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Innovation, precisely for the environment

FILE
Eco-Conception





A new quality standard in the industry

As part of our Strategic Plan we aim to achieve at least half of our turnover in the "original equipment, excluding automobiles" industry which currently accounts for a third. As you will discover in this issue of

O'Mag, the NTN-SNR group is already very present in the aeronautics, railway, wind farm, iron and steel and robotics industries as well as agricultural and construction machines, mines and quarries. The group has also become the main supplier of world-famous industrial groups such as Caterpillar, John Deere and Arcelor-Mittal.

In order to satisfy the quality and reliability requirements of industrial stakeholders we strengthened our leadership position by launching the ULTAGE label in 2013. This establishes a new performance standard in terms of load resistance, rotation speed and service life.

We have many other achievements to be proud of: with almost 35,000 references we offer the widest range of standard bearings on the market as well as thousands of specialist products. Over twenty plants ensure our products are available worldwide. Not forgetting our expert teams that are dedicated to each of these markets and that assist our customers and anticipate their needs.

Performance, proximity and professionalism are the three pillars of this strategy aimed at making NTN-SNR the preferred supplier to the stakeholders in the industry. I am certain we will come up to the mark!

Patrick DESIRE
Industry Distribution
and Emerging Countries
Vice President



NTN-SNR, which is committed to over 40 railway transport projects worldwide, is investing in innovation and new production capacity to help this sector expand.

The railway industry has been untouched by the recession: according to a survey conducted for the Association of the European Rail Industry (UNIFE) the market has grown by around 2.7% each year. NTN-SNR is even forecasting growth in double figures for business in this sector in 2014. "There are such economic and environmental challenges around mobility issues that transport projects remain a priority for the authorities", explains Francis Travostino, Manager of the Railway Sector at NTN-SNR.

OVER FORTY PROJECTS WORLDWIDE

The group is committed to over forty projects worldwide including a high-speed railway in Saudi Arabia, regional trains in the UK, a tram lines in Toronto, Basle and several Chinese cities, and an underground network in Moscow. The group is active both as a supplier of original equipment for the main manufacturers in the market – Bombardier, Alstom, Siemens – and as a partner to the operators in maintenance operations. "We are making long-term commitments: up to 30 years after the lines are brought into service", says Francis Travostino. In this sector NTN-SNR achieves 75% of its growth outside France: it is reaping the benefits of its international development strategy. A network of expert salespeople is deployed in over twenty countries in Europe, North America

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RAILWAY BEARINGS

International development on the right track

and Asia. "In recent years we have increased our presence in the field while continuing to invest massively in our production and innovation capacities."

SPECIALISED PRODUCTION CENTRES

In 2011 NTN-SNR invested 14 million euros in building a new 1,500 m² plant in Seynod (Haute-Savoie). This plant produces a range of axle, transmission and motor bearings, which are also manufactured on two of the group's other sites in Annecy (Haute-Savoie, France) and Turin (Italy). "We develop customised items for each project depending on the chassis – called 'bogies' in the trade – and the conditions in which they will operate" (see text box).

Two hundred thousand bearings were manufactured in these three plants in 2013. And each new reference was approved on one of the test benches of the R&D centre in Annecy: NTN-SNR is one of the few bearings manufacturers authorised to perform this regulatory obligation itself. "This enables us to be far more responsive in test phases, which may take up to six months" adds Francis Travostino. The group is also developing a quality policy in compliance with various international standards: it already has IRIS (International Railway Industry Standard) certification and has started applying for German HPQ (Manufacturer-related product) and Russian GOST (State commercial and industrial standards) accreditation.

PRODUCT AND SERVICE INNOVATION

With over 40 years' experience in the railway sector (see text box) NTN-SNR is maintaining its technological advances, particularly in the mechatronics sector. Latest innovations: a system that diagnoses the level of bearing wear and integrated sensors that measure temperature and speed. "These technologies help improve safety and reduce maintenance costs", says the Manager of the Railway Sector.

