

CE 8930

Group Assignment #4

Assigned: Thursday, February 6, 2014
Due: Tuesday, February 13, 2014 (midnight)

Now that everybody in the class is familiar with hands-on modal testing and Pulse DAQ systems/ software, it is time for our very first hands-on group assignment. Students can check the group names and see which group they belong to on BB. The assignment report should NOT exceed a total of 5 pages; 10/ 100 points will be taken for each extra page. Please use Times New Roman 11 font with normal margins.

Students are asked to complete an Experimental Modal Analysis exercise on a wood plate (available at the White House). This assignment has three objectives:

- i) To complete a full set of hammer impact tests.
- ii) To complete a full set of shaker tests.
- iii) To compare the results obtained in items i and ii.

i) Specifications for the hammer tests:

The natural frequencies and mode shapes must be obtained through measurements obtained at nine pre-defined points. Students are allowed to choose between available types of hammers as well as a choice among the available hammer tips. The variables of the DAQ system, such as frequency range, number of lines and etc., are all left to the discretion of each group.

Students are expected to submit a brief paragraph explaining their preparatory phase as well as explanations supporting the decisions behind their choice of accelerometer locations and DAQ settings and all other relevant details.

ii) Specifications for the shaker tests:

The natural frequencies and mode shapes must be obtained through measurements obtained at nine pre-defined measurement points. The location of the shaker and all other DAQ and shaker variables are left to the discretion of the groups. **To prevent damage to the shaker, groups should not exceed 500 mV input to the shaker.**

Students are expected to submit a brief paragraph explaining the design of the experiments, the preparatory phase as well as the quality checks.

iii) Comparison of the Hammer and Shaker Results:

Students are asked to discuss at least ten distinct items comparing the practical and technical differences between the hammer and shaker tests. Students are expected

to plot at least three FRFs of their choice, obtained through hammer and shaker tests.

To help you design the experimental set-up, the mode shapes obtained through the finite element model of the plate are provided below. Each group should aim at identifying as many modes as they can. The group who manages to identify the largest number of modes will gain a bonus point.

