

[KIZEI]®

The first spherical roller bearing with **metallic shields**

NTN® SNR®



NTN SPAW Heavy-Duty Bearing Units for waste water treatment

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Having an impact on the homeless has been a rewarding experience

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Fresh from the NTN Community Garden

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NTN BEAR HOLIDAY CAMPAIGN

Meet the NTN Teddy Bears: Roller & Linéaire

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Update from our President & CEO



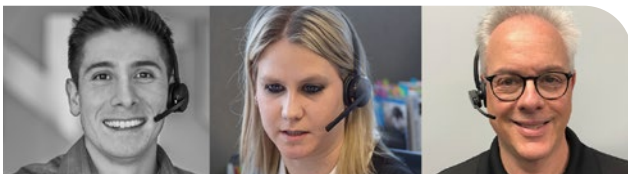
Paul Meo
PRESIDENT & CEO

Support to keep you moving forward

As the situation with COVID-19 continues to evolve we want to assure you that the health and safety of our employees, customers and partners is our top priority at NTN Canada. Throughout the pandemic, we have remained committed to fulfilling customer's orders and have adjusted our manufacturing output to respond to the changing demands in the market while ensuring our operations and service capabilities continue safely. If we have learned anything during this time, it's the importance of being nimble, flexible and adaptable for our customers.

What changes have we made to adapt?

All of our divisions have had to adapt their operations and I am very thankful to each and every one of our employees for the great efforts they have made, from social-distancing practices and remote working across locations, to ensuring frequent cleaning at our facilities. We continue to support the latest COVID-19 public health protocols provided by our health authorities, using available technologies, to not just meet but to exceed current requirements.



Thanks to the resilience and agility of our employees, we have quickly figured out how to serve our customers and clients remotely and accelerated our own digital transformation. Online video meetings and interviews, reduced travel to clients and dispensing with physical conferences that can be done virtually are changes that we have made for compliance with social distancing policies. Additionally, we have implemented remote-service solutions for troubleshooting bearing equipment and managing client accounts.



From product questions to technical support, our experts are ready to solve your problems

And to make communication easier for our people, our leaders have created a governance structure that pushes decision-making out and down. This is part of our ongoing culture shift to becoming a Learning Organization. We promote a “Middle Up Down management style” by motivating employees to come forward with ideas on how we can improve the way we do business and create solutions to get through this crisis. We have also focused on upskilling our workforce with a range of internal training seminars to set ourselves up for success for when everything picks back up.

Over the last six months, our Canadian sales division has not only delivered a strong and competitive performance relative to other market players in the bearings industry, but we have ensured workplace safety with zero COVID-19 cases in our organization. Our staff has certainly gone above and beyond and we remain committed to delivering an elevated customer experience.

From an NTN perspective, transforming into Canada's leader of the Ultimate Bearing Experience is my personal philosophy, and building local expertise and creating local solutions is more important than ever before. I believe we must continue to look to innovate ourselves, and to pursue the products and the markets that will strengthen our corporate value for our employees, customers and shareholders, as we look forward to better times ahead.

Paul Meo

PRESIDENT & CEO OF NTN BEARING
CORPORATION OF CANADA

If the Covid-19 pandemic has taught us anything, it's the importance of being nimble, flexible and adaptable for our customers.



NTN'S ENGINEERING TRIPLES UPTIME OF PAPER MACHINE COUCH ROLL



NTN's Engineering Services work in partnership with aftermarket customers to achieve bottom-line results

"Our people make the difference and go the extra mile every day," says Marcus Wickert, Director of Engineering at NTN Canada. "Our Service and Engineering team are committed to solving problems and ensuring our customers succeed...that is what really differentiates us from the competition."



Engineering service is a point of pride for our NTN organization and also a valuable brand differentiator. We decided over 30 years ago that we didn't want our brand to be just about bearings. We wanted to build our brand to be about the very best customer service and the very best bearing experience. Becoming a solutions provider involves the right combination of product, service and high degree of value addition, all backed by an underlying vision to deliver the Ultimate Bearing Experience.

Our work with this major Canadian producer of containerboard is an inspirational story. The plant was experiencing catastrophic failures of the spherical roller bearings on the large suction couch roll in the wet end of their paper machine. Failures were occurring every two months resulting in the mill shutting down its sole paper machine for over six hours each time it needed repair.

With this new bearing opportunity, we wanted to keep intact the culture of customer service that our technical support team had created with our long-established history in the pulp and paper industry. In this application, engineering service proved to be a powerful brand differentiator.

