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BioNeutra, an Edmonton-based food industry innovator, is enjoying success with VitaFiber, a sugar free, low calorie soluble dietary fibre and prebiotic sweetener.



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# Steel, aluminum tariff tactics fail

Canadian manufacturers have managed to maintain an acceptable level of confidence in their business prospects throughout US President Donald Trump's reign of tariff terror, although their optimism has diminished with each year. However, there is relief all around now that the tariffs on steel and aluminum have been lifted. This allows Canada and Mexico to move ahead with the ratification of the USMCA deal, and at least lower the level of uncertainty that has plagued North America's integrated market.

Although the details are to be worked out, the three NAFTA partners are essentially back to where they were before the Trump administration imposed the dubious Section 232 national security measure. It was the means to justify slapping tariffs on continental partners to protect US steel and aluminum producers.

The question that hangs over this chaotic affair is, to what end?

Bob Woodward's illuminating examination of the Trump presidency (*Fear, Trump in the White House*) reveals two factors – among others – that have fuelled the president's pursuit of protectionist measures, despite advice to the contrary from within and outside his administration. One is to protect domestic industry by using threats and tariffs as negotiating tactics to gain leverage – for example – in the NAFTA renegotiation. The other motivator is to tackle China's unfair trade behaviour and check its quest for world economic domination.

So far, it's mission not accomplished. As the Trump administration engages in an escalating game of chicken with China, it's doing so after insulting and annoying its allies, especially those closest to home.

When the steel (25%) and aluminum (10%) tariffs were announced a year ago, Prime Minister Justin Trudeau rightly denounced them and responded with tariffs on targeted US markets exporting to Canada. What followed was a hard negotiation to refresh NAFTA. So lots of pain felt by consumers and businesses on both sides of the border.

Turns out, Canadian negotiators weren't the dupes the real estate tycoon was accustomed to dealing with. Eventually there was an agreement that offered few gains for the US, and it was understood the steel and aluminum tariffs would be lifted immediately. They weren't, and the Trump side decided to hold out for quotas. No dice, said Canada and Mexico. And no USMCA unless tariffs were lifted.

Predictably, the great negotiator ran out of time as his fight with China escalated, so tariffs were dropped with assurances of more focussed scrutiny to prevent low-priced third-party imports from slipping across the border. And no quotas.

Amazingly, despite the poor return in North America, the US was set to try automotive tariff leverage with Europe and other exporting nations, but is holding off as it continues its China campaign.

Putting aside Trump's narrow America First view that the world is ripping off the US and protectionist measures are the answer, Western allies have common cause in the fight with China.

Europe, Japan and other trading partners accuse Beijing of violating its commitments under the World Trade Organization. Foreign companies worldwide complain they are forced to share valuable intellectual property and accuse China of other tactics to obtain technology, including outright theft. Never mind accusations China is running a global spy operation.

The Middle Kingdom doesn't have to be a friend to be a partner in trade, but all the participants must play by the same rules. More would be accomplished bringing China in line with the help of allies rather than enduring a global bludgeoning from a trade war. A smart negotiator recognizes the leverage friends can provide. So far Trump and his "advisors" have failed to see the advantage of a united front and that world trade isn't a New York real estate deal.

**Joe Terrett, Editor**

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## BULLETINS

**CarbonCure Technologies Inc.**, a developer of clean tech for the manufacture of concrete, has launched an advisory council made up of leaders from the industry who will help the Halifax company shape its strategic direction. The CarbonCure Industry Advisory Council includes representatives from **LafargeHolcim Ltd.**, **Irving Materials Inc.**, **Command Alkon**, **US Concrete Inc.** and **Thomas Concrete Inc.**

**NanoXplore Inc.**, a Montreal manufacturer and supplier of high-volume graphene powder for use in industrial markets, is the 2019 winner of the IDTechEx Graphene & 2D Materials Award for the most significant advancement in graphene, CNT, or 2D material for commercialization. The award was presented at the IDTechEx Show in Berlin, Germany. The company was recognized by one of the judges for its “bold scale-up” of graphene production that should tear down the idea that graphene is too expensive to be used as an additive in polymer composites for real-world applications.

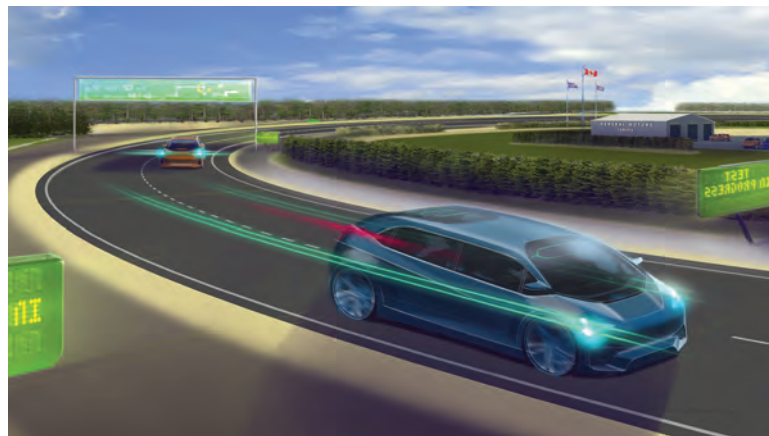
Public Services and Procurement Canada has awarded a \$102 million contract to **Ocean Industries Inc.**, based in Isle-aux-Coudres, Que., for four tugs. They’ll provide towing, firefighting and other critical support services to both the Atlantic and Pacific Maritime Forces. The new tugs replace the Royal Canadian Navy’s five civilian-crewed Glen-class large tugs and two fire-class rescue boats.

**EnerCube Switchgear Systems Inc.** has received a \$1.1 million purchase order for electrical equipment from **Raptor Rig Ltd.**, a drilling company in Calgary. The Edmonton manufacturer will design, manufacture and test bracing generators and motor control feeder switchgear.

**Eclipse Automation** has unveiled its \$4.6 million investment in a 57,000 square-foot facility in Rock Hill, SC. The Cambridge, Ont. manufacturer of automation systems described the state as the “perfect location” for its US expansion with its proximity to Eclipse customers.

## GM is staying in Oshawa

\$170 million transition plan converts assembly to stamping, saving 300 jobs



Rendering of GM's planned test track, adding to the capabilities of GM's Canadian Technical Centre in Markham, Ont.

IMAGE: GM

**OSHAWA, Ont.** — When General Motors Canada announced it was closing its Oshawa, Ont. assembly operations in November, Unifor went on the warpath. Almost 3,000 GM jobs would be affected, about 2,500 of them assembly workers represented by the union. It was a hell of a way to mark 100 years in the city.

Reaction was swift. There were work interruptions, protests and plenty of pressure aimed at GM to walk back its decision to vacate.

