MTRL 466 Meeting Minutes

Project Name:	Supports4SLA
Group:	Team TreeD
Current Meeting:	September 20, 2018
Minutes Prepared By:	Danish Abbas

Attendees:

Danish Abbas	Yes
Eddie Lee	Yes
Jean Sautter	No
Yue Shi	Yes
Kamran Rafique	No
Luc Millary Burns	No

Agenda:

No.	Subject	Owner	Comments/Actions
1	Status Update - Proposal Report Status - Schedule Update	EL	- Completed Proposal Report but have not edited together yet - Discuss in person with Yue, Eddie, Luc and Danish. That will be our final proposal report. - Send that to Kamran and Jean for their approval. - SUBMIT BY 9 PM THURSDAY SEPT 20 - DANISH - So far on schedule; we have the model and the equations
2	Overhang Failures: - Go through cantilever beam model w. Chad	EL	- Performed calculation for max deflection for various lengths to test where we should be expecting significant deflection - used max deflection equation assuming 1 cm X 1 cm cross sectional area, Force = 5N (source for force https://wiki.ubc.ca/images/f/f5/Pull_Force_Testing_-_Lab_Report_v4.pdf), E = either 2.7 GPa or 1.27 GPa (source for 1.27 GPa https://www.sciencedirect.com/science/article/pii/S1751616110001335?via%3Dihub) - Deflection is shown to be either too small or too large for lengths up to 3 mm
3	- Edit proposal report - Submit proposal report by end of Thursday	DA	
4	Solidify our approach to the Cantilever	DA	- Have to design in such a way that the surface area for each layer is the same - Start doing the calculations and focus on the exact dimensions we will be using - Try to plot the results of length and failure to get a good idea of their relationship - Try to 3D print the results from the point above

	Beam calculations		- (At least try to) Figure out the vacuum force and its application in the cantilever beam equation - Come up with things that also affect the vacuum force - Map out our progress with the length as the free variable, so we can do that completely and move on to angle as a free variable.
5	Tasks for the meeting on Sunday, September 23, 2018	EL	- Sunday: figure out the cantilever beam equation, test out the calculations and make sure they make sense - Improve the Solidworks model to have equal cross-sectional area at each length - to counteract the vacuum forces that presumably act according to cross sectional area - to keep the vacuum force constant. Ideally each layer of the entire model should have equal cross-sectional area - Agenda number 3 - Look at other cantilever beam equations to make sure we've considered all angles when looking at mechanical failure of cantilever beams; look for other similar resources: https://mechanicalc.com/reference/beam-analysis
6	Cantilever Beam Calculations	EL	- Based on Maximum Deflection (1cm length -> 1mm deflection) - Won't see deflection for our proposed test model (0.3mm to 6mm) - Need to consider Young Modulus for semi-cured resin - Need to consider vacuum force - Based on Yield stress

Minutes:

Questions to ask Chad Sinclair in our next meeting

- Inform him we're working on mechanical failure in overhangs with a focus on the cantilever beam model. The only free variable to begin with is the length of beam. We will aim for a quantitative conclusion, print it using NewPro3D's printer or our own, and see if it matches our prediction of critical deflection. If not, we'll use real value of critical deflection (critical deflection being where we start to see visible deflection)
- Our second free variable is the angle (we'll repeat the process when we get to it)
- There is a given equation for vacuum force in the NewPro3D document on the wiki. Is that valid in this situation?
- A concern about constraints: Does the Young's Modulus of the resin change significantly after curing? Also, how much will the resin shrink in volume when it cures and what is the shrinking factor?