# **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

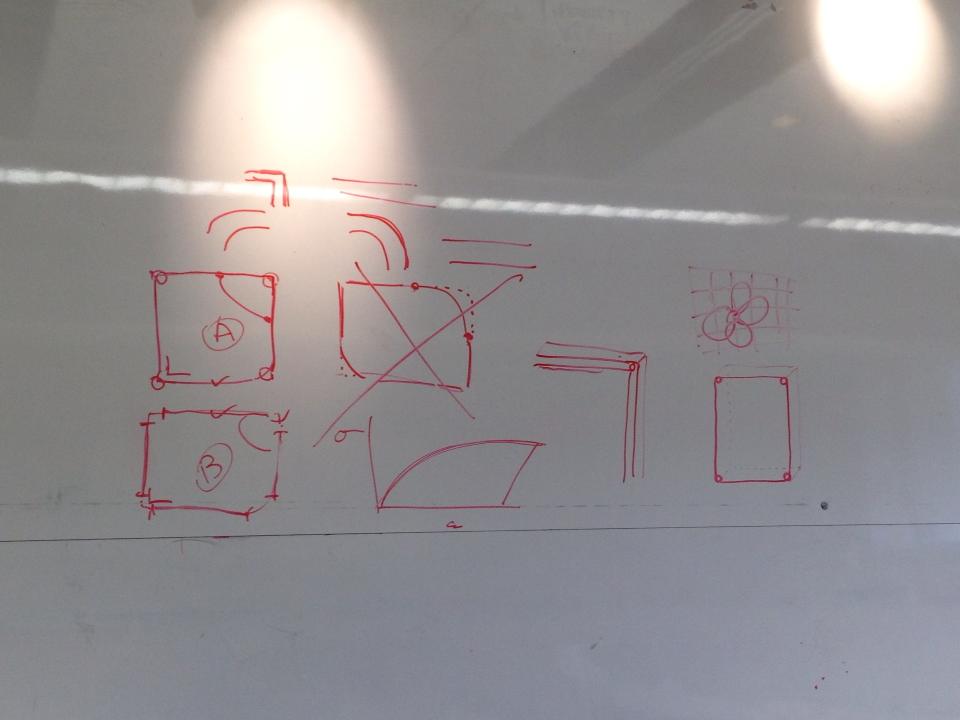
Ted Hung

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***