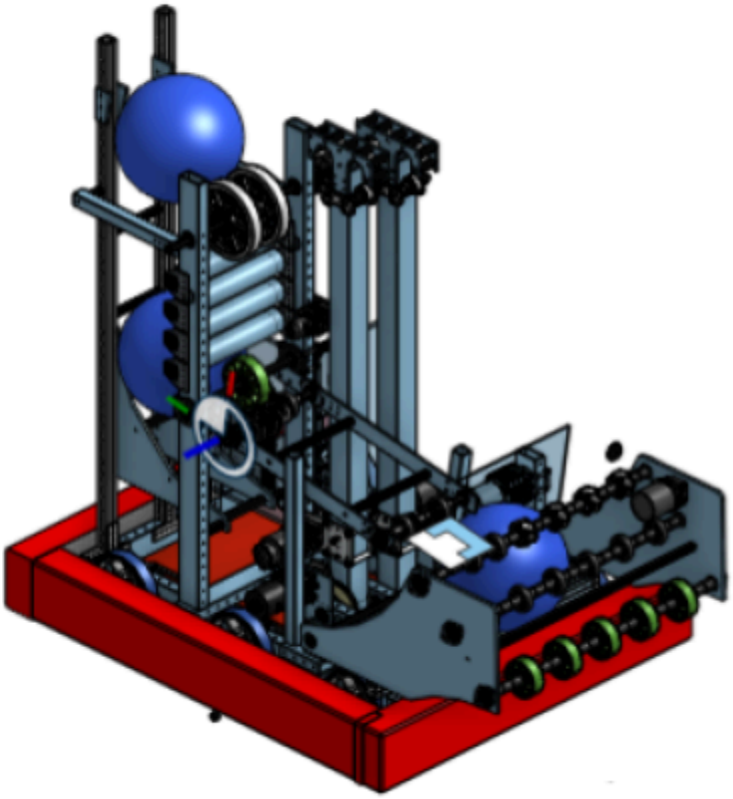
TEAM OKC ROBOTICS

FIRST Robotics Competition Team 2718
Robot Summary Sheet

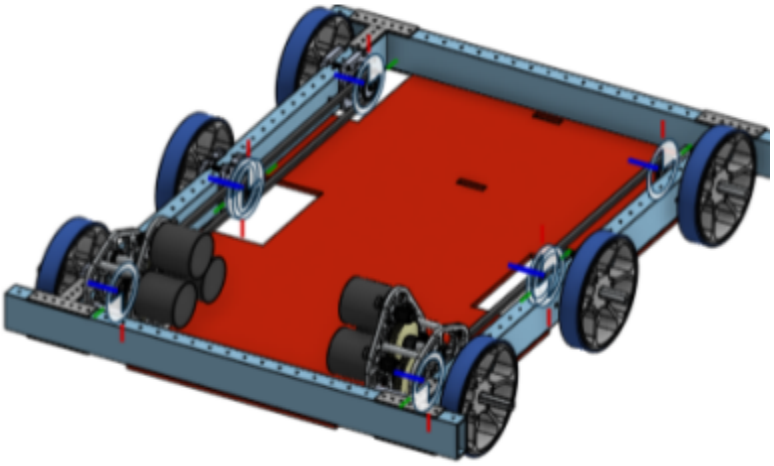


Robot Features:

- 6-wheel West Coast Drive (6 Neos, 11.25:1 gear ratio, 13.2 ft/s)
- Rapid intake with mecanum wheels for ball centering
- Close-range flywheel shooter for high or low hub
- Center balanced, tilting transversal climber

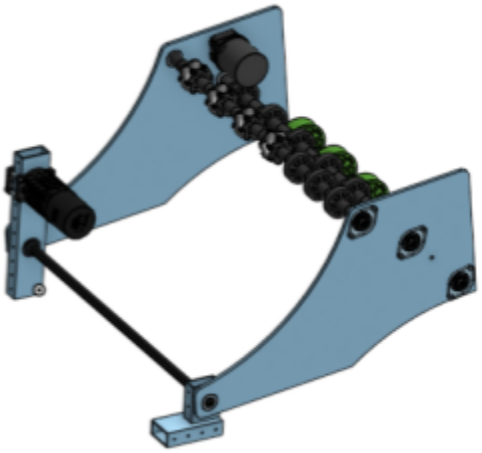
Drive Train

- Our robot runs a six wheel west coast drivetrain with a dropped center. It is run off of six Neos, 3 on each side. This tank drive allows us to accelerate quickly. It allows for our drivers to move around the field quickly while still being nimble enough to play defense or take a quick turn to pick up a ball. (11.25:1 gear ratio, 13.2 feet/s)



