



Executive Summary

The team is meeting to do the assignment Team Charter and to discuss the project as a whole. The members are assigned roles and ground rules are established. The team is getting to know each other and each others' schedules to help make the project and assignments early and efficient.

Topic: First Meeting - Team Charter

Wednesday, September 4, 2019

Kenyon Rowley

Hunter Daniel

Katherine Riffle

Agenda

- Signature Page
- Team Purpose
- Team Goal
- Team Member Personalities and Schedules
- Team Member Roles and Responsibilities
- Ground Rules
- Communication Guidelines

General Announcements

The project team members are Kenyon Rowley, Hunter Daniel, and Katherine Riffle; the advisor is Dr. Becker, who works for the client Anevas Technologies, Inc. We are attending the Monday evening lecture in SBS Castro. The Team Charter is due Friday at midnight. The SolidWorks Individual Assignment is also due Friday at midnight.

Meeting Notes

The meeting notes are mostly provided on the Team Charter itself. The team members will meet after Capstone Lecture on Monday nights every week, as well as Fridays for additional meeting time and updates. An important note is that none of the members of this Capstone Team are Machine Shop trained. The main take-aways are the team members' role assignments:

- Kenyon Rowley: Project Manager and Financial Manager
- Hunter Daniel: Logistics Manager and Manufacturing Engineer
- Katherine Riffle: Test Engineer and CAD Engineer

The team members' schedules are as follows:

Katherine Riffle

- Monday: After Capstone, Before 10am

- Tuesday: 12:30-4:30, after 7
- Wednesday: Before 10 am
- Thursday: Not available, every other Thursday after 7:30 pm starting the 12th sep.
- Friday-Sunday: completely available

Hunter Daniel

- Monday: Before 4, After 8
- Tuesday: 2-7, Can meet after 7 in allen
- Wednesday: 11-4, After 5:15
- Thursday: 2-5, Before 12:45
- Friday: Before 2, After 3
- Saturday/Sunday: Possible Work issues

Kenyon Rowley

- Monday: Before 1:30, After capstone
- Tuesday: After 4
- Wednesday: After 7
- Thursday: After 7
- Friday-Sunday: completely available

Assignments

Team Charter Sections

- Signature Page: Katherine Riffle
- Introduction: Katherine Riffle
- Team Purpose: Katherine Riffle
- Team Goal
- Team Member Roles and Responsibilities: Kenyon Rowley
- Ground Rules
- Communication Guidelines



Executive Summary

This meeting is used to assign parts of the Presentation 1 assignment to each of the team members so that the presentation will be complete, properly formatted, and presented next Monday.

Topic: Presentation 1 Assignments

Monday, September 9, 2019

Kenyon Rowley

Hunter Daniel

Katherine Riffle

Agenda

There are five sections for the Presentation, as well as putting the slides in a proper format:

- 1: Project Description
- 2: Background and Benchmarking
- 3: Literature Review
- 4: CRs/ERs
- 5: Schedule and Budget

General Announcements

The Presentation 1 is next Monday and has 5 parts. There are formatting requirements for the presentation slides. Hunter is going to be absent Friday-Monday afternoon and so will complete his assigned tasks before he leaves. The website for the project is not available for editing yet.

Meeting Notes

Katherine Riffle and Kenyon Rowley will meet with Dr. Becker on Friday at 10am-12pm in his office-lab 210 of Wettaw on North Campus to determine the Customer Requirements and Budget Expectations. The other meeting notes are the assignments to each team member.

Assignments

- Topic 1: Project Description: *Hunter*: Wednesday Night
- Topic 2: Background and Benchmarking: *Katherine and Kenyon*: Saturday Night
 - Researching existing inventions with same purpose
 - Researching inventions with applicable ideas
- Topic 3: Literature Review: *Hunter*: Wednesday Night
 - Machine Design Textbook, Structural Analysis (Statics and Mechanics of Materials), Materials Science, Solidworks Book
- Topic 4: Customer Requirements and Engineering Requirements: *Kenyon*: Saturday Night
 - Meet with Dr. Becker about CR and Budget: *Katherine and Kenyon*: Friday

- House of Quality
- Topic 5: Schedule and Budget: *Katherine*: Saturday Night
 - GANTT Chart
 - Budget: *Kenyon*: Friday Night
- Putting together and formatting the slides: *Katherine and Kenyon*: Sunday midnight



Executive Summary

Team had initial meeting with Dr. Becker. Discussed overall scope of the project and background information. Initial customer requirements were discussed along with pitching initial ideas to Dr. Becker. Went over meeting schedule and timeline for project.

