Dampers and Real Time Hybrid Simulation
2021 NHERI Lehigh REU

Audience

High School (9-12th grade)

Takeaway

Students will understand of how to conduct characterization testing of dampers to use for Real Time Hybrid Simulation (RTHS).

Introduction

In the last decades, earthquakes have been occurring more frequently. Earthquake engineering continually look for solutions to mitigate risks produced by seismic activities. One of those solutions are base isolation systems that use friction dampers. Dampers reduce the vibrations induced by earthquakes, which prevents catastrophic failures of buildings. The motivation for this lesson plan is to inspire students to pursue the earthquake engineering field.

Objectives with Activities

During the activity, students will . . .

- Understand how to conduct experimental testing in engineering and applications of engineering concepts
    - Choose between three different dampers (including the BRFD)
    - Explore with different inputs (like displacement and force)
    - Identify how the dampers react to their inputs (with limits)
    - Observe the damper move (may make some noise)
    - Observe the friction force results of the dampers
    - Determine which inputs/damper performs best
    - Draw connections —why each inputs/damper showed different results

Background and Vocabulary

- Present background information
- What engineering students, faculty, and researchers do
- Importance of testing and Real Time Hybrid Simulation
- Seismic Isolator and dampers

- Tour the facility and demonstrations

Assessment

Students will give individual two-minute presentations about their findings and what they learned.

Conclusion

After this course, students will know more about dampers and leave with a motivation to pursue the earthquake engineering field.