

HEAVY

NOKIAN HEAVY TYRES' CUSTOMER MAGAZINE

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nokian
HEAVY TYRES

TRUSTED EXCAVATOR OF WATERWAYS

➤ At a worksite, an excavator operator must have a clear vision of where and how to excavate. **Sami Anttila**, who has been working at Juho Krekola Oy for nine years, has a clear view of the job.

– You need to consider the most purposeful order of excavating.

Where should you start and how should you proceed in order to achieve the best possible results, and to carry out the work in the easiest and most economical way, Anttila analyses.

– You need to consider the shape and structure of the terrain, the effects of the ground freezing, and other related features.

Anttila is the trusted excavator for the local waterworks. Most of his working days are spent travelling around the Seinäjoki region with the water utility workers. Excavation is related to renewing connections as well as finding leaks. During the year, Anttila also does some other work for his employer, such as excavating foundations for single-family homes.

He uses a wheeled Liebherr excavator type 316, a 16-tonne machine that he is very familiar with. The excavator is equipped with Nokian Armor Gard tyres of the size 10.00-20.

– In my work, the sturdiness of the machine's tyres is the most important feature. These tyres from Nokian are definitely sturdy enough. They are also extremely durable, says the excavation industry professional.

The words of Anttila, who is in his thirties, have weight behind them, as he has already driven many types of tracked and wheeled excavators.

– I was first trained as an electrical technician, but I have since taken a course that qualifies me to work as an earth moving machine operator. And I also drove an excavator during my military service, he adds.

BEHIND THE WHEEL	Sami Anttila
WHERE	Seinäjoki, Finland
WHAT	Earth moving
MACHINE	Liebherr 316 KKHP
TYRES	Nokian Armor Gard 10.00-20



We wish fluent operations for our customers

Marketing Manager Juha Lehtinen from Vianor, what are the benefits for the customer from the close co-operation between Vianor and Nokian Heavy Tyres?

First of all, it means uninterrupted work. We control the entire process, starting from raw material procurement and product development, so that we are able to provide our our customers with an uninterrupted work process and professional service.

Can a tyre ever be perfect?

No, but it can be optimal for its purpose. Here, everyone is committed to meeting the needs of difficult working conditions. We receive feedback regarding the tyres from our customers that are doing the work.

Operating experience received from our customers helps product development people to take the actual operating conditions into account more accurately.

What does operating experience tell you?

Customer feedback clearly tells us that the tyres we have developed for the difficult Nordic conditions are better and more cost-effective under any conditions. Valuable working time must not be wasted. The livelihood, and even occupational safety, of our customers depends on us to keep our promise.

You need to achieve maximum output from your machine, and the operator receives the most information from the terrain through the tyre.

NOKIAN HEAVY TYRES LTD is one of the leading manufacturers of special tyres in the world. In the forestry tyre segment, it is the world market leader. The product range also includes various special tyres for agricultural, industrial, harbour and mining use. All products feature high quality and durability, as well as innovative solutions developed as the result of development and testing conducted in close co-operation with customers. Nokian Heavy Tyres is known for its professional, flexible service – the best in its field.

Nokian-branded tyres are known for their high quality, which users experience as numerous effective hours of use and flexibility of work

under demanding conditions. The long-term co-operation with leading machine manufacturers has generated solid know-how and a thorough understanding of the customers' needs and various conditions of machine usage.

Apart from the products, the comprehensive partnership is also tested in the field. We are where our customers are – in the forest, on the field, at the harbour – and we continuously develop our service concept to better respond to our customers' needs.

Nokian Heavy Tyres Ltd is part of the Nokian Tyres group.



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Beyond All-Steel Radial strikes rock



Taking the tour where it belongs Under actual worksite conditions

You can, of course, polish a tyre for display, but when push comes to shove, you need to be where the landscape is dominated by mud, dirt, sand, and stone.

Last spring, Vianor and Nokian Tyres, together with Liebherr Finland, Sisu, and Vehoc organised a joint promotion tour for earth moving professionals. Each day, the tour visited different worksites or quarries. The entire family of Nokian off-road products was on display. The tour allowed earth moving professionals to study the new machinery, and the new Nokian tyres developed for professional use, under actual conditions.

– Usually, the machines and tyres are only on display. Now, the customers were able to drive and try out the machines and tyres. The tyre and machine are clearly meant to work together, and presenting them separately would be difficult, says Marketing Manager **Juha Lehtinen** from Vianor.

– The feedback from the tour has been very encouraging. The performance of the Liebherr wheeled loaders and the Nokian Loader Grip 3 tyres was demonstrated beautifully at the sand quarry filled with slushy snow. Together with our customers, we noticed that there is very little sway, and that the tyres have excellent grip even under poor weather conditions.

You really need to visit the customer on site, as it is useful – especially for the customers, but also for the manufacturers of machinery and tyres.

– The livelihood of the contractors depends on us keeping our promises. A tour always includes marketing, of course, but the topic is serious, says Lehtinen.

