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[O] THE NTN-SNR GROUP PARTNERS' MAGAZINE

N°11

MARKETS 03

NTN-SNR INNOVATES
IN MONITORING

AROUND THE WORLD 06

RUSSIA: AN AMBITION
FROM THE COLD

INNOVATION 11

RENAULT EOLAB
AT THE TIME OF ULTRALOW
CONSUMPTION





An international presence at the service of customers

In 2014, our performance in the areas of automotive, aeronautics and industry contributed to the growth of our aftermarket and distribution activities. A success to the credit of the international dimension of the Group.

NTN-SNR continues to strengthen its R&D expertise and its commercial and industrial presence in its area of responsibility, to meet the requirements of markets and anticipate their needs. Our strong position in the NTN group also allows access to technical and industrial capacities worldwide. We thus give ourselves the means to develop our ranges towards greater competitiveness, reliability and quality.

This ambition has emerged in recent months through several major launches, such as the marketing in Europe of a «premium» range for machine-tools designed in Japan (see p. 10), or the expansion of a range of bearings for gearboxes (p. 8). Our innovations in monitoring (p. 2) and our contribution to the development of a low-consumption motor at Renault (p. 11) also illustrate the importance of R&D with this double culture.

We are satisfied, dear customers, to have you as the first beneficiaries of this unique positioning. We will obviously continue to do so in 2015, to provide you with new solutions, particularly in emerging markets where we are strengthening our presence (p. 4 and 6). You can count on the enthusiasm and commitment of all employees of NTN-SNR.

Alain CHAUVIN

Executive Officer, Managing Director of Europe & Africa regions, President and CEO NTN-SNR Roulements



INDUSTRIAL MAINT NTN-SNR inn

NTN-SNR has developed an operational status monitoring technology for rotating machines, easy to deploy and suitable for low speed operation. Discovered at a preview at the Hanover trade show, in April 2015.

At the Hanover trade show, from 13 to 17 April 2015, NTN-SNR presented several innovations in the field of mechatronics and monitoring of industrial systems. The most ambitious is a Condition Monitoring System technology (monitoring of the operational condition), intended for rotating machines. «The objective is to monitor the ageing of bearings and surrounding components to detect any defects for predictive maintenance and management of industrial assets,» says Sébastien Brisson, Industry innovation manager at NTN-SNR.

FEWER SENSORS

Classical in form – an acquisition box installed on the machine to be monitored - the technology developed by NTN-SNR engineers requires fewer sensors. «Two acquisition points were enough, where it would have taken six with a conventional device,» says Hervé Lénon, Innovation and Mechatronics manager at NTN-SNR, about a test carried out on a wind turbine. In a multishaft system, the number of measurement points can thus be reduced by two thirds. A result obtained by combining a new dynamic



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The NTN-SNR monitoring technology was developed with the collaboration of numerous industrial customers - steelworks, paper mills, quarries, etc.

AN ENTIRE MECHATRONIC RANGE

Besides monitoring, NTN-SNR has developed, with its TMR (Tunnel Magneto Resistance) magnetic measurement technology, more compact sensors, designed to be integrated into bearings or standalone. These compendiums of intelligence measure in particular absolute angles and high resolution speeds from a passive or active target.



Already tested in numerous sectors. And yours?

The low speed monitoring technology of NTN-SNR was successfully tested for several years in the railway sector (axle bearings), on wind turbines and in the steel industry. NTN-SNR now manages partnerships and is seeking to develop others, all sectors combined - cement industry, quarries, mines, papermaking, pumps, etc. - to demonstrate the contribution of its solution.

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ENANCE ovates in monitoring

approach of mechanisms, latest generation sensors and innovative processing algorithms, adapted to the nature of each installation.



LOW SPEEDS

Another virtue of these devices: their ability to carry out multi-parameter analyses on low speed rotating assemblies - in the order of 5 rpm - and generally, under conditions where the «standard» vibration analysis has its limits. «Our technology makes the best of significant speed variations or strong vibration disturbances. It thus meets unsatisfied requirements,» emphasises Axel Rocher, MRO marketing and Industry Services manager at NTN-SNR.

