

Developing a Structural Engineering Encounter (SEE) Active-Learning Laboratory Environment

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College Cohorts:

Jessica Opinion & Veronica Rico

*AIMS² Undergraduate Research Project
Summer 2016*

The TEAM

Faculty Mentors



Dr. David Boyajian



Dr. Tadeh Zirakian

College Cohorts



Jessica Opinion



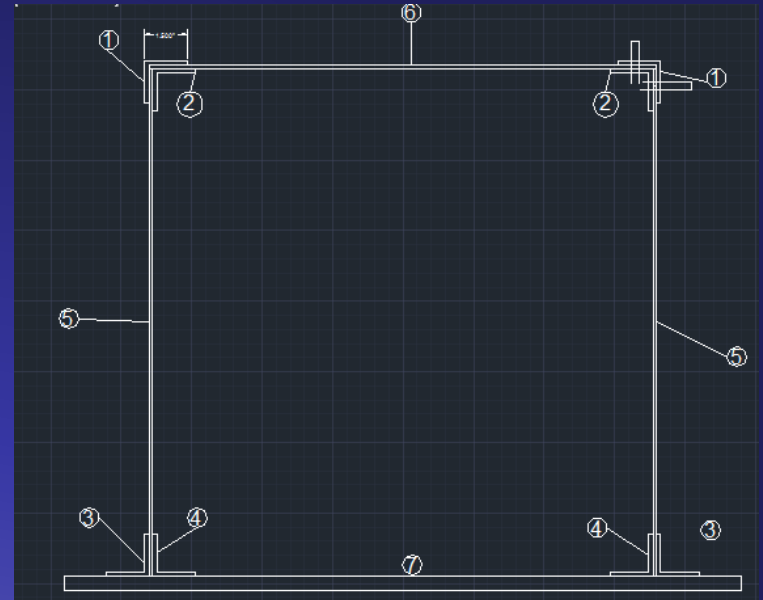
Veronica Rico

Introduction

- Objective:
 - ✓ Provide hands-on approach for comprehension of mechanics and structural analysis
- Why is it important?
 - ✓ Improve status of current mechanics lab instructional capabilities
 - ✓ Foster tie between test and theory
 - ✓ Serves as a resource for student recruitment into Engineering program

Design Phase

- Design, detailing, and use of AutoCAD for conceptualization of single-story, single-bay portal frame
- Fabrication of portal frame components by machinists

