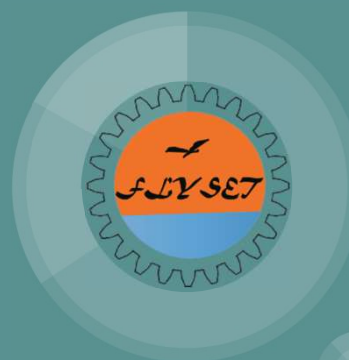


2018 FLYSET FTC Workshop - 6 Wheel Custom Chassis

(9/3/2018)



Abhishek

- Fifth season with FTC team 8565 Technibots
- Second season with FRC team 6901 Knights Robotics

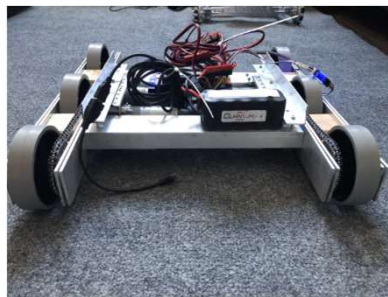


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Chassis Specification

Six Wheel Custom Chassis



14 pounds

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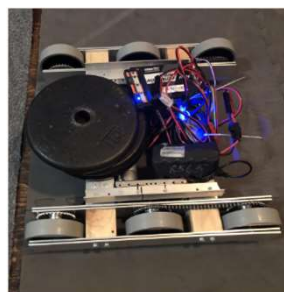
6 Wheel Custom Chassis



14 pounds



29 pounds



44 pounds



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Six Wheel Custom Chassis

- Fully custom chassis
- Four NeveRest 40 motors
- Six wheel drive, 4 wheels chain driven
- Gear ratio from motor to wheel 40:1
- Consists of 3 pairs of andymark wheels
- REV expansion hub is horizontally mounted on the robot chassis
- Base chassis weight: 14 pounds

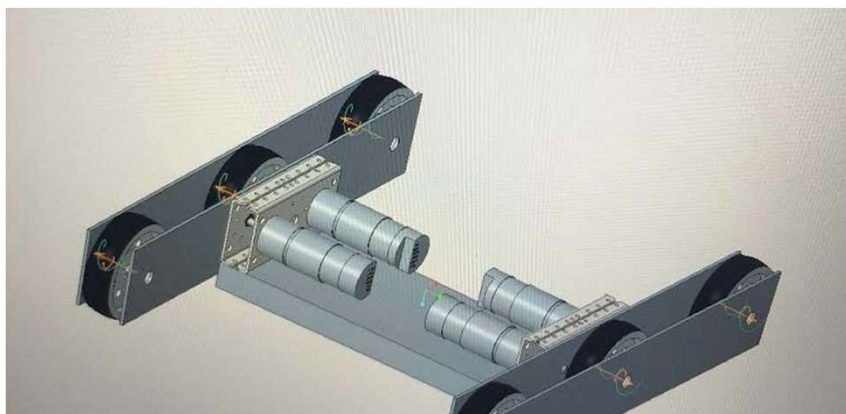


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Chassis CAD Design

6 Wheel Custom Chassis in Design Phase



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Six Wheel Custom Chassis CAD Notes

- This was not my first chassis that I have made in creo as I have worked with creo a lot in the past with the team
- Most pieces in the CAD were also custom made



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Chassis Test Results

6 Wheel Custom Chassis Build Notes

- Material issues: I built my chassis out of the wrong material originally
- Design: I did not realise that three sprockets could not be chained together in one line



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Test 1: Forward Speed Test

- The chassis did not perform as well as the other six wheel chassis as all the wheels were drive wheels but two of them were not chained. This amounted to lower general results than the other six wheel chassis.

	No load	15 lb load	30 lb load
Distance traveled	4.3 m	4.11 m	4.03 m



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Test 2: Three Second Turn Test

- The turn speed is the lowest as the two dummy wheels are dragged along and induce high friction.

	No load	15 lb load	30 lb load
Degree turned	173	161	153



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Test 3: Driving up/down a ramp

- The chassis wheel design was able to easily move up and down the ramp.

	No load	15 lb load	30 lb load
Up ramp	1	1	1
Down ramp	1	1	1



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Test 4: Balance Stone Balancing Ability

- Easily able to get up and down the balance stone.