A tested and true new introduction

The Nokian Loader Grip 3, tailor-made for demanding earth moving, is a safe choice. The sharp tread pattern and strong, two-star body structure of the tyre ensure that grip is



All of the off-road product family

- The events of the Vianor-Liebherr tour presented the new OTR products from Nokian Heavy Tyres and Nokian truck tyres, for example.
- One of the products making a positive appearance was the Nokian Loader Grip 3, a special tyre for wheel loaders that has a block pattern and offers stable, precise handling.
- Also present were the latest additions to the Nokian Tyres summer tyre range: Nokian Hakka Blue and Nokian Rotiva AT.
- The tour featured experts who answered the customers' questions regarding tyres and provided further information concerning tyres and their characteristics.



maintained and the material keeps moving. The easily cleaning tread pattern of the new tyre also improves grip.

The optimal design of the block pattern and shoulder area guarantees the right size and shape of contact surface for the tyre. This manifests itself in the excellent traction. Protective ribs on the rugged sidewalls add to the reliability. The DSI wear indicator easily displays the thickness of the remaining thread. ■

✍ Miika Kaukinen

New Nokian Loader Grip 3 Effective hours for earth moving

The Nokian Loader Grip 3 is a block pattern special tyre especially aimed at wheel loaders. The wide contact surface and strong construction of the tyre provide stable, precise handling. The open lateral and longitudinal grooves on the tyre effectively remove soil from the surface. The natural rubber based special compound ensures durability and grip on soft gravel, as well. The sturdy steel frame construction and steel belts below the tread ensure many usable hours.

– The block patterned Nokian Loader Grip 3 is especially suited for earth moving in demanding locations. The sturdy All-Steel Radial structure ensures excellent durability. The abrasion guard effectively protects against cuts and bruises in rocky terrain, says Product Development Manager Martti Päivinen.

The wear indicator allows you to easily monitor tyre wear.

The direction of rotation is not specified on the new Nokian Loader Grip 3 special tyre. ■

Nokian Loader Grip 3

- Sturdy All-Steel Radial structure – stable even under demanding conditions
- Abrasion guard effectively protects against cuts and bruises
- Tread wear indicator

The right tyres can turn an electric car into an ice racer Our inspiration: 252.09 km/h on ice

Test driver **Janne Laitinen** from Nokian Tyres reached a speed of 252.09 km/h (156.67 mph) in the E-RA electric car on the ice of Lake Ukonjärvi in Inari, Finland. The record, achieved on 17 March by the world's northernmost tyre manufacturer and the Helsinki Metropolia University of Applied Sciences' high-tech E-RA (Electric RaceAbout) vehicle, is unique.

The relentless grip and stable handling that are necessary at extreme speeds were ensured by Nokian Hakkapeliitta 7 studded tyres (225/40R18).

– Testing in demanding conditions forms an



Powered by a 280-kW electric motor, the E-RA electric car reached speeds of over 260 km/h (162 mph) in the freezing weather.

essential part of our winter tyre development. The co-operation in the E-RA project is a great way to gain new experience and continue our progress at the peak of development. This is a true source of inspiration for developers of tyres, whose greatest challenges include optimising the safety characteristics and low rolling resistance, which greatly affect the range

of electric vehicles, says **Matti Morri**, Technical Customer Service manager for Nokian Tyres.

The official Guinness World Record for driving on ice is also held by Nokian Tyres and test driver Janne Laitinen. The speed record achieved on the ice of the Gulf of Bothnia in March 2011 with a petrol-powered car is 331.61 km/h (206.05 mph). ■

Nokian summer tyres: Grip, reliability, and test successes

Nokian Hakka summer tyres have gained several test wins in European motoring magazines.

The Nokian Hakka Blue, a new product tailored for the Nordic roads with excellent wet grip, and the Nokian Hakka Green, the eco-friendly and fuel-efficient choice, have earned first places in summer tyre comparison tests in motoring magazines.

The sporty Nokian Z G2 summer tyres aimed at the Central European market have also gained a number of wins.



- The new Nokian Hakka Blue summer tyre has exceptionally good wet grip. Its driving feel is quick, responsive, and sturdy, but still sufficiently calm. The tyre never surprises the driver. (Shared 1st place, *Tekniikan Maailma* 5/2012)
- Nokian Hakka Green took first place, as was to be expected. The best features of the Hakka Green are its balanced handling and predictable behaviour. (1st place, *Tuulilasi* 4/2012)



- The Hakka Blue is completely superior in the rain, providing excellent grip and control even under the most difficult conditions. Faster, safer, and more fun than its larger competitors. (Shared 1st place, *Aftonbladet Bil* March/2012)
- The Nokian Hakka Green's handling, cornering, and grip on wet surfaces are amazingly good. The tyre is much better than the other eco tyres when braking on wet surfaces. (1st place, *Vi Bilägare* 5/2012)



- The Nokian Hakka Blue has excellent wet grip. It had the best wet grip properties in our test. The tyre brakes well on wet and dry surfaces alike. The Hakka Blue is also quiet and rolls lightly. (Shared 1st place, *NAF/Motor* 2/2012)