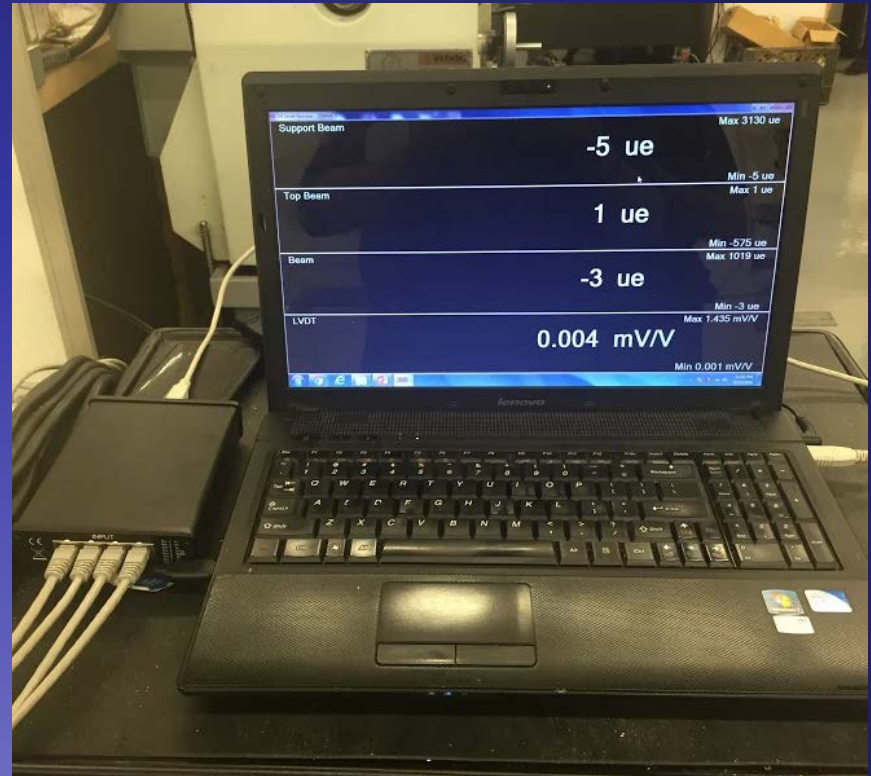


Materials and DAQ

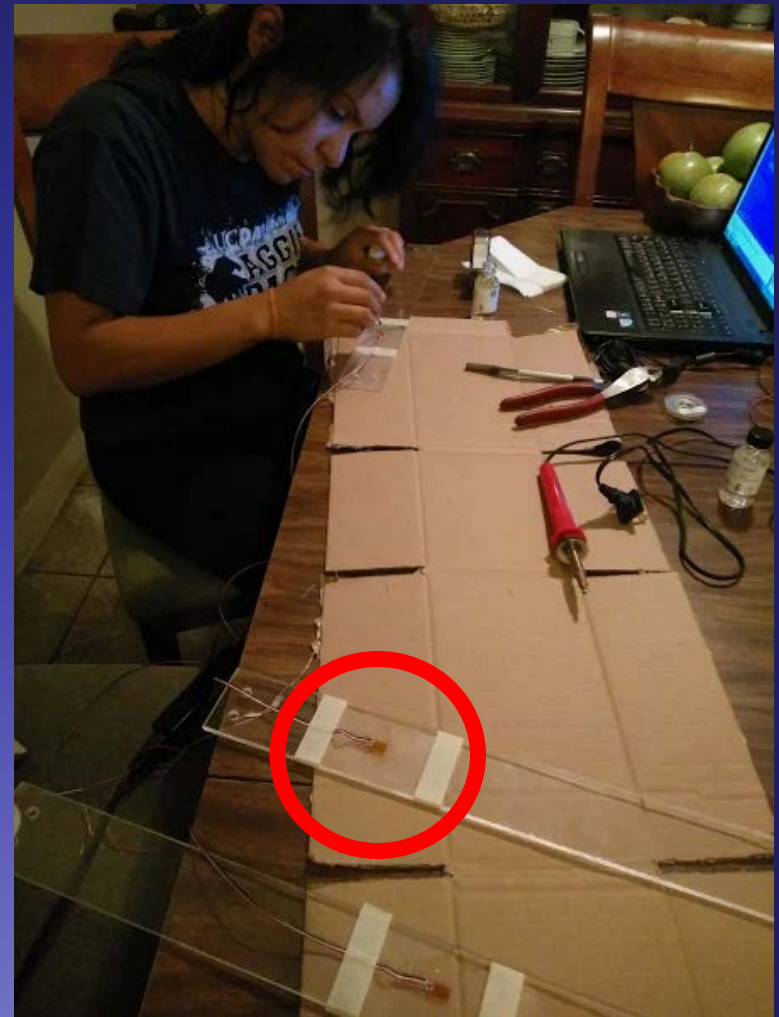
Frame Components



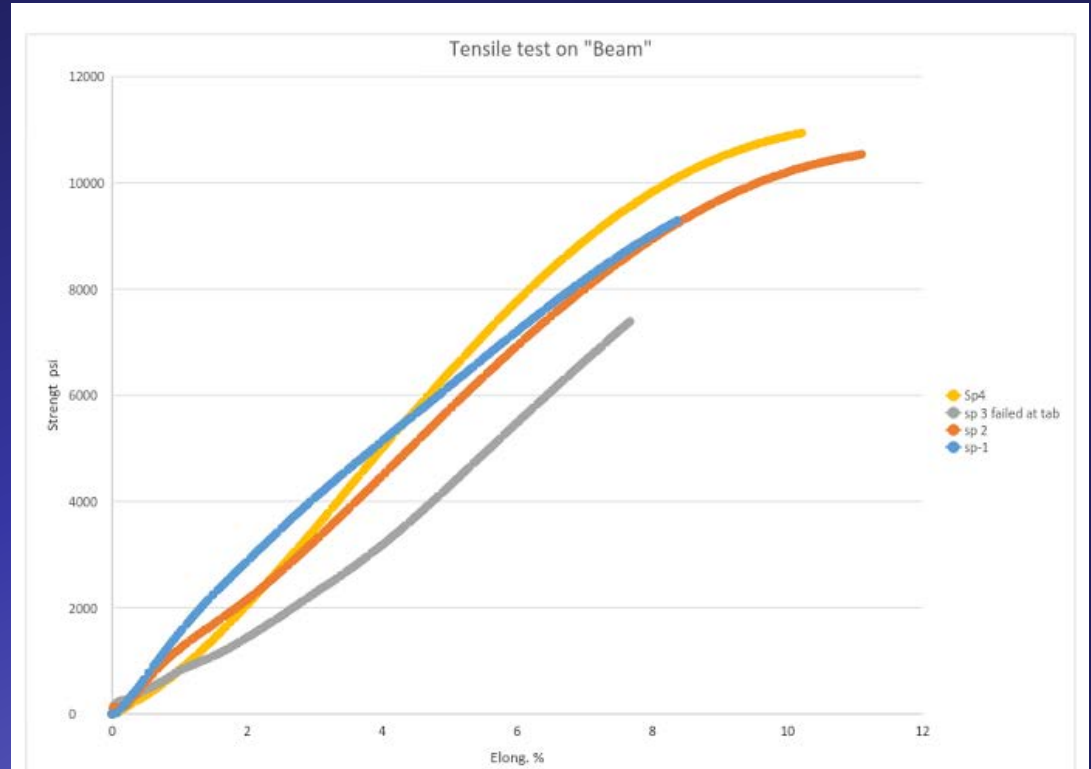
Data Acquisition System (DAQ)



