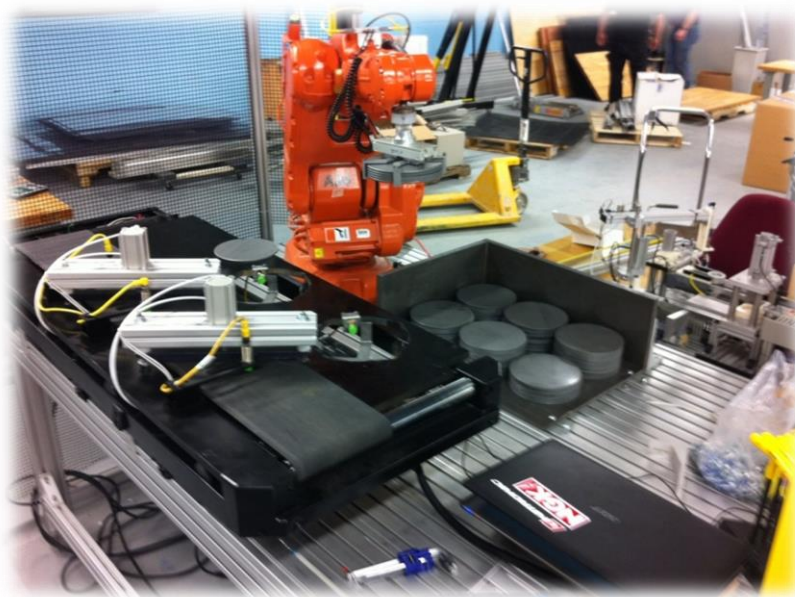


Round blank automated stacking system

Industrial partner: Jancox Stamping

The scope is to design a turn-key automation system that will increase the capacity of this manufacturing process of stamped blank production through reducing the system downtime, increasing output during system uptime, and easing physical strain on employees. Constraints of the project included both technical constraints and monetary constraints:

- i) Physically, the system is operating at a very high speed, must accommodate various size and orientation changes in the blanks being produced by the stamping press, and must be fully portable. Our solution has met these requirements by devising a system that can easily keep up with the calculated demand, and is able to transport the blanks from the conveyor into the customer supplied bins in an organized and quantifiable manner.
- ii) The stacking solution required a low ROI, which rules out replacing an entire manufacturing process; the payback time would be far too high. The only option remaining was to introduce this new technology into the existing manufacturing process. This was accomplished by integrating commonly available peripherals coupled with industry standard robotics into the stacking portion of the manufacturing process, which was deemed to be the only real bottleneck in the system. Our final product promises ROI of well under a year, and thus will prove to be an excellent choice for Jancox Stampings, Incorporated.



Capstone Projects

Mechanical Department- Fall 2012

Supervisor: Shaun Ghafari, Ph.D., P.Eng



Variable speed agitation test bed

Industrial partner: Liquid mix agitators

The main goal of the project is to design and built an agitator test system (fixture) that will be capable to be controlled and monitored by PLC and to measure the thrust force created by the agitator impeller and can operate in variable speed or manually as desired, in conjunction with Liquid Mix Agitator Inc. The system is needed to fill the void in the company. The test frame was constructed from steel utilizing bolted and welded connections. The test system will have an agitation unit connected with PLC (Programmable Logic Control). The variable frequency drive (VFD) was used to control the speed of the motor and the load cells sensor to measure the thrust force of the agitator impeller.

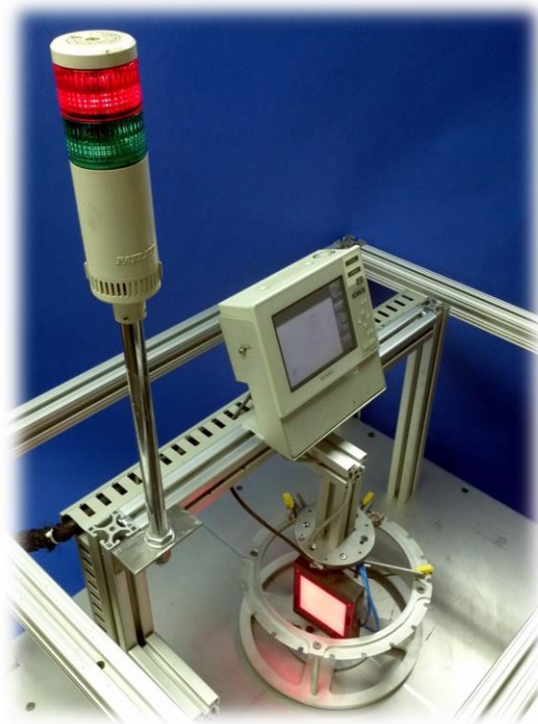


Fastener sorting machine

Industrial partner: AVP solutions

Sheridan Research Team has developed a concept model for AVP Solutions Ltd., of a fastener sorting machine that provides 'Quick-change' feature that empowers the customer to test a wide range of parts using a single unit with a very economic investment in the machine. The machines presently in operations at client site to conduct quality tests are single function, complex setups of equipment developed over the years according to customer contracts and requirements. As part of the AVP's future vision for expansion, the above limitations must be exploited keeping in mind the objective of empowering the customer to conduct easy installation, efficient operation and hassle-free maintenance practises, and thus provide a modern new design that improves the machine functionality and performance maintaining high-quality standards.