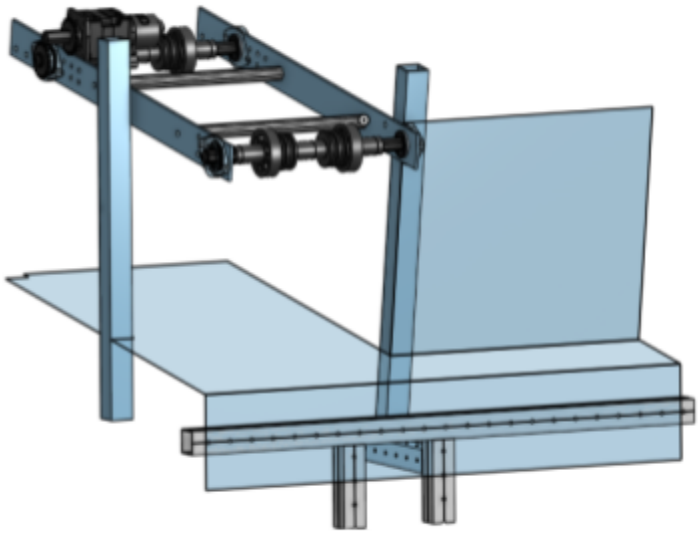
Intake

- Our intake uses squishy wheels to collect game pieces, then uses vectored wheels to push them towards the passthrough. This gives proper compression to intake them even if they have become deflated after repeated use. It is also made out of full polycarb, being able to take a punch when an opposing robot runs into us, bending back to place.



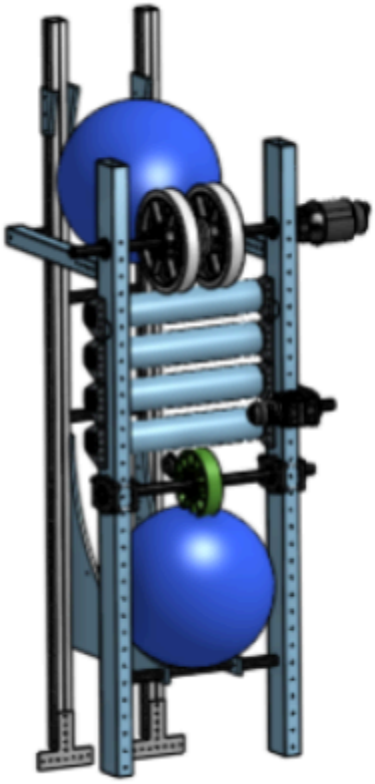
Indexer

- The indexer is polycord based. It grips the ball coming right out of the intake and pulls it to the shooter. It has been designed to fit in as small a space as possible while still being able to properly control a ball. It keeps balls from falling out while driving. It is also a color sorter. In the situation that our team picks up the other alliance's ball, when it is run backwards the ball is expelled from the robot.



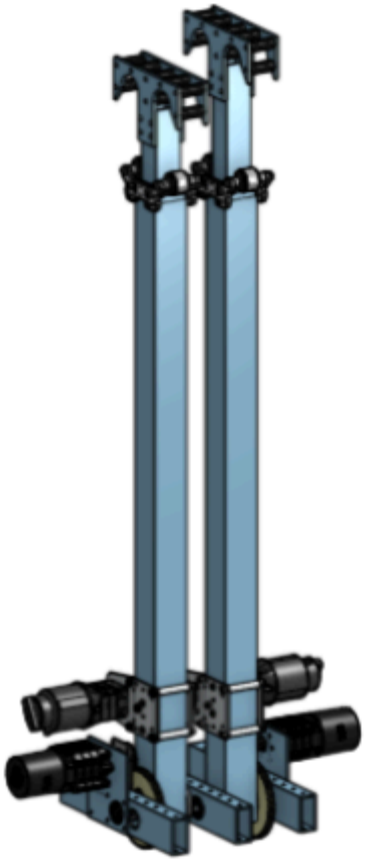
Shooter

- The robot's passthrough drives in-house made pvc spinners that are coated with grip tape in order to compensate for any variable in the ball's air pressure. These pieces are driven by one motor allowing for a constant and consistent spin to quickly bring the balls to the shooter.
- Shooter is a flywheel that we have put backspin on in order for the balls to not bounce out of the shooter. This does hinder our ability to shoot the long shot though so we have to shoot up close.