Strain-Gage Prep & Installation



Tensile Test*



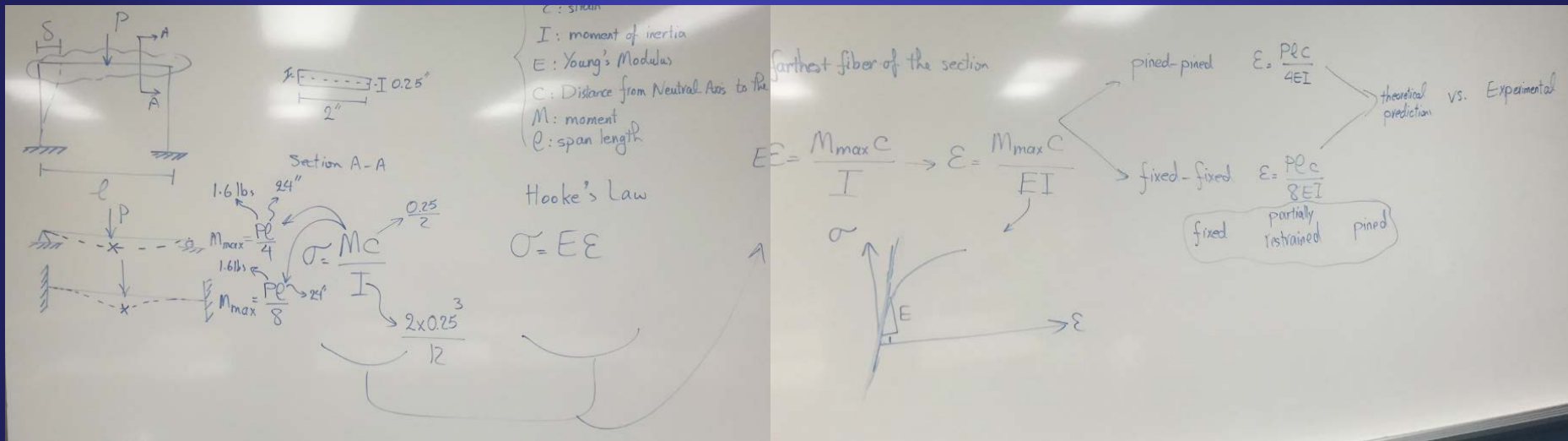
** The research team wishes to acknowledge the kind support provided by **Dr. Behzad Bavarian** regarding tensile tests.*