Topic: Meeting with Dr. Becker

Friday, September 13, 2019

Dr. Becker

Kenyon Rowley

Katherine Riffle

Agenda

Meet with Dr. Becker to clarify project:

- Details about the project
- What is implemented now?
- Customer Requirements
- Budget anticipations
- Regular meeting schedule and methods of communication
- Timeline expectations

General Announcements

The information collected for Project Description and for Literature Review, from Hunter, is finished. The slides will need to be created for him, and the Literature Review will need to be summarized. The GANTT Chart is finished.

Meeting Notes

The portable bench needs to hold the clean-room model from a prior capstone project. The entire apparatus needs to fit through doors. It will be holding specific devices and should have a storage space for them. It would ideally be transformable to a desk. It needs to absorb almost all shock during transportation along hallways and outside sidewalks, as well as go over the stationary clean-room frame bottom piece, an about 1.5"x1.5" square bump. Currently a metal cart is being used to store and move these devices. The budget of \$1000 is estimated, and it is not necessarily expected for us to use that much because the device will be mechanical without technology or electronics in the design; Dr. Becker does mention that expenses should not be valued over a higher-quality deliverable, if there is a choice. Communication through email is ideal for Dr. Becker, and he expects us to meet in person with him every couple of weeks, as scheduled through Google Calendar.

Customer Requirements

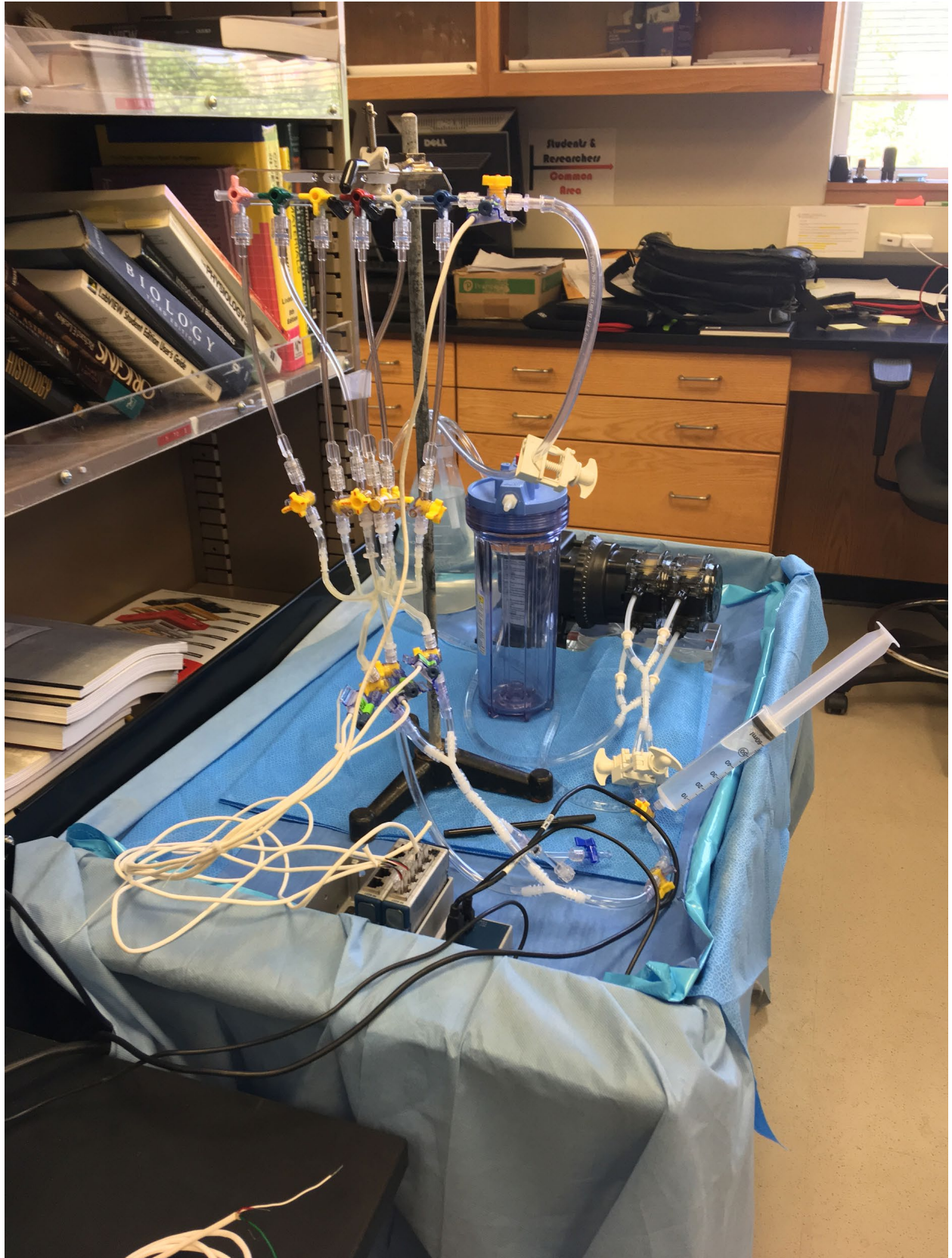
- Waterproof Countertop material with minimal X-ray interference
- Raised sides for spill prevention
- Containment for spills, drainage system, make slightly tapered system for drain
- Hold 75 lb top heavy hood
- Hood dimensions: L 48.5 in. W 24.25 in. H 54 in.
- Hood weights approximately 70 lbs.
- Lock down hood
- Make bench about 36 in. tall
- Non-metal material
- Large, smooth-rolling, shock absorbing wheels to minimize model shift and flow hood stability during transport(2 swivel, 2 locking)
- Minimize movement while in place, does not have to be completely stable
- Storage space underneath bench for accessories, flow hood fan assembly, instruments, allowing C-Arm fluoroscope instrument clearance
- Do not compromise budget, utilize money for best product

