

Problem

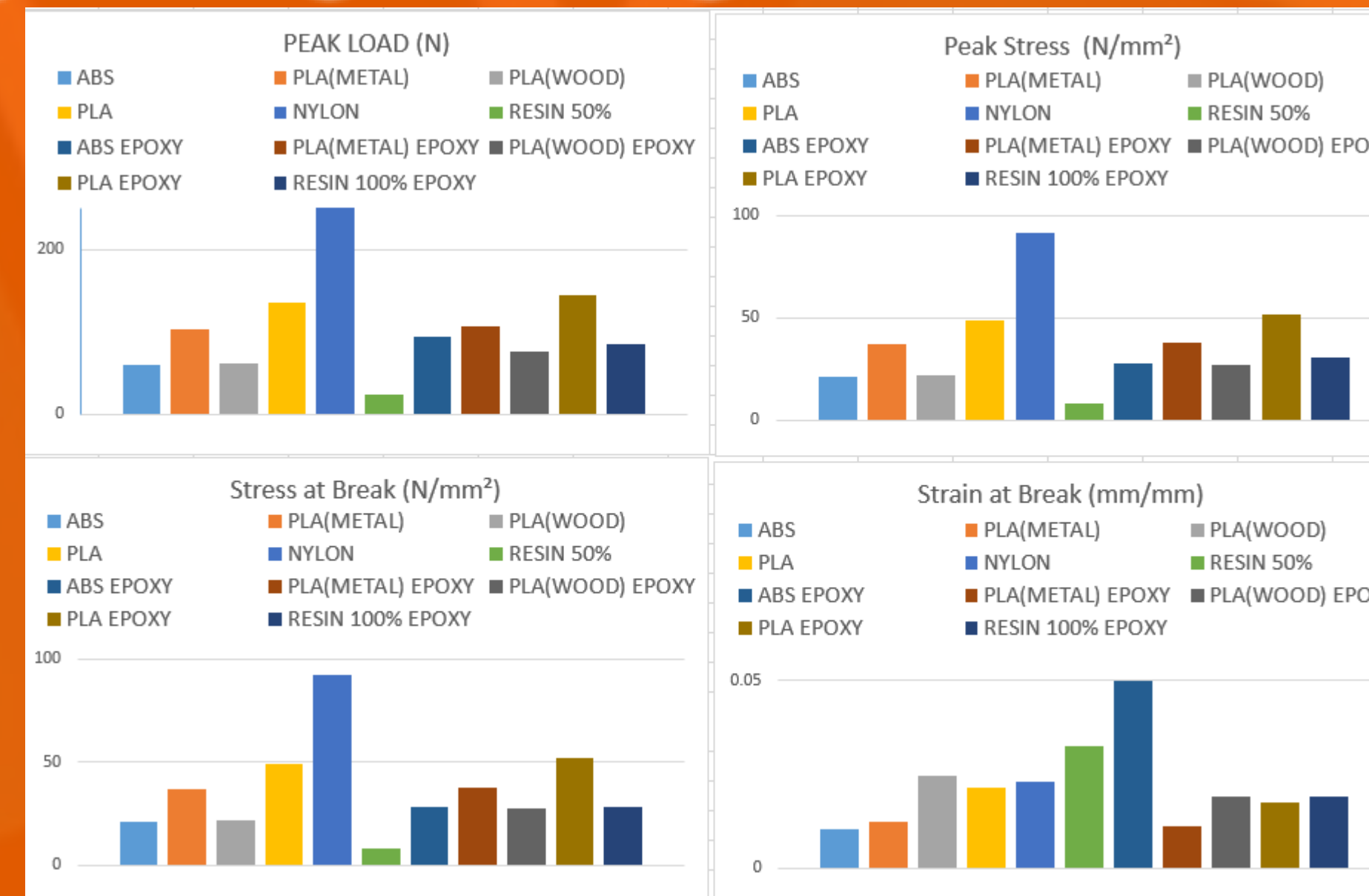
- Storefront housed 6000+ unused glasses frames.
- Sizing and customizing frames limited by distributors.

Purpose

Recommend to our sponsor a design process, material, and 3D printer best suited to produce custom eyewear.

Results

SLS printed nylon was by far the best choice for its easy post processing and strength.



Future Work

- More testing on different printed hinge concepts.
- Developing a user interface program for customization and sizing.
- Minimum structural thickness.

Conclusions

- Formlabs Fuse 1: SLS printer is recommended for its lack of post processing and quality of print.
- Nylon 12 is recommended due to its strength and ductility.

Testing/Experiments

Medium: PLA, ABS, nylon, resin & PETT. Using selected medium, conduct materials testing and analysis in order to determine a material proved to be suited for custom eyewear.

Printing



3D Printing of test specimens using FDM, DLP, and SLS processes.

