



# ***Payload Opportunities***

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**University of California, San Diego  
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# NHERI@UCSD Payload Opportunities

<https://ucsd.designsafe-ci.org/payload-projects/>



The screenshot shows the website header with the UC San Diego Experimental Facility DesignSafe-CI logo. Below the header, the main heading is "PAYLOAD PROJECTS". The text below the heading reads: "The following guidelines are provided to researchers interested in proposing a payload component to an existing research project scheduled at the NHERI@UC San Diego Equipment Facility (EF). Successful planning and execution of a payload project will require coordination between the payload project PI, the existing project PI, the NHERI@UC San Diego EF Site Operations Manager, and the NHERI Network Coordination Office (NCO)."

## Opportunities for Payload Projects

CFS-NHERI project (Phase 1 and 2)

Shear-dominated masonry wall systems

# Sample Payload Opportunity

## PAYLOAD POSSIBILITIES FOR NHERI PROJECT "COLLAPSE SIMULATION OF SHEAR-DOMINATED REINFORCED MASONRY WALL SYSTEMS"

Published on January 16, 2018



As part of a project aiming to obtain necessary experimental data for understanding the behavior of reinforced masonry walls, project PI Benson Shing and his team will be conducting shake table tests at the UC San Diego

- Project Description
- Test Schedule
- Project PI Contact Information

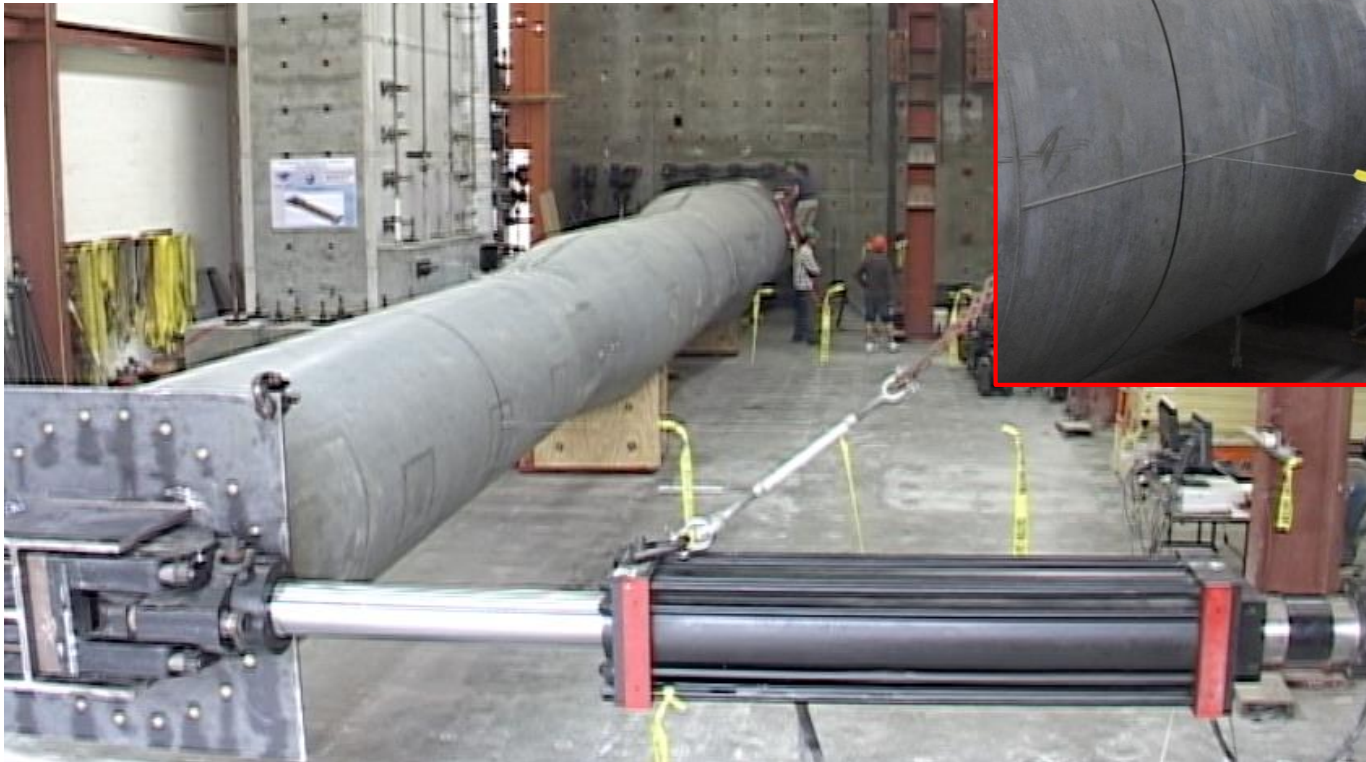
# Wind Turbine Testing (PI: A. Elgamal)