Initial Ideas:

- Multipurpose as desk?
- U shaped storage?
- Hole for running power to pump/other stuff?
- Curtains over storage area?
- Soft total max height: 82.5 in. for bench and hood combo to fit
- 3D print Locking mechanism?
- Possible Research: portable clean room, Dr. Becker built one at asu









Assignments

- Topic 1: Project Description: *Hunter*: Complete
- Topic 2: Background and Benchmarking: *Katherine and Kenyon*: Saturday Night
 - Researching existing inventions with same purpose
 - Researching inventions with applicable ideas
- Topic 3: Literature Review: *Hunter*: Complete
 - Machine Design Textbook, Structural Analysis (Statics and Mechanics of Materials), Materials Science, Solidworks Book
- Topic 4: Customer Requirements and Engineering Requirements: *Kenyon*: Friday Night
 - House of Quality
- Topic 5: Schedule and Budget: *Katherine*: Saturday Night
 - GANTT Chart: Complete
 - Budget: *Kenyon*: Friday Night
- Putting together and formatting the slides: *Katherine*: Saturday Evening



Executive Summary

During this short meeting, we communicated the specifics from Dr. Becker's last client meeting to Hunter Daniel. We also decided the steps toward Presentation 2 over the next week.

Topic: Concept Generation

Monday, September 16, 2019

Kenyon Rowley

Hunter Daniel

Katherine Riffle

Agenda

- Communicate to Hunter info from client meeting
- Decide next steps toward Presentation 2

General Announcements

The portable bench needs to hold the clean-room model from a prior capstone project. The entire apparatus needs to fit through doors. It will be holding specific devices and should have a storage space for them. It would ideally be transformable to a desk. It needs to absorb almost all shock during transportation along hallways and outside sidewalks, as well as go over the stationary clean-room frame bottom piece, an about 1.5"x1.5" square bump. Currently a metal cart is being used to store and move these devices. The budget of \$1000 is estimated, and it is not necessarily expected for us to use that much because the device will be mechanical without technology or electronics in the design; Dr. Becker does mention that expenses should not be valued over a higher-quality deliverable, if there is a choice. Communication through email is ideal for Dr. Becker, and he expects us to meet in person with him every couple of weeks, as scheduled through Google Calendar.

Customer Requirements

- Waterproof Countertop material with minimal X-ray interference
- Raised sides for spill prevention
- Containment for spills, drainage system, make slightly tapered system for drain
- Hold 75 lb top heavy hood
- Hood dimensions: L 48.5 in. W 24.25 in. H 54 in.
- Hood weights approximately 70 lbs.
- Lock down hood
- Make bench about 36 in. tall
- Non-metal material
- Large, smooth-rolling, shock absorbing wheels to minimize model shift and flow hood stability during transport(2 swivel, 2 locking)

- Minimize movement while in place, does not have to be completely stable
- Storage space underneath bench for accessories, flow hood fan assembly, instruments, allowing C-Arm fluoroscope instrument clearance
- Do not compromise budget, utilize money for best product

Meeting Notes

We communicated the above information to Hunter Daniel.

The next steps toward Presentation 2 is Concept Generation. Presentation 2 is 10/7, so we should have Concept Generation done through this first week, leaving Concept Evaluation and Budget Planning for the last 2 weeks. The best way to do Concept Generation is if we all contribute our own ideas, and then they can be separately professionally presented, which is just busy work of communicating these ideas.

