

# THE LATEST FROM THE STACK

- Customer Profile: Hoult's Contracting
- What does an Impact Crusher Rotor do?
- Quarrying in the World's Most Northern Place
- Edge Equipment

Edition 11 | Autumn 2022



**TRANSFORMATIVE MACHINES**  
**HOULTS CUSTOMER PROFILE INSIDE**





## OPINION

# HOW TO AVOID THE BULLWHIP EFFECT?

**Hello.**

2021 was, as we have been told by many of our customers, one of the busiest years on record. What does this mean for this year?

With raised demands for aggregates due to the current housing market and the number of large roading projects going on, many aggregate producers have had to ramp up production. Speaking in the short term, this has been something many quarries have been able to capitalize on taking up new supplier contracts, however, to err on the side of caution, we must consider what might be happening in the quarrying industry right now.

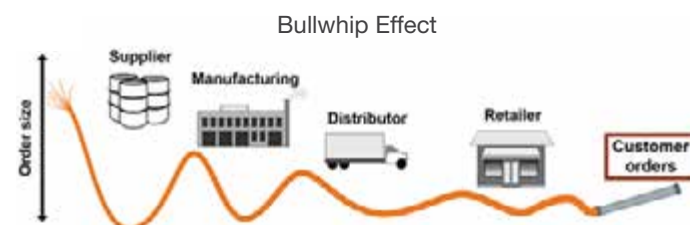
### Are we currently seeing the bullwhip effect?

In terms of supply chain, the Bullwhip effect is something any producer or supplier should consider when forecasting. For example, an aggregate retailer may keep 100 tons of aggregate in stock. If it normally sells 20 tons a day, it will order that replacement amount from an aggregate supplier weekly. One day they sell 70 tons of aggregate and decide that to keep up with this sudden new demand they must order 100 tons extra in their next order.

The supplier may then respond by ordering double or 400 tons from the quarry to ensure they do not run out. The quarry then produces 800 tons to be on the safe side. Following the supply chain from the customer to the quarry the amount needed was 70 tons at the customer level which has now been amplified to 800 at the manufacturer level.

The big question becomes how do we avoid the bullwhip effect? It all becomes a balancing act of not over or under ordering and producing while trying to forecast which way the market will go. The best solutions put forward by our own Supply Chain Manager, Ivan Skobe, were based on all-around communication. Without clear communication between the retailer, supplier, and everyone in between the bullwhip effect is much more likely to happen. Ivan suggests:

- Improved communication and information sharing with downstream customers.
- Share information like sales promotions, planned demand



peaks, and more so upstream suppliers don't get misled into thinking the market has picked up.

- Communicating information on actual demand rather than orders as well as planned promotions or increases in safety stock can prevent this occurrence or lessen its effect.

In the quarrying industry, this sort of effect could see huge demand for aggregates in the short term with the government's 4-year infrastructure investment plan funding many large highway projects throughout the country.

This coupled with a raised demand for aggregate in the home building industry (with each home requiring on average 250 tons of aggregate) is causing a huge elevation in demand, however, we must ask the question, will it last? Our expert recommends that to avoid overproducing due to the bullwhip effect, we should all be watching key market indicators 3-4 years ahead of time. By looking that far ahead we can predict when large projects may be ending or started causing the demand for aggregates to rise and fall.

By keeping communication channels open and watching trends in the market defined by key indicators, you can keep up with ever-changing demand patterns and avoid the effects of amplified demand. This leads to smarter decisions when it comes to forecasting and mapping out what the future will look like for your business.

**Bert Hart, Sales Manager**

*Bert Hart*



Russell Agg wash plant set up in Hawke's Bay.



A Keestrack H4e Cone crusher leaving the Equip2 yard enroute to its new owner.

## PROJECTS ON THE GO!

Working on a project, using E2 equipment?

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Equip2 team photo from the end of 2021. All set for 2022.



Kieran Oliver Contracting Ltd  
Crushing train with a K4 feeding  
two Keestrack R5 Impact Crushers.



Composting NZ Ltd Brendan  
Mallia with his new Keestrack  
K4 reclaiming soils that came in  
as waste material in Kapiti.

