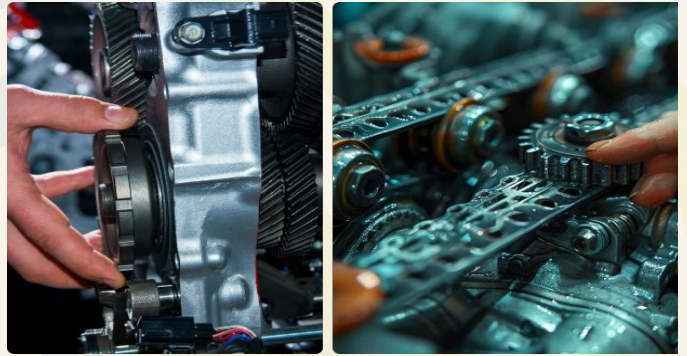


## Case Study

### PRECISION MANUFACTURING FOR HIGH-PERFORMANCE GEARBOX ASSEMBLY IN NEXT-GEN EVs



## Background

A leading automobile manufacturer sought to develop a high-precision automotive component, but faced constant challenges with component accuracy and supply chain efficiency. The company was doing cutting-edge innovation for a crucial component in their upcoming next-generation electric vehicles (EVs) - a high-precision gearbox assembly.

The assembly not only required exceptionally tight tolerances but also needed to deliver robust performance under dynamic operating conditions. The launch date of the EV was set. Given that this was an order for an assembly line production automobile component, we had to deliver an economical and scalable solution under strict deadlines, while meeting stringent tolerance limits.

## Identifying the problem

A gearbox is the component that undergoes the most wear and tear in an EV. This meant we had to solve multiple challenges. Firstly, the need for high durability and precise performance over long periods necessitated the development of a custom material blend.

Additionally, the component design involved intricate geometries that were challenging to manufacture within the required tolerances. This meant we had to design a complex supply chain, coordinating with multiple suppliers for raw materials within precise timelines.

Finally, as the client expected a rapid production ramp-up post-launch, the processes and systems had to be resilient and scalable within a short time frame.

## Our Solution

As a global manufacturing leader with facilities across India, Vietnam, Mexico, the US, and Europe, we stepped in to address these challenges.

**Manufacturing:** Our state-of-the-art manufacturing facilities across the globe allow us to employ a large variety of manufacturing techniques. To meet the tight tolerance limitations of the gearbox assembly, we utilized state-of-the-art CNC machining and precision forging to achieve the complex geometries and tolerances required.

**Materials:** We collaborated with material science experts to develop a new custom alloy that provided the necessary durability and performance required for a lifetime of operation without fatigue or failure.

**Prototyping and testing:** Rapid prototyping was employed to quickly test and refine the design, followed by rigorous testing to ensure the components met all operational requirements. This was an iterative process, meaning every part went through multiple rounds of redesign, testing, and evaluation before being finalized.

**Supply chain:** We implemented a streamlined supply chain management system that integrated suppliers into a single platform, enhancing coordination and reducing lead times by 30%, significantly reducing overall project timelines for the client, and paving the way for a timely launch. We also successfully scaled production capabilities to meet the launch schedules of the automobile manufacturer's EV line.

## Insights for automobile manufacturers

Cars are made on assembly lines, and assembly lines don't ever stop, except for maintenance. This makes Just-in-Time inventory control the most economical approach to minimize costs and maintain continuous production.

What this also means is that the distance and lack of support and communication between user and supplier are common pain points in today's globally integrated supply chain. Ideally, you would like to have end-to-end visibility of all parts in transit in real-time, and this is the value Zetwerk's integrated logistics brings to the table.

With our teams readily available in the US for immediate support, we were able to offer a holistic solution to this OEM's problems.

Zetwerk's US presence with multiple facilities and 250+ employees in the US helped instill trust in our capability to deliver as per their required timelines and at their doorstep.

Every step of the way, we have strict quality controls, and the customer is kept updated on the development of each part on a real-time basis, thus adding transparency and reliability to the whole process.

Consequently, the client reported exceptional satisfaction with both the product quality and the project execution, leading to an expanded partnership with Zetwerk for future models.

## The Zetwerk Advantage

The successful development of the high-precision automotive component by Zetwerk highlighted the company's capability to address complex manufacturing challenges through innovative solutions. This project demonstrates Zetwerk's position as a top supply chain partner for automotive OEMs.

The success of this project underscores the value Zetwerk brings to customers. By addressing pain points, offering precise manufacturing solutions, and innovative materials science, we provide a seamless transition for customers seeking new product development. Our comprehensive approach ensures that you don't just get the part you ordered but also a well-oiled ecosystem to sustain and scale production.

When you work with Zetwerk, you get:

- ⦿ Manufacturing capabilities spanning multiple continents
- ⦿ Seamless transition and diversification of supply
- ⦿ An expert team that identifies and solves problems
- ⦿ Local support with manufacturing facilities and warehouses
- ⦿ A solid, reliable partner, with financial stability and an impeccable track record
- ⦿ State-of-the-art manufacturing units capable of delivering cutting-edge products