FIRST ROBOTICS TEAM 4909 - BILLERICA BIONICS

WEEK 3
Testing and Prototyping

With the end of week 3 came some successful testing and prototyping. Programming and Electrical have been hard at work this week working on test boards and testing programs on them. With the stock of pneumatics we had built up from last year and some new pieces ordered this year, the Electrical team had manufactured a pneumatic testing board complete with compressor, safety valve, and some air tanks. They combined it this week with the electrical test board from weeks prior in order to make it so that programming could design programs and test them on something other than an online simulator. With that, programming has successfully actuated pistons by running programs and also has remotely activated CIM motors and mini-CIM motors as well.

Mechanical has been up to some mayhem as well. They have completed a wooden prototype of the lifting mechanism that can be driven by a power drill. In addition, they have been making progress on a practice frame of a robot to test mecanum drive while the actual bot is being constructed and for after end build day.

Otherwise, mechanical will be entering crunch time next week, as parts have finally arrived back from AndyMark, such as mecanum wheels, the tuff-box gearboxes, and various adapters and mounting bits. Hopefully, by the end of week four, we will have a driving robot.

HELPFUL LINKS

Team 4909

@Team4909

@FRC4909
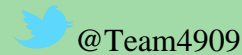
Team4909.weebly.com

Game Information

FIRST Website

PTC Creo

TEAM 4909 TALKS

COTS vs. Build Your Own

As a second year team, we, The Billerica Bionics, have been faced with the decision to either buy parts from stores, or to try and fabricate them ourselves. Both choices, however, have their pros and cons.

If we were to choose to buy a corporate off the shelf product (COTS), all of the time consuming work of cutting metal, drilling holes, etc. would have already been done for us. We would get exactly the materials that we need, and the products would be professionally made, so there would be little chance of issues in the manufacturing of the component. Despite all the positive outcomes of buying products from stores, there are some drawbacks to it as well. The materials can be quite expensive, especially if they are purchased online. Also, the amount of time the team will have to wait for the products may prove to be detrimental to the extremely limited time frame we are given. For example, we have ordered some important components
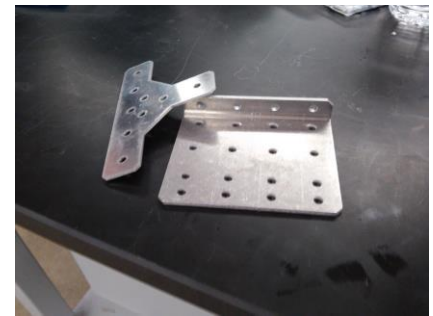
from AndyMark that were crucial to the building of our bot: the mecanum wheels. We had no choice but to order these fairly early in the season, but with the massive influx of shipments that the store was experiencing, we had only received the parts quite recently.
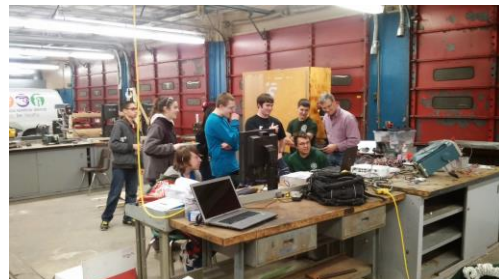

A mecanum wheel

Building our own parts offers its own set of conditions as well. First, we could save some time and money by recycling materials the team has used in past seasons. In addition, it is cheaper to build our own items, especially because we have a large stockpile of materials already. Another factor is that we can start making the component as soon as possible; we wouldn't lose any time waiting for products to be shipped if we built our own.

Unfortunately, there are some problems with this method as well. It would take a lot of effort to build the component instead than buying them, when time could be spent actually putting the robot together. Also, we could run into the risk of human error. The parts we build would be likely to lack the precision of a professional company, therefore resulting in lower compatibility with the robot if made incorrectly. For example, there were some "L" and "T" brackets that we ordered from Andymark to have as spares. But we soon came to the conclusion that if we needed more, we could easily fabricate some utilizing the resources at the shop.

A few brackets from AndyMark

Team Updates

Team Division	Accomplishments	Plan for Next Week
Mechanical	• Working on modifying the practice robot to make a mecanum drive chassis for programmers/electrical to plan and test on • Designed the manipulator in CAD • Built the vex gearbox which will be used to power pulley's spindle • Started fabrication of the drive chassis	• Finish the drive train • Update the drive train CAD with other changes if made • Build the manipulator
Electrical	• Combined the pneumatic and electrical test boards to make a complete testing board for programmers/electrical • Detailed schematic was made of the electrical test bed • Set up the CAN program for the pneumatics test bed	• As the primary test board will be integrated into the robot, a second test board will need to be constructed • Set up sensors with Programing • Install onboard electronics of the lift prototype and eventually the actual bot

Programming	• Programmed a mecanum Drive
	• Programmed a pneumatics test-moves a pneumatic piston
	   ○ Now understand how to program pneumatics
	• Programmed an ultrasonic sensor-prints out the distance that it detects
	• Learned about PID functions
	• Learned about encoders
		• Autonomous plan
		   ○ Outline options for autonomous
		   ○ Start writing code for some of the basic options
		• Start TELEOP code
		• Put the test codes together
		• Encoder testing

Business	• Website is effectively finished; simply adding more content at this point • Banner designs are complete • T-shirt design is nearing completion • Poster design has made progress	• Work on awards • Work on Business Plan • Finalize Banner, Poster and T-shirt designs

Upcoming Schedule

Date	Competition Name	Competition Location
March 6-8	Reading District Event	Reading Memorial High School 62 Oakland Road Reading, MA 01867
March 26-28	Northeastern District Event	Matthews Arena 238-262 St. Botolph Street Boston, MA 02115

THANK YOU TO OUR SPONSORS!