

Heated Diagnostic Radiology Examination Table

Week 4 – February 13 to February 20, 2009

Team Members:

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Client:

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Problem Statement

A frequent patient complaint is that current x-ray tables are hard and cold. A pad can be used to eliminate the first complaint; however the temperature of the table cannot be altered on standard tables. A heated exam table or attachment that has a temperature control to give patients added comfort during exams, needs to be developed. The materials used need to be radiolucent and may not obscure the body part being imaged. A mechanism must be implemented that eliminates the possibility of patient injury such as burn.

Last Week's Team Goals

- i. Complete and submit shop applications.
- ii. Resolve funding issues with the client.
- iii. Meet with advisor.
- iv. Brainstorm ideas.
- v. Arrange date with client to test various materials for radiolucency.
- vi. Decide on three designs.
- vii. Arrange a meeting with Wally Block to discuss x-ray imaging and problems associated with various materials/ideas.

Summary of Accomplishments

- i. After Joel contacted our client concerning funding she agreed to provide us with a \$200 budget. Unless we can come up with more funding our on own we may still need to take our budget into consideration when designing our prototype and buying materials.
- ii. At our meeting last Friday (Feb. 13) we met as a group and continued to brainstorm taking into consideration the “blue sky” approach. Ideas include but are not limited to radiant heating through the use of liquid filled tubing, chemical thermo pads, and a hollow supported box with liquid, air or steam heating. At our meeting this Friday (Feb. 20) we will try to decide on three basic ideas.
- iii. At our meeting last Friday (Feb. 13) we met with our advisor, Mitch Tyler. Again, Mr. Tyler provided questions and considerations to take into account with regards to our design. He emphasized that we should meet with Wally Block concerning x-ray imaging and review the textbook “Medical Imaging Signals and Systems”. Since our meeting with Mr. Tyler we have obtained a digital copy of the suggested text and have been in the process of arranging a meeting with Wally Block. Following his suggestion we have also redefined our individual research efforts.
- iv. Due to the many general considerations that must be accounted for in our design our group has split up the research to have a better understanding of specific problems and since last week we have refocused our individual research. The research was split up accordingly: Joel, thermodynamics; Tyler, tubing; Joey, padding; Paul, x-ray. At our group meeting this Friday we will continue to discuss design possibilities.
- v. Joel has researched the issue of thermodynamics and has developed generic equations and considerations to take into account when creating the design. The considerations will be important when determining tubing layout, padding thickness, input temperature, and tubing temperature threshold.
- vi. Tyler has researched different tubing possibilities focusing on material x-ray compatibility, pressure/temperature thresholds, life span, cost etc. Currently polyethylene, nylon and pvc tubing are all inexpensive possibilities. Samples of each have been obtained from the hardware store and will be tested with our clients x-ray machine. Also, their feasibility of each will be discussed with Wally Block. Tyler also searched for different inexpensive heating, and pumping methods while at the hardware store.
- vii. Joey investigated different possibilities for padding and material characteristics of each. Material characteristics will be important in patient safety, sanitation, and heat transfer.
- viii. Paul has obtained a copy of the textbook “Medical Imaging Signals and Systems”, we will review this material to become more familiar with attenuation caused by certain materials.
- ix. The PDS and problem statement were updated at our meeting last Friday (Feb. 13), our updated problem statement and PDS outline client expectations and

design challenges, this will guide our research. Specifically, the cost of production for our prototype has been defined.

- x. All team members have submitted applications and are in the process of acquiring a student shop pass. This will allow us the opportunity to use the student shop in the development of our prototype.

This Week's Goals

- i. Complete and submit shop applications.
- ii. Meet with advisor.
- iii. Begin to consider design criteria and design matrix.
- iv. Decide on design alternatives.
- v. Work on design.
- vi. Arrange date with client to test various materials for radiolucency.
- vii. Arrange a meeting with Wally Block to discuss x-ray imaging and problems associated with various materials/ideas.
- viii. All team members read chapters 4 and 5 from Medical Imaging Signals and Systems.

Project Difficulties

The problem of project funding was solved, the client has agreed to provide \$200 for the creation of our prototype. Unless we can come up with more funding our on own we may need to take our budget into consideration when designing our prototype and buying materials.

Activities

2.13.2009	Team: Meeting with advisor, brainstorming, and task assignments.	2.5 hours
2.16.2009	Joey: Researched possible padding and padding characteristics.	2 hours
2.19.2009	Paul: Update website.	.5 hours
2.18.2009	Paul: Researched fluid pressure, pumping fluids, and fluid eqns.	2 hour
2.16.2009	Paul: Copied text for Medical Imaging Signals and Systems.	.5 hours
2.16.2009	Joel: Contact with client regarding funding.	.25 hours
2.16.2009	Joel: Contact Wally Block regarding possible meeting.	.25 hours
2.17.2009	Joel: Researched heat transfer and general thermodynamics eqns.	2 hours
2.15.2009	Tyler: Researched possible tubing and tubing characteristics.	1.5 hours
2.15.2009	Tyler: Searched for inexpensive tubing, pumping, and heating possibilities at hardware store. Obtained samples of 3 common tubing types for x-ray attenuation testing.	2.5 hours
2.19.2009	Tyler: Wrote progress report	1 hours

