

Mech 410 Project Requirements

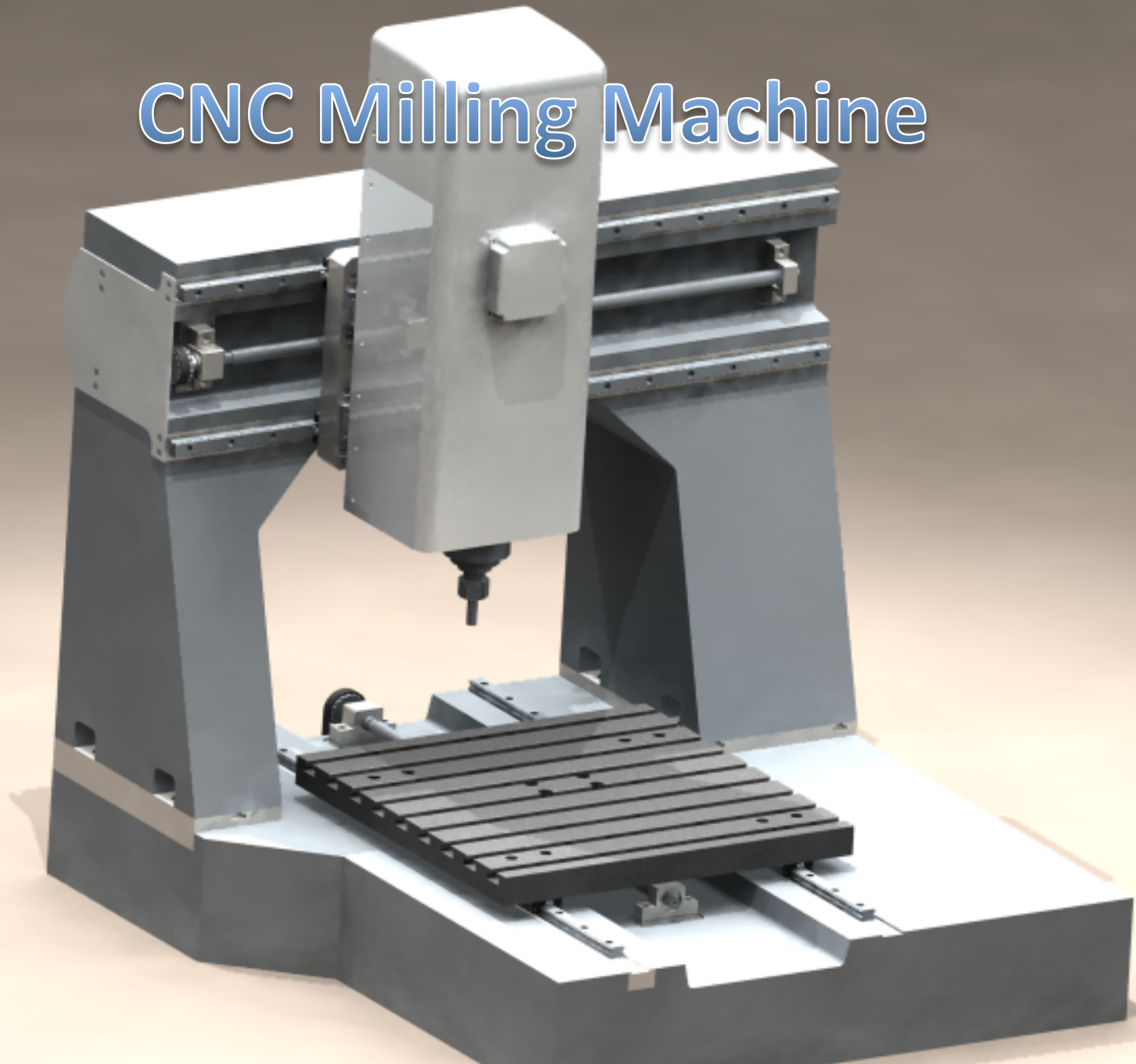
- 3 persons per group (group submission Jan 9)
- A combination of CAD/CAE/CAM
- Required submissions:
 - Topic submission (Feb 2)
 - Proposal submission (Feb 13)
 - Final Report (April 2)
- Presentation (March 15-26)