› Bearing Failure Investigation

When bearings fail repeatedly well before their design life, the common approach is to simply change bearing brands. NTN mitigated the fear of buying the wrong bearing by providing extensive engineering analysis on the bearing application. Our engineering and service teams went beyond just explaining our NTN ULTAGE® product features. At each plant visit, information was collected on the application and the associated monetary costs the failures were generating for the mill. The removed bearings were carefully analyzed to define the root cause

VALUE ADDED BREAKDOWN



Increased Productivity
\$150,000*

Increased Bearing Life
\$15,480*

Documented Cost Savings
\$165,480*

Annualized Cost Savings
\$165,480*

* All monetary amounts listed in Canadian dollars

of the catastrophic failure. Following this comprehensive evaluation, our engineering team outlined the necessary corrective actions for the entire bearing system, confirmed the suitability of our NTN ULTAGE® spherical roller bearing while outlining the cost savings that would be achieved.

› The Solution:

Differentiating NTN's engineering support with service that goes above and beyond was critical in helping this customer select our solution over the alternatives.

As part of this process, NTN's applications engineering team conducted three consecutive detailed bearing failure analyses of the couch roll and discovered multiple reasons for the failures. First, loose housing fits allowed the bearing's rotating outer rings to move relative to the housings during operation. This resulted in heavy outside diameter wear, fretting corrosion and cracking. Additionally, evidence of thrust load was observed and could be linked to a tight inner ring fit that did not allow for proper shaft expansion. Finally, moisture from the wet operating environment was getting into the bearings past the brass spacer rings, significantly degrading the lubricant and bearing performance.

NTN's team recommended the correct press fit for the bearing's rotating outer ring and loose inner ring fit for the stationary shaft. A new design for the brass spacer rings was also recommended to remove a second unused keyway slot that was an open channel for water to get into the bearing. Lastly, a higher viscosity lubricant with water inhibiting characteristics was implemented to better withstand the wet end paper machine conditions.

› A Successful Outcome

The NTN solution lasted three times longer, operating for six months between roll rebuilds. The mill has been completely satisfied and specifies NTN ULTAGE® spherical roller bearings for this demanding application. ULTAGE® spherical roller bearings were introduced to support higher loads and the growing demand by various industries for faster rotational speeds. Besides allowing machines to run at maximum productivity, the innovative ULTAGE® design was able to reduce heat generation for extended grease life and improved uptime, compared to conventional bearing designs.

An increase in bearing life was confirmed as the mill went from replacing 12 bearings per year to 2 bearings per year, generating a total annual cost savings of \$165,480.

Intimate discussions and numerous fact seeking missions at the plant were led by Mike Shadid, NTN Applications Engineer. "Our efforts in understanding our customers business, their operating conditions and challenges allowed us to make suggestions that were important to their bottom line," says Mike Shadid.

Initially, the engineering team found that the renewed roll had wrong fits that were reversed from what was required. During the process NTN also provided the customer with a lubrication review due to water ingress which further improved bearing reliability.

"Through the documented cost savings evaluation and reporting process, we were able to engage them to discover what's important, identify the risk, establish goals, and set expectations," says Mike Shadid. "This in turn helped our customer learn how to align the divergent interests in the buying group and build the business case to get management approval."

Today NTN has grown its business with this buying group and this can be attributed to the expertise of our dedicated engineering and technical service group. With over 190 years of combined bearing experience and excellence in the Canadian marketplace, our engineering representatives are professionals dedicated to providing expert failure analysis and recommendations to optimize bearing life and reduce downtime. This case study is just one of many that showcase how NTN's engineering services can work in partnership with aftermarket customers to achieve bottom-line results.

› Conclusion

We recognize the success of our customers has a profound and direct impact on our own business. Our success depends on our ability to earn their trust and confidence as a solutions provider. How we engage the customer in helping them solve their problems, in helping them achieve their goals, in helping them make a buying decision becomes the ultimate differentiator.



[KIZEI][®]

The first spherical roller bearing with metallic shields

NTN 



NTN-SNR's exclusive, revolutionary offer - a new range of spherical roller bearings protected by metal shields - boasts improved production efficiency, lower maintenance costs, ISO standard dimensions, guaranteed interchangeability, innovative design, and more. Halfway between the sealed and open models, KIZEI[®] is today's innovation and tomorrow's standard.

Staying true to the company's top priority - customer satisfaction - the NTN-SNR engineering team based in Annecy, France, observed that 21% of damage to open spherical bearings is due to solid contamination and 13% to lubrication problems. This results in premature wear to the bearing, high maintenance costs and significant production losses. The problem is daunting: how to limit these two factors that cause premature end-of-life?