There is also innovation in the services provided to operators: the Experts & Tools training offer (see O'Mag No. 8) has just been extended to include the replacement of railway bearings. NTN-SNR experts go to the operators to train their engineers and technicians to assemble and dismantle bearings as part of maintenance operations. A unit is also available dedicated to renovating bearings, giving detailed explanations of lubricating techniques. "This satisfies our customers' need to be independent" concludes Francis Travostino.

NTN-SNR is strongly committed to development in the railway sector and plans to double its bearings offer by 2018.

PART OF THE HISTORY OF HIGH-SPEED TRAINS

NTN-SNR participated directly in the rail speed record that was broken in 2007 in France by a TGV (high-speed train) (574.8 km/h). In Japan the group remains associated with the 1964 commissioning of the Shinkansen, the local high-speed train the commercial speed of which was recently increased from 210 to 320 km/h.



UP TO FIVE MILLION KILOMETRES

A railway bearing weighs between 30 and 35 kilos and is designed to last for between three and five million kilometres. Its technical properties – shape, materials, lubrication – vary mainly according to the axle load and speed. In a metro train or tramcar it bears an average load of 12 tonnes at a speed of 80 km/h. These figures may be as high as 22.5 tonnes and 180 km/h for a regional train and 18.5 tonnes and 350 km/h for a high-speed train. The lubrication and sealing system level are adapted to withstand external attacks by pollution, snow, mud, sand, etc.

KUHN

A successful collaboration with the giant in the agricultural machinery sector



For over 40 years NTN-SNR has manufactured bearings for Kuhn, the world leader in agricultural machinery. At the heart of this special relationship is a shared enthusiasm for quality and innovation.



In 2012 KUHN produced and sold over 60,000 agricultural machines (ploughs, seed drills, balers, mowers, etc.) in over a hundred countries. The company, which was founded in Alsace in 1828 and which is the world leader in its sector, has doubled its turnover in the last six years to over one billion euros. This expansion has been nurtured by innovation with 100 engineers dedicated to R&D – out of a total of over 4,000 staff – and 1,600 patents filed. *"We have been ploughing the same furrow for over a century: reliable, long-lasting, innovative machines that are perfectly in line with farmers' needs"* says Jean-Christophe Haas, Manager of Communications at KUHN. The company expects the same level of commitment to quality and innovation from its suppliers. As far as bearings are concerned, KUHN has placed its trust in NTN-SNR for forty years.

LONGER SERVICE LIFE

This trust is based primarily on our capacity to manufacture reinforced bearings that are suited to the specific uses and demanding conditions of agricultural work – soil, dust, humidity, heavy loads, etc. *"We consider longer service life and reliable quality of the bearings to be a major asset"*, says Sébastien Meyer, purchasing coordinator at KUHN. For example NTN-SNR produces the TwinLine model for KUHN, which is integrated in their mowers. *"The TwinLine bearing, which was developed out of the automobile sector, provides an excellent technical basis that was modified and brought up to meet the level of requirements of KUHN mowers"*, says Jean-Michel Hee, Manager of Agricultural Sales at NTN-SNR.

SMART AGRICULTURAL MACHINES

Another factor in added value: innovation. *"Particularly the capacity of our main suppliers to remain one step ahead of technological progress, to be proactive"* says Sébastien Meyer. KUHN and NTN-SNR rely on their 40 year relationship of trust in order to make progress together. *"We meet the KUHN staff once a month to review current projects and plan for any requirements"* explains Jean-Michel Hee. This is also an occasion to discuss smart agricultural machinery that makes full use of onboard electronic resources. *"This is a major area of our R&D and one of the keys to meeting the significant increase in food demands"*, concludes Jean-Christophe Haas.

