RoboRoos Newsletter

FEBRUARY, 2015

SPECIAL POINTS OF INTEREST:

- Design includes two hinges on arms which are moved in and out by pneumatic cylinders.
- 'Magic smoke' successfully avoided in testing of parts!
- Celebrating Australia Day in RoboRoos style.
- There's a first time for everything: Even building gearboxes.
- Can LED strips really be used for anything other than Knight Rider scanners?

INSIDE THIS ISSUE:

Recycle Rush and FRC Kick Off

On the 4th of January, all competitors of the FIRST Robotics Competition (FRC) from around the globe found out about this year's competition game: Recycle Rush.

The game is as follows:

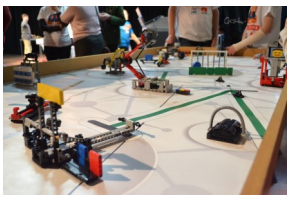
'RECYCLE RUSH is a recycling-themed game played by two Alliances of three robots each. Robots score points by stacking crates on scoring platforms, capping those stacks with recycling containers, and properly disposing of pool noodles, representing litter.' (quoted from the official FRC game manual)

This also includes a fifteen second autonomous mode and many other scoring methods.

The RoboRoos, FRC team number 4537, will be building a robot to compete in this competition during six weeks of hard work—surviving some incredibly hot days in a tin shed and a few close shaves with lack of sleep—and are very excited to be taking their robot to the Sydney Olympic Park Sports Centre on the 11th to the 14th

of March this year to compete in the Inaugral FIRST Australia Regional against teams from as far as China, Taiwan, Singapore and USA.

RoboRoos FIRST Lego League (FLL)



The RoboRoos FLL team competed in November, 2014 at the South Australian tournament, along with almost 30 other teams. They successfully achieved the 'Gracious Professionalism' award and qualified to go to the nationals in Sydney in December, 2014.

The team showed excellent team spirit when they arrived in Sydney, discovering the robot's attachments had been left behind in Adelaide and got together madly remaking lego parts on the eve of the competition.

They once again excelled, receiving the Judges award for 'Creative Thinking'. Congratulations!

Robot Design

The design team kicked off the season with discussing the strategies for both modes and creating a list of the priorities.

As RoboRoos are using different wheels this year, they also had to take them into account, figuring out that the mecanum wheels sacrifice about 30% of power during movement.

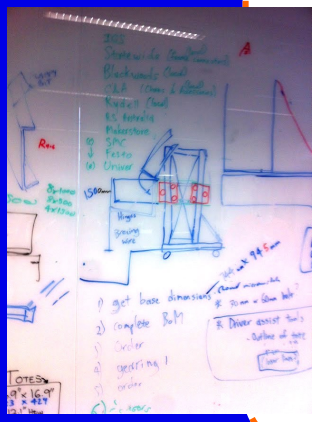
The team also watched a few Robot In Three Days videos and listed the good and bad qualities of some of the designs.

When they began designing, they had two different designs in mind.

The first was to use hinged flaps on fixed arms that can be lowered over the lip of the crate and will then snap back inside the lip so the crate can be lifted, however that would mean that it is unable to pick it up.

The second uses pneumatic arms to move in and grip the crates, however is more complicated.

In the end, they decided to combine the two designs, placing hinges onto arms which can be moved in and out by pneumatic cylinders.

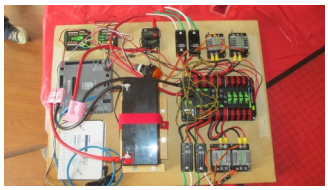


MATERIALS!!!

RoboRoos are always in need of more materials, so if you would like to do some early spring cleaning of your shed or happen upon some lying around please start collecting now.

We are looking for structural timber (such as pine framing timber and plywood sheets) and aluminium tubing for the robot and for prototyping. Offcuts are welcome. Please contact Geoff Mansfield on Geoff.Mansfield@roboroos.org.au or on 0432 905 453.

