UC San Diego
JACOBS SCHOOL OF ENGINEERING

SYMPOSIUM ON EXTRAORDINARY ENGINEERING IMPACTS ON SOCIETY

Albert P. Pisano, Dean
18 Aug 2022

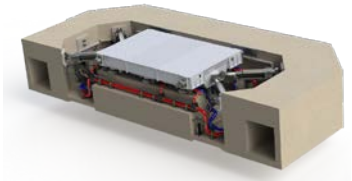
National Science Foundation

University of California at San Diego
NHERI
Natural Hazards Engineering Research Infrastructure

UC San Diego
JACOBS SCHOOL OF ENGINEERING
Structural Engineering

UC San Diego Large High-Performance Outdoor Shake Table (LHPOST)

Albert P. Pisano, Professor and Dean
Jacobs School of Engineering,
University of California, San Diego



NSF/NAE Symposium

Extraordinary Engineering Impacts on Society
18 August 2022

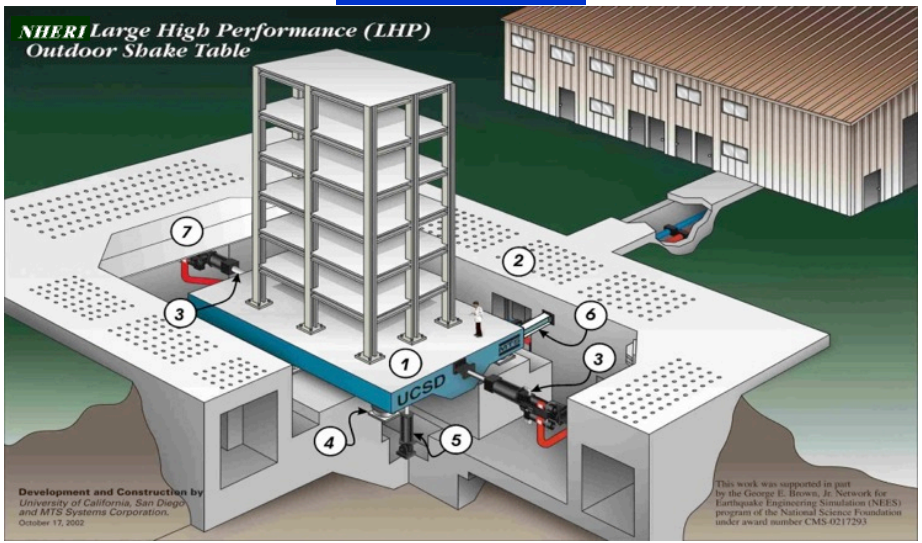
Impact of Research Conducted at the LHPOST

- Assessment, improvement, and validation of computational models used by structural engineers to assess existing and design new infrastructure systems (buildings, bridges, …).
- Impact of Structural Design Codes (some select examples):
  - Inclusion of floor acceleration provisions for precast building diaphragms and other systems in ASCE 7-16 standard.
  - Improved performance assessment methods for masonry-infilled non-ductile reinforced concrete frames in ASCE 41-17.
  - Advancement of design provisions for non-structural components and systems such as precast concrete facades, stairs, and elevators.
- Physical validation of the seismic performance of civil infrastructure systems that previously could only be assessed with not fully validated computer models or using small-scale physical models.
- Validation of innovative low-damage earthquake protective systems for use in engineering practice.