Funding Source of NHERI  
Payload Projects:

- NSF
- Non-NSF

# Testing at Powell Structures Laboratory

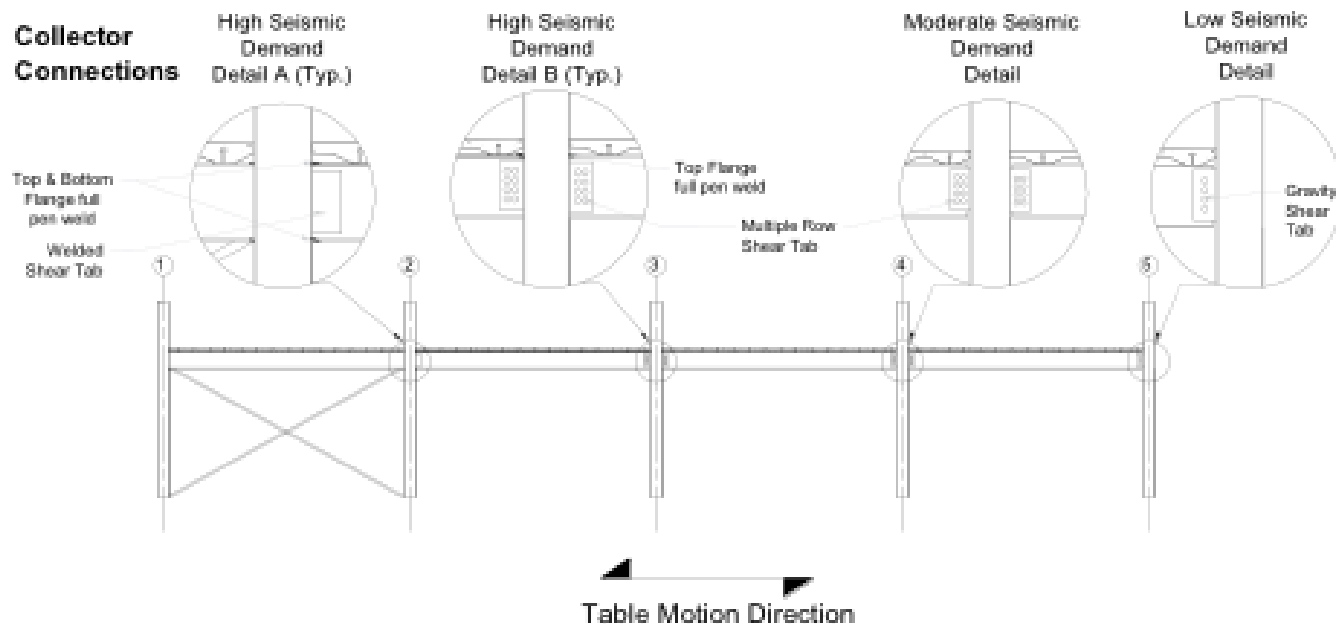


# Payload Project PI Responsibilities

- Contact Existing Project PI
- Both PIs to Inform NHERI Network Coordination Office
- Both PIs to Inform NHERI@UCSD Site Operations Manager for Approval of Technical Feasibility/Safety

