



Forklift Tie Rod Saves OEM Cost & Improves Service Life



CCTY Bearing manufactures high-quality bearings and assemblies, as well as unique solutions for OEM partners.

"Our engineering team goes beyond simply supplying a bearing to fit an application."

When customers are open to new design concepts, we work with them to find the optimal solution."

– Tracy Wei, Overseas Sales Manager

Executive Summary

When a forklift OEM provided samples for a tie rod quote, CCTY Bearing engineers took a look at the overall design. Based on knowledge from working with similar applications in the commercial truck industry, the engineers were able to improve the tie rods used in the steering mechanism.

Tie rods in forklift steering are traditionally metal-on-metal, which requires periodic re-greasing and leads to a shortened lifespan. They also include a coil spring and two cups behind the ball joint. CCTY Bearing's design utilized a metal on nylon, self-lubricating design that eliminated the need for cups and the spring – providing cost savings.

The Challenge

A current customer wanted to localize more components in their forklift and reached out to CCTY Bearing to supply a SPB and tie rod assembly. They were also open to design modifications.

Presented with an opportunity to improve the design of tie rods in a forklift steering application, CCTY Bearing's engineers knew that they had to provide flexible steering while maintaining overall truck stability and front suspension alignment.

Metal-on-metal linkage in forklifts is common. It is commonly a ball joint with steel bushings. This design uses a spring and two cups behind a ball joint to adjust the forklift's alignment angle.

The Solution

After a careful review of prints and parts, CCTY Bearing's engineers pulled from their experience working with industrial truck steering assemblies to incorporate longer life advantages into the linkage design.

CCTY Bearing's engineers focused on improving the connections with a self-lubricated, metal-on-nylon design. This arrangement allows for higher impact loads while eliminating the need for maintenance, as well as the spring and cups. It also provides:

- Improve stability during usage
- Lower steering torque
- Reduction in part vibration
- Lower cost

Once the design was finalized and passed internal tests, the forklift manufacturer ordered samples, and conducted field testing. After a year of intense testing, the OEM determined that the metal-on-polymer design was better suited for their needs.

"Since engineers with extensive bearing insight are part of the CCTY Bearing sales team, we are able to help customers vet ideas during all phases of engagement.

By working with customers from the start, we are able to find opportunities within the application to improve function and assembly."

-Dali Wang, Lead Design Engineer

The Results

For the past five years, the OEM has successfully used metal-on-polymer tie rods in its forklift steering application.

The CCTY Bearing solution proved to be a:

- Maintenance-free design
- Prolonged service life
- Cost advantage from the part reduction
- Smoother steering
- Streamlined approach to assembly

The client is enjoying reduced costs on its steering systems, while providing improved quality and product life.