Assignments

- Each person does concept generation (x5)
- Peer Evaluation due 9/20
- Create Google invites for Dr. Becker
- Don't forget to do individual Self-Learning assignment due October 4



Executive Summary

First the team meets with Professor Oman to update her on the progress, concept generation, expectations for the semester, and bring forward any concerns. Then the team details the concepts generated to each other and decides what is needed to bring to meet with Dr. Becker.

Topic: Concept Generation

Monday, September 23, 2019

Kenyon Rowley

Hunter Daniel

Katherine Riffle

Agenda

- Meet with Professor Oman
- Go over concept generations
- Decide next courses of action, considering GANTT Chart/schedule
- Self-Learning assignment is due the first week of October

General Announcements

Each team member announces their concept generation progress. We should Google Calendar invite Dr. Becker for Friday meetings.

Meeting Notes

During the short meeting with Professor Oman, we updated her about our course of action and that our progress is on schedule. The websites will be available for creation soon. The websites that we can review on the CEFNS Capstone Website for the design of our website should include Northman and the Clean-Room Hood design. She has the prior capstone project CAD model for the clean-room hood, so we will use it to make sure our project is compatible with the hood. She also has extra polycarbonate material, unopened in box.

After the meeting with Professor Oman, we collaborated with each other about our concept ideas. Hunter Daniel described the shock absorption concepts. The magnetorheological shock absorber piston would be ideal for the project, and he will describe this concept to Dr. Becker on Friday. We will also present the preliminary layout for the tabletop so that Dr. Becker may give his input and his preferences.

Agenda for Dr. Becker meeting, 9/27

- ISO Requirements
- Generator issues with clean-room/isolation requirements
- Weather-stripping the hood door

- Shock absorption concepts

Assignments

- Email Dr. Becker about meeting Friday 9/27 and Friday 10/11
- Email Professor Oman about prior capstone CAD package of clean-room hood
- Create a memo for shock absorption concepts to present to Dr. Becker on Friday

Executive Summary

During this meeting, Dr. Becker communicated his preferences for the tabletop design regarding Katherine Riffle and Kenyon Rowley's concepts. He discussed shock absorption technology potential with Hunter Daniel. He provided a pamphlet of the devices he ordered that will be used on this bench. Dr. Becker then brought us on the path the cart would travel on, to the x-ray machine whose mechanical functions he demonstrated.

Topic: Concept Generation

Friday, September 27, 2019

Dr. Becker

Kenyon Rowley

Hunter Daniel

Katherine Riffle

Agenda

- ISO Requirements
- Generator issues with clean-room/isolation requirements
- Weather-stripping the hood door
- Shock absorption concepts
- Layout for Tabletop
- MRF Shocks

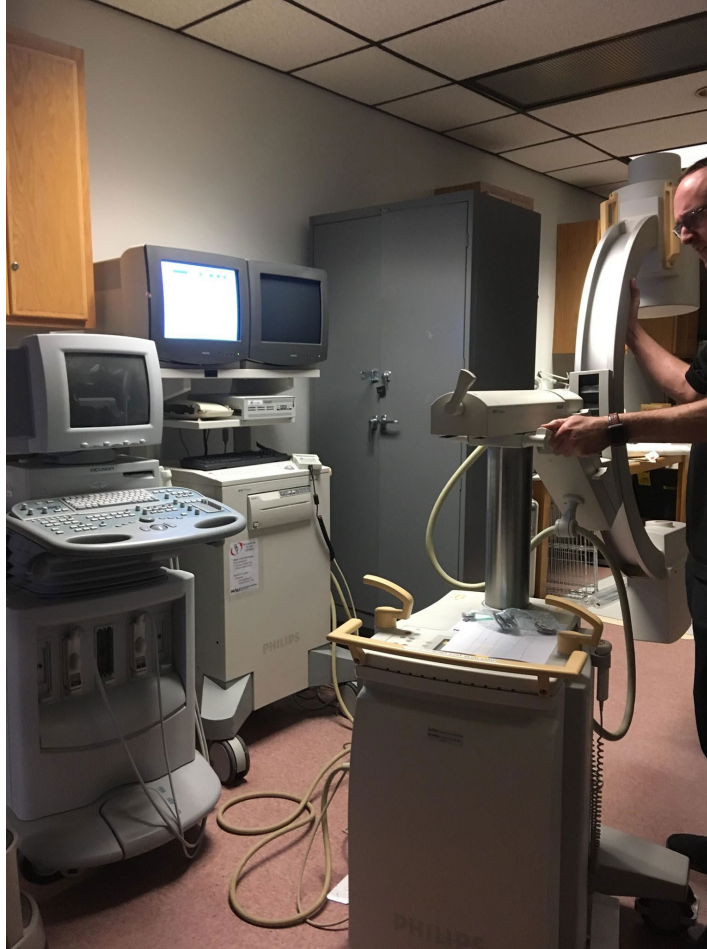
General Announcements

We should have something prepared for class on Monday. Meeting with Leah after with Dr. Becker to go over SolidWorks and Website Creation

Meeting Notes



<https://www.youtube.com/watch?v=M7Hh063ZtsA>



Shocks

Current use is a hard wheel. Cost is increment in the decision of shock absorption. If MRF is not used then just a softer tire design. It should be purchased, piston with MRF, if used, to ensure no leaking if used.