Considering these essentials, the Sheridan Research Team collaboratively designed a concept model that confines in the original space with less than 70% components eliminated, trims down the weight of setup to 50% and performs at more than three times the current rate with uncompromising quality. The design stands promising to AVP Solutions Ltd., and has helped develop a platform for future add-ons and features using this concept.



Capstone Projects

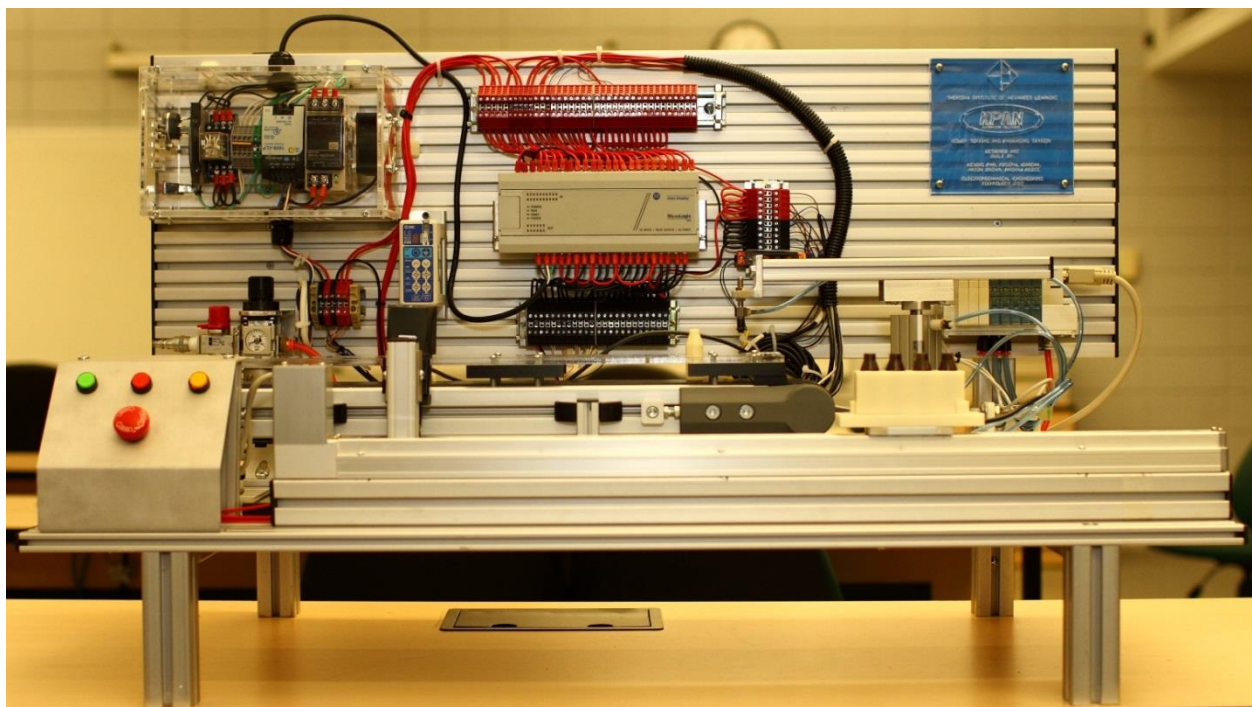
Mechanical Department- Fall 2012

Supervisor: Shaun Ghafari, Ph.D., P.Eng



Conveyor sorting system

A vision sensing, sorting and packaging system was designed, built, programmed, and commissioned. The project required the team to manage the three major constraints which were resources, time, and the budget. The vision sensing, sorting and packaging system was created for the application in beverages industries such as beer packaging line. The system can inspect for the different types of bottles that are moving on the conveyor hence sorting and packaging of the bottles in their respective packaging boxes. The system can also detect, missing caps, debris in bottles, broken bottles, missing or incorrect labels on the bottles.



Capstone Projects

Mechanical Department- Fall 2012

Supervisor: Shaun Ghafari, Ph.D., P.Eng



Automated stamping system

The overall scope of the project was to use a pick and place robot, a conveyor belt, a magazine ejector and a pneumatic press to place a plastic insert inside of an aluminum puck. Our constraints for the project included the use of a stepper motor, an Omron PLC and cost. The solution to the problem was that the aluminum puck and plastic insert would be delivered from two separate locations to one centralized location. At that location the pick and place robot would deliver each part one at a time to the pneumatic stamping machine where the two parts would be stamped together. From here the finished sub-assembly would travel to the next assembly station. The entire process would occur within an isolated location preventing the workers from coming in contact with the assembly.

