

UMASS AMHERST DESIGN BUILDING



Exterior (Leers Weinzapfel)



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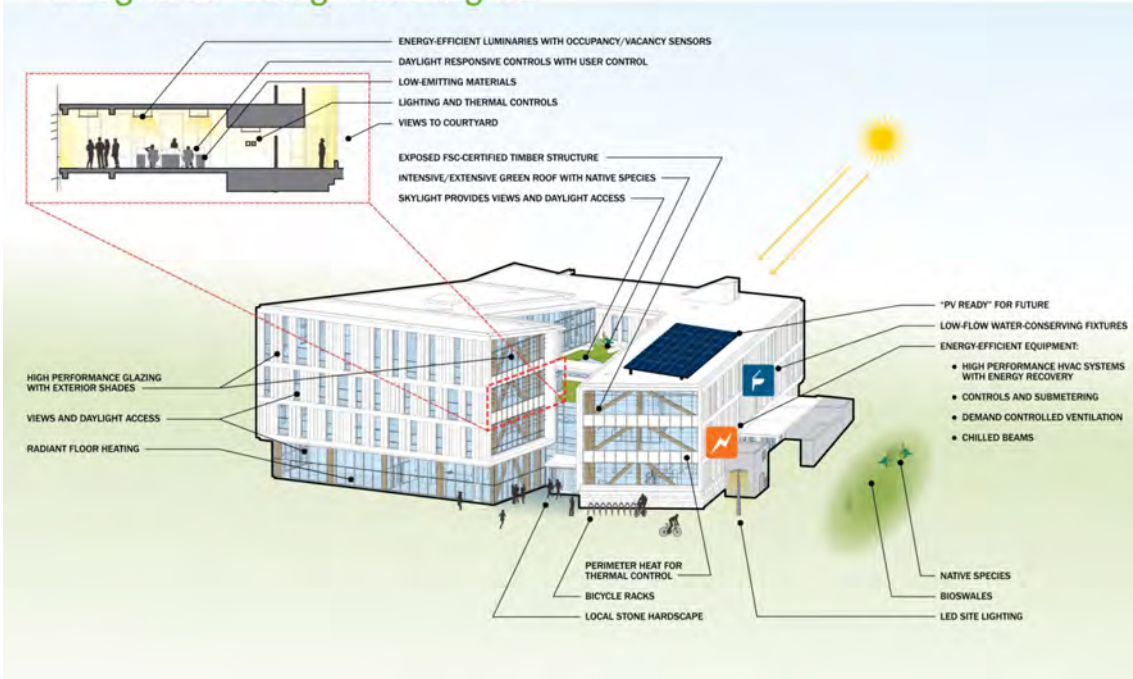


Interior Courtyard (Leers Weinzapfel)



Section (Leers Weinzapfel)

Integrated Design Strategies



Sustainability Features (atelier ten)



Building the Mockup Bench
 Photo: A. Schreyer

Timber Architecture Redefined at UMass

By Alexander Schreyer (Senior Lecturer and BCT Program Director), and Peggy Clouston (Associate Professor)

With an excavator digging a hole into parking lot 62, construction on the Design Building at the University of Massachusetts Amherst finally started this month. This 87,000 sf facility, designed by Leers Weinzapfel Associates of Boston will, in early 2017, house the departments of Architecture, Landscape Architecture and Regional Planning (LARP), and the Building and Construction Technology (BCT) Program. The building will provide an extraordinary venue for integrated teaching and research in the built environment. It will also increase visibility for these three units on campus and far beyond and solidify UMass as a regional center for study in this field. Together, all three units currently have approximately 600 students.

The Design Building will be a showcase of sustainable building practices at the LEED Gold level, featuring numerous sustainable strategies such as bioswales, a green roof, ample daylighting and natural ventilation. The building targets an EUI of 40.3 kBtu/sf/yr which is a 39% savings over ASHRAE baseline design. Even the structure itself is sustainable, employing innovative and modern FSC-certified wood composites.

