1. Introduction
Equi’Auto is the largest Automotive Aftermarket Show in France. It takes place every two year in Paris.
The promotion of innovations useful for aftermarket is one of the priorities of Equi’Auto, with the “Grand prix internationaux de l’innovation”. This challenge awards gold, silver & bronze trophy, in 5 categories.
NTN-SNR attended the show, with a stand to exhibit the range of NTN-SNR automotive products dedicated to aftermarket.
NTN-SNR applied for the “Grand prix internationaux de l’innovation” with the presentation of a light weight wheel hub, in the category of ‘OEM & new technologies’.

2. Structure of Press Connected Spline (PCS) hub joint with aluminum centering
The innovation presented by NTN-SNR is a Press Connected Spline Hub joint, developed by NTN, with an aluminum wheel & break disc centering developed by NTN-SNR.

Compare to a standard solution, the mass of the wheel hub & CVJ assembly is reduced by 21.2%, with 18.2% by PCS & 3% by aluminum centering.
This solution has been applied on a Renault demonstration vehicle called ‘Eolab’ that achieve a mileage of 2L / 100km.

3. Detail explanation of aluminum centering
The target of aluminum centering development is to save mass, but also to simplify the manufacturing of the hub. The hub is easier to forge, and the small splines of PCS are possible to manufacture with a standard process (the tool can pass through).
The geometry of the aluminum centering has been optimizing by FEM with two criterias:
1) Stay below 170 MPa of stress in the aluminum under the axial load of the nut due to tightening, to be able to use low cost aluminum for mass production.
2) Keep the displacement in the centering area below 5 microns.

4. NTN-SNR award
With an attendance of more than 95,000 visitors, and the presence of 1,400 exhibitors (who 60 % of international), EQUIP automobile 2015, who is kept from 13 till 17 October, confirmed its position of international, essential meeting in France.
The “Grand prix internationaux de l’innovation” exists since 1985. The jury consists of more than 60 journalists, from more than 20 countries.
The NTN-SNR presentation to the jury explained the advantage of this innovation: CO2 emission reduction, mileage increase, noise reduction, and also the possibility of easy maintenance by the short length of the CVJ spline.
The jury awarded NTN-SNR for this innovation, with the silver trophy.

5. Summary
Press connected Spline Hub Joint & aluminum centering is a solution to answer automotive market demand. This product also demonstrates the strength of NTN group, with, on one hand, the possibility to propose improvements on both the wheel hub & CVJ, and on the other hand, the common input of both Japan & France R&D center.
NTN-SNR will continue to promote Press connected Spline Hub Joint & aluminum centering to European car makers.

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EQUIP AUTO 2015 INNOVATION AWARD

Press Connected Spline Hub Joint

Sebastien GUILLAUME Claire BIANCHIN

NTN-SNR ROULEMENTS Automotive business unit R&D - Wheel bearing
NTN-SNR ROULEMENTS Automotive aftermarket communication

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