CENTRAL EUROPE, SCANDINAVIA

Distributor conventions to focus on growth

Several regional conventions brought together NTN-SNR distributors in 2013 to strengthen partnerships, spot opportunities, launch new products, etc. Over twenty partners attended the conventions in Krakow (Poland) from 17th to 19th June for the central European sectors and in Copenhagen (Denmark) on 16th October for the Scandinavian countries. These events, which are coordinated by our local commercial staff, attract experts from head office who come to present a number of innovations such as the ULTAGE-high-performance industrial bearings (see article p. 8). "These products, which have increased resistance and are longer lasting,



make us more competitive in the mining, iron and steel, wood and paper industries" explained Bjorn Sundin and Kim Jeppesen, NTN-SNR sales representatives for the Northern countries. "Whether for automobile spares or

in industry, NTN-SNR boasts many assets in central Europe: we are aiming for 30% growth per year" said Jaroslaw Rudzinski, NTN-SNR Manager of Poland.



FENASUCRO EXHIBITION IN BRAZIL

Meeting the sugar industry

Created in 1995, the Fenasucro exhibition in São Paulo (Brazil) has become an unmissable event for professionals in the sugar industry. The 2013 exhibition, which took place from 27th to 30th August, drew industry players from some forty countries. As usual the NTN-SNR team was fully mobilised, welcoming no less than 1320 visitors to its stand, where they were able to discover our new products and services and in

particular the new ULTAGE range. "Our customers are in contact with our distributors throughout the year. Fenasucro is a special opportunity for meeting them face to face", stresses Tiago Boldt, NTN-SNR marketing assistant. From harvesting to processing via refining, the sugar industry is highly mechanised, and therefore a strategic sector for NTN-SNR in Brazil.

AERONAUTICS

First contract with Rolls-Royce

The engines of Airbus A350 XWB will be equipped with NTN Corp bearings. This is the result of the sales agreement signed at the Le Bourget Air Show in June 2013 with the Rolls-Royce engine manufacturer. The agreement is for the supply of bearings for the Trent XWB engine that powers the future long-haul Airbus. The A350 XWB, which had its first test flight last June, is due to be brought into commercial service by the end of 2014.

This first contract with Rolls-Royce acknowledges the aeronautical expertise of NTN Corp., which is now one of the main engine manufacturers in the sector. NTN Corp. boasts two industrial aeronautics sites with NADCAP* accreditation: one in France, in Argonay (NTN-SNR) and another in Japan, in Kuwana (NTN). The parts intended for the Trent XWB will be manufactured by these plants.

* National Aerospace and Defense Contractors Accreditation Program

BURJ AL ARAB HOTEL

Dubai



DESTINATION MIDDLE EAST

An industrial sector driven by major infrastructure projects

By opening an office in Dubai in early 2013, NTN-SNR clearly stated its objectives in the Arabian Peninsula. In addition to the port and oil infrastructures, sectors such as the manufacture of materials and transport offer genuine potential in terms of industrial maintenance.

To strengthen its presence in the Middle East NTN-SNR opened an office in Dubai (United Arab Emirates) in spring 2013. The aim is to eventually have a staff of five: "The fact of being on the ground makes it easier to grasp the market requirements and to give our distributors in the region effective support" explains Michel Peltier, Sales Manager at the Dubai office.

CONSTRUCTION MATERIALS

The development opportunities for NTN-SNR lie mainly in industrial installation maintenance. Even though oil and gas may be the economic driving force behind the region, other sectors also provide openings. This is true of suppliers of construction materials used on the main work sites (see text box). "Saudi Arabia has no less than 10 steelworks and 30 cement works. And each Emirate has its speciality. Fujairah, to the east, for example, focuses on mining and quarry work" added Michel Peltier. The region also includes several manufacturers of aluminium (Dubai, Emal, Aluminium Bahrain), some of which is used in construction.

The Middle East is also continuing to develop its transport and logistics infrastructures. Saudi

Arabia is currently building over 1,400 kilometres of railways, including a very high-speed line between Medina, Jeddah and Mecca. "These projects will generate considerable demand for spare parts for rolling stock" emphasised Michel Peltier. The port centre in Dubai, which was created in the 1970s, has become a regional commercial hub and the eighth largest port in the world in terms of number of containers. "Our ranges include bearings that are highly suited to maintaining these infrastructures: cranes, bridges, elevators, etc.", says Michel Peltier.