After more than four years of research, development, industrialization and real-world tests, NTN Bearing Corporation of Canada Limited, a leading producer of premium quality ball and roller bearings, is pleased to announce the introduction of KIZEI[®], a full range of new spherical roller bearings developed to meet current market requirements.

A patented innovative concept

KIZEI[®] is a spherical roller bearing protected by metal shields attached directly to the cage. The idea may seem simple, but it presented a significant challenge in terms of design and manufacturing. KIZEI[®] provides protection against solid

particles (dust, pebbles, etc.), improves grease retention, respects ISO dimensions – and all of this without reducing load capacity,

Completely interchangeable, zero disturbance

With a minimum lifespan twice that of an open spherical roller bearing, and a need for relubrication that is three times less, KIZEI[®] guarantees the customer both optimized performance and reduced maintenance costs. Its ease of use and standard dimensions ensure complete interchangeability, and hence no interruption to the customer's working practices. Unlike the larger sealed model that requires special accessories, KIZEI[®] fully adapts to the mechanisms already used with standard open bearings: same housing, same accessories, same mounting, same grease. All that is needed is to change the part. The KIZEI[®]'s commitments thus boil down to this: effortless implementation, longer life and increased equipment performance.

A complete range

In adding this innovation to its catalogue, NTN-SNR now offers the most complete range of spherical roller bearings on the market. The aim is clear: to strengthen NTN-SNR's position in the market and to be seen as a major innovator.

KIZEI[®], the viable alternative for dirty environments

- Protection against external solid contamination
- Improvement of grease retention inside the bearing
- 100% interchangeable with standard open spherical roller bearing

With KIZEI[®], change the game!



ULTAGE[®]

WATCH THE VIDEO ONLINE  ntn.ca/company/news/

FREQUENTLY ASKED QUESTIONS

KIZEI® Spherical Roller Bearings



Q: What are some of the typical applications for Kizei® Spherical Roller Bearing

A: Mines, quarries, industrial ventilation, cement works, the iron and steel industries, sectors that make use of conveyors and overhead cranes, and more. KIZEI® is marketed via industrial distribution and aims to become the standard rather than an open bearing. And that's why we want to develop the most complete range possible.

Q: What tests were carried out before the Kizei® bearing was launched in the market?

A: The KIZEI® was rigorously tested and shown to make a difference! After 2,200 hours of service on a quarry conveyor, it was found that the KIZEI® bearing, having worked for twice as long as the original open bearing, displayed far fewer contamination indentations. This proved that the metal shield was really doing its job.

The second highly revealing test took place in the abrasive, dusty environment of a cement works. The company had recorded a \$1,174,000 loss due to downtime caused by near-monthly replacement of the open bearing. When KIZEI® bearings were used, there were three times fewer shutdowns, and the cement works plant saved over \$793,000 in the first year. These tests prove that the KIZEI® is as important for

maintenance as it is to production. And meeting the needs of both of these is one of NTN-SNR's stated aims.

Q: How is Kizei® priced in the market?

A: Like every single innovation that enters a market, KIZEI® has a higher purchase price than existing models. The cost is justified because its exclusive features guarantee a lifespan that is at least twice as long, with one third of the maintenance costs. As for its ISO dimensions, they are completely interchangeable and do not entail any additional costs.

Q: Why the name "KIZEI"?

A: "Kisei" with an "s", means "regulation" in Japanese. This signifies the regulation brought about by the new product: less contamination going in, less grease going out. "Kisei" is also one of the major title names in professional **Shogi**, a Japanese chess game. We wrote the name with a "Z" because in bearing terminology, a product part number is symbolized by a number and letters that represent different options. Metal shields, and the metal shield used in this new series, are commonly symbolized by a "Z" suffix - hence the name KIZEI®. A "ZZ" suffix is added to the standard ULTAGE® part number to identify a shield on both sides of the KIZEI® series.

NTN-SNR'S DEDICATED RANGE OF SPHERICAL ROLLER BEARINGS

	Open bearing	KIZEI®	Sealed bearing
Dimensions	ISO	ISO	Special
Protection	0	+	++
Grease retention	0	+	++
Temperature range	-40°C to -200°C	-40°C to +200°C	-10°C to +120°C
Speed	++	++	+
Nominal load	ULTAGE®	ULTAGE®	ULTAGE®
Internal clearance control	Yes	Yes	No
Internal control	Yes	Yes	No
Sleeve & nut	Standard	Standard	Special
Delivered with grease	No	No	Yes

*Suitable for sealing against solid dust particles, but not liquids.

