

HOW TO DESCRIBE A PROPOSED EXPERIMENT?

List of questions/tasks that must be addressed to use LHPOST

General Shake Table Testing Sequence

What are the dynamic characteristics of the prototype? Recommended to develop a finite element model of physical prototype. Select earthquake records in the prototype world.

What similitude conditions are to be met? Is the test unit scaled down or full scale?

What are the dynamic characteristics of the scaled model? Recommended to develop a finite element model of the scaled physical model.

Is there a requirement to add extra mass to simulate prototype mass? (e.g. lumped mass to simulate superstructure mass in bridge column test)

Bare table tuning:

- Three-Variable Controller (TVC) under white noise excitation.
- Adaptive Inverse Compensation (AIC) tuning under white noise excitation.
- On-Line Iteration (OLI) tuning with actual earthquake records.

Loaded table tuning:

- Three-Variable Controller (TVC) under low amplitude white noise excitation.
- Adaptive Inverse Compensation (AIC) tuning under low amplitude white noise excitation.
- On-Line Iteration (OLI) tuning with actual earthquake records at significantly reduced amplitudes.

Initial system identification tests to determine the dynamic properties of the test unit in its as built condition mounted on shake table:

- Frequency Evaluation Tests.
 - White noise test.
 - Sine sweep test.
 - Sine step test.
 - Impact test.
 - Small-scale earthquake record.
- Damping Evaluation Tests.
 - Log decrement method.
 - Half bandwidth method.

Perform sequence of increasing amplitude seismic tests and/or sequence of tests with a variety of records with differing frequency content. Optionally perform low amplitude system identification tests between seismic tests to identify linearized dynamic properties of damaged test unit. Between tests compare experimental results with analytical predictions and calibrate analytical model.

Shake Table Specific Questions (no particular order of priority)

What kind of testing are you interested in? Will the time histories be earthquake or some other kind of record?

- If using earthquake records will they be actual or synthetic records?
- If actual records, will the earthquake records need to be scaled in time and/or magnitude to satisfy similitude requirements?
- Will the earthquake records be expressed as displacement, velocity or acceleration histories?

Is the total weight of the test unit less than the vertical load capacity of the shake table?

What is the maximum shear capacity required?

What is the maximum overturning moment expected for the test unit compared with overturning moment capacity of LHPOST?

What are the maximum base displacement, velocity and acceleration requirements?

What is the required frequency range?

What is the total cumulative displacement for the planned earthquake records?

What kind and amount of table tuning are required for the test?

General Structural Testing (no particular order of priority)

How many channels of different types of signal conditioning are available? Use analysis to determine optimum location and type of transducers.

Will the test unit be built in place or off site and moved into place?

How many and what kind of strain gages? What maximum strain levels are expected for each strain gage? Where are they located?

How many and what kind of accelerometers? What ranges are required? What are the required locations for accelerometers?

Where should displacement transducers be placed and how will they be mounted? What displacement ranges are required?

Is there any specialized hardware that needs fabricating?

What is the expected end stage of the test? Will the test unit maintain structural integrity to the end?

What are the plans for post-test demolition?