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# CUSTOMER PROFILE: HOULTS CONTRACTING

## TRANSFORMATIVE MACHINES

**Hoult Contractors is one of Manawatu's longest operating civil excavation and development contracting companies with over 65 years of successful ventures in the area.**

The company is hugely diverse, taking on everything from subdivisions and site excavation earthworks to driveways, concreting, carparks, developments, horse arenas, and tree removal. To feed all these projects, Hoult's run a quarry in the adjacent to the Manawatu river on the outskirts of Palmerston north, that also privately sell aggregates and supplies a range of businesses with materials for concrete, topsoil, roading, and sands.

In recent years, they have expanded significantly due to the purchase of new equipment, which has improved their output and ability to produce various aggregates. With the improved capacity came changes to the business model overall that have proven highly successful and continue to grow month on month.

### HOW IT WAS

Just over three years ago, Hoult Contractors hired their current quarry manager Brian Coley, who had eighteen years of experience in quarries working up in Hawke's Bay. As he was hired, the company's owner was in the process of purchasing a new K4 scalping screen and R3h impactor, which turned into something that would prove transformative for the business.

Pre-purchase of the new equipment, the quarry operated on a range mobile made fixed plant to produce a few different aggregates to supply their projects. This machinery did its job, but not well. Brian described the overall situation with the older machinery as challenging due to the large amount

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Holts old Wash Plant above and 3-foot Symons Cone below.



**“We used to have an old Keuken 210 jaw and 3-foot Symons cone, which was pretty unreliable. they were anything but consistent; some days we would only do 10 ton due to breakdowns and other issues on a bad day, and about 300-400 on a good day.”**

Brian Coley / Quarry Manager



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of downtime caused by it during periods of being “maxed out.” They were busy and could not afford to keep having downtime. “We used to have an old Keuken 24x12 jaw and 3-foot Symons cone, which was becoming pretty unreliable.” As Brian described the quarry’s output numbers, “they were anything but consistent; some days we would only do 10 ton due to breakdowns and other issues on a bad day, and about 300-400 on a good day.”

**TONS MORE**

Acquiring the Keestrack K4 and R3h became transformative because these inconsistent and low volumes changed drastically. The much higher output of the new machines coupled with the ability to have one infeed for the whole screening, washing, and crushing process resulted in a much more efficient quarry that could maintain a high production rate.

“The best tonnage we have had so far on gap 65 has been 310 to 320 an hour which is pumping. Compare that to how it used to be on a good day where we would only do 300-400 tons for the entire day.” Once the team had been inducted, and the



machines were optimized and free from teething issues, the quarry had to start changing its business model due to the much higher output capacity. Rather than only supplying based on immediate project demand, the business was able to prepare aggregate for a range of different jobs while simultaneously starting to take orders.

“The impactor has allowed us to have stockpiles, which is something we never had before. We work our stockpiles to be around 1500 to 2000 tons now, before we got the impactor that was never possible.”

Stockpiling is a practice that gives quarries the ability to plan out supplying projects and also gives it options around selling aggregate to the public or contractors that need it on short notice. Stockpiling like this allows the quarry to become much more responsive, which helps build customer relationships and trust-building around reliability. Because the quarry has aggregate on hand, customers trust that they can go and order aggregate when they need it and have it on time. As Brian puts

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Brian Coley / Quarry Manager





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it, "I can get a phone call from a purchaser saying they need 20,000 cube of gap 65 for a project. Before we got the Keestrack gear, we would never have taken a job like that on, whereas now, I can go out to the stockpiles, have a measure up and go, OK, I've got 3,000 tons of it there already so well just keep making it to supply the rest of your project."

**PRODUCT RANGE**

The new machinery also allowed Hoult's quarry to diversify in terms of product. With their old machinery, they had much less ability to easily reconfigure the machines and produce different grades of aggregate. Hoult's primarily made concrete ag, with some gap 65, 40mm, and 20mm, which required reconfiguration to produce the different sizes.

The addition of the K4 allowed simultaneous screening, separation, and piling of the varied sizes of product. At the same time, the R3h handles the oversize, while the sand screw and dewatering screen separate the 2mm and 3mm sand. The R3h with screen box also allowed Hoult's to start producing M4 on top of what they were already making.

This diversification in product allowed Hoult's to begin selling a full range of aggregates, increasing the cash flow through the business by giving their customers more options. "Although our main focus is creating sand for the concrete market, our most sold product is gap65, but we also sell a lot of 40mm, 20mm top course, or gap 20, and we are starting to sell a bit of m4 now, we never used to even be able to make that."