EXCLUSIVE FEATURES

- ULTAGE® label
- Load capacities and rotation speed identical to an ULTAGE® open bearing
- ISO standard dimensions
- Nitrided shield and cage for greater impact resistance
- Temperature range from -40°C up to +200°C (-40°F up to +392°F)
- Initial lubrication identical to an open bearing
- Optimal misalignment
- Simple mounting on cylindrical or conical to tapered

ULTAGE® QUALITY LABEL

The ULTAGE® label is the product of two combined concepts: "Ultimate" and "Stage". It offers longer service life, higher rotation speeds, lower maintenance costs and enhanced environmental protection. NTN-SNR offers the widest range of ULTAGE®-label spherical roller bearings on the market, from 25 mm bore diameter to 2,180 mm outside diameter.

KIZEI® HAS BEEN RIGOROUSLY TESTED AND SHOWN TO MAKE A DIFFERENCE!

CUSTOMER BENEFITS:

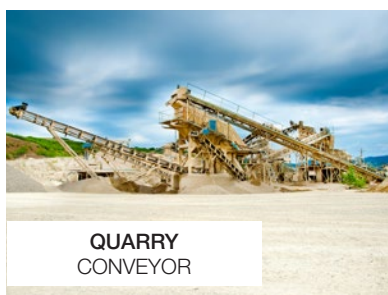
- Optimized production output due to longer service life
- Reduced maintenance cost
- Easy to use



FIELD TESTS:

1 Less bearing deterioration with twice the service lifetime

After 2,200 hours of service on a quarry conveyor, it was found that the KIZEI® bearing, having worked for twice as long as the original open bearing, displayed far fewer contamination indentations. This proved that the metal shield was really doing its job.



QUARRY
CONVEYOR

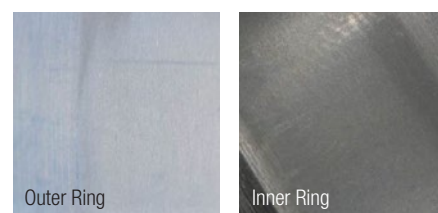
INITIAL BEARING 1100 hours of service



Outer Ring

Inner Ring

[KIZEI] 2200 hours of service



Outer Ring

Inner Ring

2 Maximized profits

The second highly revealing test took place in the abrasive, dusty environment of a cement works. The company had recorded a \$1,174,000 loss due to downtime caused by near-monthly replacement of the open bearing. When KIZEI® bearings were used, there were three times fewer shutdowns, and the cement works plant saved over \$793,000 in the first year.



CEMENT PLANT
BUCKET ELEVATOR

	Open spherical roller bearing	[KIZEI]
Life time	1 month	3 months
Production stops	12 times/year	4 times/year
Maintenance costs	100	30

A 70% reduction in
maintenance costs



NTN's SPAW heavy-duty mounted bearing units can withstand the severely contaminated environments of waste water treatment plants

Municipalities around the country rely on waste water treatment facilities to treat sewage and provide reclaimed water. Bearings used in the aeration ponds at these facilities are constantly exposed to water and contamination and must be able to withstand these harsh conditions. Downtime on these ponds can be very costly and create hazards to both the environment and local constituents.

NTN's SPAW heavy-duty mounted bearing units offer a superior one-piece solid ductile housing design and robust seals which allow them to withstand the severely contaminated and corrosive environments of waste water treatment plants better than the often-used SAF style bearing units.

Our products can handle your most extreme.

NTN precision-engineered bearings are proven to be durable and dependable. Plus they're readily available in a wide variety of fittings and come with hands-on support from experienced field engineers, all working to help you boost production like never before.

Key NTN products for waste water treatment:

NTN SPAW HEAVY-DUTY BEARING UNITS

- Heavy-duty, one-piece, sturdy ductile iron housing to withstand shocks & impacts from falling debris and cold operating conditions
 - Superior sealing protection from water and contaminants with spring-loaded, single-lip contact bearing seal
 - Extra bearing protection with optional end covers for severe debris & contamination services (2 open covers, or 1 open & 1 closed cover)
 - Phosphate-coated bearing insert, locknut & adapter sleeve for corrosion protection
 - Prelubricated & factory sealed for quick, trouble-free start ups
 - Versatile with repositionable snap ring for fixed or floating operation
 - Drop-in replacement for split housing bearings permitting faster, easier installations than SAF/SN units, having the same base-to-shaft center height and bolt position
- Not only do our SPAW units offer superior performance, but they are so easy to install that they deliver a 60% faster installation time and are a direct interchange to SAF style units. Additionally, the phosphate coated unitized bearing inserts and adapter assembly offer excellent corrosion resistance.
- Contact your local NTN representative to learn more about our SPAW/SPW Mounted Roller Bearing Units, or visit www.ntn.ca



WHO ARE THOSE MASKED PEOPLE ON THE COVER?