Test Board and Field Structures



On the 6th and 7th of January, 2015 the electrical team gathered to ensure all the important parts in the kit were there and to create the test board.

After two nights of work doing various jobs including drilling, screwing, tinning and heat shrinking, the test board was complete.

Software took over from then, making strobes blink and making sure that no 'magic smoke' was released from any part of the circuit, and that all the parts were in working order.

The test board now being in working condition, on the 17th of January the electrical team moved on to work on the field structure. MDF was measured, cut, glued, screwed and nailed together to create a replica of the step in the middle of the field—despite a lack of functioning electrical saws.

Skills Workshop

On the 9th of January a workshop was held to allow the team to practice their soldering skills. Those who attended created a basic circuit which made an LED (Light Emitting Diode) flash.

Australia Day Weekend: Robot In (Almost) 3 Days

Over the Australia Day weekend, while everyone was out at the beach holding barbecues with their family the RoboRoos were celebrating Australian independence in the best way possible—by bonding over building a robot.

The whole team put in a lot of effort to complete the field structures, to write software, to draw up CAD designs, to get sensors tested, to get parts ordered, to get entire gearboxes put together from scratch—and to have the robot frame change every time someone turned their back. They also put in quite a lot of effort to keep everyone awake until approximately 2AM.

Over the many hours that were designated as R&R between Sunday and Monday, a sleepover—or, more correctly, a stay awake-over—was held. Team-created activities ranged from watching Minority

Report to picking locks to throwing cards to dancing to Cotton-Eye Joe and, eventually, sleeping, which brought together the whole team—old and new members alike.

Well done to the whole team on their incredible achievement over these three days.

"Put together one massive tin shed, 3 days, lots of sleeping bags and pancakes (but not enough bacon), some incredibly confusing anime, a robot frame that changes approximately 5 times, and a team of RoboRoos and what do you get? A robot that is probably still not the right shape…" - Emily Mansfield, Electrical Team Captain

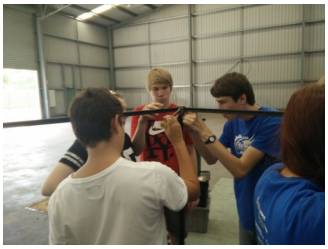
Mechanical

The mechanical team has been quite busy these few weeks, working on building the drive base, mounting the electrical board, connecting all the gearboxes and working to creating a pulley system to lift the crates.

This season has been full of many first times, as this is the first time the RoboRoos have built gearboxes and the first time belts have been used, which led to a lot of interesting experimentation.

The team now has better access to tools as well—for example, a drill press has been purchased for their use.

The team will continue to build the robot until the 17th of February before bagging and tagging the robot as a final product.



Software

To kick of the season from a software point of view, the team designed a system using infrared and ultrasonic sensors that analyses the distance, position and orientation of a crate so that it can pick them up as accurately as possible during autonomous mode.

They then decided to incorporate an LED strip into the system to allow the drivers to also be able to see what the sensors were picking up from the driving station, making the colour of the lights change according to which sensor was picking up an object in front of them.

They have continued to work on creating Arduino shields to create this system.

Hopping into engineering!

Who are the RoboRoos?

We're a community group, FIRST® Robotics Team and so much more—including South Australia's first and only FRC team.

The team's purpose is to excite young minds about STEM (science, technology, engineering and mathematics), by using a common interest: Robots.

As part of this, students get real industry experience, with help and guidance from dedicated industry professionals as mentors. It circumvents the age-old circle of being unable to get a job due to lack of experience.

Part of our ethos is to maintain a gender balance, which we continue to strive for and achieve.

www.roboroos.org.au

Sponsors

RoboRoos would like to welcome their newest supporter: The City of Unley! The team also acknowledges the significant support provided to us by the South Australian government LEAP grant.

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