THREE DECADES OF US-LED FULL-SCALE WHOLE BUILDING SHAKE TABLE TESTING: FROM LIGHT-FRAME WOOD TO MASS TIMBER

John W. van de Lindt

Shiling Pei

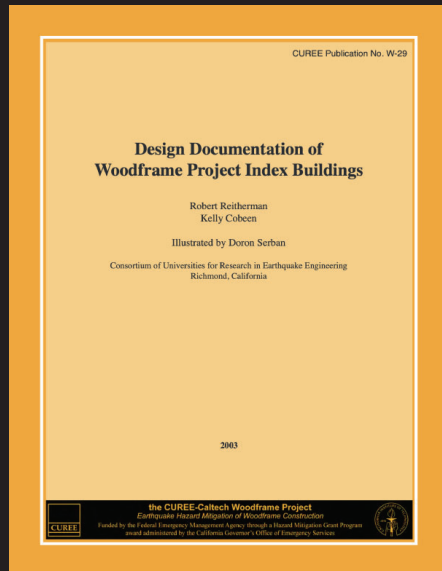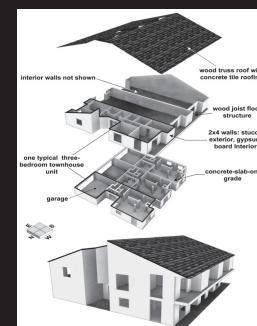Steve Pryor

Andre Barbosa

Loma Prieta, 1989

Northridge, 1994

The CUREE-Caltech
Woodframe Project

https://doi.org/10.52202/080513-0066

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Four years after this test, CLT is now in U.S. Codes and Standards… ASCE Standard 7-22

The NHERI TallWood Project

Presenter/Co-PI:

John W. van de Lindt
Colorado State University

Lead/PI:

Shiling Pei
Colorado School of Mines

Graduate Students:

Aleesha Busch (Mines)   Sarah Wichman (UW)
Da Huang (Mines)   Shokullah Sorosh (UCSD)
William Roser (UNR)   Sir Lathan Wynn (UNR)
Yi-En Ji (UNR)

Co-PI's and Collaborators:

Keri Ryan   University of Nevada Reno
Steve Pryor   Simpson Strong-Tie
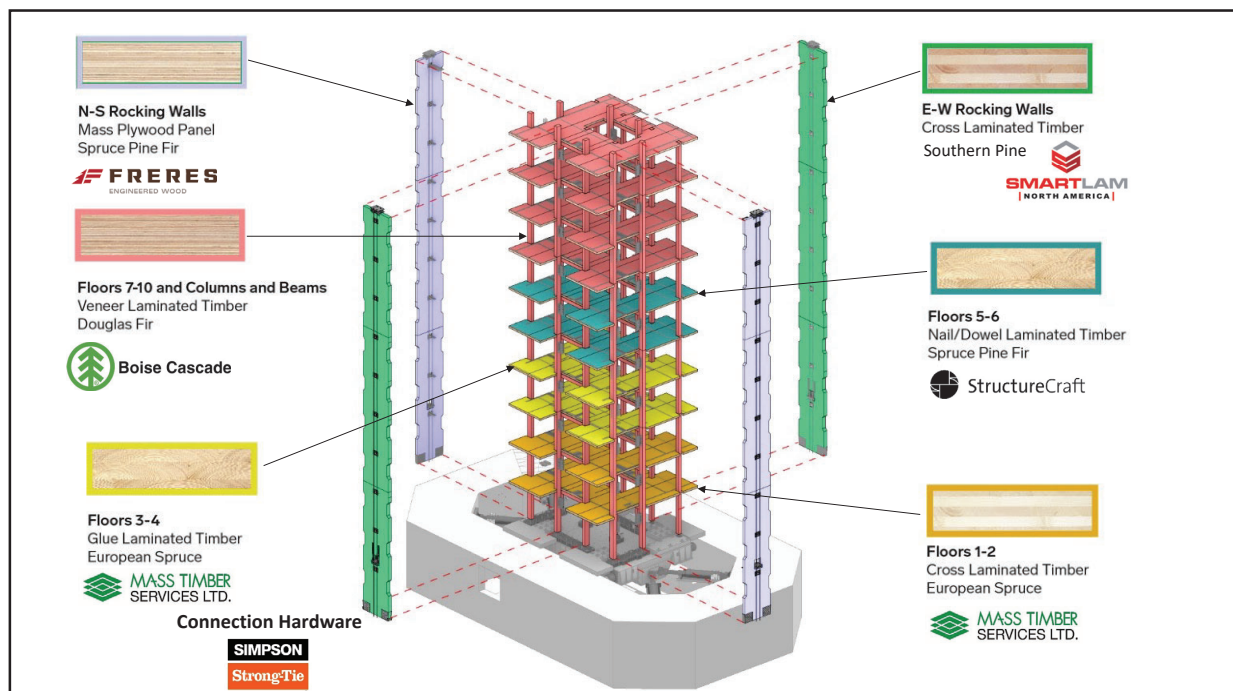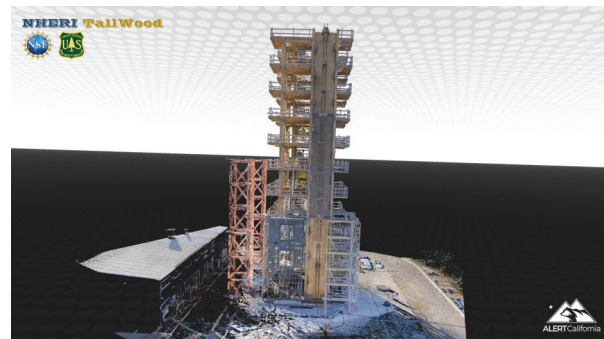Jeffrey Berman   University of Washington
Tara Hutchinson   Univ. of California San Diego
Reid Zimmerman   KPFF Consulting Engineers
James D Dolan   Washington State Univ.