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**"I can get a phone call from a purchaser saying they need 20,000 cube of gap 65 for a project. Before we got the Keestrack gear, we would never have taken a job like that on, whereas now, I can go out to the stockpiles, have a measure up and go, OK, I've got 3,000 tons of it there already so well just keep making it to supply the rest of your project."**

Brian Coley / Quarry Manager





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#### TRANSITION

Brian described the transition to the new equipment as “pretty easy.” There were a few teething issues with the R3h initially, but Hoult's and Equip2 quickly worked together to iron those out. Purchasing the equipment through Equip2 meant that they were given a full induction to how the machines work and how to maintain them and provided Hoult's with industry-leading service. Brian explained that now, the main challenge is maintaining the equipment.

“The challenges are the regular maintenance, checking plates and oil levels, stuff like that. Now that we have our head around it, we open the machine up twice a week and check everything over, which keeps it going. Otherwise, the boys find the machines very user friendly with the new technology compared to the old machines we used to have.”

Other than this regular preventative maintenance, the team at Hoult's quarry have almost eliminated downtime allowing them to produce much more with fewer issues. They also have come to

know and trust the Equip2 team with any problems or questions that come up. “I’ve personally got a really good working relationship with the boys Robin and Luke up there at Equip2, and I’d definitely recommend them to any quarry.”

#### LOOKING FORWARD

The result of purchasing new Keestrack equipment led to Hoult's quarry growing substantially. Going from producing 400 ton a day to 300 ton an hour has allowed Hoult's to diversify

their business and service markets they could not before. Their capacity to take on jobs grew, giving them the freedom to take on contracts they would not have before and sell to the public. This, coupled with Hoult's longstanding history and diversification, has allowed other parts of their business to constantly grow, which will see the company continue to scale with the years.

– Written by Tristan Tolley



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# WHAT DOES AN IMPACT CRUSHER ROTOR DO?

Impact Crushers use the energy from a heavy spinning rotor to impact and fracture materials, either by direct impact or autogenous crushing inside the crushing chamber.

In this article we'll be discussing Keestrack's Impact Rotor design and how its designed to improve Impact Crushing characteristics.

## WHAT IS AN IMPACT CRUSHER ROTOR?

The rotor in an Impact Crusher is essentially a large flywheel that holds the blow bars in place and is used to increase the power and stability of the blow bars which perform 80% of crushing function.

The rotational energy is transferred from the blow bars into the material, fracturing it, and moving material through the chamber until it has been resized to pass by the aprons and exit the chamber.

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## Chains

The chains stop large feed material from being rebounded out of the crushing chamber.

## Curtain

The curtain prevents smaller debris from being rebounded out of the crushing chamber.

## Primary Apron

The Primary Apron is responsible for the first crushing reduction and is adjustable hydraulically to a GAP setting (the gap between the apron and blow bars.)

## Secondary Apron

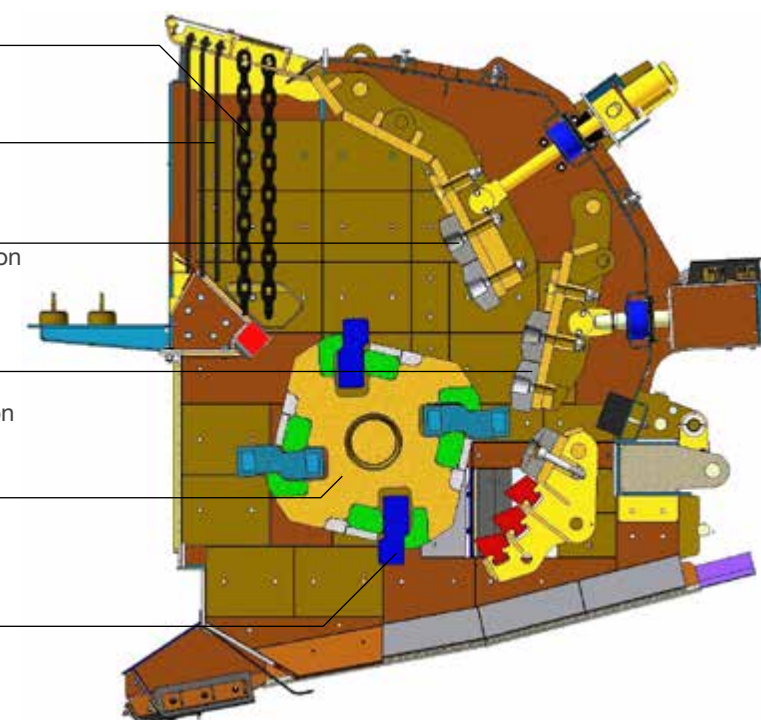
The Secondary Apron is what produces the final product. Its GAP setting is what the final product should be crushed to on exiting the chamber.