LHPOST Before and After 6-DOF Upgrade

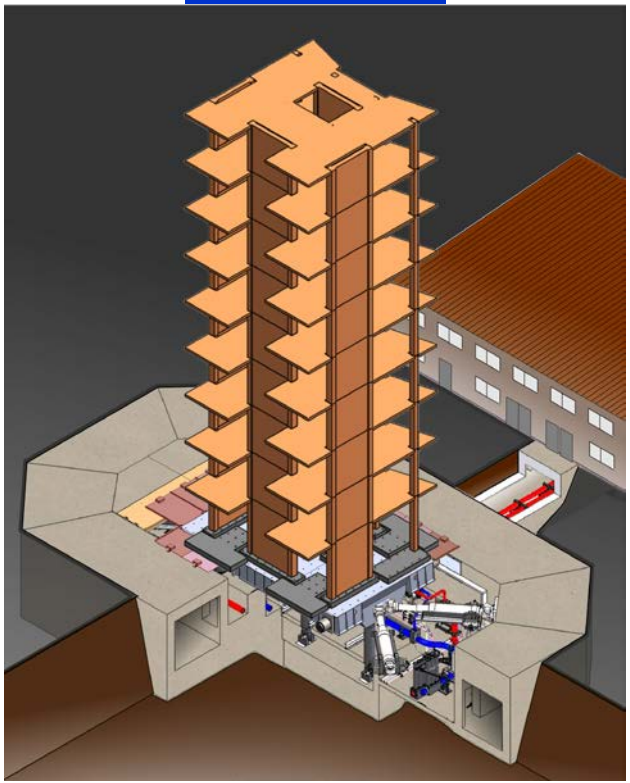
Before Upgrade (2004 – 2019)

LHPOST

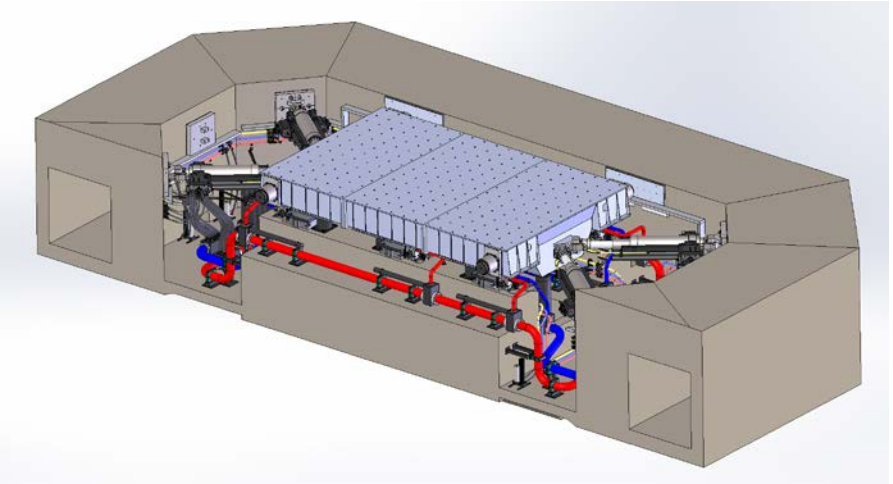


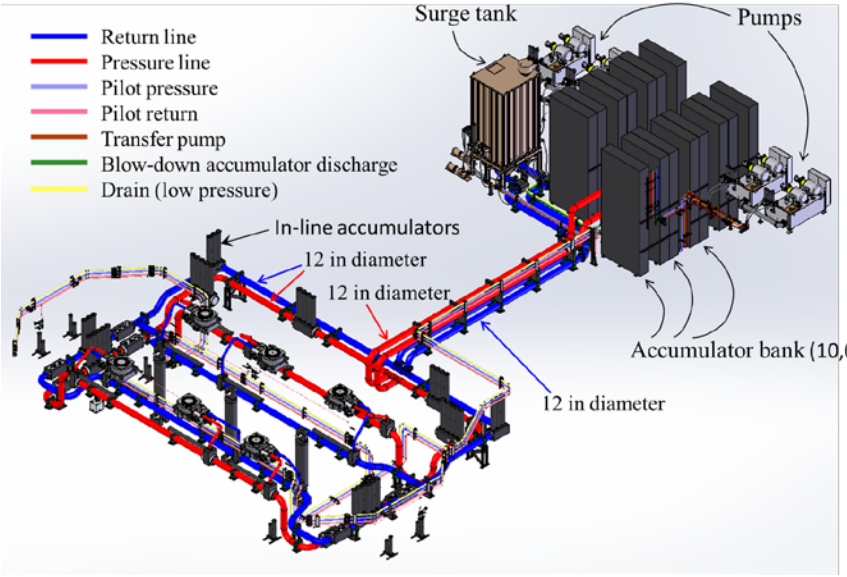
After Upgrade (2022 - future)

LHPOST6




[Video not included in PDF]
SETHURAMAN PANCHANATHAN
Director, National Science Foundation