Table Top

The hood should not be weather stripped but the door on it should be filed down so that it is not sharp and will not cut anyone. For ISO requirements, coating the workspace may not be the answer because liquids may seep beneath the laminate and be impossible to clean. Formica, polycarbonate, ethanol, bleach. Only the workspace itself needs to have these requirements and probably be made out of polycarbonate, the workspace inside the spill barriers. If the polycarbonate is too long, then it will be too flimsy; it should be $\frac{1}{4}$ to $\frac{1}{2}$ inch at least. It sounded like he wanted around an inch like the table in his x-ray lab. Additionally, medical film could be placed, for temporary/disposable usage, upon the workspace and peeled off and replaced after use.

The grooves for fitting the hood onto the table do not need to be designed for sliding, just for placing into the grooves, and only one clamp is necessary for securement. Two elevated platforms on either side of the workspace to protect the devices from spills. These sections do not need to be

x-ray compliant. Drainage is not necessary, no tilt on the workspace. He said at most a total of ½ inch to 1 inch tilt in total from one side of the workspace to the drain in the back if we use a drain.

The x-ray machine will be positioned above and below the workspace, so there should be room for the machine below the workspace, near the storage. There should be securement for wires to go out from under the glass of the hood and over the side, on the shorter edges, below to the clean room, not holes in the table itself. This should not interfere with maneuverability so it should be on the shorter sides. It should go to the storage area.

Storage

The generator is completely electrical, so a cover around the storage area would be acceptable and a good idea, probably cloth with velcro. It should be compatible with the cords and wires. He gave us a pamphlet of the devices he ordered that would be stored in the storage area. We need to find their dimensions online. There will be a set storage area for those devices, as well as smaller drawers for office supply storage. There needs to be a storage for transport directly beneath the workspace for storing the large clean-room filter that is normally located above the hood, separate from the hood, when in use.

Assignments

- Website creation
- Self-Learning assignment
- Look into cost for MRF and for wheels
- Design on SolidWorks, including dimensions for devices in the storage area
- Prepare something for the class on Monday



Executive Summary

On 10/11, team mates Kenyon and Hunter attempted to meet with Dr. Becker to discuss the design decisions that had been decided. After waiting for an hour team mates Kenyon and Hunter decided that Dr. Becker must have been busy so they emailed him the CAD drawings that they had made. These drawings included the tabletop and storage designs.

Topic: Design decisions

Friday, October 11, 2019

Kenyon Rowley

Hunter Daniel

Katherine Riffle

Agenda

Meet with Dr. becker to discuss the design drawings made.

General Announcements

No decisions made since Dr. Becker was unavailable.

Meeting Notes

N/A

Assignments

Work on preliminary report.



Executive Summary

On 10/14, teammates Katherine and Hunter met to determine the Preliminary Report responsibilities.

Topic: Preliminary Report

Monday, October 14, 2019

Kenyon Rowley

Katherine Riffle

Agenda

Determine Responsibilities for Preliminary Report. These are the sections of the report:

- Background
- Requirements (ERs and CRs)
- Literature Review
- Benchmarking
- Functional Decomposition
- Concept Generation
- Design Selected
- Compilation and Editing

General Announcements

Katherine will meet with Hunter tomorrow to discuss what is hashed out today, as well as determine what questions to ask Professor Oman.

Meeting Notes

- Background: Kenyon
- Requirements (ERs and CRs): Kenyon
- Literature Review: (Shock Absorption: Hunter, Wheels: Katherine, Tabletop: Kenyon)
- Benchmarking: All
- Functional Decomposition: Hunter
- Concept Generation: Katherine
- Design Selected: Katherine
- Compilation and Editing: Katherine and Kenyon

The benchmarking is a concern. Dr. Becker's lack of response is a concern. Here are questions for Oman: Should we do the full-system benchmarking, or can we just do additional sub-system benchmarking - because this is an original design, there is no existing full-benchmark. Dr. Becker

has not responded to us about our design and did not show up to the meeting regarding it, how should we approach the Design Selected section of the Preliminary Report?

Assignments

Katherine will meet with Hunter the following day to go over the assignments and discuss concerns regarding the benchmarking. They will ask Oman the questions from the meeting notes.