## Rotor

The Rotor is the large moving part of the crusher and holds Blow Bars. The Rotor itself doesn't do any crushing but provides weight and inertia to the Blow Bars.

## Blow Bars

The Blow Bars are the primary crushing component, also referred to as hammers. The impact these provide imparts energy to the material causing it to fracture, it also directs the material to the Aprons for additional crushing.





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### THE SPECIFICS OF THE KEESTRACK ROTOR

Impact crusher manufacturers use various shapes for their rotors, some are octagonal and some are circular, Keestrack use a square shaped rotor.

The square shape of the rotor allows the blow bars to be offset from the rotational center which places the blow bar closer to the feed material entrance with a higher likelihood of a direct 90° hit.

The physical size and mass of the rotor plays a significant role in the Impact Crushers performance, a heavier and larger rotor means there is more time and space for strikes and a lower rpm is needed to achieve the same force of the strike.

By increasing direct strikes, time and space between strikes and a lower RPM, the Impact Crusher with these rotor characteristics will have reduced wear and better feed material capability and an overall lower cost to run.

### SHAPE

The square rotor shape, placement of the blow bars and extra void in space at the front of the blow bar allows material to fall directly in front of the blow bar aiding a cleaner more direct impact and better strike angles to move material through the crushing chamber.

The 90° strike angle aids moving material into and past the aprons, increasing cubical shaping ability, throughput potential, and reducing material hitting the top of the blow bar and not efficiently making its way through the crushing chamber.

More accurate and direct hits against the blow bars ultimately enhances performance, but it also improves the utilization of the blow bars, the offset placement allows the front face of the blow bar to be given a larger void in front of it allowing a larger contact face area and thus a larger amount of the blow bar to be used before it needs to be flipped or replaced.

### WEIGHT

A heavier rotor has many benefits, more mass means more inertia and energy. Once a heavy rotor is spinning it requires more resistance to slow it down, so maintaining its rotation



during crushing can be more efficient as material has less of effect on a heavy rotor than it does on a light one, even if a small rotor is spinning faster.

The better energy expenditure and usage means a heavier rotor can do more work effectively.

### WEAR

With material spending less time in the chamber before passing the aprons and a slower rotor speed designed for direct strikes of material, blow bars can be more effectively used and process more material before changing.

The rotor itself will wear over time, which is the nature of any type of Crushing Equipment. Keestrack's rotor design differs

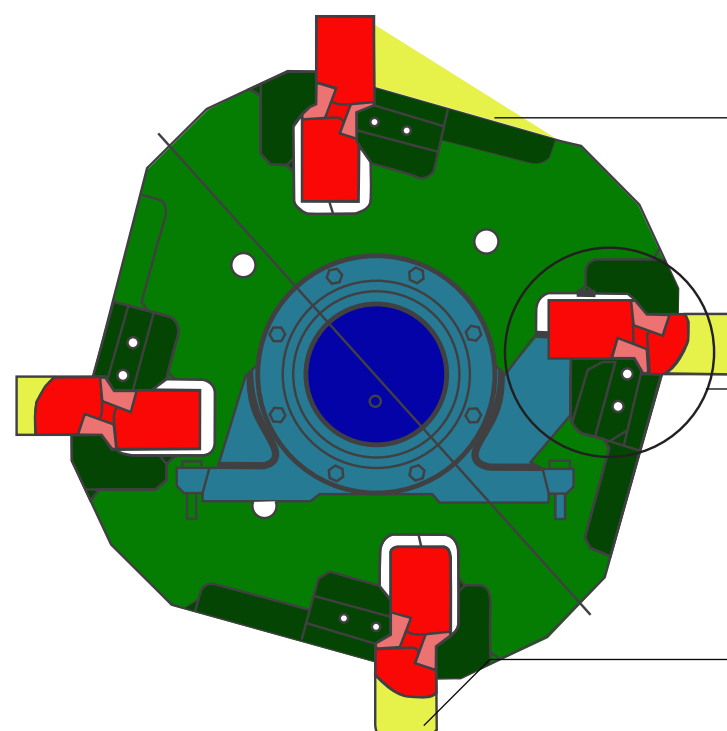
from most types by including replaceable wear plates in areas most prone to wear over time, especially near the blow bars and strike areas.

