

# Heated Diagnostic Radiology Examination Table

Week 5 – February 20 to February 27, 2009

*Team Members:*

*Tyler Vovos (vovos@wisc.edu) – Team Leader*  
*Joseph Labuz (jlabuz1987@gmail.com) - BSAC*  
*Paul Schildgen (pschildgen@gmail.com) - BWIG*  
*Joel Gaston (gaston@wisc.edu) - Team Communicator*

*Client:*

*Lanee MacLean*  
*Dept. of Family Medicine*  
*UW School of Medicine and Public Health*  
*Phone: 845-9531 Ext. 146*  
*Email: [lanee.maclean@fammed.wisc.edu](mailto:lanee.maclean@fammed.wisc.edu)*

*Advisor:*

*Mitch Tyler*  
*Phone: 262-5112*  
*Email: [metyler1@wisc.edu](mailto:metyler1@wisc.edu)*

## 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. Meet with advisor.
- iii. Begin to consider design criteria and component matrix.
- iv. Decide on component 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.

## Summary of Accomplishments

- i. All group members prepared a rough draft of their assigned segment of the mid-semester power point presentation. We plan to have our advisor Mitch Tyler review our presentation for content and format. The presentation was split up as follows: Tyler - Problem statement, background, tubing; Joel – Thermodynamics, fluids dynamics; Paul – x-ray attenuation, fluid dynamics; Joey – Padding, component matrix. We are scheduled to present Friday March 6<sup>th</sup> from 12:29 to 12:41 P.M.
- ii. Joel is still in the process of arranging meetings to test with our client and to discuss attenuation with an x-ray professional. We would like to include the information obtained from these meetings in our mid-semester presentation.
- iii. At our meeting last Friday (Feb. 20) we met as a group and began to develop criteria for our component matrix. Key components we will need to make decisions on include tubing, matting, and heating.
- iv. At our meeting last Friday (Feb. 20) we met with our advisor, Mitch Tyler. Mr. Tyler offered to review our power point presentation a few days in advance of the presentation date. We will prepare our presentation in advance accordingly. Mr. Tyler also suggested that we emphasize and explain our approach and reasoning for decisions made and experiments conducted.
- v. In addition to general research by all group members, each group member continues to research accordingly: Joel, thermodynamics; Tyler, tubing; Joey, padding; Paul, x-ray.
- vi. Joel has researched the issue of thermodynamics and fluid dynamics 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.
- vii. Tyler has continued researching 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.
- viii. Joey investigated different possibilities for padding and material characteristics of each. Material characteristics will be important in patient safety, sanitation, and heat transfer. Joey has searched for and purchased several different samples of padding to be used during attenuation testing.
- ix. Paul has continued to investigate x-ray attenuation. His acquired knowledge will be important when meeting with x-ray professionals, during testing, and during our client meetings.
- 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. Decide on component alternatives and finalize component matrix.
- ii. Meet with advisor.
- iii. Meet with professional concerning x-ray attenuation and materials.
- iv. Test attenuation of various materials (tubing, matting, fluid) with client.
- v. Finalize mid-semester power point presentation.
- vi. Begin work on mid-semester report.
- vii. Prepare design notebooks for submission.
- viii. Obtain shop permits.

## Project Difficulties

N/A

## Activities

2.26.2009	Team: Reviewed video and slides on "Usability and Accessibility in BME Design" and "Human Factors and Ergonomics". Then completed survey.	1 hour
2.26.2009	Team: Review resources on oral presentations (slides/videos)	~.5 hour
2.25.2009	Team: Read/review Medical Imaging Signals and Systems text.	~1 hour
2.20.2009	Team: Meeting with advisor, brainstorming, and task assignments.	2.5 hours
2.26.2009	Joey: Prepared assigned segment of mid-semester presentation	1.5 hour
2.21.2009	Joey: Researched/searched/purchased matting samples for testing.	2.5 hours
2.27.2009	Joey: Attend BSAC meeting	1 hour
2.26.2009	Paul: Update website.	.5 hours
2.22.2009	Paul: Prepared assigned segment of mid-semester presentation	1.5 hour
2.25.2009	Joel: Pressure, heat, and velocity calculations.	3.5 hours
2.25.2009	Joel: Prepared assigned segment of mid-semester presentation.	1.5 hours
2.22.2009	Joel: Scheduling with x-ray professional and client.	.1 hours
2.26.2009	Tyler: Prepared assigned segment of mid-semester presentation.	1.5 hours
2.25.2009	Tyler: General research.	1 hour
2.26.2009	Tyler: Wrote progress report	.75 hours