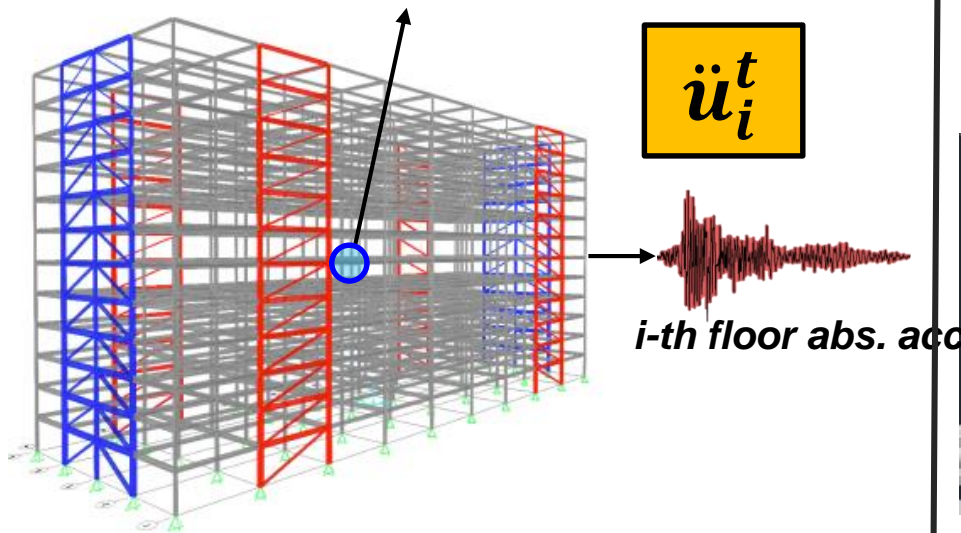
# Seismic Collectors in Steel Building Structures

- University of Arizona: R. Fleischman (PI)
- Lehigh University: R. Sause & J. Ricles (co-PIs)
  - Large-scale Component Tests
- UCSD: C.-M. Uang (co-PI): Shake Table Testing



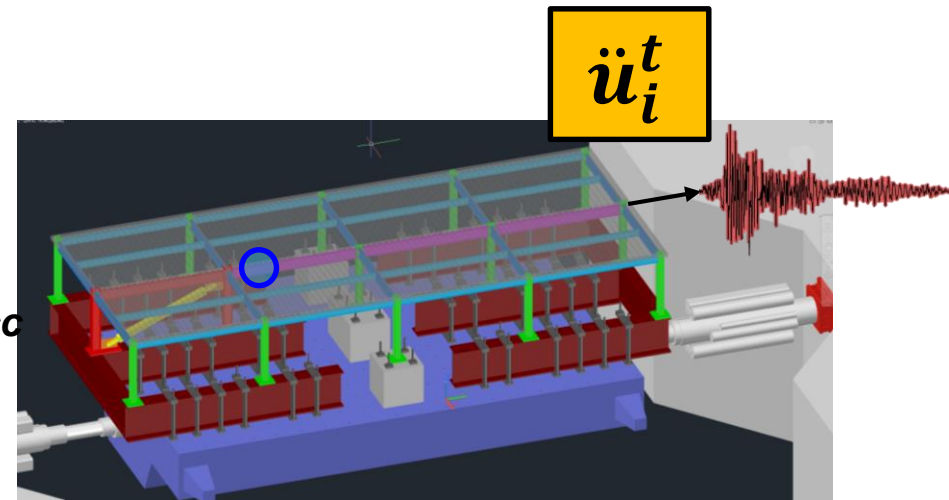
# Challenge

## Prototype Building



## Test Frame

- ✓ Reproduce *i*-th Floor Acc. History in an Elastic One-story Test Frame



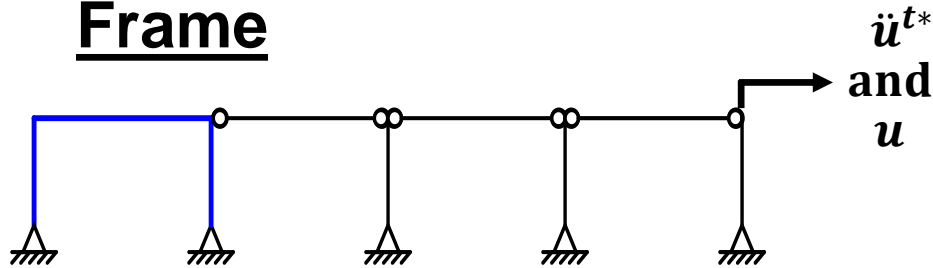
$\ddot{u}_g^*$

?