SIMPLIFIED DEPLOYMENT

Fewer sensors to be installed, which means a simpler and more economical installation. Another factor facilitates the deployment: the box adapts itself to a wide variety of com-

munication protocols. It can transmit its data directly on the Intranet, by GSM network to a smart phone or else by radio frequency to an Ethernet router connected to the company network.

It is also available in a completely standalone version without connection to the mains or an Ethernet socket. Through the use of low power components and with a data transmission every 30 seconds, it has a service life of three years.

OPTIMISED MAINTENANCE

Adapted to harsh environments and designed for remote monitoring, this NTN-SNR technology opens new perspectives for maintenance managers in several sectors: cement industry, mines and quarries, papermaking, railways, wind farms, steel industry. «It allows, for example, to monitor rolling mill bearings that operate in extreme conditions», says Pierre Maurin, MRO and Services Sales manager for major industrialists, NTN-SNR France and Benelux.

AERONAUTICS

LEAP engines: NTN-SNR demonstrates its capacities



NTN-SNR has gained the confidence of Snecma (Safran) to produce line shaft bearings for LEAP engines, designed for new single-aisle aircraft.



The LEAP range will equip particularly Airbus A320 neo.

NTN-SNR REWARDED AS SUPPLIER FOR CFM56

In March 2014, NTN-SNR received the Snecma «supplier» prize for the mass production of bearing housings for CFM56. This award certifies full compliance in terms of quality and respect for delivery deadlines over a long period.

In April 2014, NTN-SNR was entrusted by Snecma with the mass production of line shaft bearings for engines of the LEAP range, which will equip the single-aisle Airbus A320 neo, Boeing B737 MAX and Comac C919 aircraft. «*This allocation is the culmination of almost five years of investments,*» explains Quentin Brac de la Perrière, NTN-SNR sales engineer in charge of the Safran account.

From 2010, NTN-SNR has set up a strategic development team dedicated to this project. Thus, in late 2011, the first bearing housings on prototype «demonstrator» engines were

delivered. Then, in 2012, NTN-SNR won the first tender for the manufacture of «development» and «compliance» prototype bearing housings of the LEAP-1B engine (the «Boeing» version).

INDUSTRIAL CAPACITY

With an outside diameter of up to 420 mm, the bearing housings of the LEAP line shafting are much more complex in their shapes and materials than their predecessors of the CFM56 engine. Some of them were notably equipped with a structural cage integrated into the outer ring to provide dynamic flexibility to the engine. Finally, Snecma evaluated, with its LS2R (Leap

Supplier Rate Readiness) approach, the ability of NTN-SNR to support the production launch of the LEAP engine – 200 to 300 specimens in 2016 to almost 1900 in 2020. The industrial transition with its predecessor, CFM56, will actually be the fastest in aeronautics history. «*We have demonstrated our ability to control complex processes with very low tolerances on large dimensions,*» says Quentin Brac de la Perrière.



ROMANIA

A third production unit

On 10th October, last year, NTN-SNR inaugurated a third production unit at its Rulmenti site, in Romania. The extension of 10 000 m² increases to 27 000 m² the total operating area of this plant, specialised in the manufacture of transmissions and gearboxes (100,000 specimens per day). Investment amount: 20 million Euros.



Trierra employs 250 persons and generates annual sales for all brands combined of almost 13 million Euros.



TRIERRA

The essential cog in Bulgarian industry

Since 1999, NTN-SNR has been relying on the vast Trierra distribution network to supply premium bearings for key sectors of Bulgaria's industry and automotive aftermarket.

Trierra, Bulgaria's number one bearing distributor, operates from its headquarters in Plovdiv in the south of the country. «*The company created a warehouse there and stocks about 70% of our standard references,*» points out Léonard Ntirushwa, NTN-SNR business manager for the region. Trierra, which in addition operates over 15 other warehouses throughout the country, also owns 60% of the biggest Serbian bearing distribution company VTL and 50% of the Ukrainian company Rolimpex.