### THE BENEFITS?

Keestrack's uniquely designed rotor is heavier, requires less rpm to pass material and reduces time material needs to spend in the chamber before it's sized and passes the aprons.

This means an operator can benefit from increased blow bar and wear part life, a lower fuel cost to run and higher throughput of correctly sized cubical material.

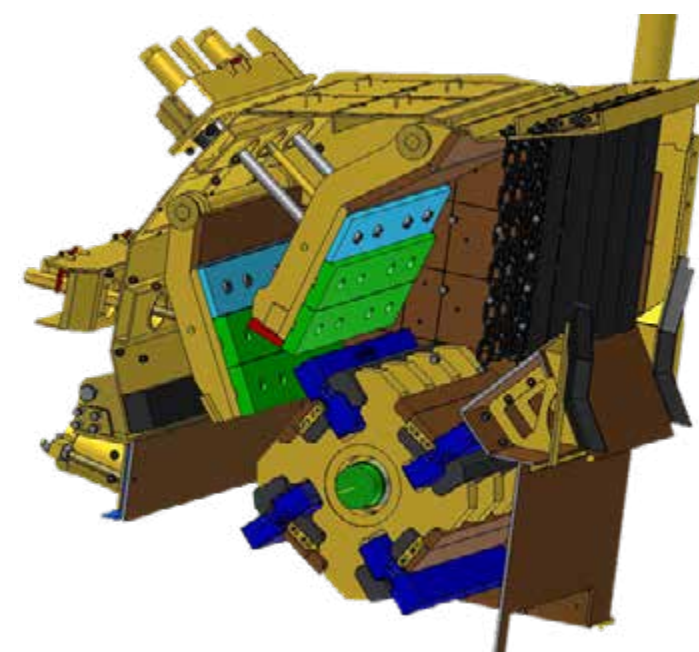
– Written By Tristan Tolley



Extra void in front of the blow bar to allow more direct impact angles.

The blow bars are stepped back from the centre of the rotor so their contact face is directly aligned with the centre cross section.

starting at the top, and going counter clockwise around the rotor the yellow parts of the diagram indicate how the blow bars will wear over time, and display how the Keestrack rotor achieves better blow bar utilisation.



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# CUSTOMER PROFILE: ALERT'S QUARRY PIT

## QUARRYING IN THE WORLD'S MOST NORTHERN PLACE

**Although no list or records formally exist for the world's most northern quarry, it stands to reason that the northernmost settlement with a quarry is likely it!**

Alert's quarry pit is just up the road from the settlement located near the tip of the Island. With Summertime peak mean temperatures of just 4°C and only 28 frost-free days, Alert has an unforgiving environment that puts significant strain on equipment, meaning durability and reliability are key to continued operation.

When CFS Alert looked to renew their crushing equipment spread to produce 20mm base material for their runway and infrastructure, they turned to Frontline Machinery, Canada's

leading material processing equipment supplier and Kee-track distributor, to provide a suitable equipment solution.

Frontline met CFS Alert's needs with a Kee-track B4 Jaw Crusher and H4e Cone Crusher. Selecting suitable machines was only a part of the total solution, and these heavyweights would need to take flight before they could be commissioned in Alert by Frontline.

### CRUSHING IN ALERT

The logistics for an order like this requires a great deal of planning, as Frontline needed to not only transport the equipment to one of the most remote areas of the world, but also needed to send service technicians to a Canadian military compound in the midst of the global COVID-19 coronavirus pandemic.

As a result of COVID, every single party had to quarantine at CFB Trenton for two weeks prior to flying to CFS Alert. Frontline

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Established in 1958, Canadian Forces Station (CFS) Alert serves as a wireless communications intercept facility and has been noted for its role in the Five Eyes intelligence network. With an airfield, roads, and amenities like any other settlement, there's a need for aggregates to build and maintain this infrastructure, and in harsh arctic conditions where infrastructure is your lifeline to supplies and help, it's even more critical that this resource is carefully managed.





“I spent my 50th birthday in quarantine,” Chevalier adds. “My wife was determined to send me a cake for my birthday. She contacted the military where I was staying, and they were having absolutely no part of anything coming into the facility.”

– Crissy Ram/ Senior Director of Marketing



**Top photo:** The Keestrack B4 Jaw Crusher and H4e Cone Crusher being assembled at that CFS Alert Quarry. – Frontline Machinery, all rights reserved by the copyright owner.

