

of the Robot for self-rescue. Therefore, we decided that it would be more reasonable to place the cata-mechanism on the elevation mechanism.

Initially, our idea was to use a $12T:60T$ gear ratio for the cata-mechanism. However, this configuration took up too many space and couldn't fit inside the elevation arm. So, we tried using a 5.5 W motor with a $12T:36T$ gear ratio. After debugging, we found that the small motor couldn't effectively pull the rubber bands. Even after reducing the number of rubber bands, the throwing distance was still not far enough, and the speed cannot meet the expectations. Therefore, we changed the gear ratio to a $1:3$ plus $1:3$, totaling $1:9$ reduction. But during the debugging, the pulling speed was too low. And the Triball will fall too close. Later we tried $1:2$ plus $1:3$, but still failed.

After analysis, we found the main reason for the insufficient throwing distance was the hitting point of the Triball. Therefore, based on the $1:3$ plus $1:3$ gear ratio, we first tried creating a fixed support for Triballs. We install 2 long nut columns in front of the cata-mechanism and tied a rubber band in the middle, attempting to prevent the Triballs from slipping and hitting too low.

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