Part of the GM property will be converted into a test track for autonomous and advanced technology vehicles.

GM Canada president and managing director Travis Hester said the plan positions Oshawa for a sustainable future, and Unifor president Jerry Dias is looking ahead to the creation of new jobs, noting: “We are in a much better position than we were five months ago when the plant was closing.”

However, peace was officially declared as of May 8. The two sides have settled on a \$170 million transition plan that will save 300 jobs by converting the assembly facilities to stamping and related activities; relocate some workers to other Ontario GM operations; provide enhanced retirement packages; open a Jobs Action Centre supported by GM, Unifor and the Ontario government; and provide financial support for retraining.

## Kruger breaks ground for a tissue plant in Sherbrooke

**SHERBROOKE, Que.** — Kruger Products LP has begun for the construction of a tissue plant in Sherbrooke, Que.

Located in the borough of Brompton, the new plant will be constructed on a site adjacent to a Kruger paper mill along the Saint-François River.

This \$575-million investment will create 180 jobs in Estrie, as well as 1,700 direct and indirect jobs during construction, which will end in 2021.

The plant will include a through-air-dry (TAD) tissue machine, an advanced, premium tissue manufacturing technology. TAD uses less fibre to obtain a bulkier, stronger, very soft product that’s more absorbent.

The complex will also include converting lines.

Annual capacity will be 70,000 tonnes of bathroom tissue and paper towels under the Cashmere, SpongeTowels and Purex brands.

## Cheese co-op gets \$1.5M from federal dairy fund

**ST-ALBERT, Ont.** — The St-Albert Cheese Co-operative has received \$1.5 million from the federal Dairy Processing Investment Fund. The non-repayable funding will be used to modernize equipment.

The new equipment will help reduce the impact of power outages and manage the performance of ventilation and humidity levels so refrigeration in the warehouses runs efficiently. This will help increase the volume of milk product processed while reducing production costs.

The factory, established in 1894, makes cheese from 100% pure milk.

The Dairy Processing Investment Fund was established to help dairy processors prepare for market changes resulting from the Canada-European Union Comprehensive Economic and Trade Agreement (CETA).

“The subsidy provides essential support for our cooperative, helping us in our efforts and contributing to the considerable investments needed to enhance our performance and competitiveness so that we can prepare for the many challenges ahead and seize new opportunities in the context of open markets and the consolidation of the dairy industry,” said Eric Lafontaine, general manager of the co-op.

Canada’s dairy sector represents \$20.9 billion in sales by farmers and food processors. In Ontario, more than 150 dairy processors generate \$6 billion in sales and create more than 8,600 jobs.



## Coffee company eyes CBD-infused beverages

**TORONTO** — Station Cold Brew Coffee Co. is partnering with craft cannabis company Pasha Brands Ltd. to introduce CBD-infused beverages.

The Canadian cold brew coffee manufacturer in Toronto is prepping for the legalization of the infused beverage market in October.

"We firmly believe that non-psychoactive cannabis compound cannabidiol (CBD) will become a prominent wellness ingredient within the functional beverage space and that coffee is the perfect vehicle to introduce it to consumers," said Mitchell Stern, co-founder and vice-president of sales and marketing.

Vancouver-based Pasha Brands will formulate and manufacture the beverages.

## Magellan scores \$45M supply deal

**TORONTO** — Magellan Aerospace Corp. will supply complex fabricated engine front frames and shafts for a commercial platform to an undisclosed customer. The contracts valued at \$45 million.

The front frames will be manufactured at Magellan's facility in Winnipeg and critical rotating engine shafts for a dual-use platform will be produced by the aerospace company's facility in Haverhill, Ma.

Delivery will run from 2019 through 2022.

Magellan provides complex assemblies and systems to aircraft and engine manufacturers, and defense and space agencies worldwide.

## Injury results in \$100,000 fine

**BURLINGTON, Ont.** — A company that produces, packages and distributes chemical products in Milton, Ont. has been fined \$100,000 as a result of a worker sustaining a permanent injury from a bottle-making machine.

Recochem Inc. entered a guilty plea at a provincial court in Burlington, Ont. to a charge under the Industrial Establishments Regulation of failing to ensure guarding devices were in place on a machine with exposed moving parts.

The company manufactures windshield washer fluid, automotive antifreeze, diesel exhaust fluid and a variety of household solvents and cleaners.

On Nov. 17, 2017, a worker was operating a plastic blow-moulding machine

that manufactures 10-litre plastic bottles.

Apprised of quality concerns, the worker opened a steel-framed door while the machine was operating to determine if there was a blockage in the exhaust pipe. The worker tripped, fell and was caught in an area with sharp moving parts.

Investigation by the Ministry of Labour revealed there were no guards or other devices preventing access to the area where the injury occurred. In addition, the door accessing the machine was not locked or equipped with an interlock.

Recochem was ordered to guard the machinery and the company complied by installing an e-stop with additional guarding at the machine's exterior.

## CAREERS

VMAC, a manufacturer of mobile compressed air equipment in Nanaimo, BC, has appointed **Rick Duifhuis** OEM division manager. Duifhuis joined the company in 2005, managing several departments and has been working exclusively with VMAC's OEM partners for the past three years.



*Rick Duifhuis*



*Michael Schulz*

As part of its expansion in Europe, Armstrong Fluid Technology GmbH has appointed **Michael Schulz** sales director for Continental Europe. Schulz comes from a Danish pump manufacturer where he was

employed in a senior sales management role with responsibility for the wholesale business in Germany. Armstrong is a global manufacturer of fluid technology machinery based in Toronto.

**Laurent Beaudoin** is retiring as chair of recreational products maker BRP Inc. in Valcourt, Que. President and CEO **Jose Boisjoli** takes over the role. Beaudoin, former CEO of Bombardier Inc., left the transportation giant last year. BRP was spun off from Bombardier in 2003.

**Mark Samuel** is retiring as chairman of the Samuel, Son & Co. Ltd. board following 13 years in the role. Lead director **John Caldwell** takes over in August. Samuel will continue to serve on the Mississauga, Ont.-based metal manufacturer and processor's board.

Photon Control Inc., a Vancouver-based developer of optical measurement technologies for the global semiconductor industry, has appointed **Nigel Hunton** president and CEO. Most recently, he was president and COO of Ferrotec USA, a supplier of materials and components to the semiconductor industry.

**Stefan Schauss** has been appointed CEO of CellCube Energy Storage Systems Inc. in Toronto. Since April 2018 he was president and CEO of Enerox GmbH, a CellCube

subsidiary. **Mike Neylan** will continue as president. **Chris Hopkins** has resigned as CFO. **John Dyer** takes over the role. He has 30 years of financial management experience including CFO roles in both private and public companies. CellCube supplies energy storage systems to the power industry.