ELLEN MCGREGOR
CEO, Fielding Environmental
Chair of MERG (Mississauga
Economic Recovery Group)

Even with a mask, you will no doubt recognize our illustrious MBOT Chair and partner with Spelgel, Nichols, Fox - Susanne Balpataky, MBOT President & CEO - David Wojcik and MBOT V.P. Government & Stakeholder Relations - Brad Butt. You might have also spotted Jim Molyneux, the new Principal of UTM, Jane Chung, President of AstraZeneca, John McKenna, President of McKenna Logistics, Paul Meo, President of NTN Bearing Corporation of Hotels, Bree Ranieri, CEO of CoTalent Corporation and me, Ellen McGregor, CEO of Fielding Environmental. So why did so many business leaders gather to launch MERG - pronounced with a soft "g". MERG stands for the Mississauga Economic Recovery Group.

WHAT'S MERG ABOUT?

It began - as all great ideas do - with a conversation. At the beginning of April this year, David Wojcik posed this question

The MERG THE PANEL



SUZANNE BALPATAKY
Spelgel Nichols Fox LLP



DAVID WOJCIK
MBOT



ELLEN MCGREGOR
Fielding Environmental



SAMEER SHARMA
Crown Group of Hotels



JOHN MCKENNA
McKenna Logistics



JANE CHUNG
AstraZeneca



PAUL MEO
NTN Bearing



JIM MOLYNEUX
MNP LLP

Construct SECTOR LEADERS



JANE CHUNG
AstraZeneca
SECTOR MEMBERS
Life Sciences &
Health Care



SAMEER SHARMA
Crown Group of Hotels
SECTOR MEMBERS
Hospitality, Tourism,
Retail



JIM MOLYNEUX
MNP LLP
SECTOR MEMBERS
Financial & Professional
Services



PAUL ME
NTN Be
SECT
Man
Tr

to me. "What can MBOT do to help Mississauga businesses recover from the impacts of COVID-19?" He went on to say, "We should form a group of senior business leaders from various sectors of the Mississauga business community to think through the impacts of COVID-19 on the various sectors and more importantly, what can be done to mitigate and reverse the effects". He then asked for my help, which immediately triggered a passion within. After all, my business had been substantially impacted and not in a good way even though Fielding had been characterized as "essential". I could only imagine the impact on business owners who had been forced to close. With a sense of urgency, MBOT needed to show strong leadership underpinned by well thought out disciplines with an outcomes focus. In late April, the approval was given by the MBOT Executive Committee and MERG was created.

We began to brainstorm objectives at a 40,000 foot level. We knew we needed data from Mississauga businesses. Data that would lead to advocacy work - with the City, the Region as well as the Provincial and Federal Governments. But more

than that, in order to
we needed data th
capabilities unique
of new talent po
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the "

THE **MERGE** **CONSTRUCT**

NTN partners with MERG to help businesses “E-MERG” stronger

The NTN Canada team is proud of our CEO, Mr. Paul Meo for his work with the Mississauga Economic Recovery Group (#MERG). Under the leadership of the Mississauga Board of Trade, MERG has been formed with the vision of "Business United For a Thriving Mississauga". Mr. Meo has joined a group of 7 CEOs who have assembled to bring action to economic recovery to help Mississauga businesses impacted by COVID-19. Mr. Meo will serve as the sector leader for the advanced and traditional manufacturing segment to spearhead actions and advocacy working with the City of Mississauga, the Region, as well as the Provincial and Federal Governments.

This group of senior business leaders from various sectors of the Mississauga business community will explore the impacts of COVID-19 on the various sectors and more importantly, develop recommendations to help mitigate and reverse the effects. With a sense of urgency, MERG was formed in April 2020 to spearhead powerful actions to help companies recover and exceed pre-COVID measures. Some of these initiatives include the creation of new talent pools and alternative access points to capital and a wide range of collaboration opportunities to help reduce costs and even serve as a recovery model for every City across Canada. A huge thanks to the MBOT and its sector leaders for stepping up! Merge sector leaders (L-R): Jane Chung, AstraZeneca (Sector: Life Sciences & Health Care); Sameer Sharma, Crown Group of Hotels (Sector: Hospitality, Tourism, Retail); John McKenna, McKenna Logistics (Sector: Transportation Logistics, Supply Chain), Jim Molyneux, MNP LLP (Sector: Financial & Professional Services); Paul Meo, NTN Bearing (Sector: Manufacturing, Traditional & Advanced); Alexandra Gillespie, UTM (Sector: Education & Not for Profit), Ellen McGregor, Fielding Environmental (Chair of MERG), David Wojcik, MBOT (Chair of MBOT).



