**SPONSOR:**

Robert Saunders, Icon Health & Fitness

# Automated Powder-Coat Tree Loading System

Icon Health & Fitness is located in Logan, UT. They design, market, and manufacture exercise equipment for different brands such as NordicTrack, Reebok, and Gold's Gym. Icon uses powder coating to paint their parts. Large trees (see Figure 1) are hung on a conveyor and the parts are then placed on the trees to go through the powder coating process. Figure 1 only shows one type of tree Icon employs. They have over 50 different types of trees they use to powder coat parts. Icon employs two operators to load and unload the trees onto the conveyor. This job is very mundane and monotonous and they need these operators elsewhere in the factory. Robert Saunders, the project's sponsor, asked team ALUS to design a solution to this problem.

Figure 1: Icon operator loading a tree onto the conveyor.

After conducting research on various powder coat conveyor systems and different automation techniques, ALUS determined that there needed to be changes made to the trees to make it easier to automate. The operator often had to fight with the tree and conveyor to get them to interface properly. Originally, Icon had a bar at the top of each tree that would serve two purposes: connect to the conveyor and distribute the weight over two conveyor drops. ALUS removed this element by changing the tops of the trees to a

Figure 2: The rail system with pneumatics installed to drive the roller chain. The storage rack is to the left and back of the rail system.

simple J-hook and installing the bar onto the conveyor full time. The trees then simply hook onto the bar in one easy motion. With this change, ALUS came to the design of a rail system (see Figure 2) that would load the trees onto the conveyor and a redesign of the tree storage rack. The trees sit on the storage rack and a fork lift driver can lift the rack and deposit the trees onto the rail system. The trees sit on top of roller chain on the rail system with a T-bar. They are then indexed forward using pneumatics. ALUS originally wanted to use a stepper motor but due to budget restrictions a pneumatics approach was used to prove the concept. This design can be modified and adjusted to use different power and the height can also be changed as necessary. Different trees can be modified easily to use with this rail system.

Robert Saunders plans to refine the design with the help of other Icon engineers. After some refinement, Icon will be able to move the operators to other areas of the factory. The hope is that Icon will be able to implement this and will use it for years to come.

**YEAR**
2014-15

**TEAM**
16: ALUS

**COACH**
Richard Gee

**STUDENTS**
Shuan Chavarria, Maren Christensen, Jeff Erickson, Paulo Lopez, Travis Sievers

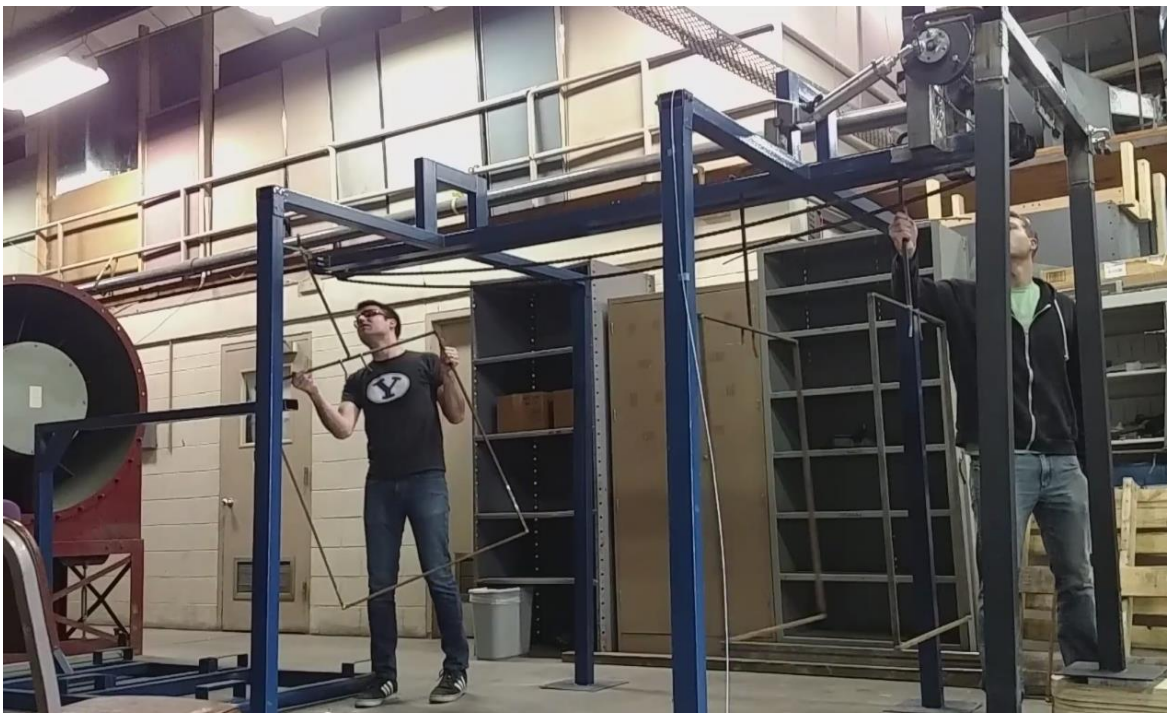

Figure 3: Team members Travis Sievers and Jeff Erickson testing the rail system. The trees are loaded onto a bar that is at the same height as the rail system.