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Tinius Olson 600SL Rehabilitation

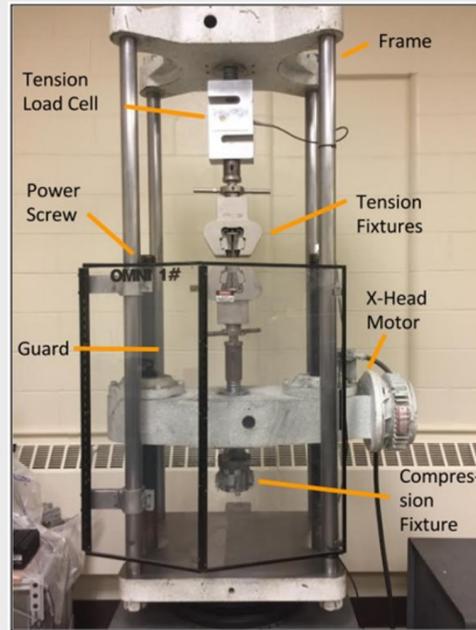


Figure 1: Tinius Olsen 600SL Tensile Testing machine

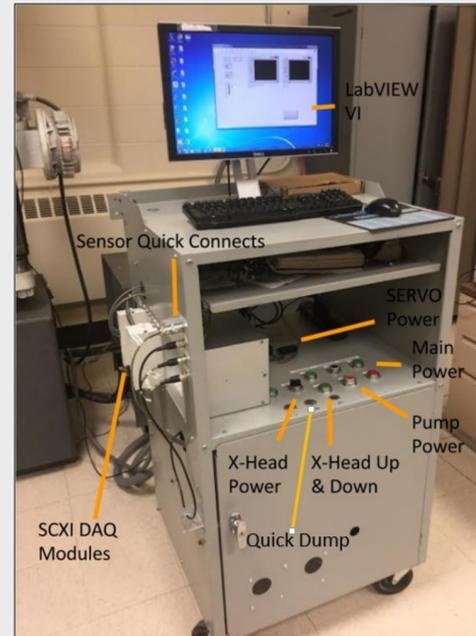


Figure 2: Data Acquisition system and machine controls

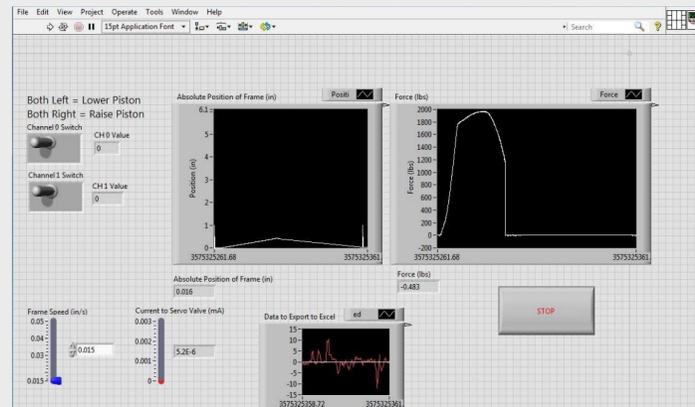


Figure 3: Implemented National Instruments DAQ, aluminum test specimen

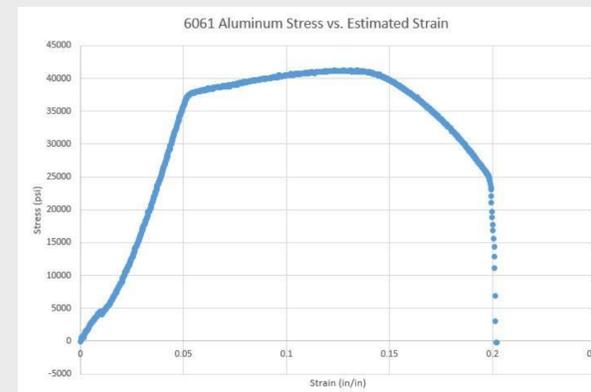


Figure 4: Obtained Stress-Strain curve from aluminum test specimen

Mission Statement

HANN Engineering will research, design, and implement a solution to recover the full capabilities of the Tinius Olson tensile-compressive testing machine for the MIE Department at the University of Minnesota Duluth by April 24th, 2017.

Opportunity Statement

The original state of the model 600 SL testing machine took up space and provided no value to the University as it did not run or acquire data. The final solution will offer a fully functional machine that will allow professors and students to perform tests as well as, in the future, expand the versatility of the machine to applications not currently available.

Constraints

To ensure the voice of the customer was captured, HANN Engineering needed to propose solutions that adhered to the following constraints:

- Current frame and hydraulic unit must be used.
- Must be completed before April 24th, 2017.
- Needs to be control driven.
- Data acquisition software such as LabVIEW or other packages must be able to record data with regard to force, displacement, stress, and strain.
- The machine needs to, at minimum, perform standard tension and compression tests.
- The results of the test must be able to be extracted for analysis.

Cost Analysis/Savings

The initial budget for the project was \$5,000.00. The final cost of the project was slightly over the budget at \$5,434.72. However, the final cost was much cheaper than the \$59,040.00 quote that Tinius Olson estimated to repair and retrofit the machine. This represents a savings of 90.80% over what it would have been to have the machine manufacturer completely restore it. Table 1 below shows a break-down of the costs.