Electrical/Computer Engineering Design Project Proposal

Title: *BEAMO – Beam Simulator*

Client: *Stephen Bruneau*

Supervisor: *not yet identified*

Description

Mechanics of Solids is one of the fundamental core courses within the physical applied science/engineering programs around the world. One of the primary goals, if not the key principle of this course, is to educate students on the nature of stresses and deflections in a simple beam under varied loading conditions. Shear and flexural stresses, plus deflections must be visualized for one to gain the basic understanding of material behavior under applied loads.

At Memorial, an apparatus has been designed to provide students with an accurate and unambiguous analog of the beam bending phenomena. The educational aspect is heightened through the use of this interactive and tactile physical model coupled with a sensor array, signal processing and interface software. The intention is to have students apply unit loads on a specialized beam while observing how the shear, bending and deflection diagrams respond instantaneously. Machined steel blocks and prisms of known mass are used for loading, and the patterns in with these weights may be set upon the beam are virtually unlimited.

*The physical apparatus **has now been built**, however, the sensor array (strain gauges primarily) and software have not been developed and thus the tool remains substantially incomplete. Prof Bruneau encourages interested ECE groups to discuss this project with him, and the prospect of developing the final product into a patent-protected commercial product for secondary educational institutions is of interest.*

A detailed design description of the apparatus is provided here:
http://www.engr.mun.ca/~sbruneau/projects/

BEAMO
Lab apparatus for hands-on learning of shear and bending moment diagrams

Steve Bruneau, EN4013, 737-2119 ---- May, 2007