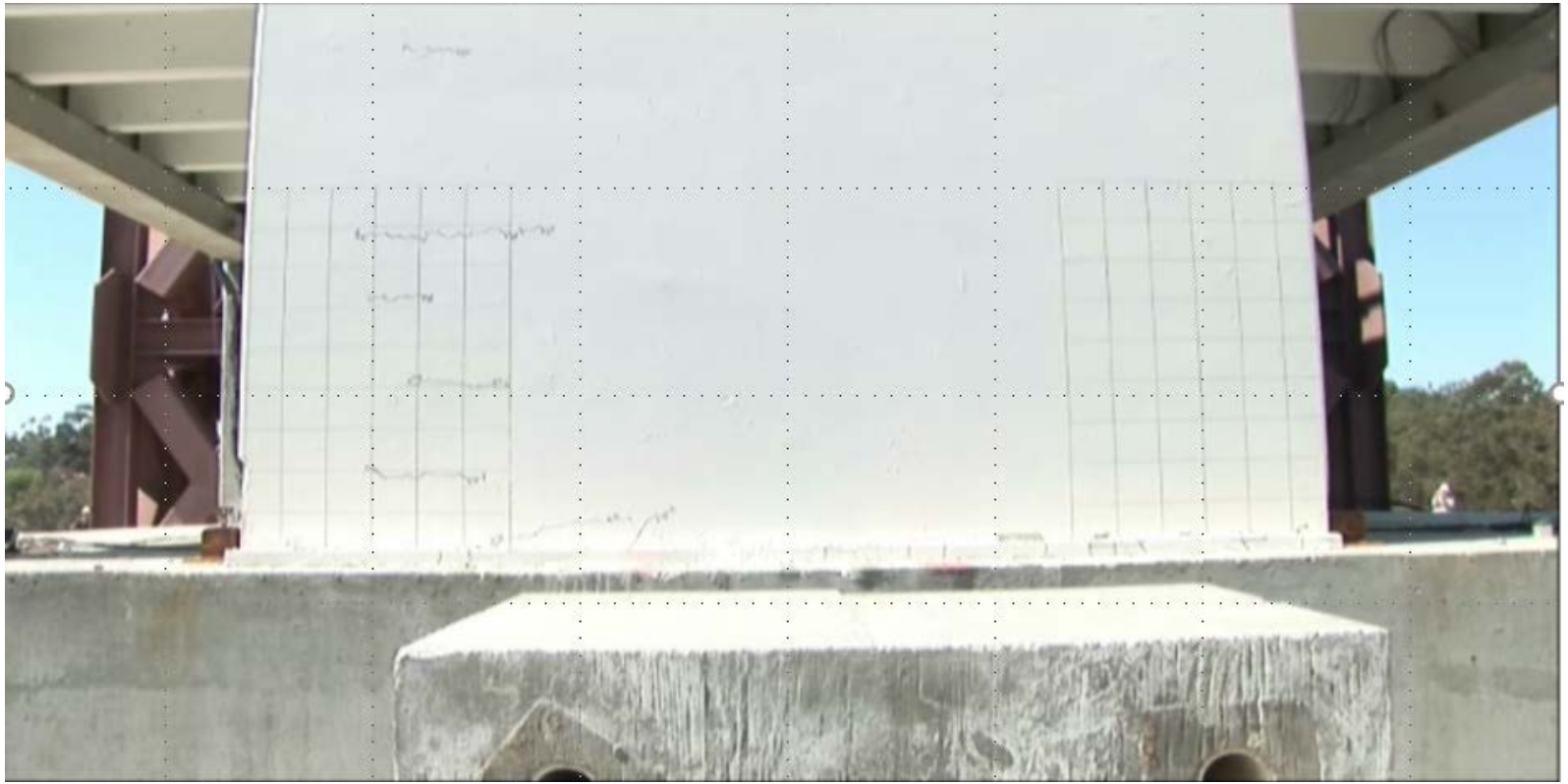

Return line
Pressure line
Pilot pressure
Pilot return
Transfer pump
Blow-down accumulator discharge
Drain (low pressure)
Surge tank
Pumps
In-line accumulators
12 in diameter
12 in diameter
12 in diameter
Accumulator bank (10,000 gallons)