MgO Systems Ltd., a Calgary-based manufacturer of prefabricated construction technologies and magnesium oxide-based insulated panels, has added two senior business development team members. **Patricia Josephs** assumes the global business development role. She comes from Terra Life Sciences where she was vice-president. **John Selby** assumes the senior business development post. Most recently he worked with companies focused on the conversion of waste to energy and wind power generation.

Viridium Pacific Group Ltd., the parent company of cannabis firm Experion Biotechnologies Inc. in Vancouver, has appointed **Kamini Hitkari** CFO. She joins the company from Aurora Cannabis where she was the vice-president of strategic finance.

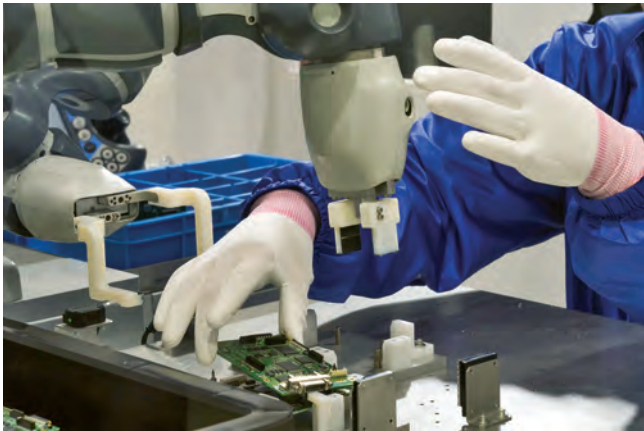
LeddarTech, a Quebec City-based provider of the auto and mobility LiDAR platform, has appointed **Richard LaRue** its chief legal officer. The company says he has worked extensively with software and biotech companies, as well as start-ups.

**Angela Lekatsas** succeeds the retiring **Graham Drake** as president and CEO of Cervus Equipment Corp. Lekatsas has held numerous leadership positions in finance and operations. Most recently she was vice-president, merger integration, responsible for capturing \$500 million in synergies from the merger of Agrium Inc. and Potash Corp. of Saskatchewan. Calgary-based Cervus acquires and operates agricultural, transportation and materials handling equipment dealerships.

**Cannara Biotech**, a Montreal-based vertically integrated cannabis company focused on cultivation and cannabis-infused products, has appointed **Jack Kay** director on the company's board. Kay is a pharmaceutical executive, having held senior positions in a number of firms, including CEO of Apotex.

## New technical report addresses cobot safety

Robotics Industry Association standard covers test methods and metrics for collaborative applications



Technical report is compatible with Canadian standards. PHOTO: ADOBESTOCK

**ANN ARBOR, Mich.** — The Robotics Industries Association (RIA) is addressing safety practices related to collaborative robots (cobots) with a new technical report.

The RIA, a not-for-profit trade association

based in Ann Arbor, Mich. that serves the North American manufacturing and service sectors, said the TR 806 standard addresses test methods and metrics for measuring pressure and force associated with contact during collaborative applications.

Collaborative robots are experiencing rapid market growth. RIA quotes research from Indian firm MarketsandMarkets that sees the market hitting \$4.28 billion by 2023, growth of almost 57% (at a

compound annual rate).

With new automation technologies comes the need for new safety standards.

"This is an important milestone in standards development because it shows how to

test whether or not the power-and-force-limited (PFL) collaborative robot is operating within the pain threshold limit values of R15.606-2016," said Carole Franklin, RIA director of standards development.

Pain threshold limit values are different for different parts of the body. She said collaborative robots have sensors and safety mechanisms built in, "but the variety of applications and flexibility of cobots makes it necessary to run tests to ensure the limits are set appropriately for the type of contact expected."

TR 806 was written to work with R15.06 and TR 606, which are US national adoptions of ISO 10218-1,2 and ISO/TS 15066. Franklin said since CSA Z434 is the Canadian adoption of 10218, Z434 and R15.06 are harmonized. TR 806 will also work with Z434 and any other 10218-based national standard around the world.

Visit [www.robotics.org](http://www.robotics.org).



## PLANT ONLINE SOUNDING OFF

What readers have to say about breaking news

Have you checked out **PLANT**'s daily news online? Here are some headlines that have inspired members of the Canadian manufacturing community to chime in. They're edited, but use the links to see the raw – and for some – longer versions of their remarks plus the stories that inspired their reactions.

Stay up-to-date on the developments – domestic and global – that affect Canada's industrial sectors by watching the news feed at [www.plant.ca](http://www.plant.ca) or reading **PLANT**'s twice-weekly newsletter (hit Subscribe on the website).

### Ontario's transportation minister raises possibility of higher speed limits

<http://www.plant.ca/Qy0ov>

➤ Step 1: Let's introduce a Federal Carbon Tax to deter people from using more fossil fuels. Step 2: Provincially raise speed limits to burn more fossil fuels. Does this make sense?

➤ Increasing the speed limit from 100 kph to 120 kph will increase gas consumption by 20% and also increase related GHG emissions by the same. Good for Big Oil – not so good for the environment.

Let's talk again once we get to electric vehicles powered by renewable resources!

### New study suggests oil sands greenhouse gas emissions underestimated

<http://www.plant.ca/a6ytF>

➤ Is there an economic and environmental case to be made for nuclear energy in oil sands extraction? Could nuclear energy also be used to refine tar sands to light fuels and ship light fuels instead of bitumen?

**Feds could tell you when to**

### drive if carbon price law stands, court told

<http://www.plant.ca/lkttq>

➤ I don't believe a carbon tax is an incentive to reduce our carbon footprint. There are much better ways to take a bite out of the carbon emissions without beating up on the individuals that need to stay warm in winter and find their way to work or school. And there will be more cases of rising food cost impacting those who can least afford it. Better to be proactive with legislation that pushes the technology we must use. Other parts of the world have legislated phasing out fuel-burning cars over the next few years. People will voluntarily move to a new technology if it does the job and the old technology is not available. The federal "incentive" to buy electric cars is a joke. It's only available to those who buy a vehicle that's \$45,000 or less. That doesn't offer any

choice at all.

### Canada joins new German-France 'alliance' that doesn't include US

<http://www.plant.ca/qAsjt>

➤ I am no climate change radical but I'm glad we're moving away from coal. It's such a dirty thing to mine. So many miners have died from coal dust-related illnesses, not to overlook mines collapsing. I think windmills are pretty. Maybe one day we'll realize what a beautiful world we live in and want to preserve it.

### Federal government gave millions to Irving's Atlantic Wallboard subsidiary

<http://www.plant.ca/zEf07>

➤ I wish I could get a loan for 50 million dollars "conditionally repayable."

### Ontario to legalize tailgate parties; amendment to be introduced in budget

<http://www.plant.ca/dpWYY>

➤ Doesn't this just promote alcohol consumption in, at and around motor vehicles? How is impaired driving going to be prevented?