THE PROMISING AFTERMARKET

NTN-SNR's main customers are the country's mines and quarries, Bulgaria being a country rich in minerals (in particular copper, zinc and gold), large producers of industrial equipment, the power generation and farming sectors. Most orders relate to maintenance operations. «*Given the economic situation, our customers keep fewer spare parts in stock,*» stresses

Trierra Chairman and CEO Ivan Rusev. «*So we have to be quick off the ball to avoid breaks in production. Presently, we are capable of delivering the most common bearings in 2-3 days. Special orders can take a week.*»

Trierra, which has 250 employees, generates an annual turnover of 12.95 million Euros all brands combined (70% industry and 30% automotive). The distributor makes no secret of its ambitions to increase its market share alongside NTN-SNR in the mining sector, as well as in the food-processing industry.

INCREASING THE AWARENESS OF LOCAL COMPANIES

In approaching prospective new customers, Trierra insists on the importance of choosing excellent quality bearings. «*The subsidiaries of Western groups want mainly premium bearings because they are looking for a quality and safety guarantee. But that is not yet the case with all Bulgarian companies,*» explains Ivan Rusev, who enjoys visiting customers with NTN-SNR.

This initiative comes as no surprise to Léonard Ntirushwa: «*Trierra is one of our most serious and active partners in Southern Europe. With its excellent knowledge of the market, it really adds value to our products.*» Trierra also offers

«**Our customers keep fewer spare parts in stock. So we have to be quick off the ball to avoid breaks in production.**»

Ivan Rusev, Chairman and CEO of Trierra

its customers assistance and monitoring services - provided by technicians who are themselves trained in NTN-SNR expertise.

TRIERRA IN BRIEF

- ◆ Began activity in 1992
- ◆ No. 1 on the bearings market in Bulgaria and no. 3 in the Balkans
- ◆ 7550 m² of warehouse space at various sites in Bulgaria
- ◆ 250 employees
- ◆ Annual turnover: 12,95 million Euros in 2014 (12.16 million Euros in 2013)



With its 17 million km², Russia has the largest rail network in Europe.

RUSSIA

An ambition from the cold

With the setting-up of a sales subsidiary in Russia, NTN-SNR has new ambitions on a market in search of solutions capable of withstanding extreme weather conditions.

On 8th October, last year, NTN-SNR inaugurated in Moscow its Russian sales subsidiary in the presence of about hundred invitees, officials, customers and local partners (see photo). The opportunity to formalise an effective establishment for several months now. «*We opened our subsidiary in February 2014*», recalls Thierry Vallet, director of NTN-SNR Russia. Covering an area of 230 m², the Moscow offices are the anchor for 12 Russian-speaking employees deployed in the field.

This expanded organisation is a milestone in

the strategy of the French-Japanese group, present for 10 years in Russia. «*These new investments will allow us to sustainably support the strategic sectors in this region of the world*», assures Thierry Vallet.

NTN-SNR's ambition matches up to the potential of local markets: Russia has the second largest automotive fleet in Europe, it is also a country with a strong industrial sector, particularly in the mining, steel and petroleum industry. Finally, it is has the largest rail network in Europe - the great distances promoting «rail» more than road development. «*We offer advanced technologies, services and maintenance solutions in all these key sectors*», says Thierry Vallet.

INDUSTRY: RELIABLE SOLUTIONS AT -50 °C
NTN-SNR Rus has put itself at the service of the

local industry. While the company already supplies the biggest names in the steel industry in Russia, Ukraine, Kazakhstan, it also strengthens its activity with those involved in mining (mines and quarries). The NTN and SNR brands have strong arguments: starting with the new SNC bearing housings in ductile cast iron, capable of withstanding extreme Siberian subsoil temperatures (up to -50°C!), or the range of ULTAGE EF800 spherical bearings that meets the most demanding applications.

Same standards in the railway industry (read O'mag no. 9, pages 2-3) for which NTN-SNR provides bearings equipped with seals developed from a polymer that retains all its properties at extreme temperatures. «*We are already delivering axle bearings for the Moscow metro and look forward to developing further on the rail passenger market: some products are also*



NTN-SNR inaugurated its Russian sales subsidiary in Moscow last October.