Kenyon will work on the Background, the CRs and ERs, the tabletop section of the literature review, and will meet with Katherine to do final edits on Friday. Also, after Oman answers the questions regarding subsystems, he will be informed of his responsibilities regarding benchmarking.



Executive Summary

On 10/15, teammates Katherine and Hunter met to determine the Preliminary Report responsibilities, as well as Hunter met with Professor Oman for help with concerns.

Topic: Preliminary Report

Tuesday, October 15, 2019

Professor Oman

Hunter Daniel

Katherine Riffle

Agenda

Go over responsibilities for Preliminary Report. These are the determined responsibilities of the report:

- Background: Kenyon
- Requirements (ERs and CRs): Kenyon
- Literature Review: (Shock Absorption: Hunter, Wheels: Katherine, Tabletop: Kenyon)
- Benchmarking: All
- Functional Decomposition: Hunter
- Concept Generation: Katherine
- Design Selected: Katherine
- Compilation and Editing: Katherine and Kenyon

Meet with Professor Oman for help.

General Announcements

The benchmarking is a concern. Dr. Becker's lack of response is a concern. Here are questions for Oman: Should we do the full-system benchmarking, or can we just do additional sub-system benchmarking - because this is an original design, there is no existing full-benchmark. Dr. Becker has not responded to us about our design and did not show up to the meeting regarding it, how should we approach the Design Selected section of the Preliminary Report?

Meeting Notes

Katherine went over the assignments for the Preliminary Report with Hunter, and went over the concerns regarding the benchmarking and the design selected sections. Hunter will meet with Professor Oman today and report back with her answers.

After speaking with Professor Oman, Hunter reports that the full-system benchmarking should still be done but that we don't have to specifically look at medical benches for that, we can go broader; for example we could list a tool bench that you can buy at Home Depot as one and talk about how

it's bad for our project and how we would need to improve on that. As for the design selection she said that we can just go with our current designs since Dr. Becker hasn't gotten back to us and then mention in the conclusion that his design is tentative since we haven't gotten his definite approval.

Assignments

The Preliminary Report sections should be completed for editing on Friday morning. These are the finalized assignments after meeting with Professor Oman:

- Background: Kenyon
- Requirements (ERs and CRs): Kenyon
- Literature Review: All
 - Shock Absorption: Hunter
 - Wheels: Katherine
 - Tabletop: Kenyon
- Full-System Benchmarking: All
 - Adjustable Height Work Table: Hunter
 - Portable School Desk: Kenyon
 - Existing Cart Substitution: Katherine
- Sub-System Benchmarking: All
 - Subsystem 1 - Shock Absorption: Hunter
 - Subsystems 2 - Tabletop: Katherine
 - Subsystem 3 - Storage: Kenyon
- Functional Decomposition: Hunter
- Concept Generation: Katherine
 - Subsystem Concept Shock Absorption: Hunter
- Design Selected: Katherine
- Compilation and Editing: Katherine and Kenyon



Executive Summary

On 10/21, the team met to prepare for the meeting with Professor Oman.

Topic: Update Professor Oman

Monday, October 21, 2019

Professor Oman

Hunter Daniel

Kenyon Rowley

Katherine Riffle

Agenda

Go over responsibilities for the remainder of the semester. Go over how the preliminary report went, and how the SolidWorks design is proceeding. Determine questions for Professor Oman.

General Announcements

These are the remaining responsibilities for the semester:

Website Check 1 (monday)

Analyses Team Memo (this is the assigning memo) (monday)

Final Presentation (two weeks, Nov 4)

- Prototype (low fidelity)
- CAD and BOM
- Project Description
- Design Description (image with subsystems defined)
- Design Requirements (CRs and ERs)
- Design Validation
 - FMEA
 - Risk Trade-Off Analysis
 - Testing Procedures
- Budget and Schedule (Semester 2)

Final Report (Nov 11); Additional Material:

- Standards, Codes, and Regulations 2.5
- Testing Procedures
- Risk Analysis and Mitigation
- Implementation Plan

Final BOM/CAD (Nov 18)

Individual Analytical Reports (mathematical justifications) (Nov 27)

Final Prototype Demo (Dec 2)

Website Check (Dec 9)

Meeting Notes

Here are what the team determined the rough assignments will be for each responsibility:

Website Check 1 (monday): Katherine

Analyses Team Memo (this is the assigning memo) (monday)

Kenyon: Structural Analysis

Hunter: Chemical Analysis (Standards, Codes, and Regulations)

Katherine: X-Ray compatibility of Tabletop and Shock Absorption of Pneumatic Tires

Final Presentation (two weeks, Nov 4)