N-S Rocking Walls
Mass Plywood Panel
Spruce Pine Fir
FRERES ENGINEERED WOOD

Floors 7-10 and Columns and Beams
Veneer Laminated Timber
Douglas Fir
Boise Cascade

Floors 3-4
Glue Laminated Timber
European Spruce
MASS TIMBER SERVICES LTD.

Connection Hardware
SIMPSON Strong-Tie

E-W Rocking Walls
Cross Laminated Timber
Southern Pine
SMARTLAM | NORTH AMERICA |

Floors 5-6
Nail/Dowel Laminated Timber
Spruce Pine Fir
StructureCraft

Floors 1-2
Cross Laminated Timber
European Spruce
MASS TIMBER SERVICES LTD.

MCE
Loma Prieta
Earthquake

NHERI Converging Design

NHERI TallWood
10-story Building Specimen

Courtesy of Shiling Pei and Reid Zimmerman
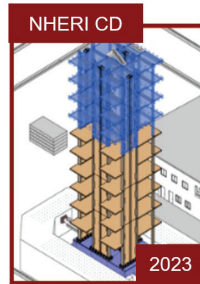
NHERI CD
2023

Scan me!

NHERI Converging Design
6-story Building Specimen

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MCE = 1.6 x Northridge, US, 1994, Mw = 6.69, R_{RUP}(km) = 10.05

Closure

- Test programs ranging from two-stories to ten stories; from 80 sq meters to 1400 sq meters
- Shakes with MRI exceeding 2500 years
- From classic code level designs for light-frame to 10-story buildings that can't be destroyed
- Codifying resilient mass timber buildings is underway

The authors working hard to plan the most recent shakes – circa 2020!
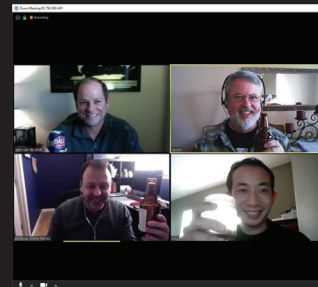
Thank you!

Please see project websites for full acknowledgements

The views expressed in this presentation are those of the presenter and do not necessarily reflect that of the funding agencies.