**READ THE LATEST ISSUE OF MBOT'S
CONNECT MAGAZINE TO LEARN MORE
ABOUT THIS EXCITING PROGRAM.**

https://issuu.com/mbotontario/docs/mbot_issue_fall_2020_web/18



SCAN HERE



Together we can make a difference!

Having an impact on the homeless has been a rewarding experience

Thank you to the volunteers at NTN Canada and Kintetsu World Express Canada for sharing and caring. Over the last few months, we have partnered together to support the Haven Toronto Shelter to help those who are struggling through this tough time. Our partners at KWE have donated spaghetti sauce and 400 packages of pasta to the Haven Toronto homeless shelter to ensure those in need have access to healthy and delicious meal options. A hot meal is a luxury for elder men impacted by poverty and homelessness.

NTN Canada's CEO, Paul Meo, encouraged KWE to support Haven Toronto in lieu of participating in a yearly corporate promotion with NTN. Instead, KWE made a donation to Haven Toronto in honour of NTN. "Having such an impact on the homeless has been a rewarding experience for us and we are so proud to have played a part," says Paul Meo.

Our NTN team members also joined forces with volunteers from the Toronto Police Service 51 Division and from Kintetsu World Express Canada to serve a delicious BBQ lunch at Haven Toronto in September. Our team members were on site to help prepare, cook and distribute over 200 meals. The homeless clients expressed so much appreciation for their only BBQ of the season and we went home with glowing hearts as we know we made a difference

to those in need.

According to Thomas B. Smith, President, Managing Director, KWE Canada, "KWE wholeheartedly supports this worthy cause and are proud to have made an impact on vulnerable people in crisis. We are committed to the communities where we work and live, and proud to lend our support to Haven Toronto in these challenging times."

Haven Toronto has maintained operations through COVID-19 but has suffered for lack of volunteers since the pandemic began. It relies entirely on the community. You can help – grab a group of coworkers, neighbours or friends to volunteer and donate food. Everyone can make a difference!



FRESH FROM THE NTN COMMUNITY GARDEN



NTN's Community Garden project has resulted in a successful harvest thanks to the hard work of our Mississauga based employees. Started with the help of our employees and our garden sponsors, Jane & Jerome Brown Farm and Rob Sharpe, the garden exceeded expectations this past summer with a wide range of vegetables from tomatoes, to peppers, lettuce, green onions and more. In August, our NTN team gathered delicious tomatoes and donated these to the Haven Toronto homeless shelter, in hopes of helping the homeless receive nutritious meals.

Our community garden has also allowed for the creation of social ties and built a greater feeling of community amongst our staff. Throughout the growing season, our employees worked diligently together to build the garden which provided a wonderful experience to many first-timer gardeners on our team. It was uplifting for employee morale to work with one another to grow food that we could donate to support those less fortunate in our community. The Community Garden also provided our employees with a safe place to unwind, while social distancing outdoors.

Our future goal will be to grow more food in order to support local families through a "blessings box" program. With a bigger harvest next year, we hope to package more fresh produce and drop these off at local food banks and shelters that support Mississauga families that may otherwise not have nearly enough to feed their children.

MEET THE NTN TEDDY BEARS

Roller & Linéaire



Roller



Linéaire

It's that time of year again! NTN is pleased to announce our NTN Bear Holiday Campaign. These adorable NTN bears make a great gift and double the joy of giving by also supporting a good cause. Send a loved one a meaningful reminder that you are thinking of them with an NTN holiday bear, in support of Toronto Sick Children's Hospital.

This limited edition bear models an NTN Bearing outfit in either purple or blue. The blue "Roller" Bear and purple "Linéaire" Bear are sure to become fast favourites. And, you can feel great knowing that your gift also supports thousands of children and youth treated at Toronto Sick Children's Hospital.



NTN Bear Holiday Campaign

All funds raised will go towards purchasing much-needed, life-saving equipment for SickKids, Canada's most research-intensive hospital and the largest centre dedicated to improving children's health in the country. Each bear is 11 inches tall from head to toe and is yours to keep with a minimum donation of \$30.00. Please donate by visiting www.ntn.ca.

All orders received by November 30th will be shipped in December in time for the holiday season. We are very grateful to everyone for their contribution, but act fast because quantities are limited.



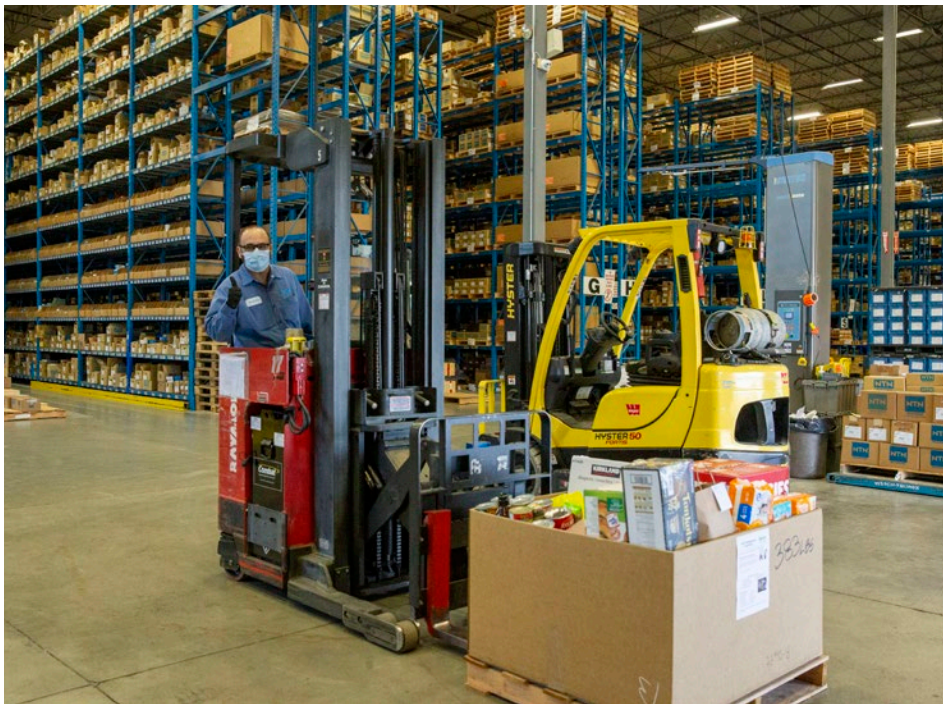
SHARING OUR GRATITUDE DURING THE *Thanksgiving Season*

NTN employees from both our manufacturing and sales divisions made a concerted effort to support Eden Food for Change with its annual food drive this year. Eden Food for Change is committed to increasing access to good food in a dignified manner, developing food skills to encourage healthy eating and empowering the community through education, outreach and advocacy. We would like to convey our heartfelt thanks to our staff who generously donated food and supplies to Eden Food for Change as well as other local food banks across Canada.



1040 POUNDS OF FOOD DONATED

Thank you to all our NTN families for your kind donations of canned goods, packaged pasta and delightful treats, and for managing to collect over a thousand pounds of food in support of the Eden Food for Change Thanksgiving Drive. We are so proud of the efforts of our staff and very grateful for our partnership with Eden Food for Change and their dedication to our community, especially as homelessness and food scarcity have become an even greater issue exacerbated by the COVID-19 pandemic. It is amazing to see our NTN community coming together during these challenging times while sharing our gratitude during the Thanksgiving season.



Obituary: Past NTN Canada President, Mr. Wataru Takiguchi, Has Passed Away

It is with great sadness and heavy hearts that we share that NTN Canada's Past-President, Mr. Wataru Takiguchi, (affectionately known as Mr. T) passed away on September 30th. He succumbed to liver cancer at the age of 84.

Throughout his 42 years at NTN, Mr. Takiguchi shared his insight and wisdom with those of us who had the privilege to work with him. He was an incredible mentor, friend, and positive influence, and was devoted to the NTN corporate community through his work at both the Canadian subsidiary and throughout the NTN Americas Region.

From 1984-1989, Mr. Takiguchi established an extraordinary record of service to our Canadian NTN operations, serving as President of NTN Bearing Corporation of Canada. In 1990, he was appointed Chairman and General Manager of NTN Americas, and in 1994 became General Manager of NTN Corporation's Global Sales Headquarters.

As a liberal arts graduate, Mr. Takiguchi had been recognized for his skills in strategic planning and thoroughly enjoyed his interactions with industry partners and customers. Most of all he loved his employees. He kept an open-door policy and any time, any day, employees had full access to his attention and wisdom. To put it simply, Mr. Takiguchi's philosophy was **"believe in your staff, listen to the voice of the customer, and make customer service your priority."**

CONGRATULATIONS TO NTN'S PUMPKIN CARVING CONTEST WINNERS!

Art and humor were on display at NTN's Halloween pumpkin carving contest. As part of our Halloween Festivities, NTN held a pumpkin carving contest. Check out these creepy, incredible and creative pumpkins:



James Hassan
Applications Engineering



Loren Almeida
Customer Service Manager



Trevor Friesen
Sales Manager - Industrial Original Equipment



Joseph Antony
Engineering Project Coordinator

Votes were cast during our virtual town hall and the 2020 pumpkin carving winners were: Loren Almeida, Joseph Antony, Trevor Friesen and James Hassan.

Thank you to all who participated in this contest, and we can't wait to see your mad scientist skills in action next time around!

NTN'S HALLOWEEN COSTUME CONTEST WINNERS!

We asked our NTN staff to show us their crafty side to create their Halloween costume for the 2020 NTN Halloween Costume Contest. Working from home remotely this year didn't stop our employees from really stepping up their game and creating epic halloween costumes. Check out these Spooktacular Halloween Costumes:



Michael Shadid
Continuous Improvement Manager
Pirate Costume



Paul Price
Inside Sales Representative IOE
Casual Vampire Costume

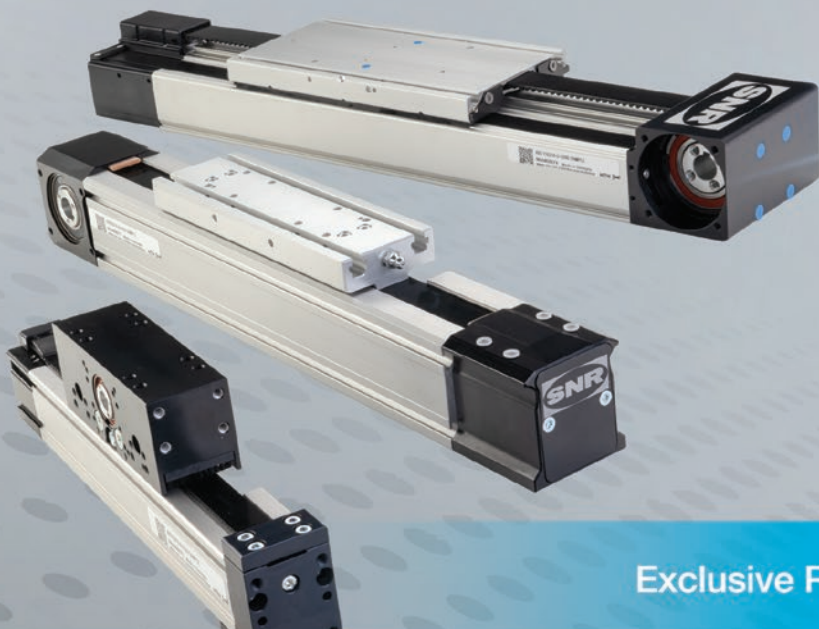


Leslie Holroyd
Senior Financial Analyst
Rainbow Feather Mask

The votes have all been tallied, and the 2020 costume winners are: Leslie Holroyd, Paul Price and Michael Shadid! Congratulations to our winners and thank you to all who got dressed up in their most creative costumes for our virtual Town Hall!

NTN®

LINEAR MOTION



Exclusive Product by NTN-SNR

NTN SNR

NTN-SNR's Bielefeld Production Facility recently built a very special Linear Module: An extra long 20 Metre Portal Axis AXS280M in combination with an AXS280TV Telescopic AXIS.

NTN-SNR manufactured this high performance multi-axis system for a leading kitchen manufacturer. The application is comprised of a 2-axis system (Y- and Z-axis) with horizontal travel ranging between 4 and 20 metres and 1.5 metres in the vertical direction. This system is used for the feeding of

wooden boards of different sizes inside an assembly line for the production of kitchen furniture. The maximum speeds are 4 m/s horizontally and 2 m/s vertically (maximum acceleration is 5-6 m/s²). The moving mass ranges up to 150 kg.

Normally, tooth belt driven modules (type AXS280Y) are used at the horizontal Y-axis for strokes shorter than 8 metres. However in this application, longer strokes are accommodated by using multi-part modules (type AXS280MP) with a rack and pinion drive. Due to the restricted

ceiling height at the customer's plant, newly designed telescopic modules (type AXS280TV) were selected to meet the required vertical Z-axis movement. The modules are equipped with a wide range of accessories such as pneumatic load compensation, collision detection, inductive sensors and a zero-point indicator pneumatic safety pin.

NTN's Linear Motion Solutions are designed for maximum performance to meet the demands of the most diverse industry applications such as this. Our infinitely extendable, modular rails allow for the construction of very long assemblies, and also provide the ability to extend existing systems. Our customers greatly benefit from our experience in the development of standard or custom Linear Motion Solutions, designed for maximum performance. Please contact your NTN representative to learn more about our Linear Motion portfolio.

20 Metre Linear AXIS assembled in Bielefeld LM Production



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