1

From left to right:
 Éric Malavasi, Director of Automotive Aftermarket and Distribution Logistics NTN-SNR;
 Thierry Vallet, Director of NTN-SNR Rus;
 Hervé Brelaud, Vice-President, Director Industry Europe NTN-SNR;
 Tatsunobu Yasui, Vice-president of NTN-SNR

2

From left to right:
 Pierre Touvier, General manager Sales Asia & Eastern Europe ;
 Leonid Nerezov, Head of Automotive Aftermarket Department, NTN-SNR ;
 Andrey Galydbin, Commercial Director of Publishing house ;
 Valeria Kulikova, Marketing Manager and Sales support, NTN-SNR ;
 Oleg Ivanov, Director of Publishing house ;
 Pavel Sorochinskiy, Business Development and Technical support, NTN-SNR ;
 Anton Khokholov, Senior Marketing Manager, NTN-SNR

« We offer advanced technologies, services and maintenance solutions in all these key Russian sectors. »

Thierry Vallet, director of NTN-SNR Rus

in the process of approval with manufacturers and Russian authorities,» says the director of NTN-SNR Rus.

AUTOMOTIVE: NTN-SNR LEADER

Finally, in the field of automotive bearings, NTN-SNR Rus intends to strengthen its status as leader in the original equipment market - it supplies the largest Russian automotive manufacturer in particular - and spares as well. A supremacy that was confirmed in September 2014 by the prize of the «*best overseas supplier of automotive parts in the bearings category*», awarded by a group of local users and distributors.

Then why stop there: «*We will develop our range*

of spare parts, both for European vehicles, preferred to the West of the Urals, as well as for Japanese vehicles, more present in the East of the region,» says Thierry Vallet. In parallel, the Group aims to strengthen its presence in the East of the country, an area that has a high growth potential. «*We will extend our network of distributors in order to cover the entire territory,*» he concludes. NTN-SNR thinks big to satisfy its customers.



NTN-SNR received the award for the best overseas supplier of automotive parts in the bearings category.



REPLACEMENT OF DAMPER PULLEYS

Integrated hardware for 33 references

A first compartment for the pulley, a second one for the hardware: the Damper kit groups together in the same box all parts to be changed when replacing this element severely strained by the engine. «Too often, only the crankshaft pulley is changed, whereas the screw may also have been damaged: with our two in one formula, the professional eliminates the risk of breakage», explains Jérémie Cardoso, product manager. Marketed since June last year, the Damper kit concerns the 33 Damper pulley references whose hardware is subject to high angles and tightening torques. We recall that the NTN-SNR catalogue has a total of 183 «Damper» models. Enough to cover most of the European and Asian markets.

BEARING PULLERS

The BBPS 10-100 kit, flagship of a new range

Removing a bearing from a blind plummer block with ease, this is possible thanks to BBPS 10-100 from NTN-SNR. This new mechanical puller model includes 3 shafts, 28 arms and 22 rings in a case. The operator can intervene on a broad spectrum of ball bearings (from 10 to 100 mm bore diameter). The extraction is effortless with a crank that is lodged on the device head. NTN-SNR thus completes its range of pullers, already enhanced with three other kits in 2014: BPES 10-105 (separator with mechanical spindle), BP S and 5-44 and 44-100 (extraction by the bore). «Our models are among the easiest to use on the market», says Olivier Hautreux, Experts & Tools products manager.



This kit has 59 parts dedicated for extraction (8.4 kg for the assembly).

GEARBOXES

300 bearing references

From 180 to more than 300 references: NTN-SNR has considerably extended its range of single bearings for gearboxes. Hyundai, Honda, BMW, Mercedes, PSA, Renault, Fiat, etc.

The new catalogue, published in October, proposes original bearings for most of the worldwide manufacturers. « We have integrated the NTN products with the existing SNR range: this combination allows us to meet the requirements of the booming market for the renovation of gearboxes,» says Lucie Rellé, product line manager at NTN-SNR. In its new on-line and printed versions, the catalogue features a search engine by box codes, bearing dimensions, product references (NTN and SNR) and manufacturers.



AUTOMOTIVE AFTERMARKET

Soon, all technical information on-line!

Some time in 2015, the technicians will find on a website, all the information essential for the use and mounting of NTN-SNR bearings on vehicles that they maintain.