Climber

- Our climber is a center balanced, tilting, transversal climber. This allows us to climb to the highest bar from anywhere because we're able to stay balanced. The hooks and arms are released to grab on to a bar, then winched in to raise the robot. The other arm is tilted and extended to hook on. Using limit switches, our robot always tilts and lowers to the correct point, making for a constant climb. Then we winch up our second arm in order to pull the robot up higher and let go of the first bar. We then repeat these steps to reach the traversal bar.



Strategy

- In auto, our team shoots a high goal shot, then reverses to get the taxi points. We are able to start from anywhere in the tarmac, which gives our alliance partners the opportunity to run their autos and for us to still be able to make the shot.
- During the bulk of the tele-op period our drivers work to minimize cycle time to shoot as many high goal shots as possible. A major advantage is the fisheye camera which allows for a field view even when the robot isn't in the driver's eyeline.
- With 45 seconds left, we go to climb and because of our robot's balance we are able to climb from anywhere. This allows for our alliance partners to climb where they need to. The combination of points this allows not only gets us a higher likelihood of winning but gets us a ranking point.

CAD

- CAD was important to make sure measurements were correct and make sure all the mechanisms would work before they were actually constructed. It gave our team instructions. Since we are a first year team we had a lower budget and had to buy all new parts so CAD was important to finding what would work and what we needed

Trial and Error:

Building our robot this year required alot of trial and error and failing and improving. Here are some of our major pron=blems we encountered and how we fixed them.

Intake:

1.)Chain by nature loosens itself. Giving a ton of chain lag

Solution-We switched to pulleys because they will not stretch over time, never needing a cam of some sorts or a tensioner.

2.)The front support used to be made out of churro. This is a very flimsy material compared to a lot of materials but we went for it because it’s the only material we have being a rookie team. This also caused us to mess up the dimensions of the front,

Solution-We changed the front to steel shaft, for more protection and balancing out the intake.

3.)The starting design of the intake, the wheels weren't at the front. Not allowing us to pick balls right up the wall.
Solution-We put the wheels right up front, allowing us to pick them up easily.
4.)The wheels at the front were small and we had a west coast drive. Causing it to be a different compression every time you drive up the balls.
Solution-We added bigger squishy wheels, so we can have the right compression no matter how we go up the balls.
5.)We changed the indexer of the robot so the original intake couldn't work. Seeing that all of the balls needed to go to the left of the robot.
Solution-We added mecum wheels at the back row of the wheels, guiding the ball to the left. Making it run smoothly throughout the robot.

Indexer:
1.)The original version of the indexer was gravity, causing the balls to come down at random times.
Solution-We made a new version of the indexer where it would take the balls straight up to the shooter tower by polycord all across.
2.)The polycord would pop out of the pulley because of the low walls.
Solution-We CADed up the pulley with higher walls so they wouldn't pop out.
3.)The compression of the balls was off due to the balls constantly being at different inflations.
Solution- We had the simple solution of adding more compression by adding tape to add more compression, due to it being consistently inconsistent.

Drivetrain:
1.)The drive train motors got in the way of the climber when we first were designing the motors. (Being in the middle)
Solution-So we moved all the motors on the drive train to the front of the robot. So all the room in the middle could be given to the climber.
2.)The aluminum gears in the drive train would be getting stirpped over time. We saw this right after our second competition(Kansas City), switching to steel right away.

Solution-We switched to steel right away, being a tougher material. Being less likely to get stripped.

Climber:
1.)Whenever we tested our original climber, we saw a gear get chipped off. Finding out that gears can't handle that much torque under a lot of pressure.
Solution-Switching to chain right away seeing that won't get damaged over time.
2.)The rope would slip out of the metal extrusion we custom built.
Solution-We figured out the rope needed to be entered very exactly, needing just human practice.

Shooter:
1.)The compression of the balls was messed up due to balls being at very different inflation.
Solution-Adding a sheet of lexan on the top of the shooter to add more compression and to make it more consistent.
2.)The balls popping out of the shooter tower.
Solution-The simple solution of making our shooter at more of an arch causing the balls to pop out less. It was also solved by drive practice alone.