**Bottom Photo:** Frontline technicians Sam St. Laurent and Nathan Chevalier at the Famous Alert signpost. – Frontline Machinery, all rights reserved by the copyright owner.

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service technicians Sam St. Laurent and Nathan Chevalier were selected to work on the project and travelled to CFB Trenton to enter quarantine.

“They had to quarantine in their room the whole time. They were given food and schedules where they could walk around the building to get some exercise,” says Crissy Ram, senior director of marketing and business development at Frontline Machinery.

“It gets freaky around day eight or nine days. For me after two or three days, I was starting to get demotivated a bit. But then day 12 and 13 show up and you see the light at the end of the tunnel,” St. Laurent says. “It’s a long two weeks. There’s not much you can do. You’re allowed to walk outside and go back to your room.”

“I spent my 50th birthday in quarantine,” Chevalier adds. “My wife was determined to send me a cake for my birthday. She contacted the military where I was staying, and they were having absolutely no part of anything coming into the facility.”

#### TWO MACHINES, MULTIPLE AIRCRAFT

For the equipment, Frontline’s technicians were required to disassemble the Keestrack H4 Cone Crusher and B4 Jaw

Crusher, breaking them down into multiple aircraft load packages, using precise configurations. The machines, broken down into 22 pallets, were then loaded onto a C-17 military plane at CFB Trenton and then flown to CFS Alert.

Due to the limited aircraft unloading equipment at destination, aircraft load packages were to adhere to precise configurations including:

- Defined approach and departure angles to prevent any critical contact points within the plane.
- Maximum and minimum equipment widths including specific track sizes.
- Maximum aircraft load package weights.
- Defined overall dimensions.
- “Forward height”, ‘center of gravity’ (CofG) and ‘forward load projection’ calculations.
- Pallet constraints and defined requirements for additional components.

Chevalier and St. Laurent took a separate flight on a C1-30 plane to Alert to perform the reassembly and mobilization of the

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equipment and facilitate the operator and mechanical training. They had trouble getting comfortable in the military nets used for sleeping, so they found an alternative solution.

“We were sleeping on the rear ramp of the plane,” St. Laurent says. “The front of the plane was so hot, and the back of the plane was more comfortable. Once the plane was in the air you were allowed to walk around, it is an eight-hour flight.”

After taking off from CFB Trenton, the plane landed for a quick refuelling in Greenland before arriving at CFS Alert. During the flight, the two men were equipped with military arctic kits for their safety, in case the plane were to crash or if they were temporarily stuck in Greenland.

The plane ended up arriving at CFS Alert without incident.

“It was a very neat experience. I had looked at going to Ellesmere Island for years, so having an opportunity to get there and get paid was great,” Chevalier says. “One of the things I found interesting was that the commanding office and higher echelon were there to welcome you and shake your hand, welcoming you to Alert. They try and make everyone feel warm and welcome. Two nights later they had a special welcoming

**“We were working every day, so not as much free time for us, but I was able to go for a hike with them. There was someone walking with a shotgun during the hike in case of wolves or polar bears. They also have a woodworking shop and gym, so it’s not boring there.”**  
– Nathan Chevalier/ Service Technician

night. It felt more like a family reunion for them. That night we arrived, people were showing up and people were about to leave. A lot of the military are there for six months at a time.”

St. Laurent says there were lots of activities for people on base.