RELIABILITY

The on-site staff have very definite priorities: to help the distributors defend the quality of NTN-SNR bearings in the face of competition from



**NTN-SNR AND INDUSTRY
IN THE MIDDLE EAST**

NTN-SNR is currently concentrating its development in the Middle East on industrial maintenance in the Arabian Peninsula. The two countries with the greatest potential in this area are Saudi Arabia and the United Arab Emirates. The commercial zone also extends to Bahrain, Egypt, Kuwait, Qatar, Iraq, Iran (currently under an international embargo) and Oman.



**DPETRODOLLARS TO FINANCE
MAJOR INTERNATIONAL EVENTS**

Taller, bigger, more audacious... since the 1990s the countries in the Arabian Peninsula have multiplied large-scale developments as part of the shift in their economy towards tourism and commerce. The iconic Al-Faisaliah Tower and Kingdom Tower in Riyadh (Saudi Arabia), Burj Khalifa Tower (828 m – the highest in the world), Burj Al-Arab Hotel and artificial Palm Islands in Dubai to name but a few.

The countries in the area are increasingly committed to organizing events on an international scale featuring new infrastructures. Dubai will be home to the 2020 World Expo and Qatar will host the World Cup in 2022.

low-cost products from emerging countries. "Local manufacturers are very keen on the reliability of European and Japanese products", added Michel Peltier.

NTN-SNR supports distributors on the ground when they visit customers and prospects, giving them technical expertise and sales documentation. "Simple things that our competitors sometimes overlook" says Michel Peltier. The staff also organise conferences attended by 100 to 150 people, both distributors and customers, to discuss quality, maintenance and lubrication in the presence of technical experts. "This type of American-style event is very fashionable here. It's very interactive, you can meet players in the sector who are given a great deal of useful information", concludes Michel Peltier.

In recent months NTN-SNR has already had three successes in the region in several sectors, namely procurement contracts for replacement bearings with Qatar Petroleum (drilling and extraction), Dubal (aluminium manufacturing, 5,000 staff based in Dubai) and Drydocks (naval maintenance in the Port of Dubai).





ULTAGE®

Performance that exceeds all expectations

With longer service life, increased load capacity, reduced maintenance costs, the ULTAGE range of spherical roller bearings creates a new performance standard for industrial applications in extreme environments.

In May 2013 NTN-SNR launched ULTAGE, a new range of spherical roller bearings intended for the most severe environments of the industry (iron and steel, transmissions, cement works, paper mills, mines and quarries, etc.) to replace its Premier range "With the ULTAGE range we have taken a major step forward in improving equipment performance and productivity, withstanding high temperatures and severe vibration levels" says Yann Genty, Product Manager at NTN-SNR.

The optimised dimensions of Ultage bearings mean it has one of the best load capacities on the market as well as being very compact. It also stands out due to its high rotation speed and low energy and lubricant consumption. The use of extremely pure steels together with

heat treatments that ensure dimensional stability up to 200°C result in service life that is twice as long and reduced maintenance costs.

UP TO 650 MM BY 2016

With bearings of between 52 mm and 420 mm external diameter, the ULTAGE range meets most of the sector's needs – "the label will be extended to 650 mm by 2016" says Yann Genty. It also includes sealed bearings for applications that must prevent seepage from pollution, such as elevator transmissions. ULTAGE bearings can be assembled directly in SNC plummer blocks, which are optimised to improve vibration resistance and incorporate the Ready Booster single point lubricator.



A 'house' software for calculating the CO₂ impact of bearings

Dylico₂ is the name of an innovative software developed internally by NTN-SNR that has been in use since May 2013. "It accurately measures the impact the various bearings have on the CO₂ emissions of a vehicle. And, for example, to simulate the carbon footprints of a car depending on the models of bearing used" explains Marc Paquien, innovation project leader at NTN-SNR and the designer of Dylico₂. For car manufacturers the software is an innovative, valuable source of

information. Considerable financial, commercial and environmental issues are at stake in reducing CO₂ emissions from exhausts. "It is currently the main issue in automobile R&D" says Marc Paquien. Dylico₂, which is currently used on an individual basis at the request of the NTN-SNR design offices, has therefore stirred up great interest. Many manufacturers have requested appointments either for a specific presentation of the software or to have it included in current projects. In order to



strengthen bonds with customers there is nothing better than turning one of their major challenges into added value.