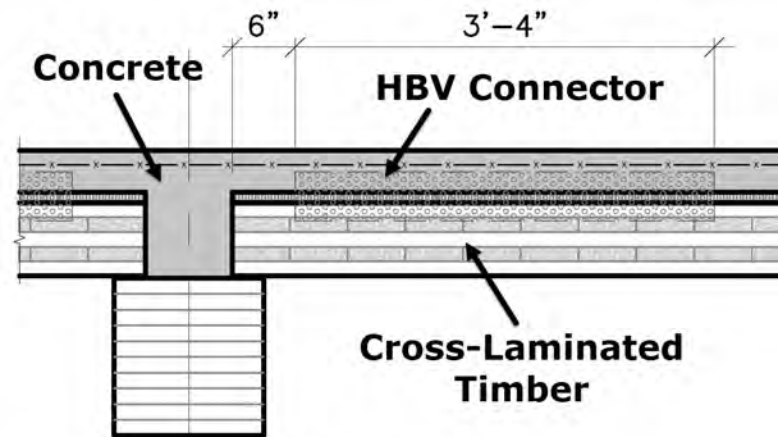
The wood structure of the Design Building is indeed something special. While heavy timber structures are not unknown to New England - just think of the many mill buildings around here - this building takes the traditional material wood and uses it in leading-edge engineered applications. It also provides effective carbon sequestration because the 2,500 cubic yards of wood that are used in this building locks-in roughly 2,000 tons of CO₂ during its growth phase which is like taking 250 cars off the road for a year.

The frame of this building uses glulam, making it a Type IV-HT (Heavy Timber) structure, permitted at this size (and even larger) under the current building code. The innovation here, lies in the building's floors, which employ a new wood product called Cross Laminated Timber (CLT). CLT is made by gluing lumber cross-wise (akin to plywood) in 3, 5 or 7 layers. This creates large panels that are used as floors, walls and roofs. Supplied by Nordic Engineered Wood of Quebec, the CLT panels in the Design Building are further unique in that they will be constructed as wood-concrete composite floors: rigidly connected to a concrete topping by glued-in steel (HBV) fasteners (see images for details). This floor system offers a significant improvement in both stiffness and strength in comparison to a non-composite system.

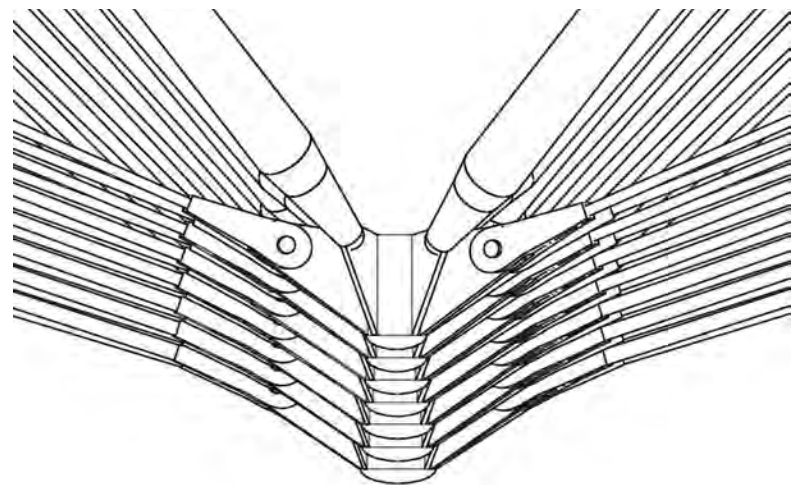
Finally, an added insulation layer between the wood and the concrete provides an effective means to reduce sound transmission. Because CLT is only included in the 2015 edition of the IBC, a variance was needed for the Design Building's floors.

To create a small-scale mockup that explains this new type of floor construction, students in the Building and Construction Technology program built what can easily be called the most overdesigned bench on campus. This end-of-semester student project, which can be viewed on the first floor of Holdsworth Hall, allowed some of the construction managers and the material suppliers to see how the system will go together and the students to learn how to work with this new material.

Overall, this building has been an exciting project for all of its future occupants and UMass at large and we all can't wait to move in.



Wood-Concrete Composite System Detail
(Equilibrium Consulting)



Zipper Truss Detail (Equilibrium Consulting)