Modules Required

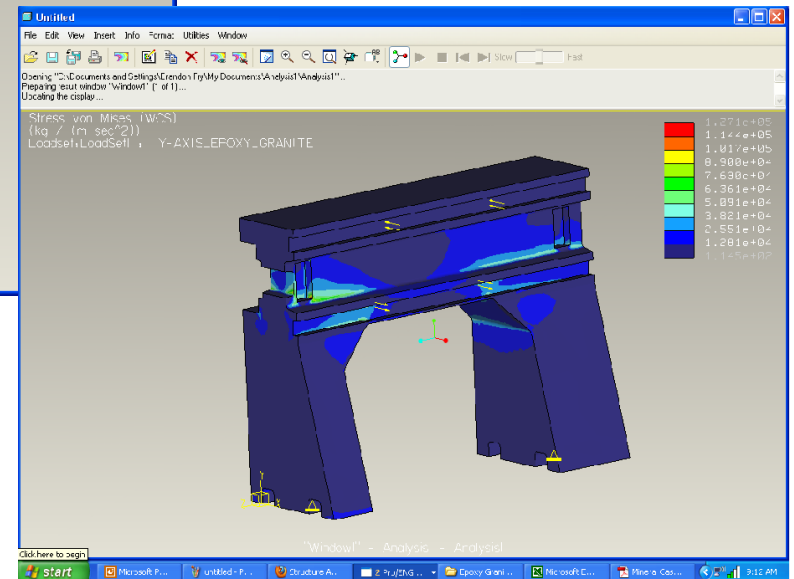
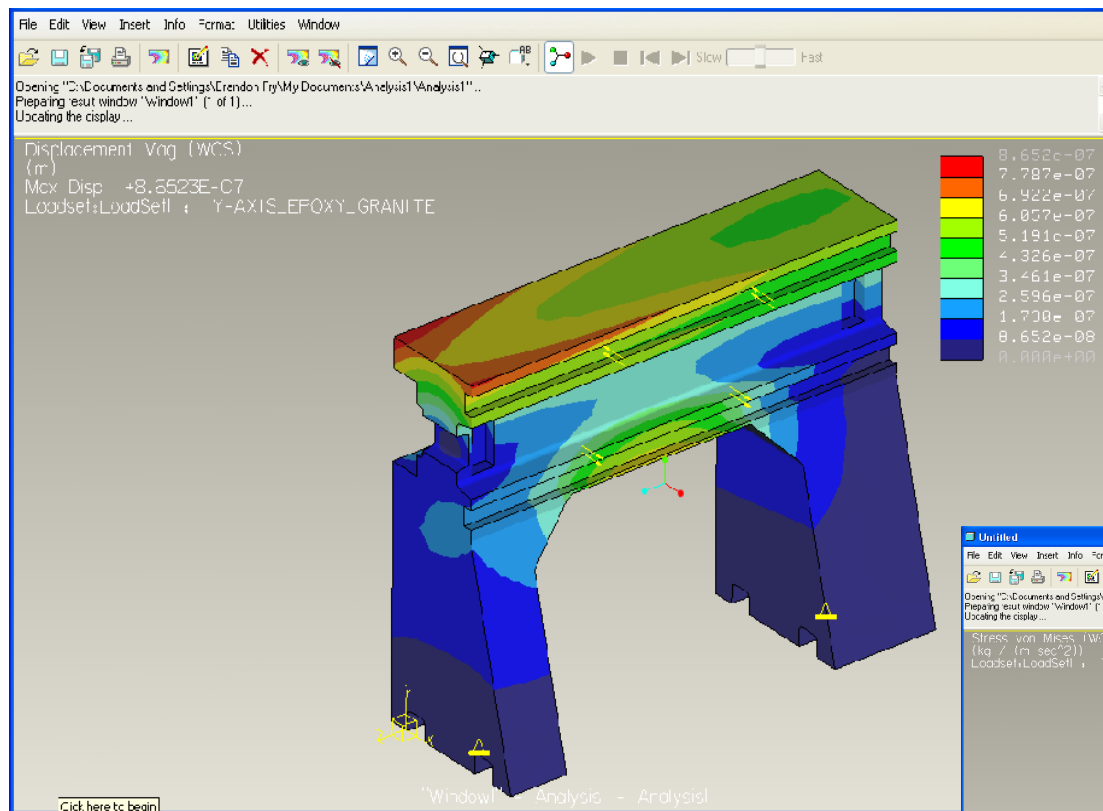
- Complex CAD model including advanced surfacing features. All modeling using SOLIDWORKS
- Proper engineering drawing of one sufficiently complex component.
- Components assembly.
- Computer Aided Engineering using Comsol or Solidworks Analysis tools.
- Simple component to be programmed in G CODE for CNC manufacturing