AUXILIARY BELTS

A new range of 700 references

Since 2013 NTN-SNR has marketed a complete range of auxiliary belts, which are sold individually. The catalogue includes over 700 references including trapezoidal, multi-v and multi-v stretch, etc. which cover 96% of the automobile range. "We have intentionally limited the tolerance of the length of our belts to ensure a high level of reliability" says Christophe Espine, Marketing Manager for automobile spare parts. For optimal mana-

gement of the catalogue, the referencing incorporates four items of information: product type, number of grooves, belt type and length. Distributor customers are also entitled to sales assistance resources. With this offer NTN-SNR is widening its current range of accessories – rollers, kits, dampers and pulleys for alternators – on the spare parts market.

AUTOMOBILE SPARE PARTS

NTN-SNR defends original quality

For the third year running NTN-SNR is participating in the "Elige calidad, elige confianza", campaign organised in Spain to promote brands that guarantee original quality in independent automotive aftermarket. Sixteen original equipment manufacturers, suppliers that provide manufacturers with original equipment, are taking part: ATE, Bosch, Brembo, Dayco, Gates, Hella, KYB, Mann, NTN-SNR, Philips, SKF, Textar, TRW, Valeo, Varta and VDO. The aim is to make distributors, and through them garage owners and their customers, aware of the advantages of choosing premium-brand spare parts. "We want to help consumers opt for quality and

trust in full awareness of the facts" said José Manuel Sancho, Manager of Automobile Spare Parts at NTN-SNR Ibérica.

The campaign is not limited to Spain. In France NTN-SNR communicates on original quality through humorous ads in the press. The group belongs to several professional associations of original equipment manufacturers (FEDA, FIGIEFA or VREI in Germany) or garage owners (FNAA) that organise campaigns in many countries, as well as the World Bearing Association that fights infringement. NTN-SNR is also very aware of the "Right to Repair" approach which promotes original quality, particularly in the United States.

NTN-SNR
Empresa miembro de la iniciativa

Elige
calidad,
elige
confianza



PEUGEOT 208 HYBRID FE

The environment-friendly town car with GTI performance

Peugeot and Total presented a town car with outstanding characteristics at the Frankfurt automobile trade fair: the 208 HYbrid FE. NTN-SNR contributed to the project by developing a new wheel bearing concept.

Combining pleasant driving and eco-friendliness: this was the challenge Peugeot and Total took up with the 208 HYbrid FE, a "Technological Demonstrator" presented last September at the Frankfurt automobile trade fair in Germany. This urban hybrid vehicle, which is equipped with a three-cylinder, 1.2 litre, 68 h.p. engine and a 30 kW electric engine, boasts surprising performance: it consumes 1.9 litre/100 km, emits 46 g of CO₂/km – half as much as a 208 1.0 VTi – and can accelerate from 0 to 100 km/h in 8 seconds – virtually like a 208 GTI!

NEW CONCEPT

To achieve these staggering results the Peugeot Sports staff who led the project put their experience with car racing to good use. The 208 HYbrid FE weighs 20% less than a standard production model, despite the hybrid engine and battery (25 kg, total 40 kg of electric hybrid system). The modifications to the bodywork and the use of cameras instead of rear-view mirrors improve its aerodynamic coefficient (SCx) by 25 %.

Peugeot and Total entrusted NTN-SNR with the bearings. "For the 208 HYbrid FE we developed a wheel bearing concept which reduces weight by between 0.5 and 1 kg per wheel depending on the knuckle design" explains Vincent Pourroy-Solari, Automotive innovation manager at NTN-SNR. This new concept also offers an optimised internal design to reduce friction and reduce assembly time. For the 208 HYbrid FE the bearing is fitted with ceramic balls, similar to certain products intended for racing cars or aeronautics. Total also contributed by developing a new lubricant designed to reduce friction.

