National Science Foundation

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NHERI
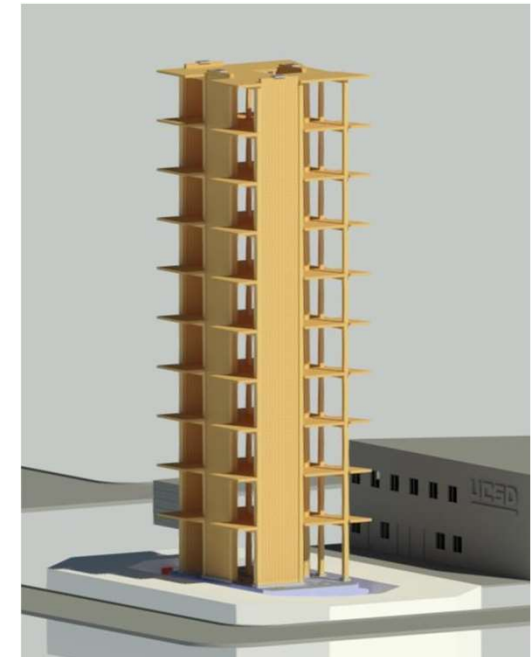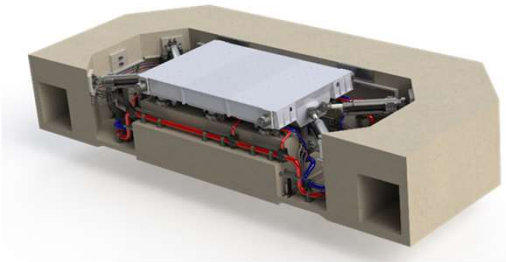Natural Hazards Engineering Research Infrastructure

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Structural Engineering

Universal Base Extension for LHPOST6

Machel Morrison, UCSD

Joint Academia-Industry NHERI Workshop
NHERI@UC San Diego

Friday May 19, 2023
University of California, San Diego

12.2 m (40 ft)

7.6 m (25 ft)

Facility[1]	LHPOST	SRMD	UCB	UNR	SUNY-Buffalo	E-Defense	NIED	ILEE	CGS	Pavia
Country	USA	USA	USA	USA	USA	Japan	Japan	China	Algeria	Italy
Max Payload (MN)	20	4	0.75	0.45	1	12	5	0.7	0.6	0.3
DOFs	6	6	6	6	6	6	6	2	6	4
Platen Size L x W (m)[2]	12.2 x 7.6	4 x 5	6.1 x 6.1	2.8 x 2.8	(2) 3.7 x 3.7	20 x 15	14.5 x 15	(4) 6 x 4	6.1 x 6.1	4.8 x 4.8
X-Dir Velocity (± m/s)	2.5	1.80	0.64	1.52	0.75	2.00	1.30	1.00	1.10	2.00
X-Dir Displacement (± m)	0.89	1.22	0.15	0.30	0.15	1.00	0.50	0.50	0.25	0.50
Y-Dir Velocity (± m/s)	2.0	0.80	0.64	1.52	0.75	2.00	0.70	1.00	1.10	2.00
Y-Dir Displacement (± m)	0.38	0.61	0.15	0.30	0.15	1.00	1.00	0.50	0.15	0.50
Z-Dir Velocity (± m/s)	0.6	0.25	0.25	1.40	0.75	0.70	0.20	-	1.00	0.50
Z-Dir Displacement (± m)	0.13	0.13	0.05	0.10	0.08	0.50	0.50	-	0.10	0.14

[1]Performance metric that matches or exceeds that of the proposed upgraded LHPOST

[2](#) denotes number of tables, for multi-table facilities (note: UNR also offers (3) 4-DOF tables as well as a new 6-DOF table)

Development of a Seismic Design Methodology for Precast Building Diaphragms
PI – Prof. Robert B. Fleischman, University of Arizona

