9th NEES/E-Defense Planning Meeting Breakout Session: Monitoring

Room 2
3:45 pm – 5:30 pm
Friday, August 26, 2011

Moderators: Anne Kiremidjian and Akira Nishitani

Recorder: Naru Nakata

Number of Participants: About 12-13

Suggested Issues

1. How to best utilize the test data obtained at E-Defense and NEES.
2. How to use the tests as an opportunity for payload tests to install instruments and health monitoring systems.
3. What new E-Defense tests are needed for improvement of technologies.

(1) How to best utilize the test data obtained at E-Defense and NEES

Questions to the E-Defense Test Data Management

- Are the E-Defense test data available?
  →The answer is YES. But, most US participants did not know.
- When do the E-Defense test data become available?
  →Two years from the test (FYI, six months in NEES test data)
- How can we access the E-Defense test data?
  →**ASEBI** (Archives of Shakingtable Experimentation dataBase and Information)
  (FYI, NEEShub for NEES test data)

ASEBI

- English pages are not available yet.

(1) How to best utilize the test data obtained at E-Defense and NEES (Cont'd)

Facts and Suggestions

- Some Japanese group published papers on damage detection related research using E-Defense data without participating experiments.
- US researchers are also very interested in the E-Defense test data.
- Dissemination of the availability of the E-Defense test data is critical for effective use in research community.
- Use data for damage diagnosis algorithm verification
- Use data for uncertainty quantification
- Study data to identify gaps in knowledge and understanding of uncertainties

(2) How to use the RC and Base Isolation/Control tests as an opportunity for payload tests

Successful Payload Projects

- Drs. Nagae and Nitta's payload test at E-Defense
  - Payload to E-Defense Structure Projects
  - Deployed their sensor units for strain and gap displacement measurement
  - Detected cracks and damages
- Prof. Kiremidjian's NEES payload test at Univ. of Nevada, Reno
  - Payload to Multi-Span Bridge Project
  - Deployed their wireless smart sensor
  - Wavelet energy-based algorithm was shown to be promising for detection of global damage

(2) How to use the RC and Base Isolation/Control tests as an opportunity for payload tests (Cont'd)

Suggested Ideas:

- Damage detection with dense measurement
- Deployment of new instruments
- Algorithmic based payload

Questions:

- Is information about instrumentation scheme available?
- Who is in charge of data sharing?
- To be successful in the NEES proposal, a letter of agreement from the E-Defense director is required. What should the letter be saying?

Comments:

- Difficulty in Monitoring Payload: May not possible to put all the sensors we want.
- Importance of Coordination: Payload teams should not interrupt the main project team.
- It is worthwhile to review information of sensor arrangement in the past experiments.

(3) What new E-Defense tests are needed for improvement of technologies.

- New Sensor Technologies:
  - Wireless Sensors and Smart Sensors
  - Rotational Sensors
  - Acoustic Emission Sensors
  - Laser Scanning
  - Crack Sensors and Corrosion Sensors
- Ground Motions:
  - Long period and long duration ground motion tests
  - High amplitude and long duration ground motion tests
- Monitoring System Technologies:
  - Localization of damage
  - Identification of hidden damage
  - Early warning based on the state of structure
  - Targeted failure mechanisms and their detection methods