- The Nokian Hakka Blue summer tyre has excellent wet grip properties. (Shared 1st place, *Autoreview* 7/2012)
- On dry surfaces, the Nokian Hakka Green has good directional stability and a precise driving feel. The tyre is also reliable under extreme conditions. You can switch lanes quickly on wet roads and rely on the grip of the tyre. The Nokian Hakka Green saves fuel at every speed. (2nd place, *Za Rulem* 3/2012)



- Nokian Z G2, built for Central European roads and tailored for fast driving: "Remarkable all-round talent. The shortest braking distances on wet and dry surfaces, good steering precision, stable lateral steering, low fuel consumption." (1st place, *Auto Bild* 9/2012, 50 summer tyres tested)
- This highly balanced Finn reached the best grade not only in wet braking, but also in terms of rolling resistance. (1st place, *gute Fahrt* 3/2012)

Read more about Nokian summer and winter tyres: www.nokiantyres.com

The new BAS tyres are tested at Estonian oil shale quarries, for example.



Beyond All-Steel Radial technology

– power with a will of steel, now also for mines

Beyond All-Steel Radial technology now even conquers rock. The sharp rocks and demanding conditions on the rough passageways of a mine provide a tough challenge, to which BAS is the perfect answer.

This new tyre of size 18.00R25, developed for underground LHD mine loaders, is already in test operation in Estonia, Switzerland, and Turkey. Tyres using Beyond All-Steel Radial technology are used to mine oil shale for energy production as well as gold, and to build tunnels.

The mine tests confirm that the new techno-

logy combines in a unique manner the best features of traditional cross-ply and radial tyres.

The tyres have first-class stability, excellent durability due to their stronger construction, and low rolling resistance. The sum of these features means excellent hourly results, lower fuel consumption, and lower emissions.

Removing excess heat

Lower heat generation means slower wear under demanding operating conditions.

The low heat generation of the Beyond All-Steel Radial tyres is also important for underground mines, since removing the heat created by the excavation from the mine is a big challenge.

The new Nokian BAS Mine L-5S feels at home on long transfers. It has a precise and

Nokian BAS Mine L-5S

- effective hours
- stronger structure
- low heat generation
- low rolling resistance.



comfortable driving feel, even at higher speeds. This new product will be introduced to the market during the summer.

Beyond All-Steel Radial technology is used actively across different product groups: container and material handling, mining and tunnel construction, and earth moving. ■

► Read more: www.nokianheavytyres.com/beyond-all-steel-int

✍ Miika Kaukinen



The wider, straighter Forest King is coming soon

Next autumn, Nokian Heavy Tyres will introduce the new 35.5L-32 Nokian Forest King TRS LS-2 tyre to complement the tyre selection for skidder equipment.

– So far, we have been lacking a tyre of the size 35.5L-32. It is a common size, however, and they are especially sold to North and South America, says Sales Manager **Jarkko Heinämäki** from Nokian Heavy Tyres.

The new tyre is five inches wider than before, and when the diameter is 2,010 millimetres, the total weight amounts to nearly 600 kilogrammes. The load-bearing capacity is high, meaning that the tyre meets today's standards.

Wider shoulders

Size is not the only new feature of the latest Forest King. The tread model has been developed for even higher traction.

– The tread is now straighter than before, creating traction across the entire surface, Project Manager **Teemu Vainionpää** from Nokian Heavy Tyres Product Development illustrates.

– At the same time, the tyre shoulders have been strengthened. We have also paid more attention to rim protection. New design prevents

wood from penetrating between tyre bead and rims flange. We have also improved chain use by structural means, as the use of chains is very common in tyres of this type.

According to Vainionpää, the product development of cut to length harvester tyres is also proceeding continuously, and new products are to be expected in the near future. ■

✍ Kari Saarinen

Largest tyre from Nokian rolls into the mines

Nokian Heavy Tyres has produced the largest and heaviest tyre in the factory's history; the 29.5-29 Nokian Mine King L-5S. The tyre has a diameter of 2,010 mm, a width of 750 mm, and a weight of 1,050 kg.

The tyre offers grip and reliability for large underground mine loaders. Field testing is set to begin during the autumn.

– The tyre is designed for underground machinery, with bucket capacities of up to 17 tonnes of crushed stone. The sufficient tunnel size and volumes for such machinery can be found in mines located in the Nordic countries and Australia, for example, says Project Manager **Jyrki Perälä**. ■

Tyre Technology Engineer Veli-Pekka Palonen (on right), Project Manager Jyrki Perälä, and Tyre Technician Pasi Suomela provide a point of comparison for the size of Nokian Heavy Tyres' largest product.



Extreme solutions on the hillsides

A steep worksite pushes a tyre to its utmost limits. Possibly the harshest conditions in Europe can be found on the northern slopes of the Alps: Germany, Austria, Switzerland, and France. Not to mention the demanding conditions in the Nordic countries – the birthplace of Nokian Heavy Tyres' product development.

Working on a steep hill requires creativity and reliable grip.



Highlander – mountain expert

Two thirds of Austria's surface area consists of mountain ranges. This is a challenge for both the forest economy and the forestry machine manufacturers. It is no wonder, therefore, that Austria has the most experts in machinery designed for steep hillsides.

One of the most innovative companies in the field is Konrad Forsttechnik, which is located in Preitenegg in the forest-filled state of Carinthia. The company manufactures wheeled harvesters with the Highlander brand.

Steep hill champion

From the start, the design of the Highlander focused on working in steep terrain. The company's own R&D unit, with 10 employees, decided on the following features: low centre

of gravity, slanted engine, and special oil pan, tilting cabin, and a strong crane. The machine is secured to the hill using a winch.

Konrad recommends the machine for hills with a maximum inclination of 60 per cent, but, in practice, the machine is used under even steeper conditions. The Highlander is the only wheeled machine that can operate on hillsides like this. Its manufacture started in 2006, and since then the machine has been equipped with tyres from Nokian. >>



Guntram Bink



Stephan Meier



Nokian MPT Agile

Only Nokian takes you to the top

Tyres from Nokian were chosen because it was the only tyre brand that could meet the requirements set for load-bearing capacity and traction. In the beginning, the machines had four bias-ply tyres (size 700/70-34), but they were soon replaced by the Nokian Forest Rider 650/65R38 radial tyres. Nowadays, the size is 710/70R34. The large contact surface and load-bearing capacity of the radial tyres (8,750 kg per tyre, pressure of 360 kPa or 3.6 bar) are necessary to keep the machine secure on the steep hill and to enable effective harvesting. A six-wheel model is also available, featuring four wheels of size 710/45R 26.5 on tandem axles. Each of the four tyres has a load-bearing capacity of 6,900 kg, using an air pressure of five bars, or 500 kPa.

Gentle grip on the terrain

The high load-bearing capacity is needed because the machine weighs around 21 tonnes by itself. Using the strong crane and the cutter developed by Konrad, the machine can process trees with a diameter of up to 60 cm. This places an especially heavy load on the front axle tyres. To reduce tyre wear, the machine was equipped with radial tyres. The six-wheeled model is even gentler on the terrain. The cutter can also be equipped with a forest trailer, allowing for tall trees to be carried down into the valley. Loads like these weigh 5 to 7 tonnes, and the tyres need to be able to carry this additional load, even in difficult terrain.

No compromises

Nokian Heavy Tyres, represented by its Austrian importer Forestree, was actively involved in the tyre selection, even before the development of the cutter started.

– I only want the best tyres for my machines and, for the Highlander, the Nokian is the brand of choice. I make no compromises in this respect, says Managing Director **Josef Konrad**.

Forestree delivers the ordered tyres and specially reinforced rims that can withstand high loads even during longer periods of time, according to the “just on time” principle. Konrad’s latest model, the “Pully”, will also be equipped with tyres from Nokian. It is a remote-controlled tractor intended for steep or sinking terrain, and it can tow itself up a very steep hill using a wire. This is a unique piece of machinery that is not available anywhere else. And the next wheeled machine from Konrad is sure to have its tyres made by Nokian Heavy Tyres, as well. ■

✍ Forestree 📷 Konrad Forsttechnik

Nokian Heavy Tyres maintains a firm grip on the world of public utility work. Maintaining the streets and utilities of Southern Germany takes its toll on people, machinery, and tyres, with altitude differences of over 800 metres along the work rounds.

Testing durability in Southern Germany

Hheavy magazine visited Southern Germany to ask road maintenance professionals about the demands placed on the tyre by the daily work. Even four-wheel drive vehicles may be rendered incapable by the differences in altitude and the winter conditions.

Guntram Bink works as a mechanic on the street maintenance depot of the city of Ehingen in Southern Germany.

– Due to its design, our four-wheel drive MAN F2000 lorry wears its tyres out quickly. We have tested four different types of tyre, all of which barely lasted for 15,000 to 20,000 kilometres. Finally, Vianor Service Center recommended Nokian Heavy Tyres to us. They were able to triple the lifetime of the tyres, Bink describes.

The selected tyre was the sturdy 365/80R20 Nokian MPT Agile, originally developed for the needs of the armed forces. According to Bink, it is excellent for public utility tasks. In the summer, the lorries are mainly used for different types of repair. In the winter, they are equipped with salt-spreaders and ploughs for road maintenance. There are a total of 270 kilometres of road to be ploughed and sprayed with salt water, consisting of both busy highways and smaller roads.

The maximum difference in altitudes is 800 metres, making this a tough task for both people and machinery. The tyre from Nokian, however, is manufactured for extreme conditions, and it has delivered on all its promises.

According to Mr Bink the mechanic, the tyre does tend to create more noise than its competitors, but the handling is calm on the road while off-road grip remains firm.

– The F2000 is already showing signs of age, so it will soon be replaced by MAN’s new TGM model – equipped with Nokian Heavy Tyres products, of course.

“The tread pattern is what counts”

Mowing, park and garden upkeep, and winter maintenance – the Unimog U 400, with its 130 kW of power, has a rather varied list of jobs. The special vehicle is equipped with 365/80R20 Nokian MPT Agile tyres, and it works hard on the tasks of the technical depot of the city of Reutlingen, also known as the gateway to the Swabian Jura.

