Forklift Tie Rod

Reduces OEM Cost & Improves Service Life

CCTY

EXECUTIVE SUMMARY

When a forklift original equipment manufacturer (OEM) provided product samples for a tie rod quote, CCTY engineers took a look at the overall design. Based on their expertise from working with similar applications within the commercial truck industry, the engineering team was able to significantly 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 feature a coil spring and two cups behind the ball joint. Conversely, CCTY's design utilized a metal-on-nylon, self-lubricating tie rod design that eliminated the need for the spring and cups—providing significant cost savings.

> 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*

THE CHALLENGE

One of CCTY's current customers wanted to localize more components in its forklift equipment. The forklift OEM reached out to CCTY to supply a spherical plain bearing (SPB) and tie rod assembly, expressing an openness to recommended design modifications.

Presented with an opportunity to improve the design of the tie rods in a forklift steering application, CCTY's engineers knew they had to provide flexible steering while maintaining overall truck stability and front suspension alignment. It is common to see metal-on-metal linkages in forklifts, typically as a ball joint with steel bushings. This standard design uses a spring and two cups behind a ball joint to adjust the forklift's alignment angle.

> Because engineers with extensive bearing knowledge are part of CCTY's 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 SOLUTION

After a careful review of all prints and parts, CCTY's engineering team pulled from their combined expertise working with industrial truck steering assemblies to incorporate longer lifespan advantages into the linkage design—focusing on improving the connections with a self-lubricated, metal-on-nylon design.

This new and improved arrangement allows for higher impact loads while eliminating the need for maintenance, as well as the spring and cups. In addition, the new design provides:

- Improved stability during usage;
- Lower steering torque;
- Reduction in part vibration; and
- Lower overall cost.

Once the design was finalized and passed internal tests, the forklift OEM ordered several product samples and conducted field testing. Following a full year of intense testing, the manufacturer determined that the metal-on-nylon tie rod design was much better suited for its needs.

THE RESULTS

For the past five years, the forklift OEM has successfully used the new and improved metal-on-nylon tie rods in its forklift steering applications. Because of CCTY's expertise and ingenuity in its recommended design modifications, the manufacturer saw several key results:

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

The forklift OEM is continuing to enjoy a significant cost savings on its steering systems, as well as improved quality and product life.

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