	No load	15 lb load	30 lb load
Go on the stone?	1	1	1
How long on the stone? (forever is settled on the stone)	forever	forever	forever



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Test 5: Pull Strength Test

- The chassis did not perform as well due to the two dummy wheels.

	No load	15 lb load	30 lb load
10 lb pull weight	n/a	5.56 seconds	5.93 seconds
20 lb pull weight	6 seconds	9 seconds	n/a
30 lb pull weight	N/A	N/A	N/A



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Test 6: Autonomous Straight Line Drift Test (Optional)

The drift is normal as compared to the other robots

	No load	15 lb load	30 lb load
Horizontal drift	6.5 cm	2.3 cm	.87 cm



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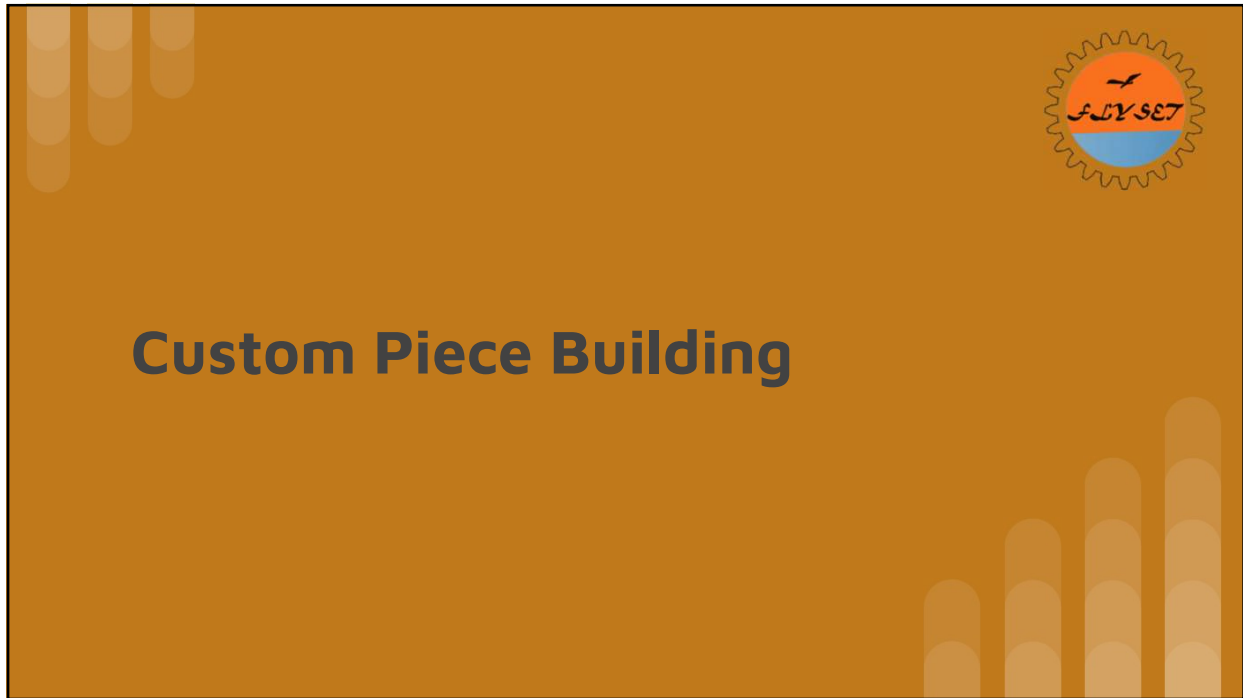


6 Wheel Custom Chassis Summary

- The robot was not as well performing as expected
- The robot was not able to drive all six wheels due to a design flaw
- The turn speed was also not very fast
- The robot although is as sturdy as expected
- Small and low center of gravity



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How to custom build pieces

- First recognize that the piece must be sturdy
- Plan out your design on paper
- If possible, plan on cad
- Use proper tools to custom





How to custom build pieces (cont.)

- For ALL METAL BUILDING: use cobalt drill bits
- Mark out your pieces with sharpie
- Try to fix your mistake before trying to make the piece again
- Try to use a drill press or a variable speed hand drill



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Safety

- Protect your eyes and hands
- Pieces will heat up with friction, remember this
- Wear shoes to protect your feet
- Do not use power tools when you are tired, stay alert



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