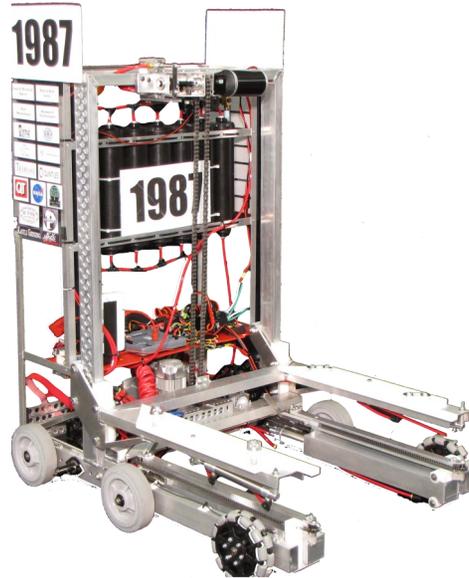# The Robot

2015

FRC Team 1987 The Broncobots

Lee's Summit North High School

Lee's Summit, Missouri

The 2015 Robot

Highlights:

- **CAD**
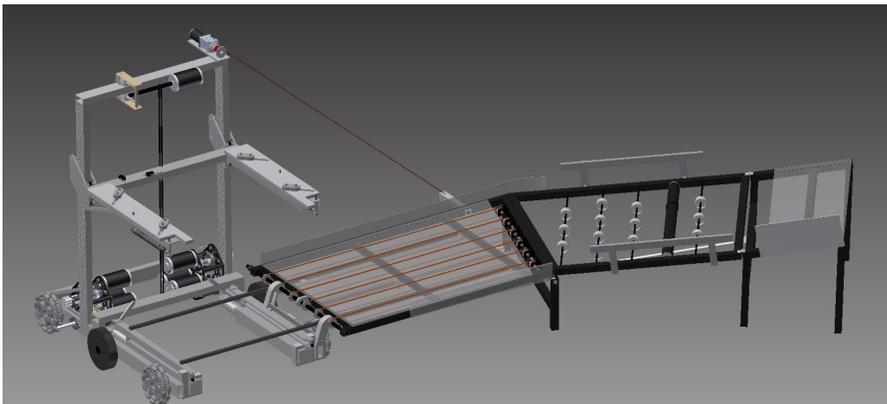- **Programming**
- **Drive System**
- **Squeezy**
- **Lifter**
- **Conveyor**
- **Pusher**

The 2015 Robot can...

- **Operate completely autonomously**
- **Quickly & efficiently create stacks of six totes and push them out onto the scoring platform**
- **Creates a stack of six in 30 seconds**

CAD Design

Pusher

The pusher is capable of moving all 30 totes out onto the scoring platform; this is equivalent to pushing 240 pounds in a single movement.

The pushing mechanism is made up of two 1.5 in cylinders with a 15 in stroke. There is a chain mechanism allowing us to achieve a double extension of 30 in.

A proximity sensor on the end of one pusher knows when they are retracted or fully extended.

Squeezy

Squeezy is the mechanism which grasps or "squeezes" the totes in order to lift them. It consists of a metal frame with plastic sliders which shift inward toward the tote. Squeezy has a linear switch to tell if the sliders are open or closed. The system is powered using pneumatics.

Lifter

The Lifter has the capability to lift six totes with a can on top. It is chain driven from a 9:1 gear box with full CIM.

Two sensors are present on the Lifter. The first one perceives when a tote is at the bottom waiting to be loaded. The second knows what height the lifter is currently at.
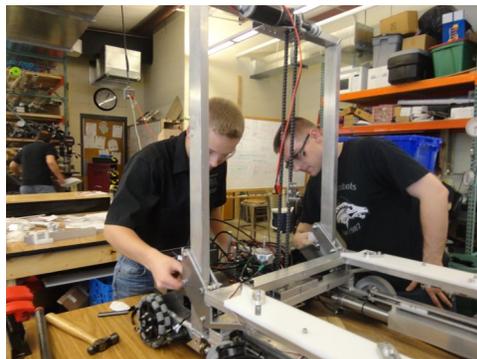
Programming

The robot is completely autonomous due to extensive command based C++ programming and many sensors. The robot contains three proximity sensors that detect the tote, a string pot that tells the height of the lifter, a diffuser which tells when the pushers are extended, and a gyro that indicates the angle of the robot.

The robot can create five stacks of six totes within a single match, giving the alliance sixty points.
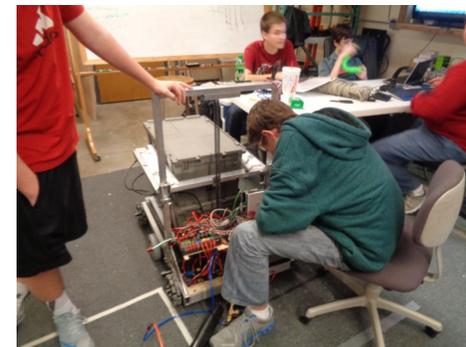
Drive System
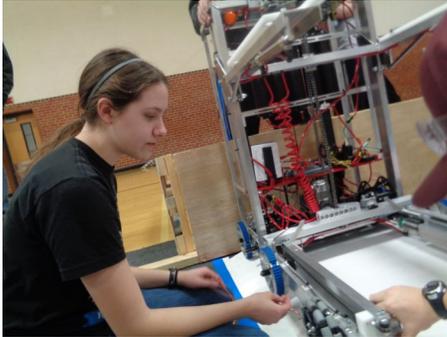
The 2015 robot drives on the 2015 custom West Coast chassis with two West Coast Products gear boxes.

We used six inch wheels in a 6-wheel (no drop) configuration. The wheels are chain driven from gear boxes. The outer and inner wheels have performance track tread.

The drive system contains two sensors: an encoder and a gyro sensor. These allow us to know both the distance as well as the angles which the robot has moved from a designated position.

Conveyor

The conveyor is a detachable sub system that connects to the side of the robot. It is made almost entirely of carbon fiber and can be placed inside the robot for transportation.

The first part of the conveyor has both passive rollers, as well as a powered carbon fiber roller, and the final section is driven by a Bane Bot motor.

The conveyor features six belts of 3/16th, 80 durometer polycord. Two proximity sensors are present on the conveyor. The first one tells when the tote has entered the collector and the second senses totes waiting on the conveyor.