## TMMC adds to Lexus mandate

Cambridge will assemble NX and NX Hybrid



Prime Minister Justin Trudeau and the Lexus NX, coming to TMMC in 2022.

PHOTO: JOE TERRETT

BY JOE TERRETT, EDITOR

**CAMBRIDGE, Ont.** — The Canadian automotive industry has endured much disappointment over the past year, what with General Motors closing its Oshawa, Ont. assembly operations (3,000 jobs) and Fiat Chrysler Automobiles announcing the cancellation of the third shift (1,500 jobs) at its Windsor, Ont. plant.

Leave it to Toyota Motor Manufacturing Canada (TMMC) to cast some sunshine over an otherwise cloudy sector of the Canadian economy. The world's number two automaker announced April 29 it will produce the compact Lexus

NX and NX Hybrid SUV models for the North American market at its Cambridge, Ont. facility, starting in 2022. This announcement closely follows production of the first revamped RAV 4s to come off the line (showcased on March 29), fruit of the \$1.4 billion investment the automaker announced in May 2018.

Toyota's investment in upgrading the infrastructure, backed by \$110 million each from the federal and Ontario governments, allows TMMC to build multiple platforms with quick and easy changeovers.

Automakers such as Toyota and GM are shuffling their line-ups and production as consumer

taste shifts from sedans to SUVs, crossovers and trucks. Hence, the Lexus announcement is a big deal. TMMC is the first plant outside Japan to produce the luxury brand and the new arrivals represent a vote of confidence from headquarters.

"It means Toyota's Canadian operations are here to stay," said TMMC president Fred Volf. "It also means TMMC will be building some of the most ecologically advanced, most in demand cars in the Toyota licensed global line-up."

The NX and NX Hybrid, launched in 2015, are priced in Canada between \$41,150 to \$51,350 and deliver 10.7 L/100 km in the city or 8.5 L/100 km on the highway. They'll fill in for the Corollas, made at TMMC since 1988, which are moving to a plant in Mississippi, before settling at a plant to be constructed in Alabama. No financial details related to the program were provided.

What automotive investment announcement would be complete without a few words from government sponsors? Prime Minister Justin Trudeau made an appearance to shake some hands, chat with Toyota workers and recognize the significance of the Lexus product mandate, while emphasizing the competitive advantages Canada offers.

"This is a company that understands what Canada brings to the table as we compete in the global marketplace," he said, talking up the "highly educated, highly skilled workforce" and the country's manufacturing quality being "second to none."

But he also noted trade deals that include NAFTA, CETA and the CPTPP provide preferential trade access to more than two thirds of the global economy. "In fact, we're the only G7 country that has trade deals with every other G7 country."

Ontario Premier Doug Ford was absent, a missed opportunity to rage at Trudeau about the "carbon tax" although Deputy Premier Christine Elliott was there to make sure everyone understood Ontario is "open for business."

Much of the credit for the Lexus program belongs to TMMC's more than 8,500 team members, represented by a group forming a backdrop to the podium that reflected the diversity of the workforce at the Woodstock and Cambridge facilities. They're responsible for 16 quality awards and Toyota's continuing confidence in Canada's ability to compete in the global auto industry.

Since 2003, TMMC has made more than 1.3 million Lexus RX and Lexus RX Hybrid vehicles.

## Durham's new boilermaker program

Students will get industry training, paid work placements

**OSHAWA, Ont.** — Durham College, Ontario Power Generation (OPG), and the International Brotherhood of Boilermakers (IBB) are collaborating to offer a three-week pre-apprenticeship program that will provide essential boilermaker training.

The Oshawa, Ont. college will manage and deliver the program.

Pre-apprenticeship is an introduction to the boilermaker trade and provincial apprenticeship program. The inaugural session began on April 29. Four additional intakes scheduled throughout the summer will train 100 new candidates.

Successful applicants will be referred for work at OPG sites, training with senior staff

and learning their craft in the nuclear industry. The program is also being supported by the Organization of Canadian Nuclear Industries (OCNI).

Boilermakers build and maintain nuclear, hydroelectric and coal-fired generating stations, as well as oil sands extraction plants, oil refineries, liquefied natural gas processing plants and other facilities. They also work in the mining, chemical, pulp and paper, cement and potash industries.



Students from Durham College's new boilermaker pre-apprenticeship program.

PHOTO: DURHAM COLLEGE

Their work includes everything from specialty welding to hoisting, positioning and installing huge components for massive industrial plants, and project management.

### What's that skunky smell?



Aurora Sun facility under construction in Medicine Hat, Alta.

PHOTO: AURORA CANNABIS

There's more than the smell of money coming from the Aurora Sky pot facility near Edmonton's airport. Canadian Press reports Aurora Cannabis, the company that operates the 800,000 square-foot plant, is not just working hard to produce 100,000 kilograms of marijuana a year.

It's also deploying odour eradication technology to prevent the skunky aroma of pot

production from disturbing the neighbours. This includes exhaust units for deodorization; 800 HVAC filters throughout processing areas; 1,360 pocket filters throughout the growing bays; an air-misting system; and specialized carbon and charcoal filtration units that absorb contaminants and impurities from the air.

The same tech will be put to work in the 1.6 million square-foot Aurora Sun plant under construction in Medicine Hat, Alta. When operational, the facility will be capable of producing 230,000 kilograms of high-quality cannabis annually.

Aurora is touting its odour mitigation efforts as good for the industry, but perhaps there's an opportunity for a home version so recreational users can keep the pot tang in their homes to a minimum.

### Plastic bags, a greener choice?

At least 127 nations have imposed bans or taxes on plastic bags, according to a United Nations report, and Newfoundland Labrador will soon join them.

The Canadian Plastics Industry Association may be engaged in a futile attempt to prevent an all-out ban of single-use plastic shopping bags in the province, but it's not waving a white flag yet. Dwight Ball's Liberal government is set to legislate an end to plastic bags after consulting with constituents (87% apparently in favour).

But the CPIA and the local industry conducted a random live-telephone survey of its own that found 55% of residents oppose a ban given three scientific studies conducted by governments in the UK, Denmark and Quebec.

The life cycle analyses studies all found that plastic shopping bags are better for the environment and have a much lower global warming potential than the alternatives. Paper was deemed the worst option because it has the highest carbon footprint and potential for global warming.

The government's expert panel revealed plastic bags are a tiny part of the waste stream (0.2%). The experts cited windblown litter as a more pressing concern and recommended the province adopt modern baling systems that contain and bind waste into cubes before placing them in landfill.



Lowers global warming potential.