Development of a Seismic Design Methodology for Precast Building Diaphragms

PI: Prof. Robert B. Fleischman, University of Arizona
Co-PI: Prof. Jose I. Restrepo, UC San Diego

[Video not included in PDF]

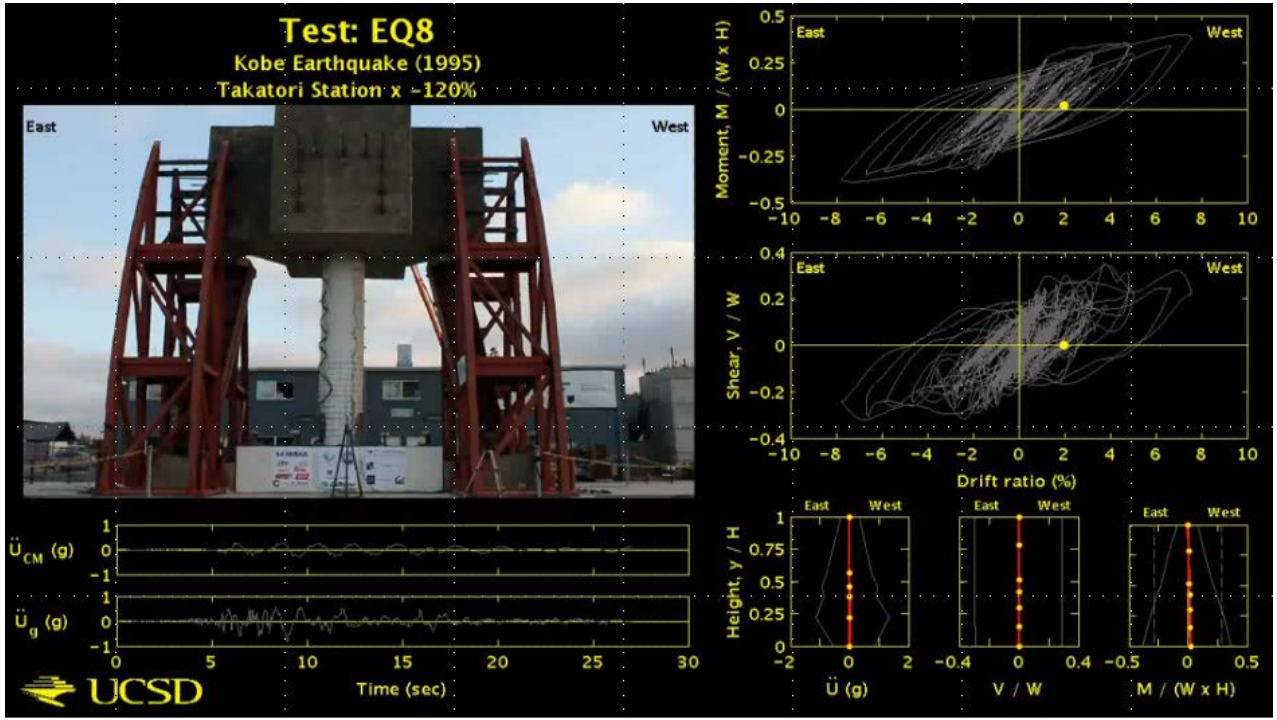
[Video not included in PDF]



Large Scale Validation of Seismic Performance of Bridge Columns

PI - Prof. Jose I. Restrepo, UC San Diego

[Video not included in PDF]



Seismic Risk Reduction for Soft-Story Woodframe Buildings

PI - Prof. John W. van De Lindt, Colorado State University

- Full-scale testing allowed to **validate the new evaluation techniques and higher performance levels** that were key to the success of the **San Francisco's mandatory soft story retrofit program** (6000 buildings in San Francisco undergoing the rigors of that program)

Seismic Risk Reduction for Soft-Story Woodframe Buildings

PI - Prof. John W. van De Lindt, Colorado State University

[Video not included in PDF]

Select Set of Specimens Tested on the LHPOST (1-DOF)













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Synthetic Six-Axial Ground Motion

[Video not included in PDF]


THANK YOU !
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Thank You

On behalf of everyone who continues to be impacted by your investments.