

Applied Laboratory Demonstrations for Construction Management Statics and Structural Analysis Courses

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Construction Management students at Roger Williams University have been taking the Engineering Statics course even though both Construction Management and Engineering students have different pre- requisite requirements. Engineering students take mechanics of materials course after statics and get the experimental part of the theories covered in Statics. Because this course is not part of the CM curriculum, as a result, our students lack the applied side of strength of materials and end up not having any lab experiments to tie it back to theories covered in the course.

To compensate for the lack of the “bridge” course and to alleviate the constraints that we are facing with the number of credits our students have to take, the CM program decided to develop its own Statics course and redevelop Structural Analysis course by embedding experiments that illustrate the theories covered. The project is creating laboratory exercises to be performed by different student groups in the classroom and include measurements taken by students in class used to answer questions about the behavior of materials and structures tested. Each experiment/demonstration is presented by a team of four students, then the class will collect the data, complete an assigned analysis requirement, and write an individual report on the phenomena observed. The titles of the demonstrations are: APPLIED STATISTICS: Equal Arm Balance, Equilibrium of a Particle, Truss Design and Testing, Truss Design and Analysis, Calculate Centroid – 2D, Design of supports. APPLIED STRUCTURES: Simple Tension Analysis, Simple Compression Analysis, Simple Torsion Analysis, Bending Analysis, Young’s Modulus, and Shear and Moment diagrams.

Initial findings from the on-going research study indicate that lab exercises and demonstrations have proven to be effective in reinforcing concepts of statics and structures for CM students. It is important to provide a balance between lecture and laboratory based problem solving. Understanding the learning preference of construction management students is key in making sure that these labs are successful.

The authors of this paper are planning on conducting a direct and indirect assessment of the student learning outcomes of this course and compare the results with last year performance when none of these experiments were covered. The experiential learning will improve construction management students’ performance in the applied statics and structures courses. This model is helping the instructor to overcome some of the challenges demonstrated by lack of students’ participation and understanding of the behavior of simple structures.

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