- Prototype (low fidelity): Katherine and Hunter
- CAD and BOM: Katherine
- Project Description: Kenyon
- Design Description (image with subsystems defined): Katherine
- Design Requirements (CRs and ERs): Hunter
- Design Validation: Kenyon
 - FMEA
 - Risk Trade-Off Analysis
 - Testing Procedures
- Budget and Schedule (Semester 2): Hunter

Final Report (Nov 11); Additional Material:

- Standards, Codes, and Regulations 2.5: Hunter
- Testing Procedures: Kenyon and Katherine
- Risk Analysis and Mitigation: Kenyon
- Implementation Plan: Kenyon and Katherine

Final BOM/CAD (Nov 18): Katherine

Individual Analytical Reports (mathematical justifications) (Nov 27): All

Final Prototype Demo (Dec 2): Katherine and Hunter

Website Check (Dec 9): Katherine

Assignments

Discuss Preliminary Report and SolidWorks with Professor Oman. Go over remaining responsibilities. Ask her for further clarification regarding the website check and the individual analysis memo. Ask if these assignments are okay for the individual analyses:

- Kenyon: Structural Analysis
- Hunter: Chemical Analysis (Standards, Codes, and Regulations)
- Katherine: X-Ray compatibility of Tabletop and Shock Absorption of Pneumatic Tires



Executive Summary

On 10/25, Hunter Daniel and Kenyon Rowley met with Dr. Becker to go over the design.

Topic: Dr. Becker Design Updates

Friday, October 25, 2019

Dr. Becker

Hunter Daniel

Kenyon Rowley

Agenda

Hunter Daniel and Kenyon Rowley meet with Dr. Becker to obtain notes about the design.

General Announcements

Final Presentation is on November 4.

Meeting Notes

These are the notes for the design:

- Wider Tabletop, should be 6' long
- Tapered workspace for drainage
- Raised parts of tabletop is too complicated
- Storage area should not be underneath seal of polycarbonate workspace
- Will store the air filter under the table during transport
- Use polyurethane wheelbarrow tires for shock absorption

Assignments

Katherine and Kenyon will implement these notes into the SolidWorks Design. Here are the other responsibilities as a reminder:

Final Presentation (two weeks, Nov 4)

- Prototype (low fidelity): Katherine and Hunter
- CAD and BOM: Katherine
- Project Description: Kenyon
- Design Description (image with subsystems defined): Katherine
- Design Requirements (CRs and ERs): Hunter
- Design Validation: Kenyon
 - FMEA
 - Risk Trade-Off Analysis
 - Testing Procedures
- Budget and Schedule (Semester 2): Hunter



Executive Summary

On 10/28, the team determined the individual analysis assignments with Professor Oman.

Topic: Individual Analysis Permission Memo

Monday, October 28, 2019

Professor Oman

Hunter Daniel

Katherine Riffle

Kenyon Rowley

Agenda

The team will determine the individual analysis assignments with Professor Oman. These are the ideas that were determined during last week's meeting:

- Kenyon: Structural Analysis
- Hunter: Chemical Analysis (Standards, Codes, and Regulations)
- Katherine: X-Ray compatibility of Tabletop and Shock Absorption of Pneumatic Tires

General Announcements

Final Presentation is on November 4. Here are the responsibilities for the rest of the semester:

Final Presentation (two weeks, Nov 4)

- Prototype (low fidelity): Katherine and Hunter
- CAD and BOM: Katherine
- Project Description: Kenyon
- Design Description (image with subsystems defined): Katherine
- Design Requirements (CRs and ERs): Hunter
- Design Validation: Kenyon
 - FMEA
 - Risk Trade-Off Analysis
 - Testing Procedures
- Budget and Schedule (Semester 2): Hunter

Final Report (Nov 11); Additional Material:

- Standards, Codes, and Regulations 2.5: Hunter
- Testing Procedures: Kenyon and Katherine
- Risk Analysis and Mitigation: Kenyon
- Implementation Plan: Kenyon and Katherine

Final BOM/CAD (Nov 18): Katherine

Individual Analytical Reports (Nov 27): All

Final Prototype Demo (Nov 2): Katherine and Hunter

Website Check (Nov 9): Katherine

Meeting Notes

After determining better analysis ideas, the team discussed these analyses with Professor Oman, and gained approval for the permission memo:

- Table Leg Strength: Katherine Riffle
 - Determine Material and FOS for the frame using maximum expected loads
- Drainage Tilt: Hunter Daniel
 - Determine minimum angle of tabletop tilt for drainage; determine coating
- Surface Deflections and Thicknesses: Kenyon Rowley
 - Determine the amount of deflection based on live loads for the tabletop and workspace; determine their minimum thicknesses for good FOS

Assignments

Final Presentation (two weeks, Nov 4)

- Prototype (low fidelity): Katherine and Hunter
- CAD and BOM: Katherine
- Project Description: Kenyon
- Design Description (image with subsystems defined): Katherine
- Design Requirements (CRs and ERs): Hunter
- Design Validation: Kenyon
 - FMEA
 - Risk Trade-Off Analysis
 - Testing Procedures
- Budget and Schedule (Semester 2): Hunter



Executive Summary

On 11/1, the team met to work in the Final Presentation and the low fidelity prototype.