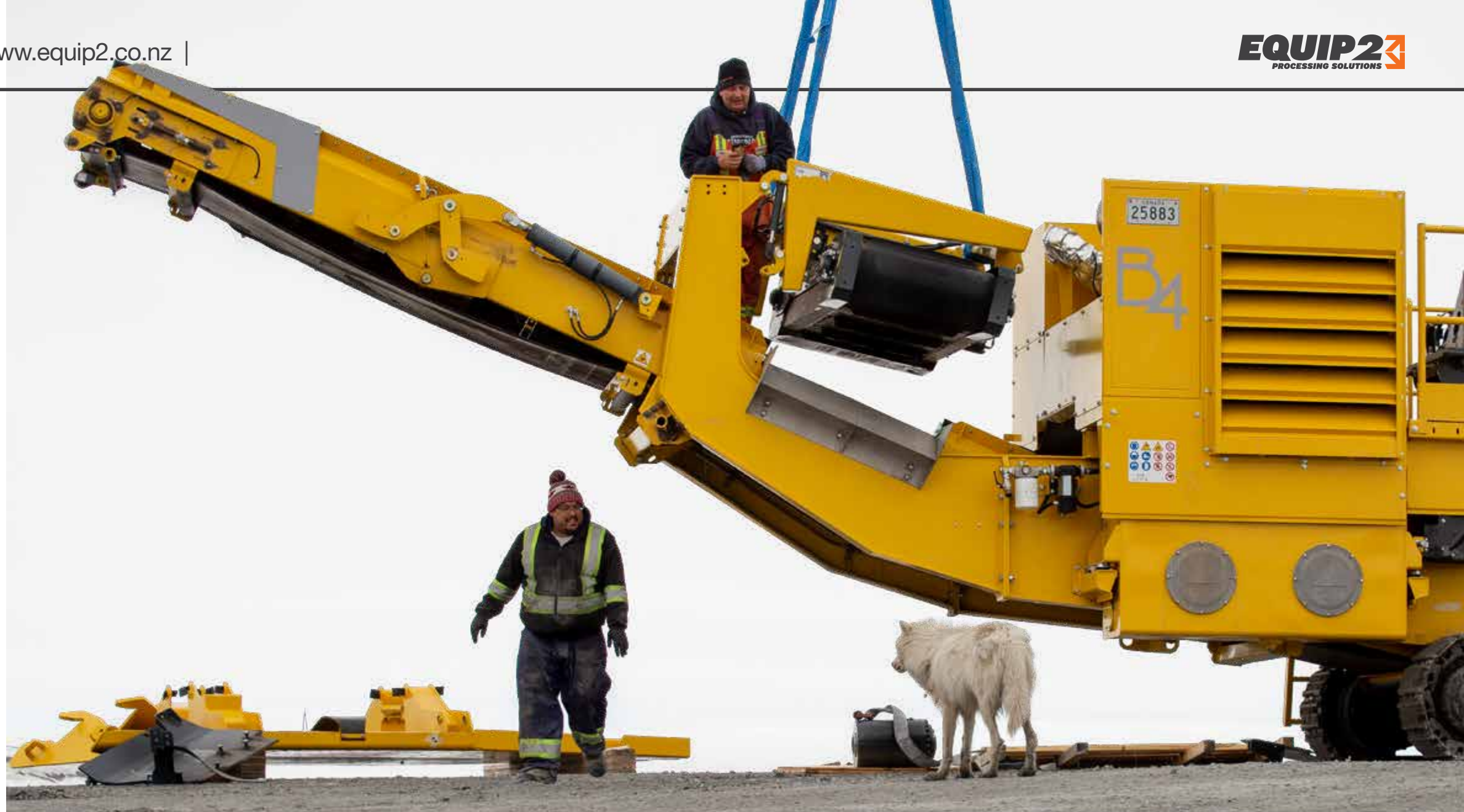
“We were working every day, so not as much free time for us, but I was able to go for a hike with them. There was someone walking with a shotgun during the hike in case of wolves or polar bears,” he says. “They also have a woodworking shop and gym, so it’s not boring there.”

At CFS Alert, there are no Wi-Fi capabilities, but Frontline’s technicians were able to communicate with their families using a communal hard-wired computer.

The meals were handed out on a schedule at the same time every day.