2 %* LESS CO₂ EMISSION

The NTN-SNR engineers also used their expertise in the choice and assembly of standard bearings equipping the gearbox, camshaft and high-pressure fuel pump. Lastly, NTN Transmissions Europe (NTE), a subsidiary of the NTN group, supplied two reduced-weight transmissions specially designed for the 208 HYbrid FE. NTN-SNR managed to reduce the overall weight of the vehicle by 6.6 kg. "Consi-

dering the reduction in weight and friction, our contribution results in 1.7 to 2.8 g less CO₂/km depending on the reference in question. That's the equivalent of 2% emissions by a 208 standard production model" explains Vincent Pourroy-Solari.

Participation in this unusual project created a unique opportunity for NTN-SNR to test new innovative solutions that will eventually result in new products.

* estimated value.



OBJECTIVE - 4 %

An energy saving plan inspired by the Seynod 3 workshop

NTN-SNR launched an energy saving plan in 2011. The approach, from diagnosis through to continuous measurement, is tested in the Seynod 3 workshop (France) and then deployed throughout the group's plants. 2013 objective: a 4% reduction in consumption..

In 2011 NTN-SNR adopted an overall approach to energy saving. "Several local initiatives have been taken in the last ten years. We have changed gear by adopting a formal methodology to be implemented in all the plants" explains Jean-Hervé Bulit, NTN-SNR Environment Manager.

This means we faced considerable challenges. The energy consumption of the NTN-SNR plants – electricity and natural gas for production purposes and to heat the premises – is equivalent to a French town of 21,000 inhabitants at a cost of around 10 million euros a year.

ENERGY DIAGNOSIS

The Seynod 3 site (near Annecy, France) where 115 staff work producing automobile bearings was chosen as a "laboratory" for this energy saving plan. "The size and modern equipment in the plant mean that it concentrates many of the characteristics of our production workshops in the world" says Jean-Hervé Bulit. In 2011 an energy diagnosis was performed in the plant to measure consumption accurately and assess the impact of the various improvements that might be envisaged.

The diagnosis was used as a basis to draw up a list of operations to be conducted in each plant: adjust the need for compressed air with the latest compressors, use of variable speed driven pumps to alter the lubricant flow, mapping the temperatures in the workshop to manage heat production. Implementation of the various operations in 2012 on French sites reduced the group's energy costs by 2%. In 2013, 129 campaigns were launched in all the group's factories (France, Italy, Romania, Brazil) with the aim of reducing consumption by 4%.

ASSEMBLY MODULE
NTN-SNR Seynod production site



DETECTING ANY DRIFTS

The Seynod 3 workshop remains one step ahead. In early 2013 it was equipped with an Energy Management and Information System (EMIS) that monitors the individual consumption of each item of equipment – furnaces, boiler, compressor – and buildings. The system measures the savings made, detects drifts over time, analyses consumption according to workload and temperatures for the purpose of future improvements. "Systems of this type are used on the group's other sites" says Jean-Hervé Bulit. They will eventually be used to manage the workshops, taking into consideration energy consumptions in real time.





How many bearings are there in a wind turbine?

Over 20,000 wind turbines are brought into service each year. These enormous machines, which can be over 100 metres tall, operate using wind... and around fifteen ball bearing units.

Most of them equip the "multiplier" **1**, that increases the speed of the blade rotation: there are ten or so with a diameter of between 30 and 70 centimetres. The two bearings of the generator **2**, which transform the mechanical movement into electricity, can measure as much as thirty centimetres.

With the bearings of the main shaft **3**, which holds the blades, everything is on a monumental scale: the parts are often over 1 metre in diameter but may be over 3 metres on very powerful machines. Wind turbines also use four slewing rings, which are very similar to bearings – NTN-SNR produces them in its factory in Korea. Three of the rings **4** direct the blades according to the wind direction and the fourth connects the nacelle to the pillar **5**. The nacelle on certain wind turbines in the sea may measure over 4 metres in diameter!