



NTN-SNR TAKES WHEEL AND TRANSMISSION BEARINGS INTO THE NEW GENERATION WITH A MORE COMPACT DESIGN

Hybrid and electric vehicles are bringing a new set of architectural constraints to running gear designs. As electric vehicles continue gaining traction in the automotive market, car manufacturers are under greater pressure to up their game and overcome these new challenges. Heavier axles are a prime example. At the same time, the axial dimensions of electric motors and reduction gearboxes are also rising. Manufacturers may respond to such changes by resizing the wheel/CVJ assembly, but this approach has the side-effect of reducing the vehicle's steering angle.

Aware of the specific constraints facing hybrid and electric vehicles, world-leading aftermarket manufacturer NTN is currently working on a new design for a more compact wheel and CVJ transmission bearing assembly that both protects and improves running gear performance.

Gaining a clear insight into the technical challenges associated with how the bearing width affects the vehicle's performance was a game-changer for the project's success. The design for the new wheel bearing heralds a real technological breakthrough and can be credited to the close working relationship between the Group's different entities. In particular, NTN-SNR Annecy brought its wheel bearing expertise to the table, while the NTE teams in Le Mans shared their leading-edge knowledge in transmission systems. The Group drew strength from its skilled workforce - one of its key competitive advantages - to redefine the interface between the bearing and the transmission, which is usually inaccessible. During the project, NTN-SNR masterminded a number of solutions to the many technical constraints with electric vehicles. The Group drew on every ounce of its expertise in mechanical design to guarantee a bearing whose service life and rigidity would satisfy the market's requirements.

After spending several years focusing its efforts on improving the steering angle, NTN-SNR has extensive experience in reducing the axial dimensions of the assembly between the wheel bearing and the transmission. However, the length of the transmission shafts, which is governed by the width of the powertrain, also plays a decisive role with

a direct influence on the turning radius. With manufacturers constantly changing the architectural designs for their vehicles, especially for their electric cars, NTN-SNR set itself the ambitious objective of trimming 40 mm off the wheel bearing width. By significantly reducing the axial dimensions to improve the turning radius for this new breed of vehicles, NTN-SNR will open up the realm of possibilities for its customers when designing vehicle gear trains, while keeping one technological step ahead of the competition.

The project aimed at developing a more compact axial design was spearheaded in 2016 as part of the company's in-house collaborative innovation structure (Créa Lab) and involved several of the company's departments. From organising creativity sessions to identify a concept through to producing the first prototypes, the entire bearing development chain took part in designing the innovation.

The company's research efforts culminated in two new architectures for wheel and transmission bearings. The first architecture improves the axial dimensions by 35 mm, which will increase the steering angle by up to 3°. The prototype was completed late 2020 as part of a collaborative effort between the Iwata factory in Japan and the prototyping department at the Annecy factory, and

has been undergoing trials since January 2021. There are plans to present this latest innovation to potential customers before the summer of 2021. It will also be unveiled in June at Automotive TechDAYS, an international event aimed at showcasing the expertise of the automotive and transport industries in the Auvergne Rhône-Alpes region.

This new bearing is designed for dedicated EV platforms. Many manufacturers are currently developing a range of electric vehicles. The width of their electric drivetrain severely impedes the steering angle. When used on small cars, regardless of whether they are powered by an electric motor or petrol engine, this new bearing ensures an extremely low turning radius, which is paramount to improving the vehicle's handling.

Patents have already been prepared and filed for the design and architectural rules and the seal for this new breakthrough bearing. The bearing's new geometry changes the seal position and diameter. The larger seal is now positioned around the transmission and provides more room for expansion, which heralds a range of innovative possibilities. To minimise the risk of increasing the friction torque, new architectural designs have been created.

For more than 100 years, NTN-SNR has been proud of its ability to stay ahead of the innovation curve and pioneer the technologies of tomorrow's world. That is why the Group is open to the prospect of sharing licences for this new bearing, just like it did when marketing the ASB bearing, which has since become a new benchmark for measuring wheel speed.

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