PHOTO: ADOBESTOCK

### A new health supplement for pets

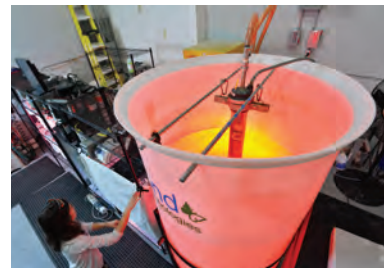
Pond Technologies Holdings Inc. has found a new group of customers for algae-based consumer products, while helping to reduce CO2 emissions. The Markham, Ont. clean tech company's wholly owned subsidiary Pond Naturals has expanded its line to include a health supplement for pets.

X10 uses algae oil containing astaxanthin produced at Pond Naturals' algae plant in Agassiz, BC. The product helps keep kitty or Cujo feeling young by covering 10 aspects of the pet's health and reducing free radical damage. This slows the natural effects of aging, or aids in recovery.

Pond's technology set up at an industrial site uses CO2 to grow many species of algae, including strains that produce anti-oxidants, omega-3 fatty acids, and protein for human and animal consumption.

X10 was developed by Regenurex Health Corp. (acquired by Pond Naturals in January) in partnership with Odorchem Manufacturing Corp., which has established distribution channels in the North American pet market.

Maddies Natural Pet Products and Kane Veterinary Supplies in Canada are already carrying the pet supplement. US and UK distribution partners are expected to join soon.



Turning CO2 into algae.

PHOTO: RODNEY DAW

This is a process that turns natural gas and CO2 ... into solid carbon nanofibres that can be sold in a brick or powder for a lot of industries that utilize them.

Mina Zarabian, a researcher at the University of Calgary who developed this higher purpose for greenhouse gases.

### Going driverless in mining

Autonomous vehicles are already operating in the mining industry, one of the benefits sought being increased productivity. SMS Equipment has deployed the first Komatsu driverless 980E-4AT in Canada, although it wouldn't comment on who the customer might be. But the industrial heavy equipment supplier based in Acheson, Alta. did indicate the gigantic dump truck is suitable for use in oil sands operations.

Suncor Energy has been testing 400-ton capacity driverless Komatsu trucks and plans to have a fleet of 150 or more over the next five years, which doesn't bode well for drivers, hence the productivity gain.

The new truck is modelled after the workhorse 930E. And it's big. Maximum gross vehicle weight is 62,527 kilograms and the wheels (about \$42,000 each) are almost four metres high.

Not that this would come up, but imagine parallel parking one of these things in downtown Fort McMurray.



The Komatsu 980E-4AT in action.

PHOTO: KOMATSU



## Banks top lenders

### \$6.4 billion for manufacturers

Most small-medium Canadian manufacturers finance most investment in their businesses from their own cash. The **PLANT** Manufacturers' Outlook 2019 survey shows 70% of companies will dip into internally generated cash over the next three years, and 32% will hit up the banks. Other sources of financing trail far behind.

Statistics Canada does a higher-altitude biannual survey that looks at suppliers of business financing and outside using internal cash, domestic banks were responsible for most of the disbursements to manufacturers (more than \$6.4 billion) in the second half of 2018.

Other banks (including foreign) cashed in at almost \$3.6 billion, followed by finance companies (almost \$2 billion), credit unions (\$461 million) and insurance companies (\$261 million). The total represents a \$960 million increase over the first half of 2018.

Outstanding credit available was \$73 billion, a \$3 billion increase from the first half of the year.

Total term credit disbursed during Q2 (compared to the first half) rose by \$7.7 billion (5.8%) to \$138.7 billion.

The Bank of Canada's Senior Loan Officer Survey reported overall lending conditions eased slightly in the second half, mainly due to competition for corporate borrowers between lending institutions.

## Plants add jobs

Employment rose by 107,000 in April and the unemployment rate declined by 0.1 percentage point to 5.7% as more people participated in Canada's labour market, according to Statistics Canada's monthly labour report.

Manufacturing increased by 5,700 from March, a 0.3% change for a total 1,748,200 employed. Ontario had the biggest gain at 11.8%.

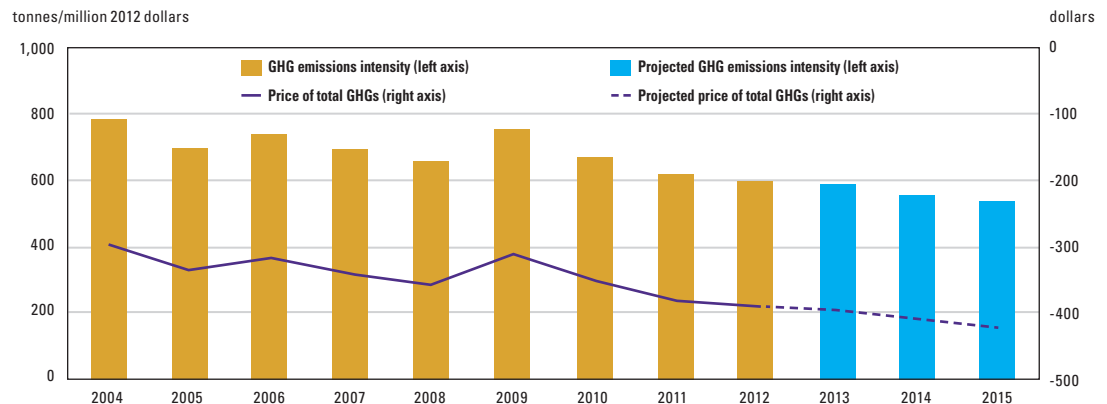
Saskatchewan, Alberta and BC also showed increases, while all other provinces showed decreases.

Canada's unemployment rate was 4.7% for the month, compared with 3.6% in the US. On a year-over-year basis, the unemployment rate declined by 0.2 percentage points in Canada and by 0.3 points in the US.

# PLANT PULSE

## ECONOMIC DEVELOPMENTS AND TRENDS

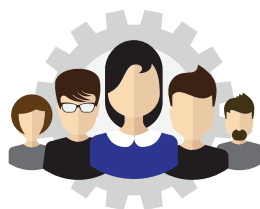
### GHG INTENSITY AND COSTS



The decline in the intensity of greenhouse gas (GHG) emissions among the largest manufacturing emitters from 2004 to 2012, was the main reason environmentally adjusted multifactor productivity (EAMFP) growth outpaced multifactor productivity (MFP) growth. A Statistics Canada report shows a decline in emission intensity was also the primary driver behind the falling price of GHGs. The market price represents the cost of reducing emissions, which increased from \$298 per tonne of emissions in 2004 to \$390 per tonne in 2012 and a projected cost of \$422 for 2015.

