house similar programmatic functions to the IDB, and offer open, flexible spaces with high-ceilings and natural light. As a key feature, they will each have a public loggia at its base which physically links to their neighbors. Students will collaborate on the design of this active corridor connected to commercial amenities and shared outdoor courtyards.

At the end of the studio, students will have had a comprehensive overview of mass-timber as a sustainable technology. They will have utilized this knowledge creatively towards an individual and collaborative advanced architecture design project with the following integrated systems: structure, environmental, building envelope and assemblies, and building service. Moreover, bring the technology to their professional work place.

Resources:

- Bonner, Jennifer and Hanif Kara. Blank: Speculations on CLT. AR+D Publishing, 2021.
- Green, Michael, and Jim Taggart. Tall Wood Buildings: Design, Construction and Performance. Birkhauser, 2017.
- Jones, Susan. Mass Timber: Design and Research. ORO Editions, 2018.
- Nakashima, George. The Soul of a Tree: A Master Woodworkers Reflections. Kodansha, 2012.
- Wood Reference Handbook. Canadian Wood Council, 2000.

Site:

