

HEAVY

NOKIAN HEAVY TYRES' CUSTOMER MAGAZINE



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FOR ROUGH CONDITIONS

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HEAVY TYRES

Christian Mühlhausen

CHALLENGE: CLEANING THE STREETS OF STUTT GART

The waste management service of the City of Stuttgart, Germany has approximately 850 vehicles in its fleet. The public utility also manages the cleaning of streets and roads. **Ronald Meister** is one of the four depot managers of the public utility. He has 43 drivers and 9 Unimogs, among other vehicles, working under him.

In the wintertime, the vehicles are used for ploughing and salting the streets, but the tasks can be rather varied during the summer.

In addition to cutting grass and transporting building materials and water, special machines such as suction brushers and rinsing vehicles are also hard at work.

Last summer, Nokian MPT Agile tyres were installed under the City of Stuttgart waste management's Unimog U 400 for the first time.

– We needed a tyre that would be suitable for winter caretaking and off-road use, but one that would also respond calmly on the road, says Ronald Meister.

– And we did have further requirements. The tyre had to fit on the rim of the U 400, as selecting a new tyre type for the new Unimog series models would have required four new rims for each of our Unimogs; these cost €1,000 per piece. This is where we wanted to save.

Based on recommendations, the choice was Nokian tyres, and depot manager Meister is rather happy with them. Although the tyres have yet to survive their baptism of fire in winter street maintenance, Meister remains very confident about the coming winter – after all, the Nokian MPT Agile is designed for extreme military conditions.

BEHIND THE WHEEL	Ronald Meister
WHERE	Stuttgart, Germany
WHAT	Street and road cleaning
MACHINE	Unimog U-400 (175 kW, year 2007)
TYRES	Nokian 365/80R20 MPT Agile





Success from playing on the customer's team

What is the basic idea that the work of Nokian Heavy Tyres is based on, Director Jarmo Puputti?

Nokian Heavy Tyres believes in teamwork in all its activities. This is visible throughout the organisation, from product development to technical support for the customers.

Developing new products always starts by understanding customer needs. This is not possible without co-operation with the machine manufacturers and users. A holistic understanding of the customer's needs is possible when experts in several fields combine their strengths to seek new and innovative solutions to allow end users to reach their goals.

Machinery tyres are exposed to demanding conditions. They are expected to tolerate heavy loads, work safely under all conditions, and offer improved machine handling characteristics and lower costs.

In addition, the entire lifecycle of the tyres needs to support sustainable development.

How does success in teamwork materialise?

Seamless co-operation between Nokian Heavy Tyres' experts, rim manufacturers, track and chain manufacturers, machine builders, and end users is behind every success.

User satisfaction is the ultimate benchmark of success.

This is why Nokian Heavy Tyres emphasises thorough testing of new products in their real operating conditions, and continuous monitoring of their products throughout their lifecycle.

The entire personnel of Nokian Heavy Tyres foremost want to be on our customers' teams.

NOKIAN HEAVY TYRES is one of the world's leading manufacturers of special tyres. Its key product segment is forestry tyres. Other important products are special tyres for agricultural machinery and a variety of industrial machine tyres.

What makes Nokian Heavy Tyres unique is its familiarity with extreme driving conditions and its respect for nature. We also lead a continuous, close dialogue with our customers.

We are passionate about developing even more functional solutions and tools for forest, field, road, terminal and mine work. Relying on our persistence and creativity, we can ensure you safe and efficient work. We provide flexible service in all cases to help you achieve your goals.

Nokian heavy tyres are sold in both the OE and replacement markets. The company works in close co-operation with original equipment manufacturers. Nokian Heavy Tyres Ltd. is part of the Nokian Tyres Group.



HEAVY
Magazine for Nokian Heavy Tyres' customers.

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New areas, new sizes.

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New Beyond All-Steel Radial Special tyres for material handling and earth moving

The unique Beyond All-Steel Radial technology launched by Nokian Heavy Tyres is covering new ground.

A new size, 480/95R25, is being introduced for the first product that was manufactured using this technology, the extremely durable Nokian HTS Straddle for straddle carriers.

The Nokian HTS Straddle provides top-class wear durability for straddle carriers operating in ports and freight terminals. This special product combines the high load-bearing ability requested by operators with the excellent driving stability that is valued by drivers.

For the operator, the advanced properties mean increased productivity and operational

reliability, as well as lower fuel costs.

For the driver, new technology provides additional driving comfort and safety.

Later this year, a new special tyre will be introduced to the market in size class 18.00R25, developed for underground LHD mine loaders and utilising the Beyond All-Steel Radial technology.

Beyond All-Steel Radial technology combines in a unique manner the best features of traditional cross-ply and radial tyres: first-class stability, excellent durability, and low rolling resistance. ■

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

Dynamic ecological duo: Electric sports car ERA and Nokian Tyres

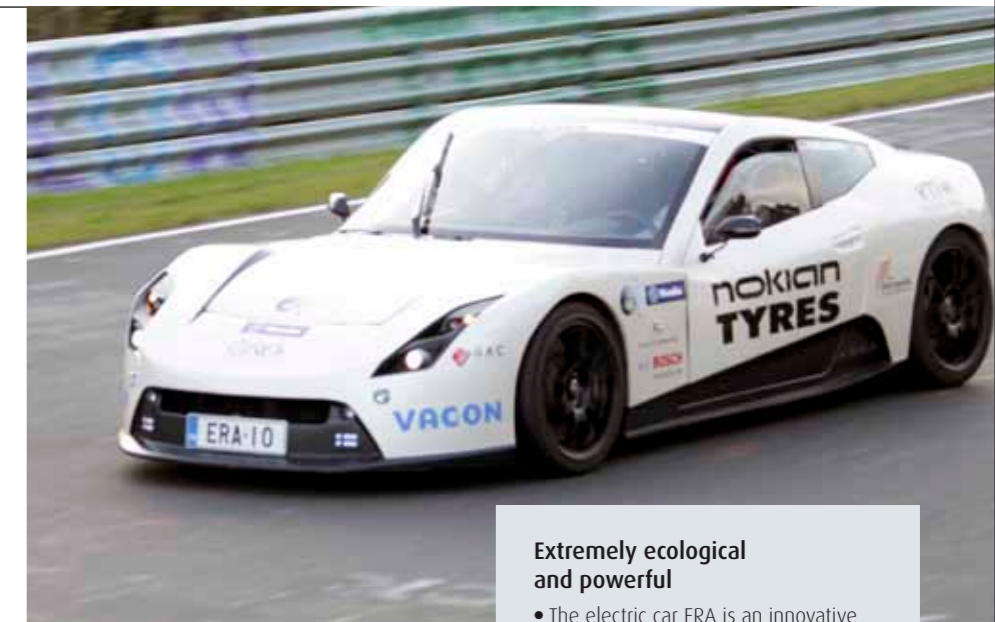
The ERA (Electric Race About) is an electric car built by students from the Helsinki Metropolia University of Applied Sciences. This fully-fledged sports car has had a flying start in the electric car racing series: it took second place in the Automotive X-prize 2010 competition in the US, and won the Michelin Bibendum Challenge 2011 competition in Germany.

In the races, the car was helped along by eco-friendly Nokian Z G2 225/40ZR18 tyres. In the Nordic countries, the ERA uses Nokian Hakka Z 225/40ZR18 tyres.

Tyres consume energy. The lower the rolling resistance of the tyres is the lower the energy consumption – and the more kilometres to go.

Other factors, such as load-bearing capacity, safety, wet grip, aquaplaning properties, tyre driveability, and low driving noise levels are also important features. One of the largest challenges in tyre R&D is being able to combine low rolling resistance with tyre safety characteristics.

– We have succeeded well. However, we still



Extremely ecological and powerful

- The electric car ERA is an innovative demonstration of skill by Finnish students.
- The car consumes an extremely low amount of energy; only 14.5 kWh per 100 km, corresponding to 1.6 litres of fuel – No carbon dioxide emissions.
- The car accelerates from 0 to 100 km/h (62 mph) in six seconds, and it has a top speed of 220 km/h (137 mph).

want to keep up with the latest developments, and be slightly ahead of them if possible, says R&D manager **Mikko Liukkula** from Nokian Tyres.

– Nokian Tyres is a pioneer in the tyre industry, and a company that values eco-friendliness. This is why we take delight in cooperating in the ERA electric car project. ■

» Read more: www.raceabout.fi/era

Nokian winter tyres claim more test victories

Year after year, both studded and studless Nokian Hakkapeliittas have claimed test wins and podium finishes in the automotive press in different countries. The studless winter tyre Nokian WR D3, designed for Central European winter conditions, has also received praise.



- Hakkapeliitta 7 has balanced handling under all circumstances. (1st place, *Tuulilasi* 13/2011)
- Absolute state of the art of the tyre industry as regards grip on ice and snow (2nd place, *Tekniikan Maailma* 17/2011)
- The Hakkapeliitta R's best features are balanced driving and good grip under different driving conditions. (1st place, *Tuulilasi* 12/2011)



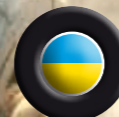
- The Hakkapeliitta 7 brakes best on snow and gives very good grip when accelerating. Easy and neutral to drive, even on the grip limit. (1st place, *Vi Bilägare* 13/2011)
- The Hakkapeliitta R has excellent handling on ice, and is equally supreme on snow. (1st place, *Vi Bilägare* 13/2011)
- The Nokian WR D3 is the best Central European winter tyre. (1st place, *Aftonbladet Bil* 8/2011)



- Hakkapeliitta 7 has safe handling. Braking, acceleration, and lateral grip are very good. (2nd place, *Motor* 5 October 2011)
- The Hakkapeliitta R friction tyre has better grip on snow than many studded tyres. (2nd place, *Motor* 5 October 2011)



- The Hakkapeliitta 7 has excellent longitudinal grip on ice. The handling on snow is ideal. In deep snow, it is in a league of its own. (Shared 1st place, *Auto Review* 18/2011)
- The Hakkapeliitta R has the best directional stability, and the tyre responds quickly and predictably. (1st place, *Za Rulem* 18/2011)



- The Hakkapeliitta 7 has excellent steering, providing the best grip during braking and acceleration on ice. (1st place, *AutoCentre* 40/2011)
- The Hakkapeliitta R grips as well as a studded tyre. (1st place, *AutoCentre* 40/2011)
- The rubber compound on the Nokian WR D3 is so good that the tyre has even better grip than Nordic friction tyres. (1st place, *AutoCentre* 40/2011)



- The Nokian WR D3 tyres are highly recommended. We especially commend their grip on snow and dry asphalt. (*Auto, Motor und Sport* 21/2011 and *Auto Zeitung* 20/2011)
- Nokian is the winner of the German car magazine *Sport Auto's* (11/2011) winter tyre test, with an overall grade of "Highly recommended".

Nokian TRI 2 Extreme Steel Master of demanding chain operation

True to its name, the Nokian TRI 2 Extreme Steel enjoys tasks of extreme difficulty. The risk of cut or puncture damage is high in metal recycling or waste handling, for example. The sturdy steel belts and tailor-made tread compound of the new tyre, also suitable for earth moving, provide excellent cut resistance and puncture protection in demanding conditions both on and off the road. The tread compound is developed for locations requiring continuous use of chains.

The arrow-shaped tread and the rigid structure of the block-patterned Nokian TRI 2 Extreme Steel tyre guarantee that work is performed efficiently and tyre wear is balanced. The high load-bearing capacity increases stability when moving heavy loads.

– The area of use of the reliable, versatile Nokian TRI 2 tractor tyre has been extended towards demanding locations that require the best



possible durability from the tyre. The tread of the new Nokian TRI 2 Extreme Steel is excellent for use with chains, as the steel belt enforced tyre has an extremely strong structure, says Product Development Manager **Martti Päivinen** from Nokian Heavy Tyres.

The eco-friendly tyre also cleans effortlessly, ensuring that the machines do not carry soil onto roads. ■

Nokian TRI 2 Extreme Steel

- Extremely durable special tyre for conditions requiring the continuous use of chains
- Excellent cut resistance
- Steel belts provide good puncture protection.

The story of the world's most famous winter tyre. Hakkapeliitta's 75-year history online: www.nokiantyres.com/hakkapeliitta75



The best load-bearing capacity on the market

The new Nokian Country King agricultural tyre easily carries an additional weight of up to two tonnes. As the load grows the contact area of the tyre increases, in turn increasing the load-bearing capacity.

The size selection of the tyre is increased by adding a low-profile special product. The Nokian Country King 710/35R22.5, developed in co-operation with the world's leading manufacturer of agricultural technology, is especially suitable for forage wagons and trailers.

The load-bearing capacity of this modern steel belted tyre is among the best in the world in its diameter class.

It has a load index (LI) of 158 D, which in practice means an additional load of 2,000 kilograms (500 kg/tyre) compared to competitors on the market (LI= 154 D). The fuel-efficient tyre is an excellent choice for agricultural machinery and trailers when moving more on the road than in the field. Low rolling resistance reduces fuel consumption, in turn making the tyre an economical, eco-friendly work partner.

Work is especially effective on soft soil or grass, as the tractor and trailer combination will not sink; instead, it is gentle on the growth surface and turns easily. The opening pattern of the tread ensures that the tyre cleans easily and quickly, and will not carry soil onto the road. ■

Vianor Industrial service concept extended

The number of sales outlets included in the Vianor Industrial concept is increased further, as the service expands to different sides of the world. Over 30 locations are operating under the Vianor Industrial concept in Finland, Sweden, Norway, and Ukraine. The service is currently being introduced in Russia, as well.

In the Vianor Industrial service, professional solutions are offered to machine owners and contractors by utilising the latest innovations and activity models.

The strength of the new concept is Vianor's increased ability to remain close to the customer, understanding and anticipating their tyre needs, and developing solutions for their problems in both products and service.

– Co-operation with Nokian Heavy Tyres enables an uninterrupted chain of information transfer and development work between the manufacturer, retailer, and end user of the products, says Marketing Manager **Juha Lehtinen** from Vianor Industrial tyres.

The concept answers the more complex and technical service needs of customers using heavy machinery. Anticipation is often required.

– Discussions with customers probe the future need for tyres. This gives us a good view of the market, and customer representatives can reserve a sufficient amount of tyres to be delivered at the right time, Lehtinen says.

However, this is not enough anymore, as the complex technical nature of machinery requires even more extensive understanding and expertise.

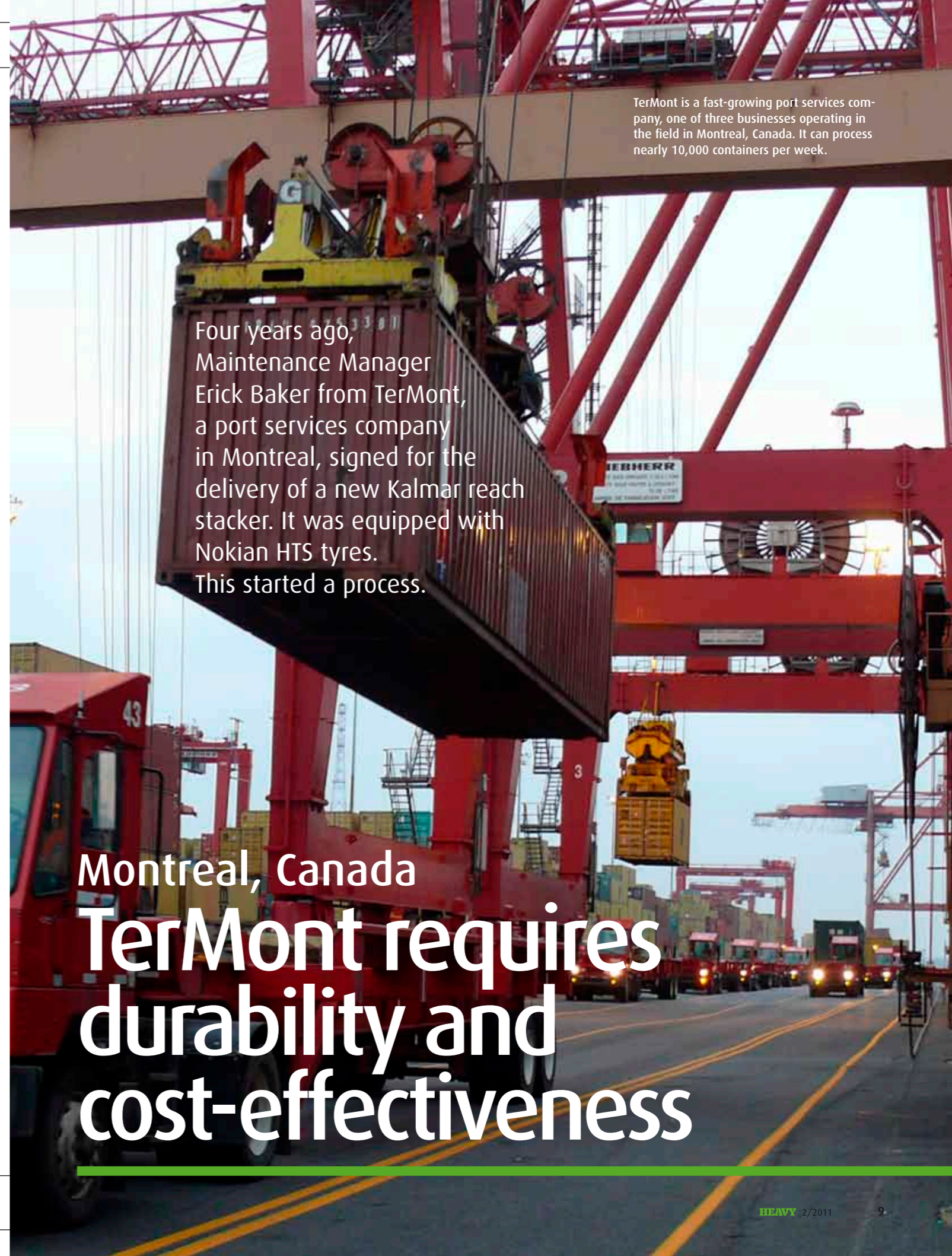
Vianor Industrial means co-operation

– We sign tyre service contracts with customers to seek and calculate the most cost-effective solution. This way, the customer is aware of their tyre costs per tonne, hour, and kilometre, Lehtinen assures us.

Machinery and equipment are becoming more and more technical, and their features are being improved. We are developing tyres to keep up with them. Many times, the customers' machinery has equipment measuring and optimising its operation.

– Tyres are the only place providing us with information concerning traction, slip, and the driving surface. The traction ratios between the machine axles are often optimised using computer software, which makes tyres even more involved in the optimisation process, Lehtinen estimates. ■

This autumn, Vianor Industrial opened a sales outlet in the city of Donetsk in Ukraine, well known for its extensive mining activities. 1.5 million people live in the Donetsk metropolitan area.



TerMont is a fast-growing port services company, one of three businesses operating in the field in Montreal, Canada. It can process nearly 10,000 containers per week.

Four years ago, Maintenance Manager Erick Baker from TerMont, a port services company in Montreal, signed for the delivery of a new Kalmar reach stacker. It was equipped with Nokian HTS tyres. This started a process.

Montreal, Canada
TerMont requires durability and cost-effectiveness



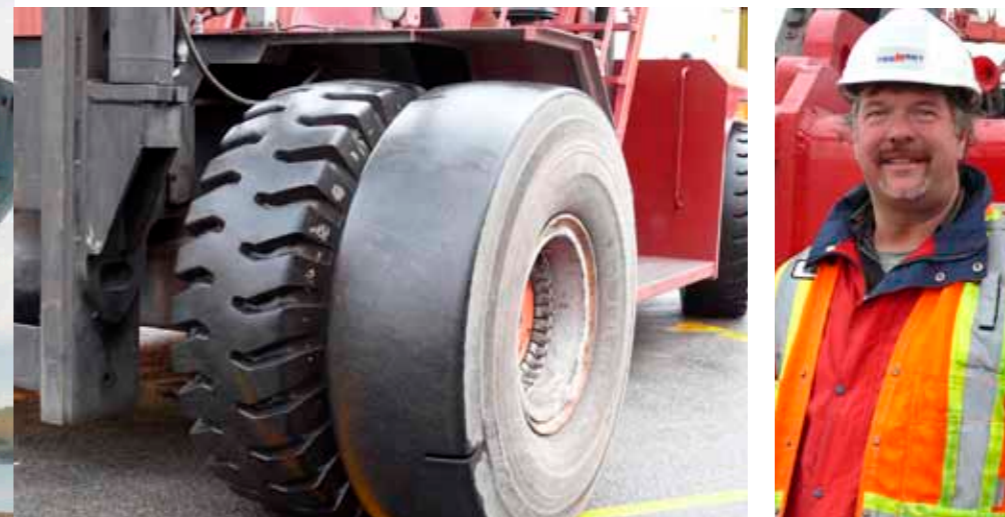
The arrival of a cargo ship turns the port area into a circus, with cranes and lorries presenting their own acrobatics.



Nokian HTS tyres stabilise reach stackers that handle stacks of up to four containers.

Experience brings expertise. This combination of two different HTS tyres for a container handler was discovered through experimentation.

TerMont's Maintenance Manager Erick Bakerin was amazed by how durable Nokian tyres were.



Port of Montreal

- Located in Canada, along the St. Lawrence River, over 1,000 kilometres inland from the Atlantic Ocean.
- Connects the industrialised areas in inland North America to Europe.
- Approximately 2,000 cargo ships visit the port annually.
- Every year, the port handles over one million containers, or a total of 12 million tonnes of cargo.
- Furthermore, 8 million tonnes of liquid raw materials and 5.6 million tonnes of dry raw materials pass through the port each year.

All of the 60 vehicles for which Baker is responsible will move to Nokian tyres in a few years' time. Baker has three words to describe the reasons: reliability, durability, and costs.

TerMont is a joint venture between Mediterranean Shipping Company (MSC, the world's second-largest company in its field), Logistec Stevedoring, and Cerescorp. It has an 18-hectare terminal at the Port of Montreal, which is one of the ports located the farthest inland in the world.

TerMont mainly handles MSC's containers, but some containers from OOCL and Hapag Lloyd as well.

Around 2 to 3 ships per week arrive at the port, which means that the company can process nearly 10,000 units in a short time. The arrival of a cargo ship turns the port area into a circus, with cranes and lorries presenting their own acrobatics.

– A few years ago, we were happy to go an entire weekend without punctured tyres, Baker says.

– During the high seasons in spring and

autumn, we could not keep vehicles out of operation for long, so we had to replace tyres even before their working hours were full, he goes on to say.

– And safety is always a concern. There is not a lot of room for stevedoring and storage, which means that we need to handle stacks of up to five containers. This makes the stability of the loaders and container handlers an essential issue.

We required reliable, durable products that would allow us to save on total activity costs.

One solution at a time

The first step in the new direction was taken, when Sylvain Marois from Montrealin Pneus SP offered Nokian Heavy Tyres products to TerMont. As a test, Nokian HTS 18.00-33 tyres were installed on one Kalmar reach stacker. Erick Baker and Pneus SP's expert **Clermont "Charlie" Fortin** monitored their functionality. The results were astonishing: Nokian tyres achieved over 37 per cent better results than competing brands of port tyre.

Reliable operation for nearly 10,000 hours left

the newcomers in the field far behind, as well.

Testing was resumed by installing sturdy Nokian HTS E-4s as inner tyres, and smooth-surfaced Nokian HTS L-4S Slicks as outer tyres.

This turned out to be the perfect combination for reach stackers.

The Nokian HTS tyres (40 PR) provided additional stability for the reach stackers. This was needed, as TerMont needs to handle stacks of up to five containers.

The next vehicles to be tested were the 50-tonne container handling forklifts; smaller 18.00-25 HTS E-4 and L-4S tyres were installed on them.

The requirements for the tyres were almost the same as for reach stackers, and the products received excellent feedback once again.

Stability was especially improved.

– On a windy day, when a 30-tonne 12-metre container is hanging from the boom of the crane, the operator needs to keep the situation under close control to put the container in the correct position.

For this challenging purpose, the Nokian HTS tyres were the best, Baker describes. The wind limit for container work at Port of Montreal is 72 km/h.

After this, 35 Ottawa terminal tractors were equipped with purpose-built Nokian HTS Tugger tyres of the size 315/60R22.5. These special products had far fewer punctures than the tyres they were replacing.

– There are still punctures from time to time, of course, such as when we run into nails falling out of containers, but the wide Tugger tyre is fortunately one tough buddy for our Ottawa tractors, Baker says.

– It wears out evenly and lasts much longer than the others, even with all the heat that is generated under heavy loads and when turning. Loss of working hours due to tyre maintenance has reduced significantly.

In the beginning of 2009, 14.00-24 Nokian RTG tyres were introduced in the tall RTG harbour cranes. The agile RTG tyre has a cross-ply structure and an optimised, round shoulder. These features

reduce heat generation inside the tyre, and improve wear tolerance and damage resistance.

Tyres used by TerMont earlier lasted for around 8,000 to 12,000 working hours. Furthermore, sidewall cuts on the tyres had to be repaired from time to time.

– We started using Nokian RTG tyres in some of our cranes in the beginning of 2009. Our cranes are in use approx. 4,000 hours a year and working conditions vary between freezing cold and moist summer heat. Not a single Nokian tyre has been damaged due to sidewall cuts or punctures during this entire time.

We believe that according to our annual tyre rotation, these tyres will last for well above 16,000 hours, Baker says happily.

Maintenance is key

Erick Baker and Charlie Fortin have joined forces to monitor the functionality of different Nokian tyres in TerMont's port equipment. A tyre pressure of 140 to 150 psi is utilised for all equipment, and the pressure is inspected regularly. The

new Tire Pressure LED pressure guards will first be introduced in the terminal tractors, and later on, in other vehicles as well.

– The trained eye of an expert can spot the need for filling or repairing in a tyre during a quick morning review, says Charlie Fortin, who has over 25 years of experience in working with port equipment.

– Safety is always an issue. We monitor each tyre to gain the maximum benefits from it. Baker agrees.

– It took us five years to find the best possible tyre solution for all our vehicles. Our current tyre costs per working hour are much lower than before we switched brands.

Nokian Heavy Tyres has provided us with reliable products whose durability has exceeded our expectations. Our activity management system requires constantly increased stability, and Nokian products meet that need, as well, he says. ■

✍️ Michel Poirier-Defoy

An excavator tyre needs to last a long time

The traditional Finnish earth moving company Juho Krekola Oy will send out excavators even at night, if need be. The company, located in Seinäjoki, western Finland, has relied on the Nokian Heavy Tyres' selection of products for a long time.

The entrepreneur **Seppo Krekola** has dozens of years of experience in varied excavation work. Operating Juho Krekola Oy together with his brother **Kalle**, he knows that an excavator needs to be both powerful and reliable. The tyres on the machine are a cornerstone of reliability.

– I always choose Nokian. The main reason is that they are in a league of their own in terms of wear resistance. You cannot buy new tyres constantly. In the ten-tonne excavator class, Nokian Heavy Tyres products last us 18,000 hours. This is a great result. Of course, we do rotate the tyres from front to rear and back at regular intervals, Krekola explains. His company mainly

uses Liebherr and Volvo excavators.

– Tyres from another manufacturer wore out in 4,500 working hours with similar use. Even in the 19-tonne excavators, Nokian products are twice as durable as the others. Some tyre brands do have block patterns that grip well on wet grass, but we mainly work on asphalt and crushed stone.

Good experience has made Krekola rely on a single tyre brand. Some machines have had other tyre brands already fitted as original equipment, and so they wear them out first.

– We have a Hyundai that came fitted with tyres from another brand. We'll wear them out first and then replace them with Nokian.

He recalls a case from the early 1980s when a competitor tyre developed an extrusion in two weeks when equipped on an Åkerman H7. Warranty coverage did not work as agreed, and soon the entire manufacturer switched to Nokian tyres, Krekola remembers.

Moving even when it's cold

The earth moving company established in 1966 performed a generation change this year. In addition to administrative work, Seppo Krekola also operates machines a lot himself. All in all, the company has roughly a dozen excavators, most of which are wheeled.

– We do all sorts of excavation, but for the

most part, we work in renovation. We are at our best when working in the telecommunications, electricity, and water supply fields, says the entrepreneur.

And it is this sort of infrastructure construction that brings to his mind an example case that represents how important the on duty service maintained by the company is. A work assignment took a company excavator 50 kilometres from home – in the middle of the night.

– We had to drive all the way to the town of Parkano in the middle of the night, when a telephone line had been flooded. The phones were dead, and we had to get them fixed. Securing a transport lorry would have taken too long, so we just drove there on a wheeled excavator. We dug a hole and let the cable guys do their work, Krekola laughs.

– The on duty service is an important part of our work. We have some machines in the garage, ready to go, even in midwinter. If the sewers start flooding or domestic water stops running in the middle of the night, we need to get to the heart of the problem quickly.

Transfers are quick using a wheeled excavator, even though we usually use a transport lorry for longer distances.

Krekola usually buys tyres from Seinäjoen Rengaskeskus. The distance between the companies is suitably small. ■

✍ Kari Saarinen 📷 Mikko Lehtimäki



Juho Krekola Oy

- Established: Seinäjoki, 1966
- Field of business: All kinds of earth moving work
- Wheeled excavators: Hyundai 55 KKHP 6 t 2008, Liebherr 309 KKHP 10 t 2006, Liebherr 316 KKHP 16 t 2011, Liebherr 316 KKHP 16 t 2004, Cat 316 C KKHP 19 t 2006, Volvo EW 200 KKHP 19 t 1997 (2 pcs)
- Tyres: Nokian Armor Gard 9.00/20, 10.00/20

Heavy tyres means playing ball with the customer

At Nokian Heavy Tyres, we have our stop-watches running in sync with our customers at all times, to ensure they all have the tyres to get the job done. The service and tyre maintenance form a partnership that the entire line can appreciate, especially in the toughest possible conditions.



The man in the harvester is slightly stressed by the order on the front screen. With the pulp for the textbooks still standing in the forest and the paper mill emailing in a list of quality requirements, your tyres better have a fair amount of grip and predictability.

By staying in line and on schedule in the forest, you allow the entire production line to march to the same beat, regardless of the conditions.

Nokian Heavy Tyres is the leading manufacturer of forestry machine tyres in the world.

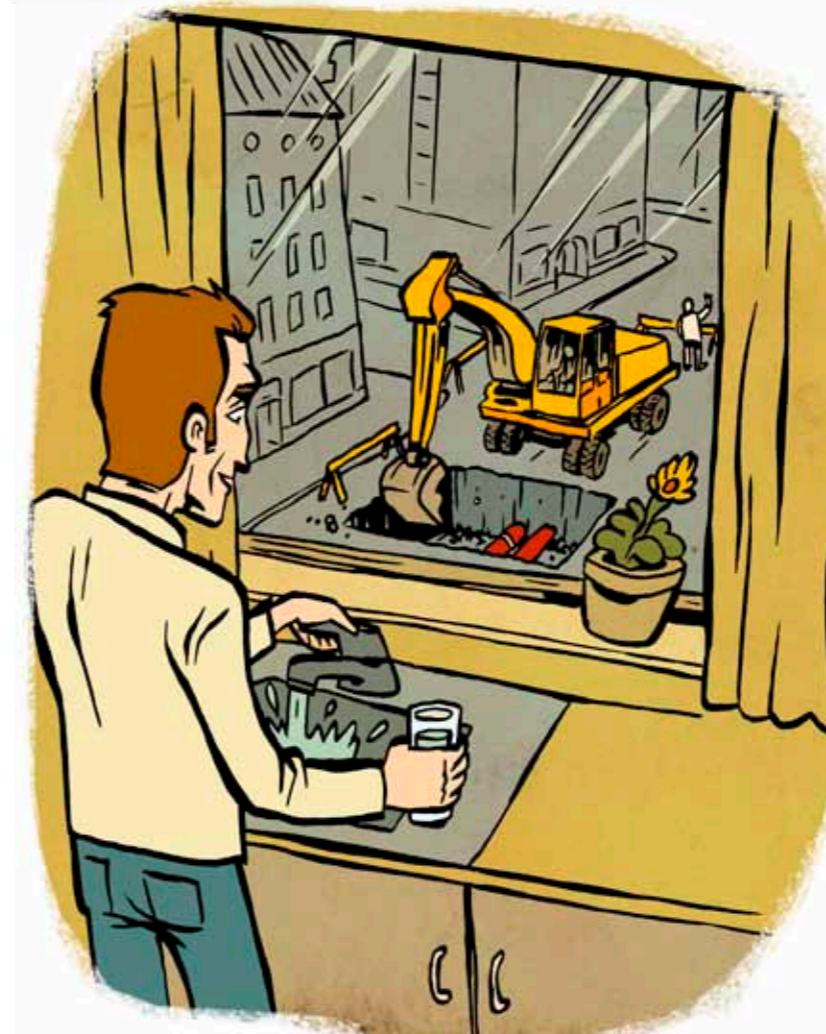
No wonder. The tyres are manufactured and developed in Finland, amidst the world's most demanding usage conditions. Your machine may nearly sink in the mud in spring and autumn, you may have a metre of snow in winter, but you keep on working.



This line is as old as human history. The journey from the field into the stomach may have more kilometres than before, but it takes less time.

Nokian Heavy Tyres meets the demands of agriculture as the size and speeds of tractors and other agricultural machinery increase.

The tyre plays a key role in successful work. Excellent grip, high load-bearing capacity, and a pleasant driving feel all make your everyday work quite a bit easier.



Under a city, there are thousands of kilometres of electrical grids, heat pipes, water-lines, and communication cables. Surgical precision is required from the contractor. A leak in the water line needs to be located in a few hours using heavy machinery, although pliers would seem more appropriate considering the room for error.

Your work site may be so cramped, and so far away, that you need to get there using the machine's own wheels. Problems facing tens of thousands of people usually surface at night, when your transport driver is resting as well.

Contracting requires stability and off-road ability from a tyre. Nokian Heavy Tyres offers safety and reliable traction for locations requiring maximum precision, grip, and wear resistance.



Working in a gold mine, going down, down, down. The men may not be wearing rubber, but the machines are. Inside the rock at a depth of hundreds of metres, a 30-tonne machine is as demanding as its driver.

The world of mining and tunnelling equipment tyres is razor-sharp. The loads are heavy and the surfaces are very challenging. This is why mining tyres are a whole new ball game in the world of tyres, where reliability also means service expertise. A working mine is teamwork at its finest. So make sure your winger plays with Nokian Heavy Tyres when going for gold.



In a port, every second has a price; this is why you don't need any problems at the most demanding logistics nexus points. Nokian Heavy Tyres develops the material handling equipment tyres and harbour tyres together with the world's leading equipment manufacturers to meet the demanding criteria. Our acclaimed wear resistance is based on careful material and structure development, and testing is performed under actual usage conditions.

Our stopwatch proudly runs in sync with the customer to make the heart of global logistics beat in tune with the demand.



Nowadays, Europe has this nasty tendency of being covered in snow and cold weather from Siberia, at least for a short while. While waiting for average weather, you may want to rely on the Nordic expert before winter even gets to where you are.

The ploughing issues that have been experienced more often than necessary, and at surprisingly southern latitudes, have frozen several airports for hours, even days - not to mention street maintenance and ploughing.

For Nokian Heavy Tyres, drawing on Nordic expertise, this Pan-European challenge is business as usual. The solutions are often simple, and people from Nokia can give you the most useful tips.

✍ Miika Kaukinen ✍ Ville Pirinen

Heavy tyre characteristics are captured using three different measurements. No equipment exists for these tests, so they first had to be built.

Collect tyre forces and let our customers use them

Research co-operation

- Agrifood Research Finland is the Finland's leading authority in agriculture and foodstuffs research.
- Agrifood Research Finland's Vakola centre in Vihti carries out testing related to agriculture and food industry technology. Vihti has a selection of equipment for the measurement and testing of heavy machinery.
- Aalto University is Finland's largest university, consisting of four universities from different fields of technology.
- Aalto University's vehicle technology research is focused on tyre and surface contact under winter conditions, a vehicle's kinetic dynamics and its modelling, and systems design for heavy vehicles and moving machinery.



A tractor and trailer run along a circular track on the yard of Agrifood Research Finland's Vakola centre in Vihti. They stop for a while, and then accelerate again. You might not realise you are witnessing a unique procedure, even on a global scale.

– When speed is increased along a circular track, the lateral force generated by the tyres and the slip angle of the tyres increase. The measurements tell us what the lateral force is at each slip angle, says vehicle technology researcher **Johannes Kankare** from Aalto University.

The slip angle means the angle of the tyre with respect to the direction of movement. The tyre only generates a lateral force when yielding, which means that it generates lateral slide, although it is not visible to the eye. The tractor can reach 30 kilometres per hour on the track, and that is enough for now. With a passenger car, you could reach the maximum force value, but a tractor would tip over before reaching the top.

Slip angles are not the only variable Kankare is tracking with Agrifood Research Finland's per-

sonnel. He is also using his computer to measure longitudinal, transverse, and vertical acceleration. The longitudinal force from the pole, the longitudinal and lateral speed of the trailer, and the rotation speed of the tyre are also captured. The lateral force generated by the tyres is calculated based on transverse acceleration.

After the circular track, the same tyre model is tested on a straight track by gradually increasing braking force to find out the longitudinal forces generated during slides of different magnitudes. Even the bump test has its role in the big picture. It measures the damping properties of the tyre.

Unique measurement method

Each Nokian Heavy Tyres model is tested at two different pressures and three different vertical loads - two repetitions for each measurement. The computer stores the signals from the different sensors.

– A speed sensor optically measures the longitudinal and transverse speed from the road surface. The tyre rotation speeds are also measu-

red. On top of the axle, we have an accelerometer measuring acceleration along three axes. On the pole, we have a force gauge, Kankare states.

The tyre rotation speed sensors are manufactured by the personnel of Agrifood Research Finland's Vakola centre, specifically for this test. Measurement instruments are available for testing passenger car tyres, but instruments suitable for the largest of tyres are not known to exist.

– This may be the first time in the world that a method like this is used.

Nokian Heavy Tyres wants to provide its customers with these figures to allow them to simulate tyre behaviour as part of their vehicle simulation models. Although the measurements do include factors causing uncertainty, such a trailer allows us to estimate the parameters, Kankare says.

Also serving R&D

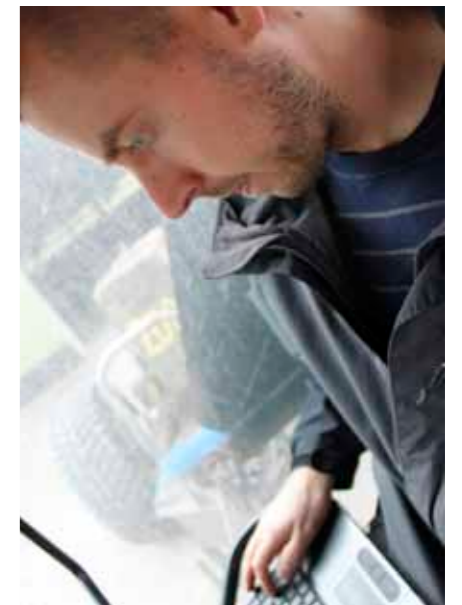
According to R&D engineer **Matti Kaunisto** from Nokian Heavy Tyres, these tests are primarily intended to meet the needs of customers.

Later on, the measurement results may be

utilised in product development.

– Should the customers indicate a need for us to develop certain properties, we have a measuring method ready and can perform additional testing for new prototypes, Kaunisto says happily.

He is also happy that co-operation with both Aalto University and Agrifood Research Finland's Vakola centre is improved by means of the measurement project. Vakola is a traditional partner for Nokian Heavy Tyres in the field of fuel consumption and pulling power measurements. Aalto University is also an established partner. ■



Vehicle engineering researcher Johannes Kankare measured and defined tyre's lateral forces at different slip angles.

✍️ Kari Saarinen

Chains: Grip and Protection



Like tyres, chains are your reliable partner. When installed correctly, a chain will operate freely between the tyre and ground surface.

Will the use of friction chains increase the operating life of a tyre?

- Using chains serves two main purposes: Either improving grip and thereby traction, or protecting the tyre.
- When the chains are tightened correctly, the tyres and chains will wear out less quickly.
- The protection provided by the chains increases the operating life of the tyre and makes your work safer.

When using chains, do you need to increase tyre pressure compared to running without chains?

- Correct tyre pressure is determined by the requirements of the location: load, speed, and application. Using chains does not require increasing tyre pressure in itself.
- In forest use, for example, the pressures are the same with and without chains.
- In tractor use, speed is often limited when using chains, which may allow you to adjust the pressure if necessary. A tyre has more load-bearing capacity at a lower speed, which means that you can lower the pressure when the speed decreases, even if the load remains the same.

Does the tightness of the chain affect tyre wear or its other properties?

- When installed correctly, a chain will operate freely between the tyre and the ground surface.
- If the chain is too tight it will burden the tread surface and increase wear. A tight chain will alter the rolling diameter of the chain and tyre combination, which can have a negative effect on four-wheel drive tractors, for example.
- If the chain is too loose, it may roll up, causing rapid chain wear and attachment to the tread surface, in turn resulting in local damage. The hard alloy bits on the chains may turn against the tyre and damage the tread. When rotating, a loose chain may hit the axles or structures of the machine, damaging them.



When selecting chains, note the space required by the tyre and chain. In a wheel loader, for example, space is often limited. For such a usage scenario, the 26.5-25 Nokian Mine L-55 may be replaced by the Mine L-35, whose lower groove depth allows for the installation of chains approx. 50 to 60 mm thick.

Where and why are tight mesh, protective chains usually used?

- A tight mesh chain is used on demanding surfaces, and usually in machines with a low rate of speed. For example, a wheeled loader will benefit from protective chains at a quarry where the crushed stone or rock type is sharp and cutting.
- There are also some conditions where it is important that the tyre does not directly touch the driving platform. In a foundry, for example, the platform is often scorching hot, or it may contain nearly molten metal that would easily damage the tyre. Under these conditions, protective tyre chains allow for effective use of the machinery.

What is the best tread surface type for matching chains and tyres?

- Chain manufacturers have options for different tread models.
- Primarily, you select the tread based on your use, and then complement it with a suitable chain.
- For example, the tread on the TRI 2 Extreme Steel is very well suited for driving on a hard surface. Chains are required in the winter in alpine areas, for example.
- The tread compound for these products has been selected taking into account the demands of chain use. In forestry equipment, the tread usually has a bar pattern. The tread is designed for easy cleaning. In the forest, chains are used to improve traction and to protect the tyre under difficult conditions.
- Optimal results are achieved by selecting the correct tyre and chain combination for the area of use. It is essential that both the tyre and chain are serviced regularly; the tyre must be checked for the correct pressure, and the chains must be checked for tightness and wear. Worn chains significantly reduce the service life of tyres.

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 area and strong body of the tyre provide stable, precise handling. The open lateral and longitudinal grooves of the tread pattern effectively remove soil from the surface. The natural rubber based special compound ensures durability and grip on soft gravel, as well. The sturdy steel body structure and steel belts below the tread ensure an impressive hourly output.

– The block patterned Nokian Loader Grip 3 is especially suited for earth moving in demanding sites. The sturdy All-Steel Radial structure ensures excellent durability. The abrasion guard effectively protects against sidewall cuts and abrasions 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
- Wear indicator

Heavy-duty introduction for mining equipment Nokian Nordman Mine All-Steel Radial

Nokian Nordman Mine All-Steel Radial, the new product in the Nokian Nordman range, is a heavy-duty special tyre for mining equipment, such as articulated dump trucks in underground mines or above-ground quarries.

The aggressive tread pattern provides good grip even on slippery surfaces. The cut resistant rubber compound and All Steel Radial structure allow for low rolling resistance and long transfers. ■

Nokian Nordman Mine All-Steel Radial

- Cost-efficient dump truck tyre (EUR/h)
- Durable All-Steel Radial structure for demanding conditions
- Good grip even on slippery surfaces





Kati Luoto is Finland's Strongest Woman. She says that the 130-kilo trailer tyre that was rolled in the Finnish championships was light.

Training with even heavier tyres

Many European countries have annual strongman contests, but more and more strongwoman contests are also arranged.

Even at school, Kati Luoto took on the boys in sport, and won, after beating all the girls. Later on, three small children took their toll, and her overall fitness collapsed. In the wake of this, she started exercising, which soon turned into weight lifting. Six Finnish championships in strongwoman contests is an achievement nobody else in Finland has been able to replicate.

Luoto earns her living at a gym, but wants to continue weightlifting as a fun hobby.

Even her workout room is special: she has been allowed to store her equipment at a parking hall for a store in Espoo.

Finland's Strongest Woman

Kati Luoto has been Finland's Strongest Woman six times: in 2004, 2005, 2006, 2007, 2010, and 2011.

She missed a couple of years due to pulling her hamstring.

Kati Luoto confesses that she does get butterflies in her stomach before a competition, but the feeling gives her the motivation and security she needs.

The security is based on long and systematic weight training, resulting in correct technique. Kati Luoto has this to say to newcomers to the sport:

Whether you are male or female, do not start with weights that are too heavy.

Tyre rolling is only one part of this fun but excruciating game of strength and speed. In the contest, the tyre is lifted and rolled over a certain amount of times, and the performance is timed. The athlete with the fastest time takes home the event points.

Kati Luoto confesses that rolling heavy tyres is more skill than pure power and tenacity.

– It's half strength, half technique. You could train for this by doing dead lifts, but you need to use a real tyre for training.

– The heavier the tyre you train with, the easier the competitions are. When training, I roll 250-kilo tyres, Luoto says.

And you also need to train your technique.

– Technique is paramount for tyre rolling.

When training with large weights, you need to have your technique just right to avoid injury. Tyre rolling is impossible if not done correctly.

So, how do you do it, then?

– Grab hold of the tyre. You make the first move with your arms; your biceps, that is. Then, try to put your knee below the tyre, then help it forward with your feet, and topple it over. Your back and hamstrings work very hard to achieve this. The end is almost automatic.

The six-time Finnish champion has one more goal. She wants to be world champion, and next autumn, this battle is to be fought on Finnish soil. ■

✍ Miika Kaukinen
📷 Jyrki Alastalo / Suomen Vahvin Mies ry.



Kazakhstan copper, a mining area the size of Poland

Kazakhmys PLC is one of the world's leading mining industry companies. The corporation operating in Kazakhstan, Central Asia, is among the 100 largest companies listed on the London stock exchange.

The company focuses on mining, enriching, and selling copper. Kazakhmys is the largest copper producer in its country, and it is ranked 11th in the world. As by-products, the company produces significant amounts of zinc, silver, and gold. The company is also a major energy producer in its native region.

Kazakhmys is heavily involved in China and Europe, the two main market areas for copper. It has a central location between the main markets. The company operates a total of 17 mines that generated 32.9 million tonnes of copper ore last year. An indication of the infrastructure required is that mining is supported by a railroad network of 1,100 kilometres, one hundred locomotives, and 800 train cars.

Nokian Heavy Tyres supplies tyres for underground mine loaders in the Zhezkazgan mining complex, Kazakhmys' largest mining area in terms of production.

– While no two mines are identical, the mines in the Zhezkazgan region especially require wear and cut resistance from a tyre. To increase the service life of the tyres, chains are used to protect the tyre body. We maintain close co-operation with chain manufacturer Pewag, says Nokian Heavy Tyres Sales Manager **Kaspar Sepp**.

– We have our own stock in Kazakhstan, ensuring that tyres are available to the customer when needed. ■



Kuwait: Kazakhmys

The first Heavy Tyres eNews is out

You can now subscribe to the Nokian Heavy Tyres eNews on our website. The first eNews focuses on Nokian NORDMAN special tyres, operating reliably in varying conditions around the world. Heavy Tyres eNews discusses solutions for mining, forestry equipment, and material handling.

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Nokian HTS Straddle

- › Excellent hourly output in demanding conditions. The ultra-durable Beyond All-Steel Radial structure makes handling safe and extremely comfortable

Nokian HTS

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