# **MTRL 466 MEETING MINUTES**

| **Project Name:** | Adaptive Architecture  |
| --- | --- |
| **Group:** | Sinclair |
| **Current Meeting:** | November 1st, 2013 |
| **Minutes Prepared By:** | Kush Shah |

Attendees:

Chad Sinclair

Vicki Pistner

Jeremy Leung

Lauren Day

Juan Gerardo Ellorin

Ted Hung

Kush Shah

Agenda:

Group Progress and Next Steps:

* Need to have concluded and chosen a design by the end of the project.
* By end of the project need to see if the concept is feasible.
	+ Bimaterials:
		- Looked at 3 different bi-materials for mid-term report..
		- Need to do number crunching on different bi-materials to confirm best choice.
		- Mention basis of criteria such as highest force, ideal temperature change etc…
		- Use Jiggy’s data to get plot of likely temperature changes throughout the day, to make thermal model.
		- Develop/use equations for calculation purposes for the various criteria used to determine the best choice.
	+ Heat Calculations
		- Need to check the equations used are the correct ones.
		- Explanation of thermal model needs to be more clear.
		- Don’t need to complexify thermal model more – There are other things that can be worked on.
	+ Shape Memory Materials
		- Figuring out the temperature change – will be useful for determining shape of SMA.
		- How to calculate force for actuation of bending of SMA.
		- Need to find an SMA that fits our design specs – can’t control composition of SMA hence we are constrained in what we can use.
		- Performing an experiment to see the bending and see if performs the way we predicted.
		- Less background review – more design + focused view on the final product and how it will work.
		- For this application – focus more on how is going to work – what is the weight going o be? What is the actuation force going to be? What is the temperature going to be? Is there going to be an alloy which fits these conditions?
* Life Cycle Analysis
* Do heat transfer calculations for other months (only did for August)
* Use best case scenario months i.e. the hottest months
* Working on the eco-audit.
* Economic analysis –Energy savings with blinds vs. use of A/C for cooling purposes.
* Choosing a frame material
* Possibly talk to Blair about choosing a material that is more architectaully apt than the others which fit our criteria.
* Need material so actuation force for hinges can be calculated.
* What is the design of the frame? One piece with an actuator or are we choosing another design (see figure below).
* Possible designs: One solid piece with actuators on the corners; frame with corners which are just the actuators; or frame which has walls separated and connected by hinge.
* Coverings of blind



Minutes:

Jeremy:

 Bimat chosen, steel +polymer, have to make it

 Plan on making a curve that shows percent actuated throughout day/month

 3-4 boxes should be able to be lifted

Jiggy:

 Worked with Ted and Kush

 Figuring out Nusselt’s number

 ***Calculated convective heat transfer and conductive***

 ***Need to look at thermal conductivity of SMA and convective coefficient or air***

Ted and Kush:

 ***Double check if can be powered by sunlight***

 ***Calculate bending force of actuator***

 Look into why use Nitinol – ***What other types of SMA’s avail – why not them (better phase stability and strain performance)***

 Working on solidworks – almost done- ***don’t get caught up in nitty-gritty detail***

Lauren and Vicky:

 Frame material chosen ***– look up available outside materials***

 Video of hinge (from SAPA)

 ***Practice Eco-audit***

 ***Look at logistics of covering***

 ***Layout final report***