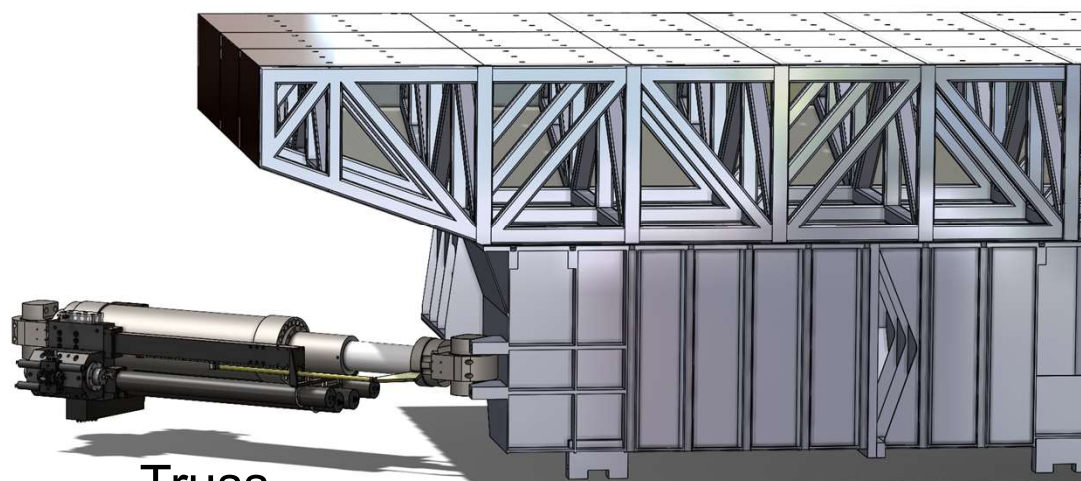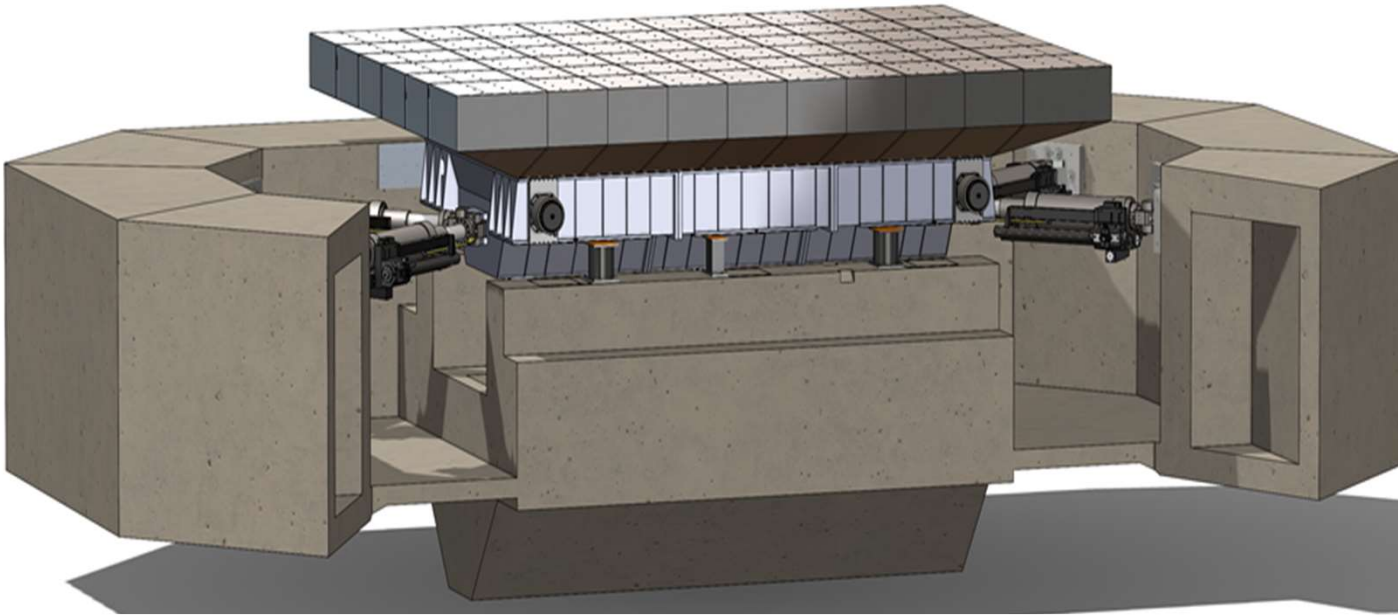# Collapse Vulnerability and Seismic Design of Metal Buildings

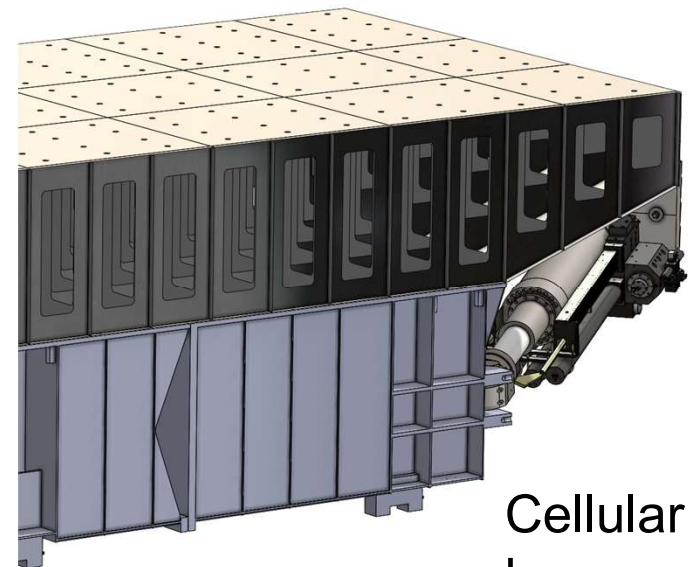## PI – Prof. Chia-Ming Uang, UC San Diego

Universal Base Extension

Potential Applications:
- Multi-bay frame buildings
- Buildings with complex geometry
    - Vertical irregularities
    - Non-orthogonal systems
    - Structures built on topographical slopes
- Interacting buildings with a common soil medium

Truss

Cellular beam

Universal Base Extension

➢ **Input from industry as to the need**

➢ **Focused workshop to follow**

- Potential applications
- Design Objectives
  - ✓ Functionality
  - ✓ Dynamic Characteristics

➢ **Proposal to NSF**

➢ **Design, Fabrication, Characterization Testing**