Topic: Final Presentation and Low Fidelity Prototype

Friday, November 1, 2019

Hunter Daniel

Katherine Riffle

Kenyon Rowley

Agenda

The team will determine the design and method for the low fidelity prototype. The team will determine who is presenting which sections of the final presentation. The team will determine additional assignments for the final report.

General Announcements

Final Presentation (two weeks, Nov 4)

- Prototype (low fidelity): Katherine and Hunter
- CAD and BOM: Katherine
- Project Description: Kenyon
- Design Description (image with subsystems defined): Katherine
- Design Requirements (CRs and ERs): Hunter
- Design Validation: Kenyon
 - FMEA
 - Risk Trade-Off Analysis
 - Testing Procedures

- Budget and Schedule (Semester 2): Hunter

Final Report (Nov 11); Additional Material:

- Standards, Codes, and Regulations 2.5: Hunter
- Testing Procedures: Kenyon and Katherine
- Risk Analysis and Mitigation: Kenyon
- Implementation Plan: Kenyon and Katherine

Meeting Notes

Katherine will start with the introduction and project description. She will discuss the design description, including notes from the last meeting with Dr. Becker. Kenyon will then go over the design requirements. Hunter will discuss design validation and schedule. Katherine will end with budget planning.

The tabletop prototype is 3D printed by Katherine Riffle. Material for the low fidelity storage area are found during the meeting.

Assignments

Put together parts for presentation. Katherine 3D prints the tabletop. Kenyon puts together the low fidelity storage area. Start on the final report:

Final Report (Nov 11); Additional Material:

- Standards, Codes, and Regulations 2.5: Hunter
- Testing Procedures: Kenyon and Katherine
- Risk Analysis and Mitigation: Kenyon
- Implementation Plan: Kenyon and Katherine



Executive Summary

On 11/22, Katherine Riffle and Hunter Daniel meet to talk about the design. Dr. Becker did not show so they meet instead with his assistant Chris Settanni (ces227@nau.edu).

Topic: Final Design

Friday, November 22, 2019

Dr.		Becker
Chris	Settanni	(ces227@nau.edu)
Hunter		Daniel
Katherine Riffle		

Agenda

Kenyon and Katherine will meet with Dr. Becker and show him the SolidWorks designs and ask for his notes, as well as the following questions. How should we manufacture the wood tabletop and the legs? What coating do you recommend for the tabletop? We need the dimensions, locations on the table/storage, and weights of the medical devices.

General Announcements

BOM and SolidWorks is due tonight. Individual Analysis due next week. High fidelity prototype due after Thanksgiving break.

Meeting Notes

Dr. Becker did not show. Instead his assistant, Chris Settanni (ces227@nau.edu), helped by providing these notes on the design:

- Should design for 3 people leaning on the tabletop
- The water beaker holds 2L of water
- 2L of water added to pump weight (around 8kg)
- Should use oak for wood tabletop
- Air filter is 2"x4" and is 75lbs
- No changes to the design are necessary
- For welding/manufacturing the frame, find a friend in the machine shop or outsource

Assignments

Kenyon will complete the BOM and email Dr. Becker. Katherine will meet with Leah and Professor Hewes about the individual analysis now that the weights are determined for the devices. Katherine will then complete the SolidWorks CAD using the complete BOM put together by Kenyon in each of the design parts.



Executive Summary

On 11/25, the team met to construct the high fidelity prototype.

Topic: High Fidelity Prototype

Monday, November 25, 2019

Hunter
Katherine
Kenyon Rowley

Daniel
Riffle

Agenda

The team will construct the high fidelity prototype.

General Announcements

Individual analysis due this Wednesday. Prototype due Monday.

Meeting Notes

The team went to Home Depot to get supplies for the prototype. They drew specs on the tabletop and legs to show where the cuts will be made and where to attach the legs to the tabletop and storage area.

Assignments

Hunter cuts out the tabletop design, and cuts the legs to size, then attaches the legs to the tabletop, and hands off this to Kenyon. Kenyon then makes sure everything is attached and in order, finalizes storage design, attaches storage and creates and attaches the workspace on the tabletop, makes sure it is all in order. Kenyon brings the prototype to class on Monday.