The main task of **Stephan Maier**, the driver, is to clean the municipal rainwater sewers in the summer. There are over 90,000 sewage screens in the region of Reutlingen, a city of 112,000 people, and the municipality formed from 13 villages.

The structure of the U 400 was modified to suit the cleaning of rainwater sewers. Maier lifts up the sewage screen by hand, and the perforated tank full of leaves, mud and dirt is lifted and emptied onto the platform using the crane.

– In a day, I clean an average of 95 sewers. Every now and then, the sewers can also have some surprises, such as snakes, says Maier.

The distances in the summer are not long, so Maier cannot give a precise estimate on how the tyre wears down. The tyre has, however, already passed its winter testing, since Reutlingen has 450 kilometres of roads that need ploughing.

– I am very happy with the tread pattern of the Nokian. For winter maintenance, we need a tyre with proper grip. If the tread pattern does not work, even four-wheel drive cannot help you. ■

✍ 📷 Christian Mühlhausen



The tyres used for railway construction machines are under exceptional pressure, since only a narrow section of the tread pattern is in contact to the rail. Nokian Heavy Tyres supplied stronger than average tyres for VR Track Oy's machines.

Rails stress the rubber

Last year, Lännen Tractors Oy built two new and unique railway track construction machines for VR Track Oy. VR Track is the largest track builder in Finland, and also one of the largest construction companies. The new machines are even more versatile than before.

Driver **Antti Friimäki** has already developed a routine for driving the machine.

– One of the most important tasks for track

maintenance is replacing the sleepers or the rails. Once the workers have opened the rail, I drive the machine onto the tracks. Then, I use the large pliers on the machine to tear out the sleeper or rail, and install a new one in its place. After that, it is up to the others to reattach it, Friimäki explains.

– This new model of machine, modified from a wheel loader, can also operate a brush, plough,

or rotary plough in the winter. We use them to remove snow from the rails, but we also need them to maintain the service roads that are now also within our area of responsibility. Any loose snow can be blasted off using an air compressor.

One of the machines is equipped with a passenger hoist, while the other one will have a hoisting crane and a rail washer system.

– A significant work task is cutting the

brushes from along the rail lines by using the crushing brush cutter attachment.

In the summer, this work is done in two shifts, mentions **Pekka Niemelä**, Friimäki's colleague.

A stronger compound helps

The track machine has a new type of wheel system. It allows for the rubber tyres to be lifted off the rail by approximately 20 centimetres, for crossing over rail brakes, for example.

The machine uses Nokian TRI 2 Extreme Steel tyres, manufactured by Nokian Heavy Tyres. When running on rails, the stress on the rubber is immense, and the original TRI tyres did not work in the best possible way.

Only narrow section of the tread pattern is pressed against the rail, and if the rubber compound is too soft, this area cracks easily.

– The rails are too difficult for normal tyres. The machine needs a steel-belted tyre

made of a special rubber compound, says Sales Manager **Timo Vainio** from Nokian Tyres.

– The Nokian TRI 2 Extreme Steel works well. It is widely used for public utility equipment in Central Europe. There, chains are widely used when moving on steep terrain and this tyre has excellent durability for chain use. Pressing against the rail is similar to the stress caused by chains.

Antti Friimäki is happy with the new tyre set. The rubber no longer cracks excessively.

– This is exactly how it should work. If the wear is too extensive, the rest of the tyre starts running too deep along the rail, and this can damage the rail switch motors and the temperature indicators, says Friimäki. ■

✍ Kari Saarinen 📷 Juho Paavola



The track construction machine is full of versatility: brush, plough, rotary plough, and special tyres. On rails or off-road. This machine is the state of the art in special applications.



- Track construction machine, built by Lännen Tractors for VR Track Oy
- Originally equipped with Nokian TRI tyres
- Use was more stressing than expected, so tyres developed too many cracks
- Replacement with Nokian TRI 2 Extreme Steel tyres resulted in excellent durability