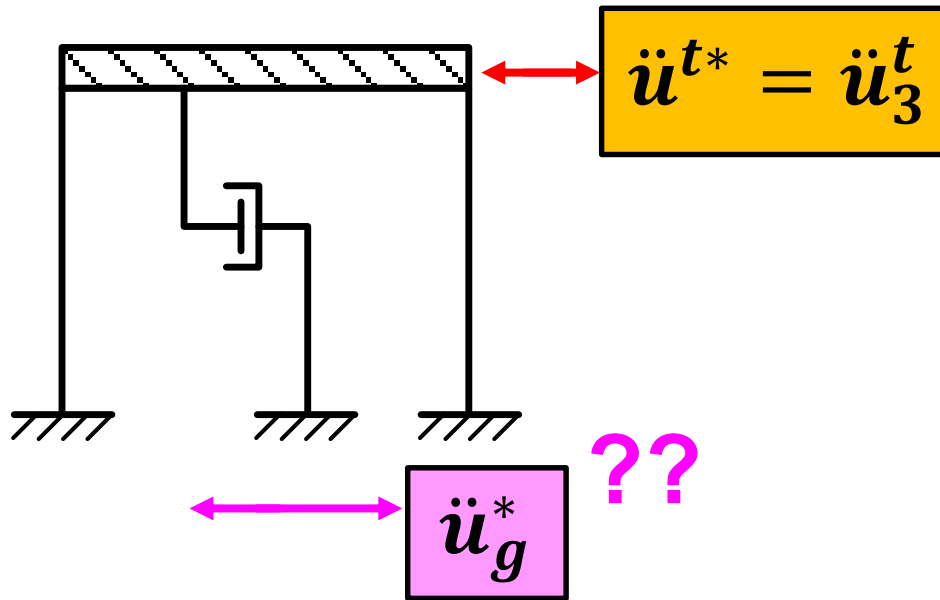


# Target Test Frame Response

## One-story Test Frame



## Elastic SDOF system



Find:

$$H(\omega) = \frac{\ddot{u}^{t*}(\omega)}{\ddot{u}_g^*(\omega)}$$

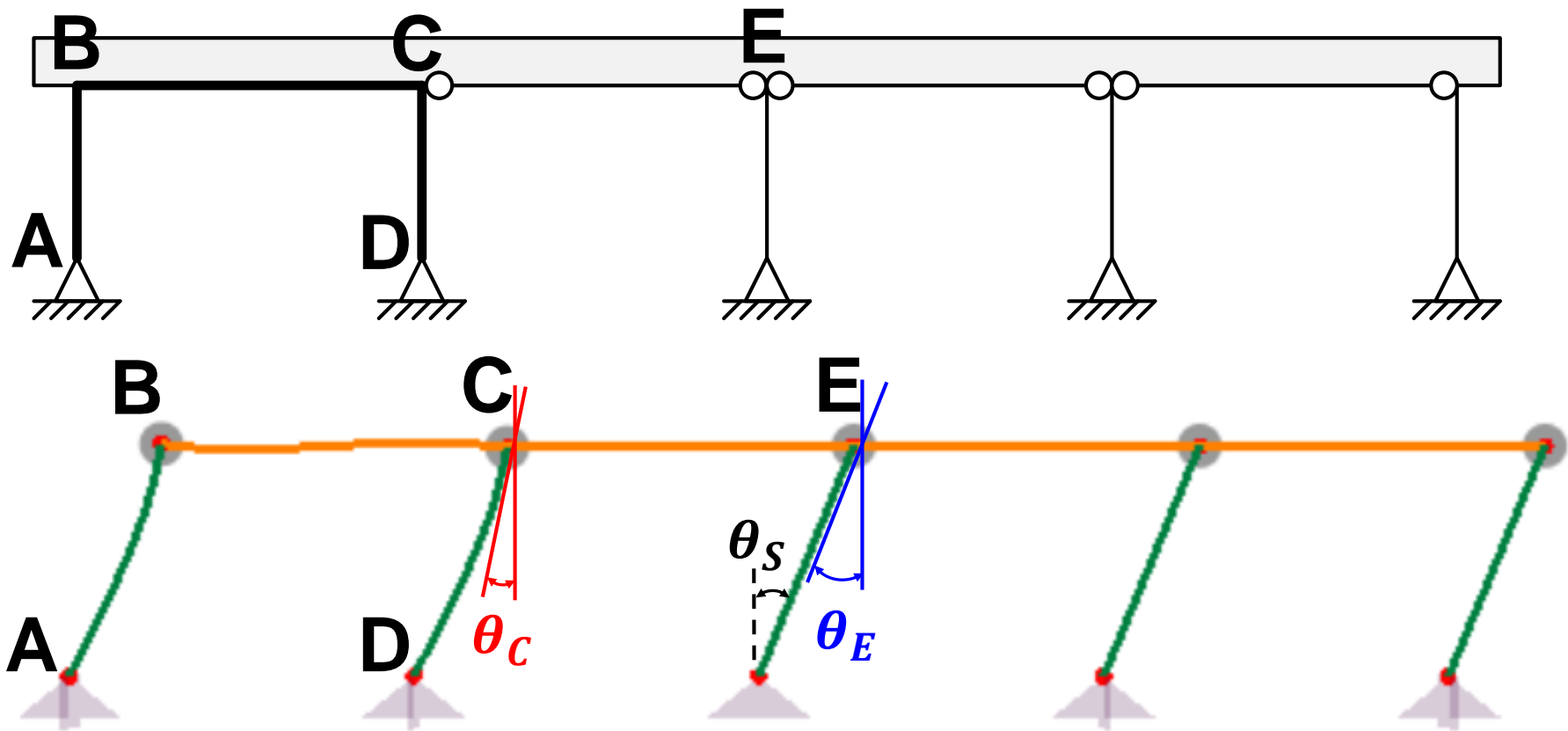
for SDOF system

$$\ddot{u}_3^t(t) \xrightarrow{\text{FFT}} \ddot{u}_3^t(\omega)$$

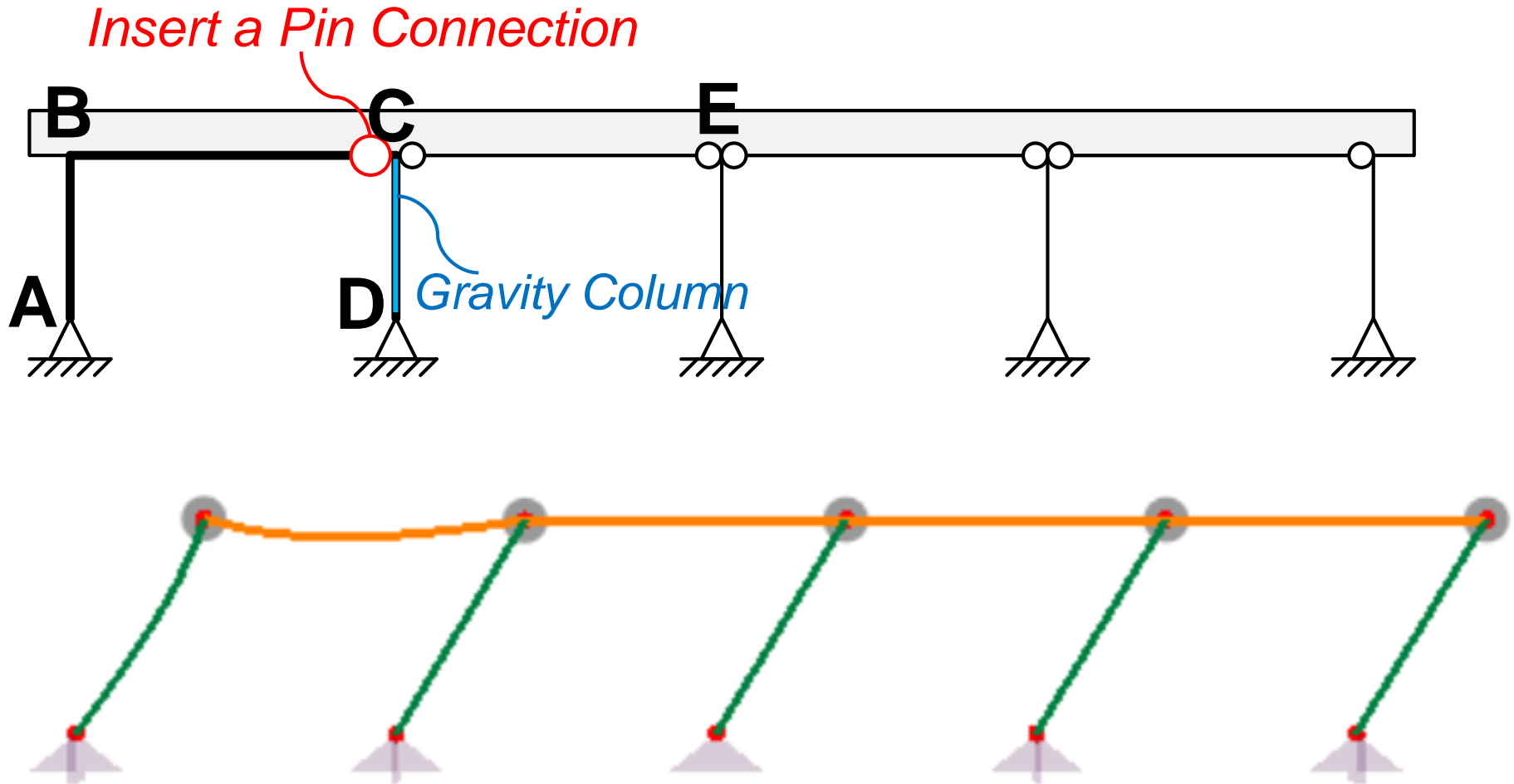
$$\ddot{u}_g^*(\omega) = \frac{\ddot{u}_3^t(\omega)}{H(\omega)}$$