Video Clip Exposure of SEE & DAQ System



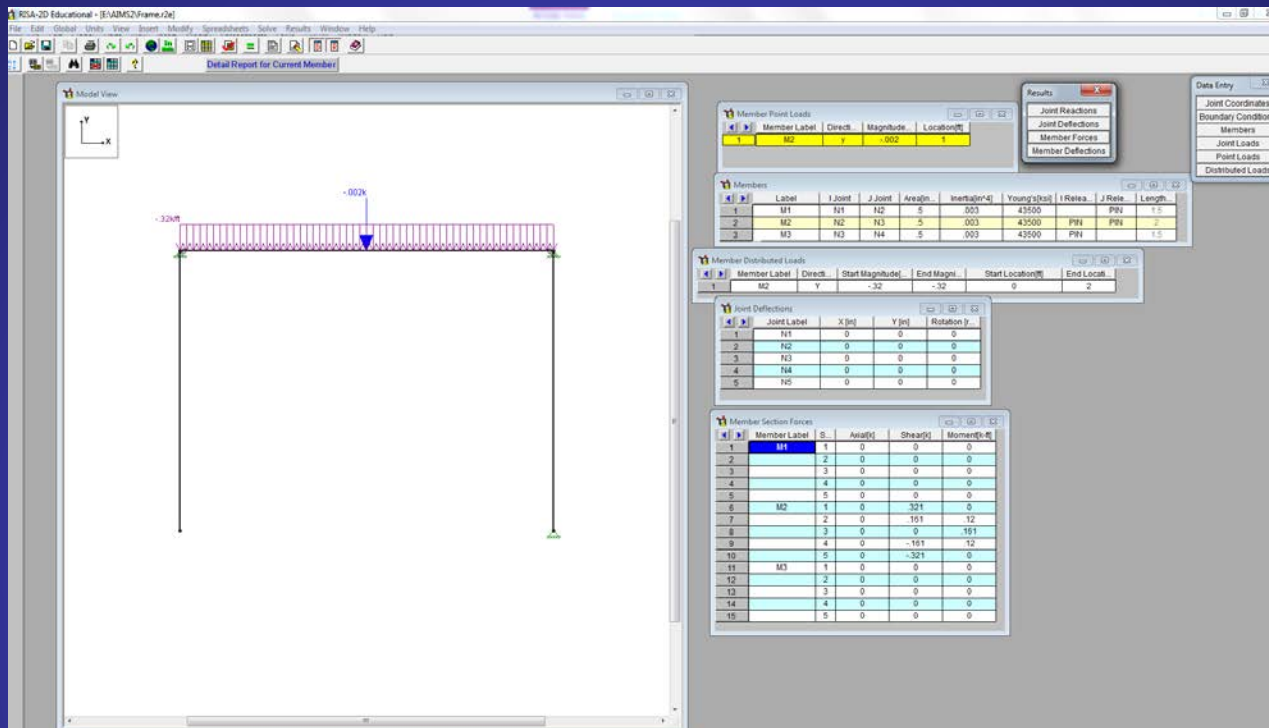
Comparison of Test Results & Theoretical Predictions

- Experimental strains were compared to theoretical results by considering beam portion of frame with midspan point load.
- Experimental results agreed well with theoretical predictions.



Comparison of Test Results & Numerical Predictions

- Numerical model of the portal frame was constructed using a structural analysis and design software, i.e. RISA.
- The agreement between experimental results and numerical predictions was found to be good.



Concluding Remarks

- College cohorts consisted of two incoming Hispanic female transfer students, who gained familiarity with the CSUN campus as well as an important STEM field.
- Cohorts learned basics of mechanics from analytical, numerical, and experimental standpoints.
- Cohorts gained valuable experience with instrumentation, e.g. strain gages and displacement transducers.
- A considerable step was taken through this endeavor to improve the quality of the mechanics lab instruction experience.

THANK YOU!

QUESTIONS?