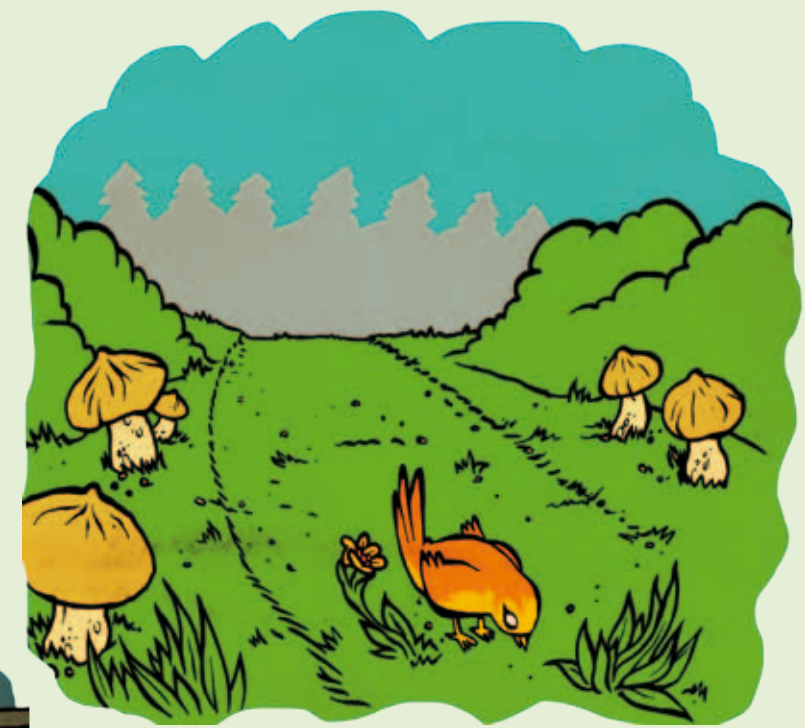


Stressing the tyre, not the environment

A tyre manufacturer constantly receives product development tips from its customers. When Nokian Heavy Tyres develops new tyre models, it considers both the intended purpose and eco-friendliness. The company wants to create a footprint that is as green as possible. In practice, this means using effective production processes to create products that are safe and more eco-friendly.

Year after year, forestry machines are becoming heavier and heavier. While in 1994, a typical machine weighed 11 tonnes and had a maximum load of 9 tonnes, in 2009, the figures were up to 19.5 tonnes and 15 tonnes. This means that we can move even more wood in one go, but what about the soil and vegetation? They are under ever-increasing pressure.

We can increase load-bearing capacity by either raising the tyre pressure or by increasing the air volume. Raising tyre pressure means increasing the pressure on the ground. Tandem axles limit the tyre sizes and, therefore, the tyre cannot be made any wider in order to increase air volume. Nokian Heavy Tyres has placed heavy emphasis on this in its product development. Increasing the contact area distributes the force inflicted on the ground to a wider area.



Even the tread pattern affects the eco-friendliness of the tyre. When tracks are not used, the tread model must be more aggressive, that is, create more traction. Otherwise, you will run into trouble on soft and slippery surfaces.

Using tracks is often justified. In this case, a tyre that has a less aggressive tread pattern, and is otherwise compatible with the track, must be selected. If the tyre and track do not work together, tyre wear will increase. This, in turn, will burden the environment. Nokian Heavy Tyres offers dedicated tyre modes for use with tracks; operational reliability and a long operating life have been the priorities in their development.

The tyre needs to be well built. In a bias-ply tyre, the crossed cord layers, together with the steel puncture protection, form a strong structure against internal pressure and external load. In radial tyres, our patented side puncture protection, and the strong tyre body and steel belts, have been developed for the same purpose. Nokian Heavy Tyres offers an unparalleled selection of radial tyres with unarguable benefits.

A radial tyre behaves more like a track, and it has more flexibility. The contact area is longer, resulting in both better traction and better off-road abilities. At the same time, fuel consumption is reduced, which is also for the benefit of the environment. This, in turn, cuts carbon dioxide emissions.

» Read more: www.nokianheavytyres.us/environment

✍ Kari Saarinen ✉ Ville Pirinen

Strong cable ensures the connection between tyre and rim

A heavy duty machine tyre is the functional sum of its components. Not all development is directly visible to the customer; instead, its benefits will be manifested through a long operating life and reliable operation.

The cable component works as a structural support of the tyre against the rim. Nokian Heavy Tyres has invested heavily in cable manufacturing to provide an even better end result for its customers.

The cable is an essential part of the tyre. It supports the entire structure of the tyre against the rim, sealing the tyre and rim together. A wheeled machine delivers a large amount of power from the drive shaft to the ground through the rim and tyre. A secure bead ensures that the stresses are kept under control, even under demanding conditions.

The tyre pressure can be up to 1,000 kPa, or 10 bars, which means that there is a lot of force pulling the tyre off the rim. The cable resists these forces, and it needs to work as flawlessly as possible to ensure the leak-tightness of the tubeless tyre.

Nokian Heavy Tyres' new production technology allows for manufacturing a hexagonal, seamless cable out of a steel type with extraordinarily high tensile strength.

– One steel wire is rolled around a fixed circumference several times, while varying the width of the layers; the number of rotations is the wire count. Passenger car tyres from Nokian have used this single wire bead technology for years, and with considerable success; now, we have decided to introduce it to machine tyres as well, says Product Manager **Tero Saari** from Nokian Heavy Tyres.

The wire count can be used to modify the shape of the cable. The count itself also defines the structural strength, that is, the size of the cable.

The cable follows the bead of the tyre

Better seating of the tyre prevents localised stress peaks during operation. The new type of

cable improves seating, both by its strength and the fact that the cable is manufactured to follow the natural shape of the tyre bead as well as possible.

– The new cable machine was bought last summer, and all the necessary run-ins have been completed. We have already manufactured some products for sale. Gradually, this technology will be introduced in the manufacturing of all our tyres through product development projects, Saari says.

– This is a clear step forward. We want to continuously improve the structures of our tyres to match even the highest demands of our customers.

Growing the apex component

While renewing cable technology, Nokian Heavy Tyres has also developed what is known as the apex of the tyre. The apex is a triangular rubber profile component that is connected to the tyre together with the cable. It guides the tensions in the tyre's bead area in the correct way.

