



Nail and Dowel Laminated Timber Diaphragms for Seismic Regions

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Organization: Colorado School of Mines
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 Material: DLT (Dowel Laminated Timber)
 NLT (Nail-Laminated Timber)
 Application: Floors
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 Failure Load
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 Notes: Project contact is Shiling Pei at the Colorado School of Mines

Summary:

Nail and Dowel Laminated Timber (NLT and DLT) are efficient technologies to build mass timber floor systems directly out of dimension lumber. It is relatively inexpensive to construct and has substantial potential to help expand the mass timber building market, particularly when the floor spans mainly in one direction. There have been multiple NLT projects constructed in the seismic region, which represents a large portion of the CLT construction market. The lateral design of NLT/DLT floor systems is currently based on very conservative assumptions (essentially equating its performance to a traditional joist-sheathing light-frame wood floor system) due to this lack of validated performance examples. This project will systematically demonstrate the potential of NLT/DLT floor systems under extreme lateral loads through component level testing and full-scale building level shake table tests. Through collaboration with manufacturers and designers (StructureCraft and Magnusson Klemencic Associates (MKA)), several full-sized NLT/DLT floor will be tested to failure in the structural engineering laboratory at Colorado State University. Based on component level test results, 2 or 3 floors of NLT/DLT diaphragms will be incorporated into a (planned) full-scale 10-story full-scale mass timber building that will be tested on the world's largest outdoor shake table for demonstration and education/outreach.