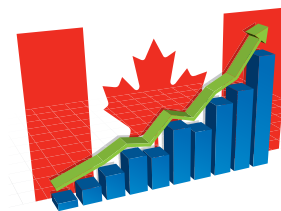
Source: Statistics Canada, CANSIM

# 6,500



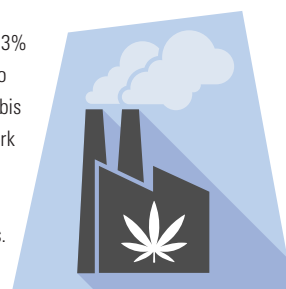
Number of women-owned manufacturing enterprises (2005-2013), employing 51,900. Men owned 36,200 enterprises, employing 474,300. Equal ownership accounted for 7,000 enterprises employing 44,800. (Statistics Canada)

# 1.4%



Projected growth of the Canadian economy in 2019. A turnaround in business investment will be required to push the economy to 2% next year. (Conference Board of Canada)

Number of workers (13% of the workforce) who reported using cannabis before heading to work or while on the job during Q1 of 2019. 27% were daily users. (Statistics Canada)



# 514,000

# 62%



Manufacturers who experienced phishing cybersecurity attacks in 2017. These are attempts to fraudulently obtain usernames and passwords disguised as trusted entities. (PLANT Manufacturers' Outlook 2019)



# 951

Workplace fatalities recorded in Canada (2017), an increase of 46 from the previous year. Among these deaths were 23 young workers aged 15 to 24.

Manufacturing recorded 160 fatalities, second to construction; and 33,893 lost time claims, second to 45,001 in health and social services. Men filed 52,240 claims, women 99,319. However, a study (Work related deaths in Canada – University of Ottawa) contends the number of fatalities would be higher if workers exempt from claims coverage, stress-induced suicides, commuting fatalities and occupational disease are included. (Association of Workers' Compensation Boards of Canada)

# SWEET SUCCESS

## BIONEUTRA WINS WITH THREE-IN-ONE VITAFIBER

Recent growth is backed by almost 30 years of ground-breaking research.

BY CAROLYN COOPER

Bill Smith chuckles a little when he recalls how he became involved with Edmonton biotechnology firm BioNeutra North America roughly 14 years ago. “To tell you the truth I never even thought about joining another company at that stage in my life,” he says.

It was 2005, the year after he stepped down as mayor of Edmonton, when BioNeutra founder, president and CEO Dr. Jianhua Zhu asked him to join the fledgling company’s board. “I did some investigation, and I thought, Wow! This is a new and exciting little company,” says Smith, who earned the nickname “Booster Bill” during his tenure as Edmonton mayor from 1995 to 2004, due to his unwavering promotion of the city.

“I thought the timing was great because the world was looking for healthier products, and sugar was the big elephant in the room at the time, so their sweetener product, VitaFiber, fit right in,” Smith explains. “It was also the only product in the world that we knew about that was a three-in-one ingredient: it was a fibre, it was naturally sweet and it was a prebiotic for digestion. I didn’t know much about the process, but I met Dr.

Zhu and I was very impressed with his knowledge and with what he wanted to do with the company – he had a sincere desire to create healthy products for people. So I started out on their board, then chairing the board, and I ended up working for them full time in 2007.”

Today the 83-year-old former mayor, business owner and Grey Cup champion (Smith played for the Edmonton Eskimos during the 1950s and early 1960s) is still chair of BioNeutra’s board, as well as senior vice-president of the company. His belief in the product has been more than validated, and the now publicly traded company has grown sales of its proprietary sweetener alternative VitaFiber IMO an incredible 1,378% in the past five years.

While many biotechnology companies fail, crushed by cash and regulatory challenges, BioNeutra continues to rack up awards and accolades. It hasn’t always been an easy road, Zhu admits, although his determination to develop more accessible, healthier products has never wavered.

“I’m not one to throw in the towel, and though we’ve had some close calls with the banker, I was certain that eventually we would succeed, and we did,” Zhu says. “Most importantly, we are helping to improve people’s health – that was always the goal.”

BioNeutra’s sweet success is actually the result of 27 years of



Highly automated production control centre.

innovation and research, starting in 1990s China, where Zhu, a chemical engineer, worked as a divisional vice-dean at the South China University of Technology.

“I came from a family that was dedicated to public health,” he says. “My parents and two sisters are medical doctors and my grandparents were involved





*Operator at a purification control station.*

PHOTOS: ROBERT BRAY

the innovators, while also helping supplement the low pay the faculty received across the board.”

That was when Zhu first began working with four colleagues on a novel process to produce what would become the functional food ingredient VitaFiber IMO, based on his own goal of developing “a healthy new food ingredient to improve people’s health that could be produced commercially and inexpensively.”

### Committed to innovation

Research continued when Zhu was offered visiting professorships at Japan’s Yokohama National University and at the University of Alberta in Edmonton, where he and his family eventually settled in 1998.

After moving to the private sector and working for a succession of under-funded biotechnology companies, Zhu realized his concept would only be commercialized through his own efforts, and in 2003 established BioNeutra. When Smith joined the firm two years later it was housed at the Edmonton Research Park, a business incubator for start-ups and growing businesses, using a pilot plant for R&D.

Financing was an enormous challenge for the struggling company, and because Zhu was developing a novel process and functional ingredient, there were considerable regulatory hurdles to clear before getting VitaFiber to market. Regardless, interest from investors and government grew steadily, which Zhu says, “was key to getting private investment. The money was important, but the government funding provided a halo effect and legitimacy. That reassured investors the project was viable.”

Roughly \$13 million went into research to fund collaborative projects at the University of Alberta, including clinical studies and human trials in Canada and



*Plant manager checking the syrup purification process.*



*Bill Smith, senior vice-president of BioNeutra.*

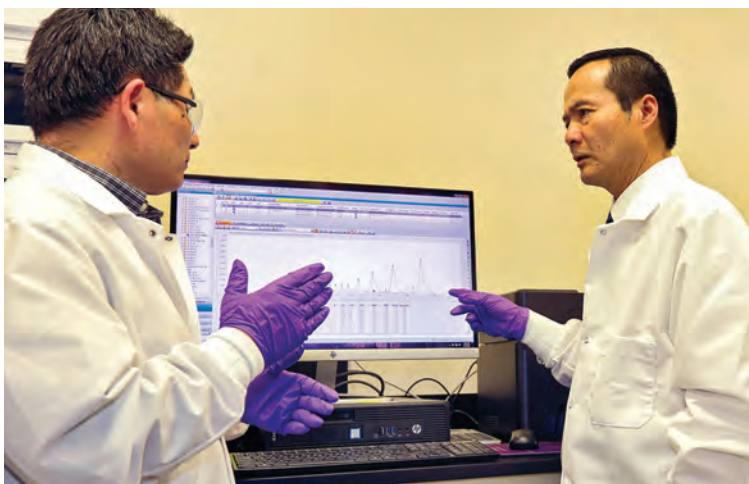
in developing eastern medicines, so I had some entrepreneurship in my blood. Inspired by them and university professors, I wanted to make a difference in

public health, but by pursuing research.”