– The new technology allows us to make a wider, taller apex component according to the requirements of the structure. These new components can be used to fine-tune the characteristics of the tyre, such as its flexibility. Lateral stability will also be improved.

– For professional machine operators, this will be of great significance in terms of both safety and comfort, Saari emphasises. ■

✍️ 📷 Kari Saarinen

Customers already using parameters

Last autumn, values describing the characteristics of heavy tyre models were measured in Vihti. Now, the parameters have been submitted for the customers to use.

➤ Patria, specialising in defence technology, uses the parameters defined by Nokian Heavy Tyres when deciding on the tyres to use in its armoured vehicles. Nowadays, the company has several tyre models to use when simulating different scenarios.

Tyre behaviour when encountering stairs, trenches, or anti-tank barriers is important, as are the forces encountered in corners and during lane changes, for example. How the tyre reacts during braking is one of the key features. It is also good to know how activities done while the vehicle is stationary, such as firing a gun or using a crane, affect the vehicle's tyres.

➤ Agco also utilises the numeric tyre data that Nokian Heavy Tyres has distributed to its customers. The manufacturer of Valtra tractors wants to stay up to date with tyre product development. Agco also performs a number of measurements on its own, comparing their results with the parameters received from the tyre manufacturer.

The tractor manufacturer is interested in the effects of driving speed on tyre behaviour, and the formation of the longitudinal forces, such as braking and traction force. When compiling its tyre range, the company uses data created by Nokian Heavy Tyres for a few different tyre sizes, at a few different tyre pressures.

➤ Braking forces were measured both on a circular test track, and a straight braking lane. The computer recorded the signals from the different sensors, generating graphical representations.

The tyre force measurements made last autumn at Agrifood Research Finland in Vakola were groundbreaking. Nokian Heavy Tyres carried out the tests together with Agrifood Research and Aalto University. Agrifood Research Finland is Finland's leading authority in agriculture and foodstuffs research. Aalto University is the largest organisation in Finland focusing on technical research. ■

✍ Kari Saarinen
📷 Patria and Nokian Heavy Tyres



New product reaches for the optimum Nokian BAS Stacker for fluent, precise terminal work

The Nokian BAS Stacker 18.00R25 is the latest solution to the tyre wear problems occurring during container handling at ports.

Reach stackers face the same challenges everywhere: excess heat generation from rolling resistance, conical wear on twin wheels, and swaying while lifting. Therefore, the new tyre reaches for the optimum performance in terms of both surface materials and structural solutions.

– The Stacker is our first radial tyre for reach stackers. If the driving distances inside the terminal are even slightly longer, a radial tyre is preferable due to lower rolling resistance and heat generation, says Sales Manager **Marko Muhonen**.

A common belief is that a radial or belted tyre is lacking in stability, which is an essential feature for the precision and fluency of the work. Nokian responded to this with the Beyond All-Steel Radial structure, which achieves the required stability during both driving and lifting. BAS effectively reduces swaying, as the surface of the tyre itself lessens the impacts. Add to this the surface structure of the BAS Stacker, and the end result provides financial effectiveness.

During hard use, the twin wheels will wear out at the edges more than in the centre, starting the never-ending rotation of tyres to even out the wear.

– If the tyre wears out conically, it harms stability, and tyres need to be replaced before their calculated operating life has ended. The new tread model of the BAS Stacker minimises the conical wear of twin wheels on reach stackers, says Muhonen. ■

Nokian Mine King L-5S The new king of mines

The Nokian Mine L-5S, which is designed for underground mine loaders, will be updated to the Nokian Mine King L-5S during this year.

– The new Mine King L-5S is an excellent choice for underground mine loaders. Its new, stronger structure creates safety for mine operation, and efficiency for moving blasted stone. This increased security works even better to reduce accidental punctures which are typical for mines, says Product Manager **Tuomas Färiln**.

– Mine King also allows for higher tyre inflation pressures. This, in turn, increases the load-bearing capacity, says Färiln.

The new Mine King L-5Ss are cross-ply tyres of sizes 12.00-20, 17.5-25, 18.00-25 and 26.5-25, and a new size, 29.5-29.

Also meeting the needs of underground mines is the Nokian BAS Mine L-5S 18.00R25, incorporating the revolutionary Beyond All-Steel Radial technology. ■





Ji Yong-ho creates mutants Mad scientist and skilled artisan

He knows tyres and especially what to do with them. **Ji Yong-ho** from South Korea is one of the most skilled tyre artists in the world.

The works of this contemporary art master represent something twisted and abnormal. They are mutants, the results of skilled, passionate sculpting, and they carry a message.

– When I became a sculptor, I wanted to be a traditional artist. But when I saw Michelangelo’s David on my trip to Italy, I was intimidated by its perfection and beauty. I felt worthless as an artist, says South Korean sculptor Ji Yong-ho.

He noticed that Michelangelo and Rodin, the ideals of historical sculpting, had already reached perfection when shaping marble, clay, and bronze.

