

IPRO 326 Midterm Report

Team Goals

To date, the goals of this IPRO team have remained relatively unchanged from the ones set forth at the beginning of the semester. The original goals of the IPRO team set forth at the beginning of the semester are stated as follows.

- Gather information regarding the detailed specifications of how lasers and waterjets work. This includes learning how the machinery itself is built and operates. It also includes learning the theory of what a laser is and how it is produced, and similarly, what a waterjet is and how it can be created.
- Examine the roles that lasers and waterjets currently have in the manufacturing industry. This includes learning how lasers and waterjets are used in applications such as welding, cutting, and stamping of materials. Further research is conducted as to what materials are suitable candidates for each process.
- Decide which machinery is better suited for a particular task. (ie are lasers or waterjets more efficient at cutting a particular type of metal or ceramic)
- Determine areas of industry that currently employ the use of laser and waterjet technology. Specifically, what sectors of manufacturing currently use these technologies. Upon discovery of current uses, examine additional industries that could benefit from this technology that do not currently utilize it.
- View firsthand a laser and waterjet machine in action to gain knowledge of how they work.
- Evaluate current costs of buying and owning laser and waterjet machinery. Find current pricing scales for such machines. Once these figures are found, determine how economically feasible it is to have small businesses purchase their own machinery versus sending current work to large scale machine shops at a lower cost.

Current Work to Date

- The team spent several weeks at the beginning of the semester planning a timeline for completion of essential tasks. A plot of when specific assignments were to be completed was formed. Progress has since been holding steady according to the plan set forth.
- The team split into two separate groups, one which researched only laser technology, and one that focused on waterjet technology. By splitting into two subgroups, the teams feels they can focus more in-depth on their particular track and therefore do more research on it.
- Utilizing primarily internet sites the team researched current industries that are employing laser and waterjet technology. In addition, information was gathered as to how lasers and waterjets actually operate. Images and videos of these machines in action were also collected to be used in reporting later and possible IPRO day presentations or demonstrations.
- The team picked a Friday midway through the semester and visited JDA Aqua Inc., which is a waterjet machine shop in the Chicagoland area. The company is run by an IIT alum. A full tour of the facility was given including demonstrations of how waterjet machinery actually works. Samples of material cut by waterjet was distributed to the team and they had an opportunity to ask many questions and gather information about current waterjet uses.
- The team visited a gas laser located in the basement of Engineering 1 building. A demonstration of the welding capabilities of this laser with a variety of different metals. The inner components of the laser were also viewed to gain insight as to how it works.

Updated Goals and Remaining Work for the Semester

The IPRO team continues to work on tasks according to the project plan set forth at the beginning of the semester. The most important of which remains the final report. The subgroups are in the process of beginning to merge back together into a single team and we are beginning the collaboration of all of our data. The remaining tasks that need to be completed by the whole team are as follows.

- Prepare a single report that details the uses and workings of both lasers and waterjets.
- Work together to determine which machinery is more effective for a particular task and include this analysis in our report.
- Finish developing the website and modify it to include all pertinent data that needs to be displayed.
- Develop materials for IPRO day presentation including Powerpoint presentation, poster, final report, and machined samples.

Barriers / Obstacles

The main obstacle that has been discovered in the process of gathering information has been difficulty in finding costs of the equipment in question. Very few sources are available for accurate costs of buying or leasing this machinery. This data is very important to our overall research because it will allow us to make better judgments regarding the usefulness of purchasing such machinery by small businesses. Currently, this setback has delayed the completion of our report as originally scheduled. We are currently in the process of trying to locate additional vendors to contact them about pricing quotes. If such information becomes available, we will include it in our analysis. If we do not discover anything new, we may change some of the focus of our report to reflect that. Fortunately there is an abundance of information in other areas that can be focused on to create a well-informed and useful presentation.