At that time universities “were being called upon to play a key role in China’s drive towards

industrialization,” explains Zhu, who enabled some of the 300 scientists working under him to commercialize their research and “use the profits to reward





*Dr. Jianhua Zhu discusses lab test results with company scientists.*

the US.

In 2009 Zhu and his four colleagues were awarded two patents in the US for the enzymatic conversion process that produces VitaFiber, followed by two Canadian patents in 2010. As a result, VitaFiber became the first IMO approved by Health Canada, the US Food and Drug Administration, the European Food Safety Authority, and Food Standards Australia New Zealand, allowing it to be sold in 30 countries. Food and beverage products containing the ingredient are allowed to use a health claim on the label that it “contributes to healthy digestion and weight management.”

VitaFiber IMO is an Iso-malto-oligosaccharide (IMO), a sweet, digestion-resistant carbohydrate found naturally in honey, miso, sake and soy sauce. IMO is manufactured through the “enzyme-catalyzed hydrolysis of starch” from various plant sources, according to Health Canada, and is a prebiotic and a soluble dietary fibre, meaning that it isn’t metabolized in the small intestine. Instead it ferments in the colon to produce beneficial bacteria in the

digestive system. Because it’s 50% to 60% as sweet as sucrose, IMO can be used as an inexpensive, low-calorie, natural sugar alternative, while offering the additional advantage of overall good gut health and weight management.

“We use a patented, highly controlled enzymatic process to transform starch molecules into branched-chain molecules made of four to seven units of glucose that contain a series of alpha (1-6) bonds,” Zhu explains. “The bonds are poorly digested by humans, they deliver fewer calories while providing fibre-like benefits.”

### Patented process

BioNeutra uses starch from peas, potatoes, tapioca, and non-GMO corn to produce VitaFiber in syrup or spray-dried powder format for use in a wide range of manufactured products, including bars, beverages, baked goods, confectionary and ice cream toppings. The versatile ingredient is vegan, certified halal and kosher, and is free of allergens, artificial colours and preservatives.

Smith believes BioNeutra’s patented process and commit-

ment to continual improvement has kept it growing while so many biotechnology companies fail. “The difference really is the product,” he says. “Dr. Zhu came around at the right time – the world was looking for good, clean healthy products, and for more natural ingredients, and we had the right product at the right time. When we started we had virtually no money to do advertising and promotion. We had one salesman going out and talking to manufacturers. It was a lot to do with word of mouth.”

As well as its functional properties, VitaFiber works well as a binder in food and beverage products, which Smith says, “helps in manufacturing and gives us a big edge up with some companies.”

Although BioNeutra has some direct-to-consumer sales, the majority of VitaFiber IMO is sold as an ingredient to manufacturers, with the largest demand coming from the US. Interest in IMO has grown significantly in recent years, as consumers increasingly avoid sugar due to health concerns, and as the market for digestive solutions matures along with our aging population. That’s been a boon to business for BioNeutra, which went public in November 2014. Zhu says sales of VitaFiber grew to “more than \$750,000 per week in the first nine months of 2018,” pushing total sales to between \$125 million and \$130 million in the past five years. Along its journey the company has been recognized with numerous business and innovation awards, including Bio-Alberta’s Emerging Company of the Year Award in 2006, the 2015

Ernst & Young Entrepreneur of the Year – Prairie Region award for Zhu, an Alberta Export Award in 2017, and an Alberta Business Award of Distinction in 2018.

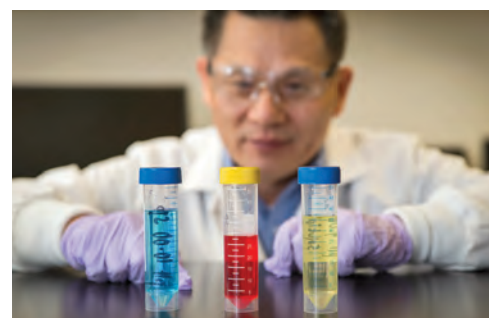
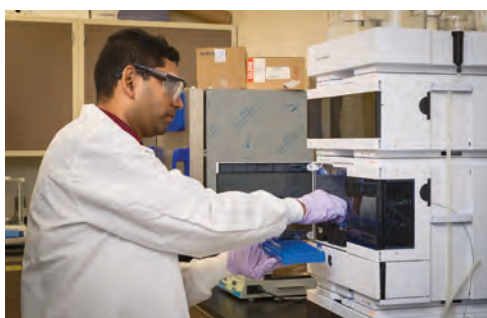
Last year BioNeutra opened an \$11-million research and production complex in Edmonton featuring 5,000 square-feet of office and lab space, and a 45,000-square-foot plant with the capacity to produce 5,000 tonnes of product annually. The majority of production (roughly 15,000 tonnes annually) takes place at contract manufacturing plants in Indonesia and China, where Smith says the enzymatic process is identical, guaranteeing quality consistency. “We also have our own personnel in the plant in Indonesia checking on it all the time, and the [production] in China is a joint venture with us, so the control of the product is very tight.”

Smith says BioNeutra will launch branded products for retail later this year, while continuing to develop new functional food ingredients. “We’ve got great research and development people within the company, and I’m looking forward to some next-generation products that we’re working on. It’s an exciting time for the company, and I hope I can be around long enough to watch it grow.”

*Carolyn Cooper is a freelance business writer based in Kawartha Lakes, Ont. who has deep roots in the food and beverage industry. E-mail [cjcooperbrown@outlook.com](mailto:cjcooperbrown@outlook.com).*

### Comments?

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*(L-R) Lab preparation for Q&A testing. Lab technician checks a high-performance liquid chromatography machine used for product analysis. Scientist prepares pH standard samples for calibrating equipment.*



## CONSTRUCTION

Alberta manufacturer is going global with its advanced excavation trucks.

BY JAMES CARELESS

The 'Global' in Tornado Global Hydrovacs (TGH) is there for a reason. Already a major force in North American construction, this Alberta manufacturer of hydrovac trucks is now expanding into China, thanks to a five-year strategic partnership with Jianghuai Yangtian Automobile Co. Ltd. ("Jianghuai Yangtian") – and Tornado has ambitions to take on the world.

Under the supervision of Tornado's wholly-owned subsidiary TGH Beijing (aka Tornado China), Jianghuai Yangtian is devoting part of its large Chuzhou factory to manufacturing hydrovac trucks for the Chinese market.

Tornado China has also signed a one-year strategic partnership agreement with Daqing Haotian Xinda Technology Ltd. (an underground water pipeline inspection company) to develop a client base in China's Heilongjiang Province.