– Whatever I tried, it came across as trying to imitate the masters. I felt like I could never reach what they had achieved.

However, Ji wanted to try, in his own way.

– I wanted to explore the unknowns of the world of sculpting. Therefore, I looked for new materials, and settled on tyres. They have fascinating patterns and shapes, and they are incredibly durable. The material is mainly rubber-like, allowing me to cut, bend, and shape the strips into many different forms. The flexibility and power of the tyres drove me to them.

A twisted message

Ji Yong-ho’s works are his own expedition into the perversions of truth caused by human greed.

– Many people tell me that my works are scary. The truth is that our society already includes many scary, disfigured things that are due to genetic manipulation and environmental disasters. I’m scared too, he says.

– Most often, I choose animals from the top of the food chain to depict power and authority. I exaggerate certain physical properties, while leaving out some others. In addition to animal mutations, my latest works include human mutations; usually, they are mythical creatures, such



Ji Yong-ho

- The 34-year-old sculptor has studied in the South Korean capital of Seoul, and in New York.
- His own exhibitions have been held in Amsterdam, Hong Kong, Taipei (Taiwan), and Seoul.
- In joint exhibitions, his works were last exhibited at the Victoria and Albert Museum in London. His works have been on display in New York, the Hague in the Netherlands, Stuttgart in Germany, and the Gana Art Gallery in Seoul.

as centaurs and sphinxes.

So, is he a skilled artisan or a mad scientist? Regardless of which one he is, he trusts his material. He needs to completely understand his medium and the technology to utilize it in art.

He uses stainless steel to weld together a durable frame for the dynamic four-legged characters. The tyre strips are added to the frame. He uses tyres from tractors, all-terrain vehicles and cars to create monsters. Worn-out strips of tyre are handy when creating soft fur.

For him, a tyre is an opportunity for telling stories – in his own language. ■

✍ Miika Kaukinen
📷 Ji Yong-ho

The fields of Brazil are a source for bio-fuels



Brazil is the world’s largest producer of sugar cane and, since the 1970s, it has been used to manufacture, alongside sugar products, a fuel to replace crude oil. The sugar in the cane can be used to manufacture ethanol – suitable as a fuel for cars, for example.

The annual sugar cane crops in Brazil are approaching 800 million tonnes. According to Unica, the organisation for the cane growing companies, the country will have 15 million hectares of sugar cane fields in ten years. This would mean that an area half the size of Italy would be dedicated to growing one single plant, intended to fuel the ever-growing need for bio-fuel. Nowadays, sugar cane is also a raw material for electricity production in a country that mainly runs on hydroelectric power.

The tyres used in agriculture are an inseparable part of this equation. Nokian Heavy Tyres and its Brazilian partner Alpha Pneus are still developing even better and more optimised means for improving production together with their customers. In the end, the development happens by the side of the field, together with the customer.

– The basic requirements for flotation tyres are the same all over the world. Their use must promote the effectiveness of work while protecting the productivity of the soil. Work on Brazil’s sugar cane fields is done using special tools, and the unique ground surface must not be compressed by the weight of the load or the machinery, says Product Manager **Tero Saari** from Nokian Heavy Tyres.

Working together, they have already discovered tailor-made solutions for the load-bearing and transport issues of Brazil’s enormous sugar cane fields. This is an optimal combination of load-bearing ability and contact surface.

And when it rains in tropical Brazil, the heavens open, and the fields turn into mud that cannot be driven on. Once the drying has started, however, the right tyre can work wonders. As unlikely as it seems, the problem-solving abilities and relentless attitude of Nokian Heavy Tyres, born from the nearly Arctic conditions, have proved to be a desired combination on the fields of Brazil. ■

Trade show presence

Nokian Heavy Tyres will have a strong presence at the following events during the latter part of 2012.

FINLAND:
• FinnMetko: Jämsänkoski 30 Aug to 1 Sept

SWEDEN:
• Euro Mine Expo: Skellefteå 12 to 14 June

GERMANY:
• KWF Tagung: Bopfingen, 13 to 16 June

UK:
• Cereals UK, 13 to 14 June

FRANCE:
• FOREXPO, Mimizan, 6 to 8 June

AUSTRIA:
• International Holzmesse: Klagenfurt, 30 August to 2 September (Forestry, stand W15)

THE NETHERLANDS:
• Agrotechniek Holland, 5 to 8 Sept

USA:
• Forestry Show, Wingfoot, 9 to 11 Sept

CANADA:
• Salon De L’Agriculture, Quebec, 28 to 30 Aug

UKRAINE:
• Agro Kiev, 8 to 10 June

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Maximised load-bearing capacity and supreme moving capabilities make our forestry tyres the strongest in the world. The structure of the strong and stable Nokian Forest King F enables higher operating pressure and up to 4 m³ more load*. The advanced Nokian Forest Rider, on the other hand, has convinced users with its first-class driving comfort and uncompromising traction.

*In six- and eight-wheeled forestry machines, the increase in load-bearing capacity from 6900 to 8000 kg corresponds to some 4 m³ of pinewood harvested in the summer.

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Nokian Forest King F



Nokian Forest Rider

