

IPRO and SMITH & RICHARDSON, INC.

Problem:

Mechanical:

- Casting chaplets is only a semi-automated process, which wastes both manpower and time.
- It's impossible to make the disks face the same way with the system that is currently in place.
- Different sized disks mean the feed mechanism needs to be flexible.

Database:

- Tools are kept track of with an outdated paper and pencil system.
- The company has no way of predicting when they will need to order new parts.

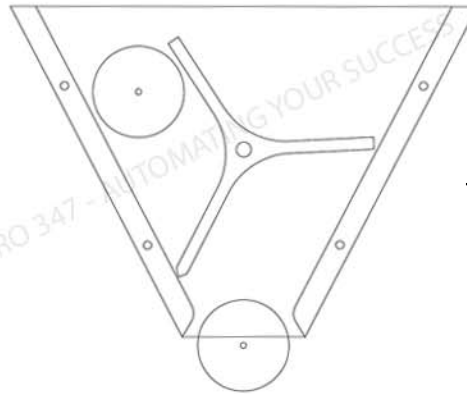
Objective:

Mechanical:

- Identify methods, materials, and systems that can be used to automate a semi-automatic sorting and placement operation for casting chaplets.
- Build a deliverable prototype.

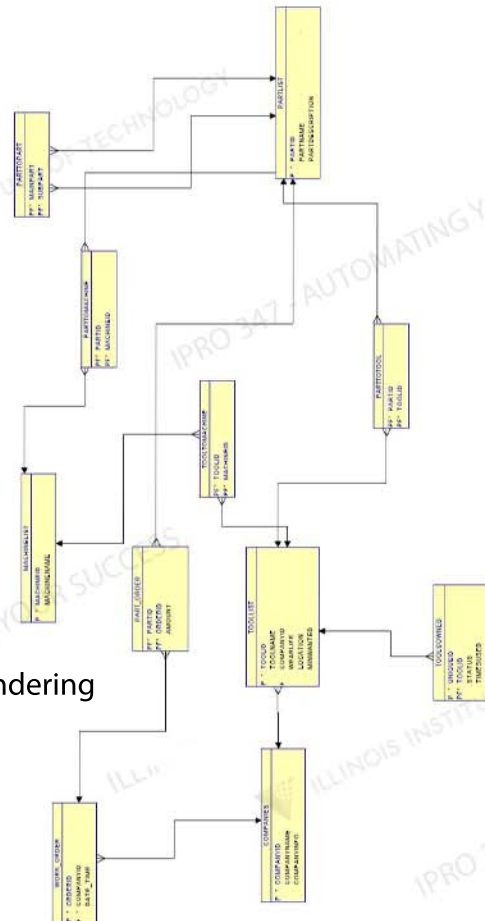
Database:

- Develop a comprehensive electronic tool management system that will keep track of the location of Smith & Richardson's tools.
- Find a way to easily transfer information from the paper tool system into the database.
- Create a program that will help predict tool-wear life for the purpose of preventative maintenance.



The 'Flipper'

ERD Rendering



Methodology:

Mechanical:

- Group:
 - o Daniel Chiu – Aero/Mech
 - o Joseph Cicero – Mechanical
 - o Ross Hill – Mechanical
 - o Woong-Kyo Lee – Aerospace
 - o Ran Xu – Mechanical
- Researched methods align disks
- Individually developed designs for various stages of the problem:
 - o Disk orientation
 - o Equal diversion of the disks to the two plates.
 - o Track system
- Final designs were constructed using acrylic sheets cut using a table saw and the laser cutter in MSI.

Database:

- Group:
 - o Jonathan Perry – Mechanical
 - o John Powers – Computer Science
 - o Ben Sanborn – Psychology
 - o Meagan Sarratt – Psychology
 - o Robert Williams – Electrical
- Extensive research was conducted in the area of tool management programs.
- Attempted to make changes to the company's program, but this was determined to be unfeasible.
- Designed a "tagalong" program to their tool management system that can keep track of tool-wear life.
- Researched data input systems and determined that OCR would be the easiest method.