

CE 474 Honors Project for Arief Purnoko

Topic

Structural analysis involves mathematical modeling of physical structures, analyzing these models, and interpreting the analysis results to estimate what the physical structures would do or had gone through under given loads or disturbances.

In Structural Analysis II - CE 474 course, different methods of structural analysis are studied using simplified representations of actual physical problems. Results obtained through these methods help develop fundamental understanding of structural behavior.

In this Honors Project, it is proposed to extend the topics covered in CE474 by methodically studying response of real structures. The focus will be on the response of buildings to earthquakes. The reason being, earthquakes have been causing severe damage to building infrastructure resulting in wide-spread losses and misery and it would be appropriate to study what happens to buildings during strong earthquakes. At the completion of this Honors Project, Arief Purnoko will have a level of understanding about earthquake engineering and seismic response of structures that is beyond the level typically achieved by undergraduate students in School of Civil Engineering. The project will help lay a stronger foundation for design and analysis in his future structural engineering career.

The following tasks will be performed and reported on:

- Prepare an online database with information on response of buildings to earthquakes around the world;
- Study reconnaissance data collected by Purdue University faculty and students after the 2003 Bingol, Turkey earthquake; prepare a dedicated online database site using the available building evaluation data;
- Using methods studied in CE474, analyze simple but representative building structures to study response characteristics of different structural systems to earthquake-induced lateral loads. Whenever possible, analysis results will be compared with field observations collected for the online databases listed above.
- Prepare a summary report on response of building structures to earthquakes. The report will be based on information gathered and understanding gained while carrying out above tasks.

Deliverables:

1. Digitized and annotated catalog of images, currently available in analog form, of buildings taken during earthquake reconnaissance.
2. An online database of buildings using reconnaissance data collected by Purdue University faculty and students after the 2003 Bingol, Turkey earthquake.
3. A brief report on response of building structures to earthquakes.

Deadlines:

1. Deliverables #1 and #2: no later than three weeks before the end of the semester.
2. Deliverable #3: by the end of the semester.