Every day, professionals worldwide handle not less than 5000 different references of NTN-SNR spare parts during vehicle maintenance or repair operations. A web portal, called TechCenter, will soon give them access – in nine languages* – to all information useful to facilitate and optimise the use of our products.

«Professionals of the automotive aftermarket and the independent mechanics will thus directly benefit from the technical expertise of our teams. A service enriched around the spare part!», says Christophe Espine, marketing director Automotive aftermarket, NTN-SNR.

SUPPORTING THE ENGINEER

Centred on the range of bearings used in engines, chassis and transmissions, TechCenter will provide mounting/removal instructions for all vehicles, as well as technical bulletins and maintenance data. This information will be accessible by brand and vehicle model, by car type (KTyp, KBA, etc.), or directly by NTN-SNR product references.

«Our products are becoming more technical. Some – such as wheel bearings – are key to the safety of vehicles or particularly sensitive, such as accessory bearings, etc., underlines Christophe Espine. TechCenter is designed to support the engineer, help him save time and identify failures and allow him to perform quality repairs using quality parts.»

STRENGTHENING THE DIALOGUE

In the process of deployment and internal testing at NTN-SNR, TechCenter will be progressively made available to the spare part



The TechCenter lists more than 5 000 parts and provides technical guidance to professionals.

network and mechanics during 2015. «We want to be sure to provide a tool in which the mechanics will find their interest, specifies Christophe Espine. This is a first step in a broader effort to increase the quality of dialogue with our customers.»

* French, English, German, Italian, Spanish, Dutch, Polish, Russian, Portuguese

LOYALTY

NTN-SNR joined «First Class», the loyalty programme initiated by NGK, world leader in spark plugs. At every purchase from one of the five partners (NGK, Mann Filter, Philips, NTN-SNR, Exide), the mechanics accumulate loyalty points and become eligible for various gifts. There already are 5 000 of them to choose from in France. An additional way for NTN-SNR to strengthen the relationship with its customers.

To know more: www.ngkfirstclass.fr



INDUSTRY

Machine tools: «Super Precision» arrives in Europe

With two proposed series, NTN ULTAGE Super Précision covers a wide dimensional range.



REQUEST FOR THE CATALOGUE

Are you looking for information on NTN ULTAGE Super Precision? Request for the catalogue. NTN-SNR also publishes an educational brochure about universal associations and equivalence tables of the range.

TECHNICAL DATA SHEET

- ▶ High precision series 7 000 and 7 900
- ▶ Contact angles 15° and 25°
- ▶ Normal light preload
- ▶ Single universal combination
- ▶ Precision level P42

Since October, NTN-SNR has been marketing in Europe high performance bearings for machine-tool spindles. A premium range, known as NTN ULTAGE Super Precision, from the Japanese market, where it has been established for several years.

NTN ULTAGE Super Précision, the range of high performance bearings developed in Japan, appears, since October in the NTN-SNR catalogue in Europe. Good news for the high precision machine tools industry. «*It is a leading range in Japan, as original equipment as well as spare. By its performance, it matches standards of excellence expected currently in the European industry*», explains Fanny Martins, Machine tools market manager at NTN-SNR.

ULTAGE DESIGN

The 98 models of the range – single row angular contact ball bearings – combine the characteristics of the ULTAGE quality label of NTN-SNR: purity of the steel, optimised design, high axial load capacity and high rotation speed (up to 1.9 million N.Dm). «*The capacity-*

speed pair determines the effectiveness of the spindle's work», affirms Fanny Martins. A performance without compromising reliability: the bearings have a moulded polyamide cage designed to optimise lubrication. Two innovations, the tapered bore and grooves made in the cage pockets facilitate the circulation of the air-oil lubricant on the one hand, and the retention of grease on the other. And reduce as much overheating!

A TARGETED AND ADAPTED RANGE

NTN ULTAGE Super Précision covers a wide dimensional range, with two series – 7 000 and 7 900 – available in bore diameters of between 10 and 130 mm, as well as in two contact angles (15° and 25°). «*That is approximately 60 % of the demand in Europe on machine tools*», says Fanny Martins. The

range is proposed in single universal pairing, which enables to carry out all types of combinations.

