

## First Robotics Team 1257

Rize's Best-in-Class Z-Strength, Ink Marking Capability and Safe Process Help First Robotics Team Soar to New Heights

### CHALLENGES

FRC Team 1257 was challenged to play *FIRST Power Up*, which entailed building robots that placed boxes on scales in competitive events vs. other FRC teams.

### SUMMARY

FRC Team 1257 selected Rize One to safely print a functional pulley with an integrated sprocket and applied ink marking to indicate which chain students needed to use with the sprocket.

### RESULTS

- Labeling eliminated confusion and malfunction about which chain to use
- Robot collected 4 lb. boxes, moved across gym, lifted to full extension (18-inch. to 6.5 feet) in 3 seconds
- Max torque on motor/gearing was 60 ft./lbs.; can stall with no ill-effect
- Part used at 40 matches/practices

FIRST ([For Inspiration and Recognition of Science and Technology](#)) is a global, non-profit youth organization founded in 1989 to inspire young people to become science and technology leaders and innovators by engaging them in programs that build science, engineering and technology skills. The organization currently offers four programs, one for each of four age ranges, that support their mission.

One of these programs is the FIRST Robotics Competition for children in grades 9-12 that encourages teams of 25 or more students to build and program robots to perform a set of challenging tasks vs. competitive teams at local, regional and global levels.

Located in Scotch Plains, New Jersey, on the Union County Vocational Technical School campus, the 298 ninth- to twelfth-grade students at the Union County Magnet High School ([UCMHS](#)) learn how to solve problems using technology in a project-based, interdisciplinary educational environment. A highly competitive school, only one-third of students who apply for acceptance to the school are accepted.

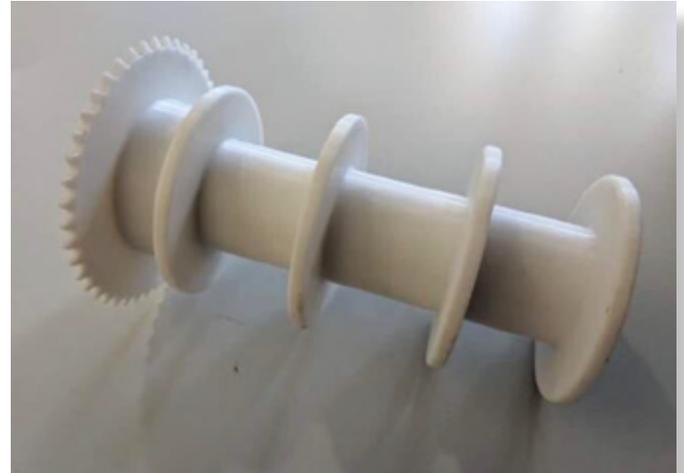
UCVTS' First Robotics Competition (FRC) [Team 1257](#) is comprised of 40 students from the Union County, New Jersey vocational district. They represent a blend of students in both college preparatory and traditional vocational programs. Jackie Gerstein, a technology teacher at UCMHS, where most of the FRC Team 1257 students attend,

is a faculty advisor and mentor of FRC Team 1257. She also focuses on the team's design, programming and electronics sub teams, while Jackie's husband Matt Hagan, 3D Print and Design Specialist at Merck, works with the team's build sub team.

## Rize Pulley Maximizes Efficiency and Performance

FRC Team 1257 had a new competition, or "game," to play in this year called FIRST Power Up, which entailed building robots that placed boxes on scales in competitive events vs. other FRC teams.

The team designed and printed a functional pulley with an integrated sprocket. The pulley/sprocket part was printed in one piece on a Rize™ One 3D printer to reduce the number of parts and minimize part assembly required. The part is operated with a cable. The chain turns the sprocket that is built into the drum of the pulley. Students wind and unwind the assembly to lift and lower the robot's elevator that holds the boxes.



*"We chose the Rize One 3D printer to print the part due to Rize's best-in-class Z-strength and ink marking capability"* said Jackie. "Labeling was printed directly onto the end of the sprocket part to indicate which chain the students need to use to use with that sprocket. This avoided any confusion and potential malfunction."

## Rize Pulley Lifts 18 Inches to > 6 Feet in 3 Seconds

Using the Rize 3D printed pulley/sprocket part, FRC Team 1257's robot successfully collected 4 lb. boxes, moved them across a gymnasium field, lifted them to full extension - from 18 inches to 6 feet 6 inches - in just 3 seconds. The robot stacked the boxes in a controlled manner to achieve whatever height the Team desired. Their record was 9 boxes placed in a single match.



The maximum torque on the motor/gearing combination is approximately 60 ft./lbs. and it can stall this with no apparent ill effect.

A testament to the unique best-in-class Z-strength of Rize 3D printed parts, FRC Team 1257 used the same part at 40 official matches, including the District Championship, and during practice sessions.

## Rize Materials and Process Ensure Student Safety

Nowhere is a completely safe, clean and easy-to-use 3D printer more important than with students. The Rize One desktop industrial 3D printer emits no VOCs and uses only safe and recyclable materials. Each component of Rize's Rizium One material is FDA USP Class VI Certified. Since Rize One requires zero post-processing of parts following printing, FRC Team 1257 can get their parts 2X faster than other systems, while eliminating messy and harmful solvents.

Said Jackie, *"Although the academic year is coming to a close, our Team never stops innovating. A Sophomore student is currently designing the next generation pulley/sprocket part that will be printed on the Rize One 3D printer."*