Following are examples from
previous years projects

CNC Milling Machine

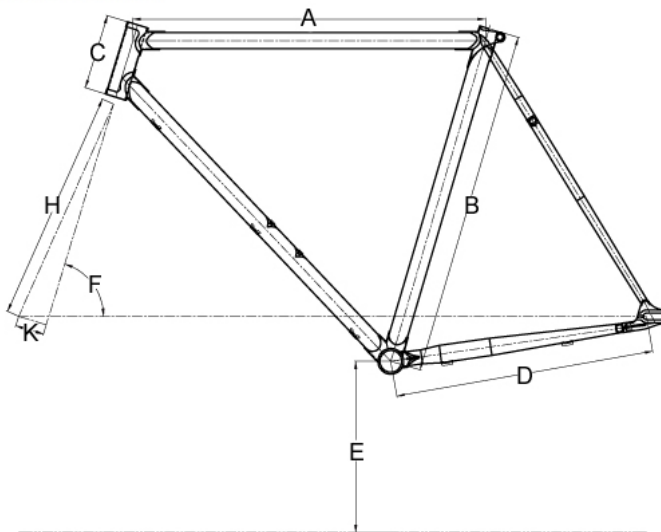


FEA Analysis

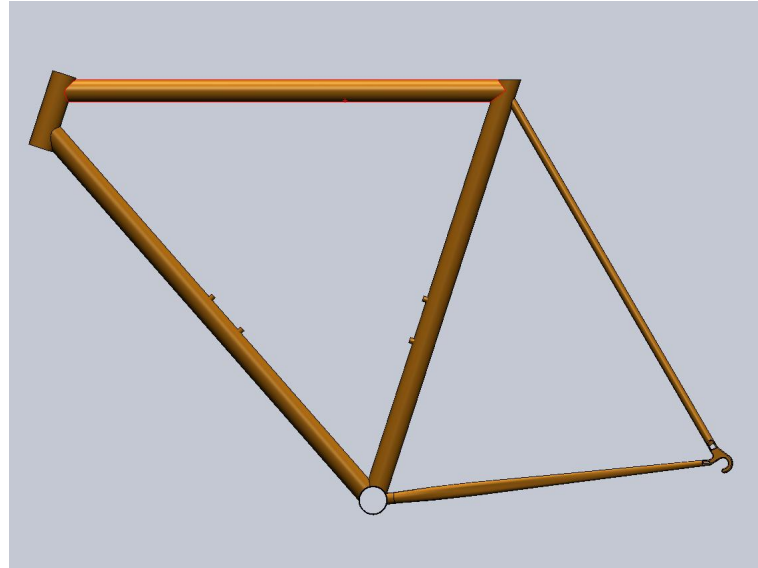


Bicycle Frame Analysis

Measurement/ Geometry



	A	B	C	D	E	F	H	K
50	520	500	90	405	267	72	362	45
52	535	520	106	405	267	73	362	45
54	550	540	124	405	267	73.5	362	45
56	565	560	142	405	267	74	362	45
58	580	580	160	405	267	74	362	45
60	595	600	178	405	267	74.5	362	45

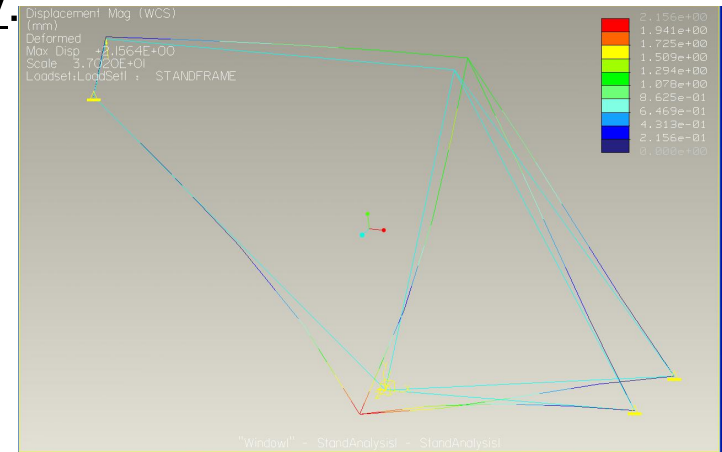


Beam Analysis

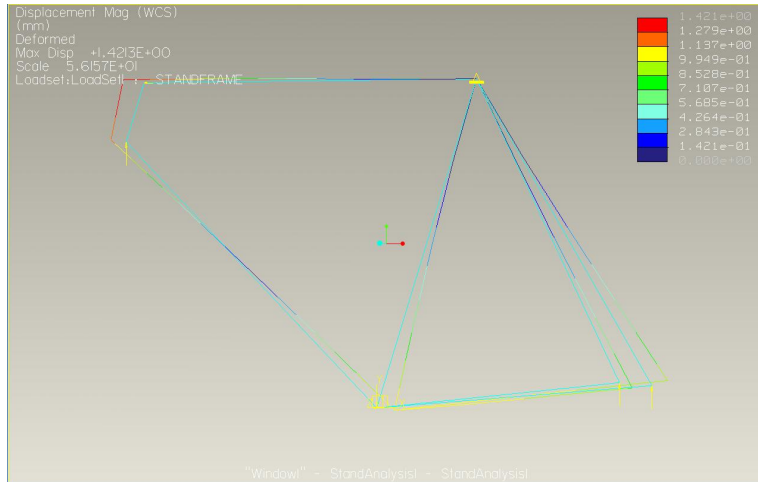


Standard Geometry:

- 1" Dia Tubing
- $\frac{3}{4}$ " Dia Rear Triangle
- 490N Load on 165mm crank arm
- 980N Mass Load
- Fixed at Head Tube and Rear Dropouts

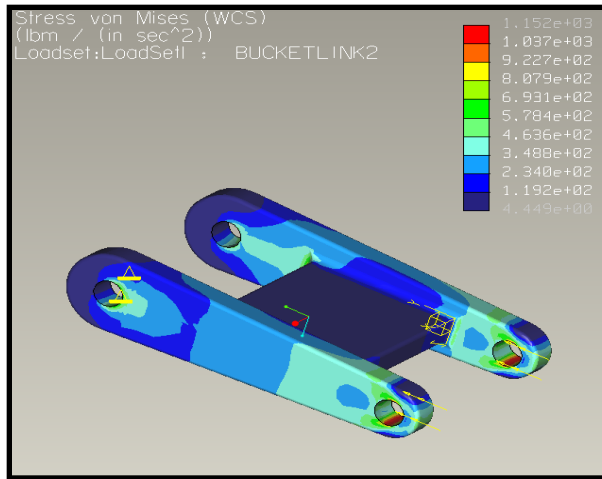


Aluminum
Max Displacement: 2.15mm

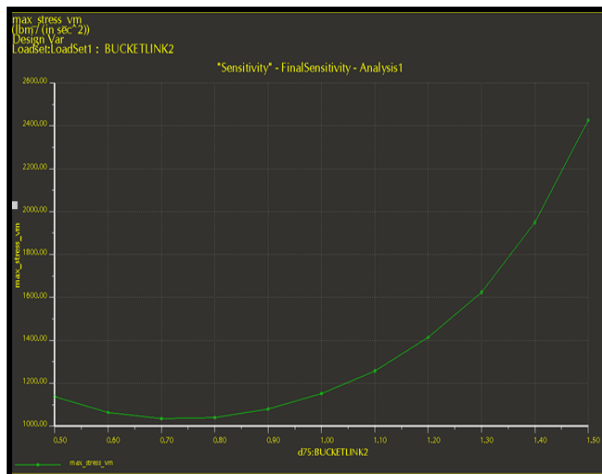


Steel
Max Displacement: 1.42mm

SENSITIVITY ANALYSIS



- Ran stress analysis
- Largest stress found at inside surface of pin hole
- Ran stress sensitivity analysis with respect to the diameter of the bottom hole of the link between 0.5" to 1.5"
- Optimum hole size found to be 0.7" (lowest max stress)



Formula SAE BODY



Working Clock



Project Suggestions

- This is a CAD and not a design project. You are not marked based on design quality or creativity, but CAD/CAE/CAM depth.
- As much a seamless topic is suggested, the chosen topic for CAD is not required to be the same for CAE or CAM.
- You are welcome to combine this project with other courses projects (fracture-fatigue, CFD, FEA...)

Project Report

- Title of the Project
 - Names and Student Numbers and group number
 - Summary (50 – 100 words)
 - Table of content/figure/tables
 - 1. Introduction (Description of the Project, problem definition, chosen approach and why)
 - 2. Implementations.
 - 3. Technical Challenges. What you have learned, solutions
 - 4. Special Features and Highlights. Additional content that you think is relevant to your work
 - Conclusion & Recommendations
 - References
 - Appendix:
 - A. Important figures, drawings, calculations, etc.
 - B. Electronic copy of all related and necessary CAD/CAE files and other source codes.
-
- **Submit both a hard and a soft copy not later than April 2th**
 - **Email the document to: atura@uvic.ca**
 - Subject: final report, group #
 - Submit a hard copy to my lab in ELW B126 in the envelope by the door.
-
- A report professionally formatted is expected.
 - **The report body should not exceed 15 pages**

Project Report Marking Scheme

- Project Topic submission • 2.5%
- Project Proposal • 7.5%
- Presentation • 15%
- Report • 75%
- Report Marking Criteria:
 - Technical Merit of the Project
 - Learning experience critical observation
 - Formal quality of the report

Final Project marking uses a **RELATIVE**
and not an **ABSOLUTE** scale