Bend Testing

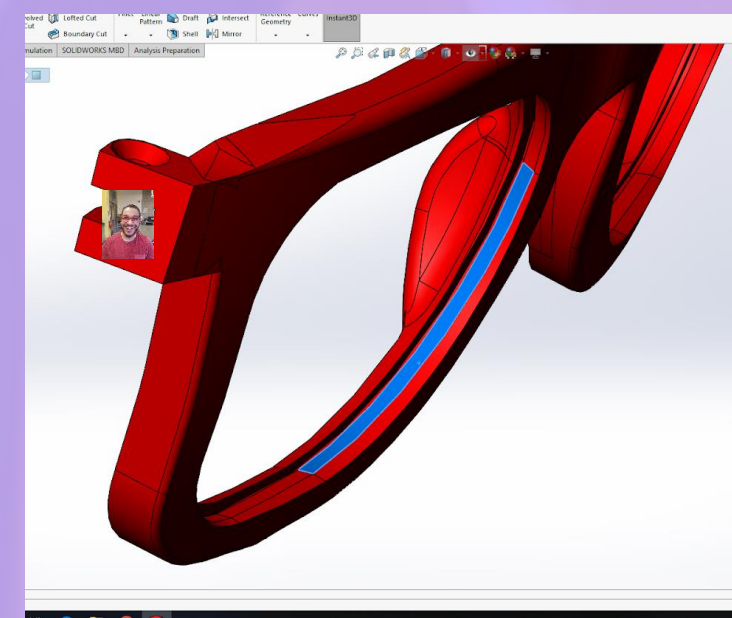


Testing 3D printed specimens using an MTS machine to meet ASTM Standards.

Tensile Testing



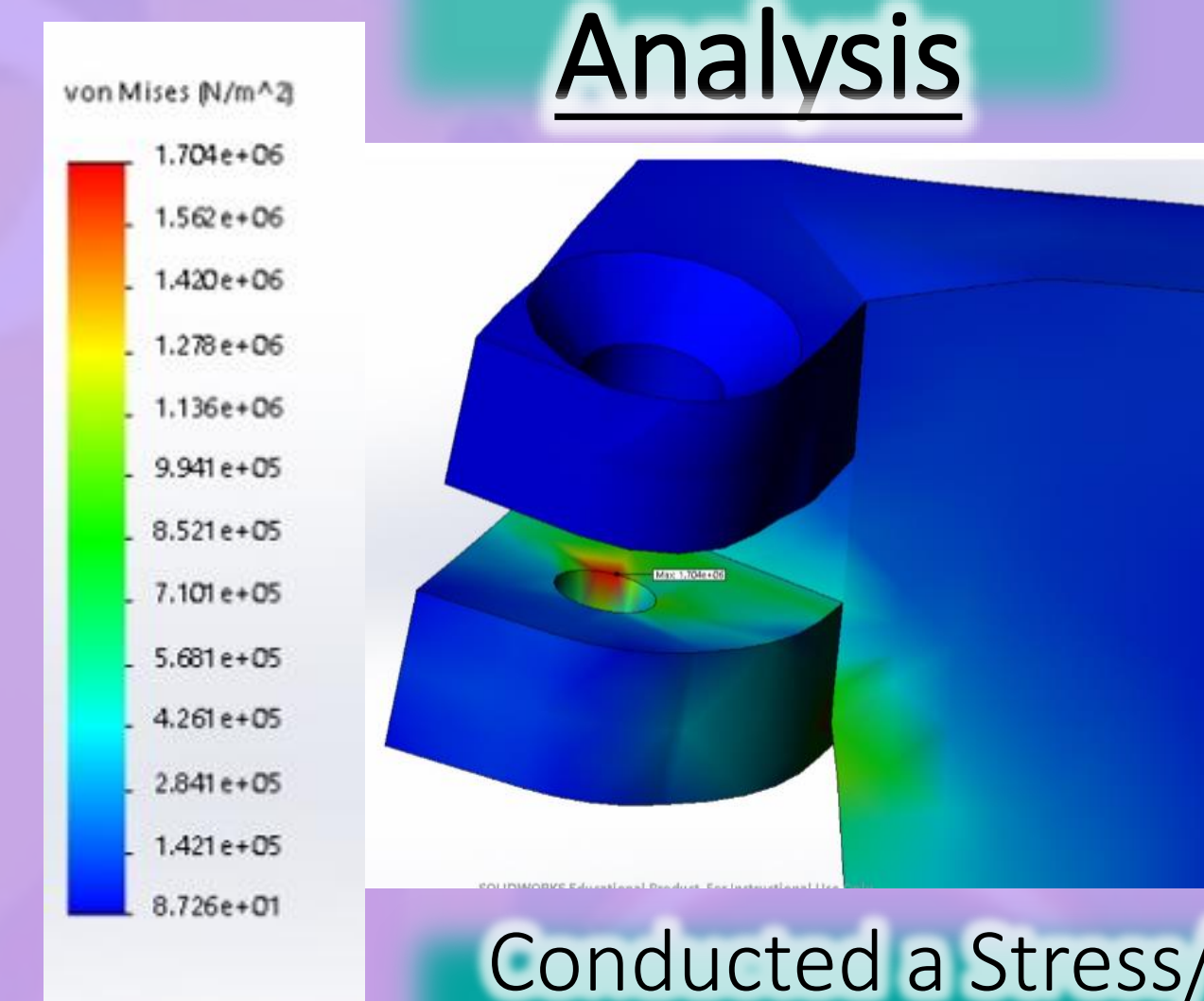
CAD Modeling



Designed and modeled eyewear frames for prototyping.

Finite Element

Analysis



Conducted a Stress/Strain analysis on hinges in a virtual environment.



Acknowledgements

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