REACTIVITY THROUGHOUT EUROPE

From the NTN-SNR European logistics centre of Saint-Vulbas, near Lyon (France), the Customers are supplied in a few days. The reliability and responsiveness of the service have already convinced several major distributors in Europe, particularly in Germany. «*For spares as well as original equipment, the suppliers have the opportunity to propose products reserved until recently, to a specialised industry at the other end of the world,*» she concludes.



In the same perimeter, all of the EOLAB bearings and transmissions weigh 4kg less than the reference vehicle.

RENAULT EOLAB

At the time of ultralow consumption

The hybrid prototype EOLAB heralds a consumption of 1 litre for 100 km. A feat that NTN-SNR is associated with, thanks to ultralight solutions of wheel and transmission bearings.

Average consumption on standardised cycle: 1 litre for 100 km! With its future hybrid low-cost EOLAB, featured in late September at the Mondial de Paris, Renault fun car went one step forward in its race to sobriety. Extremely lightweight chassis and structure, aerodynamic, optimised, hybridization, etc. To reduce weight and improve the performance of its prototype, the manufacturer has used hundreds of innovations. Some of which are signed by NTN-SNR, the only group worldwide to propose wheel as well as transmission bearing solutions. «Renault seized this opportunity: in January 2013, it asked us to look for solutions with 25% lower weight for these two product categories,» explains Sébastien Guillaume, project manager.

1 KG SAVED PER BEARING

For a year, the engineers of the Exploration team hounded every superfluous gramme: reduced part thickness, additional drilling and machining, etc. « For the front end, we have also designed an aluminium nose piece, mounted on the bearing,» says Sébastien Guillaume. The bearings are equipped with cera-

mic balls used in aviation, as well as optimised seals. The prototype is finally benefiting from an innovative system for the link between the bearing and the transmission, using the PCS Hub Joint technology developed in synergy with the NTN teams in Japan and in Mans.

Early 2014, the parts were delivered and the objective achieved: at constant scope, the bearings-transmissions assembly weighs 16.7 kg, as against 21 kg on the reference vehicle. Net gain: 1 kg per bearing. Better: « We have also reduced the frictional torque, particularly from 1 Nm to 0,7 Nm for the front end*,» exclaims Sébastien Guillaume. «Our contribution has

enabled to reduce by 1% the CO₂ emissions of EOLAB with respect to the best current series solutions»

Renault envisages an industrialisation of the vehicle in 2020. NTN-SNR, on its side uses several innovations from the EOLAB project for future developments

** Each Newton-metre gained leads to a lowering of the consumption comparable to 10 kilogrammes less over the entire vehicle.*

« A VERY POSITIVE COLLABORATION »

« The specifications were opened and NTN-SNR was able to bring forward proposals: we were quickly reassured about their ability to achieve the objectives. The solution proposed for mounting the rear wheel has enabled us, in particular, to save several kilos on peripheral components. To start with, it is a very positive collaboration. Some technological bricks will soon also be provided on a Renault platform. »

Vincent Lavillunière,
Ground link designer, Renault EOLAB



Reducer
support
bearing

How many bearings are there on a hydraulic excavator?

A tracked hydraulic excavator requires about fifty bearings for its basic operation (travel and rotation). Irrespective of its size and its use (earthwork, mining, demolition), it is made up of a crawler track chassis topped with a superstructure including the engine, hydraulic components (pump, motors, cylinders), the driving cab and the attachment (arm, boom, dipper, bucket).

Travel

The two track sets are each driven by a planetary reducer **1** using 2 angular contact ball bearings or tapered bearings - for supporting the reducer - and 14 needle roller bearings - for planet gears. 32 bearings are thus necessary so that the machine can move.

Swing

The superstructure pivots 360° thanks to a slewing ring of about 1.50 m diameter fixed on the straight truck chassis and a hydraulic motor or a planetary reducer. This includes 12 needle roller bearings for the planet gears and 2 spherical roller bearings for the shaft support **2**. These are the 14 bearings that thus contribute to the swing of the superstructure.

Note that the plain bearings **3** equip the various joints located on the boom, the dipper and the bucket.