$$\ddot{u}_g^*(\omega) \xrightarrow{\text{iFFT}} \ddot{u}_g^*(t)$$

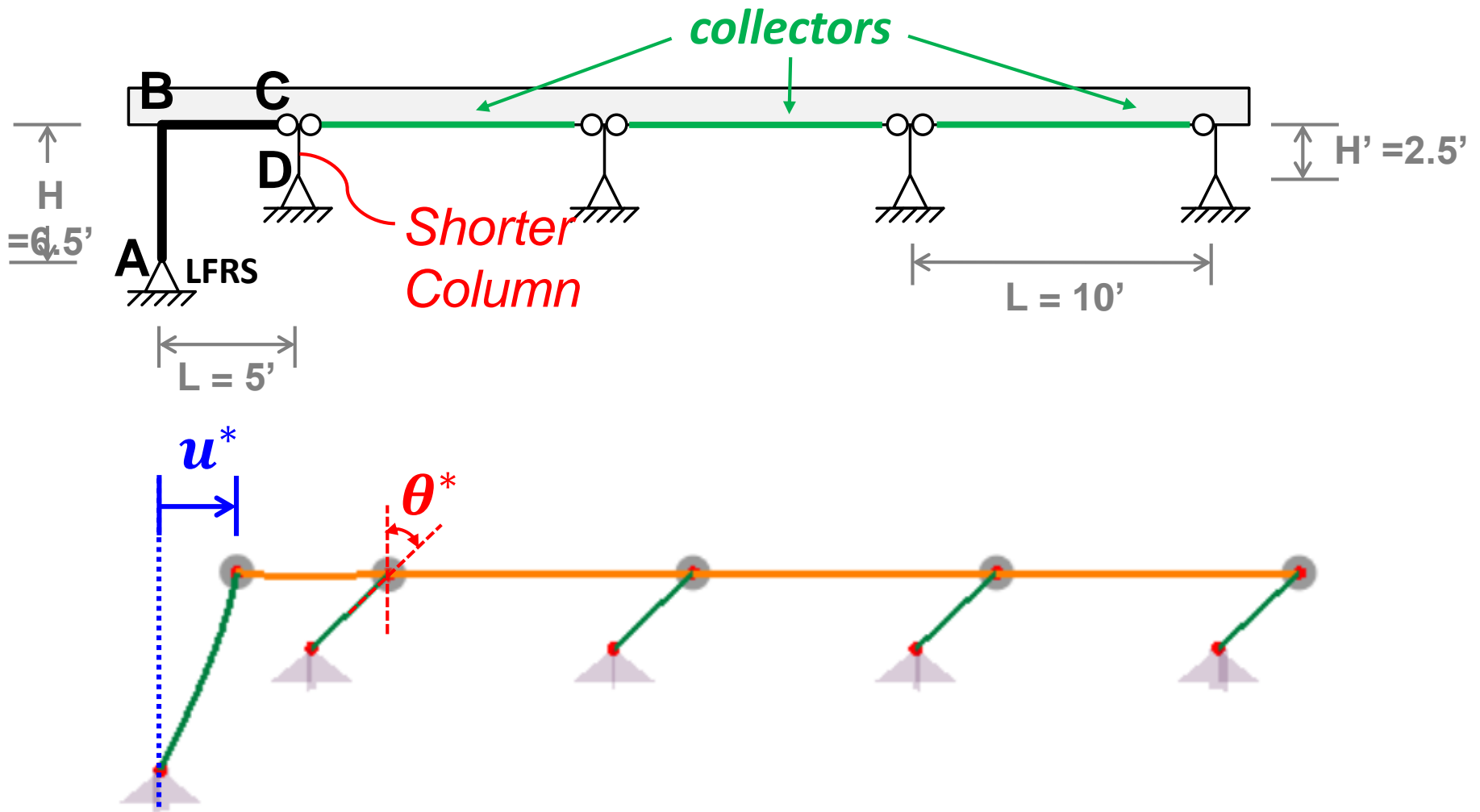
# Collector Joint Rotation Angles



# Collector Joint Rotation Amplification: Modification 1

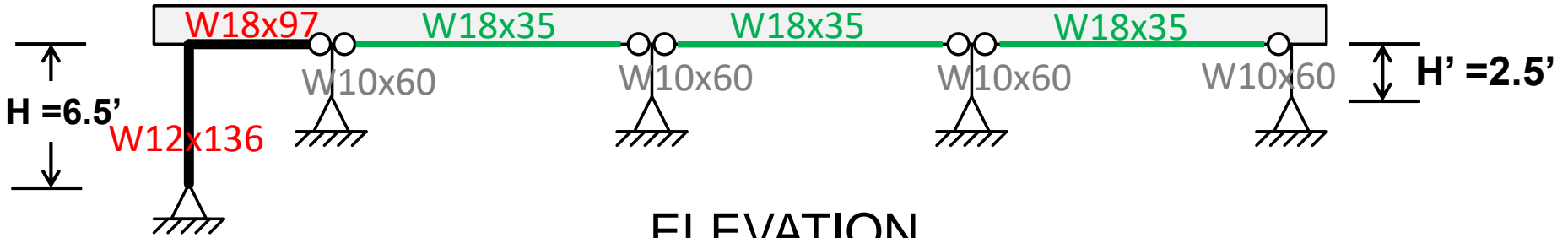


# Collector Joint Rotation Amplification: Modification 2

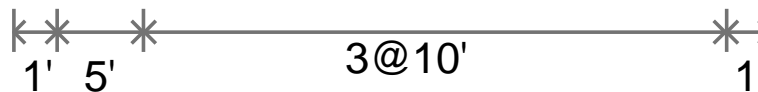
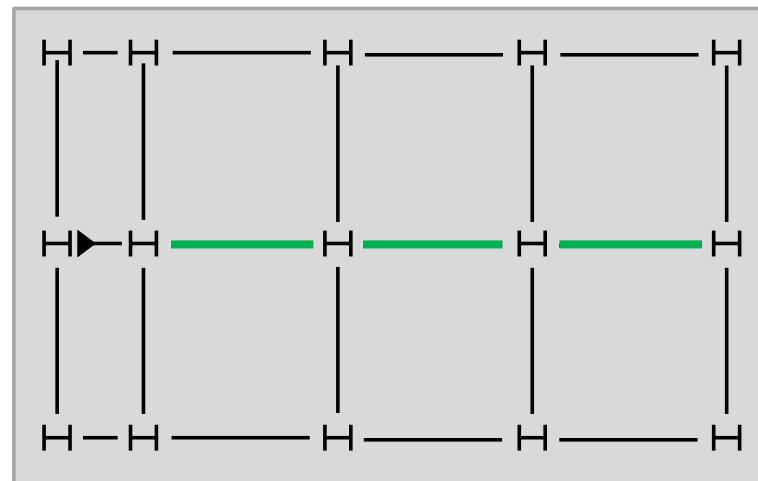


# Trial Test Frame Design

3<sup>1</sup>/<sub>4</sub>" NWC + 3" Steel Deck



ELEVATION



PLAN

$T_1 = 0.20 \text{ s}$

# Test Data/Publication Issue

- Coordination with Existing Project PI