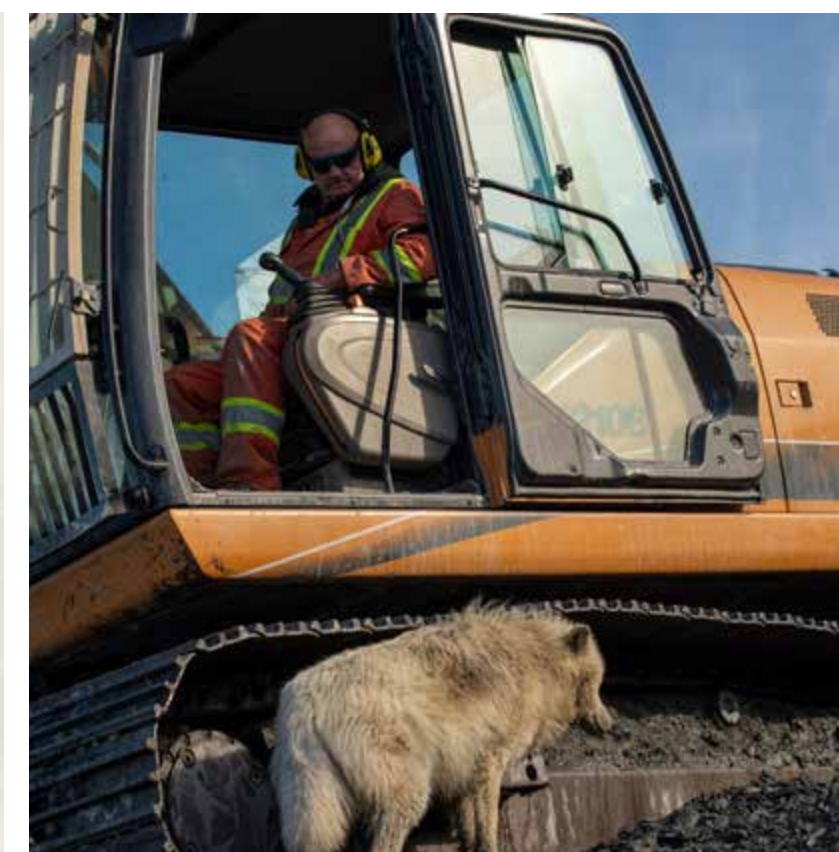
“The food in Alert was very good,” Chevalier says. “The accommodations were a little cramped. Me and Sam slept in bunk beds for first 10 days.”

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A polar bear seen during a hike near Alert. – Frontline Machinery, all rights reserved by the copyright owner.

Curious and bold, wolves were a frequent sight around the CFS Alert quarry. – Frontline Machinery, all rights reserved by the copyright owner.







Curious and bold, wolves were a frequent sight around the CFS Alert quarry. – Frontline Machinery, all rights reserved by the copyright owner.

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#### A VISIT FROM A CURIOUS PREDATOR

Once the two technicians arrived at the quarry and began assembling the equipment, they had to keep watch for arctic wolves. One wolf regularly approached the pit while the two men worked.

“They don’t seem to pose any danger, but I wouldn’t put my hand in front of them,” Chevalier says. “If you were to kneel or do anything but stand, the wolf would come right at you. At one point, Sam had a bag of tools with him. The wolf grabbed the bag of tools and ran away.”

If anything went wrong in the quarry it would have spelled trouble for Frontline’s team.

“I think everything went well, but if you were missing some parts or a tool, that would’ve been a whole different experience,” St. Laurent says.

“There was no phone in the pit. The nearest phone was kilometres away,” Chevalier adds.

One of the biggest challenges of being on site for Chevalier was being away from home for a long period of time.

“I was away from my family for over a month. By the time we flew there, did quarantine, finished the project, and came back, we were there for five weeks,” he says. “Being in Alert, there’s no escape. You are trapped. No way to transport yourself out. You are there. We did get to use a phone. We were allowed to use it for 45 minutes a day.”

#### A YEAR IN PLANNING

Although the project took more than a year to complete from delivery to final assembly, the actual installation went very smooth and was completed in 11 days with another four days required of runtime to work out all the little kinks.

“At the end of the day, assembling the machine is the same as any other job. Everything else was very different on the project,” St. Laurent says. “The team here organized things very well. There, things could get lost in the snow, but it was all lined up and very well organized, and we had a crane operator. Overall, it was a very good project.”

- This story was originally published by Frontline Machinery and modified with permission. **Read the original Case-Study here:** <https://frontline-machinery.com/on-alert-frontline-machinery-tackles-a-unique-project-in-nunavut>

Scan to read the original  
Case-Study here



**Middle right photo:** Not to be confused with Lake Ellesmere in Canterbury, Ellesmere Island is the tenth-largest Island in the world, equivalent in land area to the UK. Settled amongst near-constant pack ice during summer, which freezes solid in winter, Ellesmere Island is one of the most northern places in the world, with large portions of the Island covered in glaciers and ice. What makes Ellesmere particularly interesting is not just its location and inhospitable environment but that it is home to the northernmost settlement in the world, known as Alert, just 817 km from the North Pole.

“They don’t seem to pose any danger, but I wouldn’t put my hand in front of them. If you were to kneel or do anything but stand, the wolf would come right at you. At one point, Sam had a bag of tools with him. The wolf grabbed the bag of tools and ran away.”

– Nathan Chevalier/ Service Technician



**Bottom photo:** The Keestrack B4 Jaw Crusher and H4e Cone Crusher processing shale/slate pit material into 20mm basecourse. – Frontline Machinery, all rights reserved by the copyright owner.





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