A hydrovac truck uses high-pressure water carried to the job site in one of the two on-board tanks to loosen, dirt, sand and gravel in construction areas. The truck's large hose boom then vacuums the liquefied materials into the second tank for no-mess removal.

Compared to backhoes and other brute force excavators, hydrovacs provide a gentle, safe way to comprehensively excavate work sites without causing damage to buried infrastructure. This makes trucks particularly useful in digging near electric and telecom cables, gas lines and water mains that can be destroyed by an errant blade.

Tornado president Bill Rollins is particularly bullish about the Chinese market for hydrovacs, a country where this safe excavation technology is virtually



A Tornado hydrovac truck.

PHOTO: TORNADO

# Going GLOBAL

## TORNADO TO MAKE ITS HYDROVACS IN CHINA

unknown.

"In North America there's about 1,500 units built a year to serve a population of 330 million," Rollins says. Given that China's population is approaching 1.4 billion, he sees the Chinese market for hydrovacs as being worth at least 2,000 units per year.

"That's just for larger hydrovacs," Rollins says. When all sizes of trucks are taken into account, he expects China to buy 5,000 annually.

The Chinese market is certainly ripe for hydrovacs and their ability to excavate underground infrastructure safely, he adds. "China had a huge pipeline explosion that killed 68 people. They could have totally averted

that with a hydrovac."

Established in 1984 with the launch of its Model 1 truck, Tornado has grown from a local concern to become a North American supplier. Currently 80% of the yearly output of 120 hydrovacs are exported to the US. The rest are sold domestically.

### Hand-built hydrovacs

With annual revenues of \$28 million, the company builds its trucks in a 45,000 square-foot factory in Stettler, Alta. that employs about 100 people. Tornado is bringing a second 50,000 square-foot plant online south of Calgary that will add 60 people to the payroll.

Tornado hand-builds its hydro-

vacs applying the workstation model – rather than an assembly line – using Cummins diesel engines and chassis sourced from major truck manufacturers such as Kenworth and Peterbilt. Skilled human teams take turns assembling each hydrovac truck from start to finish, rather than using automated machines.

"There's no way a robot could do any of the stuff we're doing," Rollins explains. Compared to the competition, "we spend a lot more time on fit and finish."

Tornado's technicians are highly skilled and use the latest in air tools and other technology to assemble the hydrovacs in an efficient, timely manner. The company's production line is run using lean manufacturing principles, and it invests in R&D to improve its hydrovacs on an ongoing basis.

A case in point: about a \$1 million investment in R&D contributed to a significant reduction in the weight of the trucks thanks to "creatively redesigning the back end," Rollins says. Doing so reduces potential fines for operators who load their trucks to the maximum, thus exceeding local roadway limits on vehicle weight.

"Now when [a driver] totally

fills a truck, he/she probably will never get the maximum ticket,” Rollins says. “[Maybe] a slap on the wrist, saying ‘hey, you’re over 500 pounds’ versus 4,000 to 5,000 pounds.”

The idea to move into China came from one of Tornado’s directors, says Rollins. It took a year to negotiate the deal with Jianghuai Yangtian, plus a \$10 million investment from that company. If all goes to plan,

workers will start building trucks in China by June.

(Tornado didn’t seek funding or support from Canadian government agencies.)

### High standards

To ensure that Jianghuai Yangtian builds hydrovacs that meet the company’s high standards, Tornado is keeping a firm hand on the production process. “We’re going to dictate to them



Tornado CEO Guy Nelson, third from the right, with representatives of Jianghuai Yangtian Automobile Co. Ltd. Mike Lloyd, plant manager at Tornado’s Stettler, Alta. factory, is third from the left.

PHOTO: TORNADO

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what kind of water pump to use, what kind of blower to use,” Rollins says. “We look after everything. We tell them exactly the way we want it done.”

He is confident the details of the TGH-Jianghuai Yangtian partnership protects TGH’s intellectual property; a major concern for foreign companies selling into the Chinese market. Ensuring this protection was TGH’s primary focus during the negotiation process.

As for the current chill in Canada-China diplomatic relations due to the Canadian detainment of Huawei CFO Meng Wanzhou and various Canadians in China, “I’m personally concerned,” Rollins says. “But as time goes on and less gets said, I think it’s sort of dying down.”

While Tornado China ramps up to production, Tornado is exploring expansion into Europe and South America. And yes, these initiatives are all part of the company’s plan to become a truly global manufacturer. “Hence the name Tornado Global Hydrovacs,” quips Rollins.

*James Careless is an Ottawa-based freelance business writer. E-mail james.careless@gmail.com.*

**Comments?**  
E-mail jterrett@plant.ca.





## PERFORMANCE

Team members take their cues from leaders' behaviour. PHOTO: ADOBE STOCK

# Lead by EXAMPLE

## BEHAVIOUR EQUALS TRAINING

Your teams are watching what you do and say, and learning.

BY HUGH ALLEY

If you hold a leadership role, your teams are watching you. They look for tell tale signs of what's going on in the same way as a fortune teller looks at tea leaves. What they see is your behaviour. As a leader, you need to be aware of what your behaviour says, whether it's overt or subtle.

For example, if your firm provides reserved parking spaces for all supervisors and managers, you're communicating that your role entitles you to special treatment. By contrast, if you take a space in the general lot, you place yourself with the team.

If you rush to get other stuff done and make a decision on the fly, you communicate that the facts don't matter so much

and it's okay to make a decision based on your gut feel or mood. If you face a new problem with curiosity and take time to ask questions and get the facts, you demonstrate the appropriate behaviour is to dig into a problem.

Mark Rosenthal, an experienced lean manufacturing/quality director and manager, explored in his blog the concept of corporate culture and how it changes (<http://theleanthinker.com/2019/03/06/toyota-ka-ta-and-culture-change/>). He says, "In the end, I think [different definitions of culture] all come down to various ways of saying 'how people talk to each other.' This includes who talks to whom, and what structures and rules guide those conversations."

It's all part of how we behave. The challenge for leaders as people who strive to improve performance is to choose what that behaviour teaches the team. Regardless of what you do, the

team will learn something. The question is what?

It's a natural to observe how authority figures treat people, how they respond to problems and challenges and how they treat work, then take cues from

that behaviour. Although this puts pressure on you, the nice thing is you choose what your behaviour teaches.

If we are curious, respectful, and interested in the facts, that's what they'll learn to do. If we jump to conclusions and are dismissive of others, they'll learn that too.

Your choice.

*Hugh Alley is an industrial engineer based in the Vancouver area who helps organizations achieve significant performance gains. Call (604) 866-1502 or e-mail [hughralley@gmail.com](mailto:hughralley@gmail.com).*

Comments?

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## PRESSURE POINT

The business incentives marketplace is worth \$300 billion to Canadian companies.

BY KIM LAUDRUM

**M**anufacturers, especially small ones, are challenged when it comes to investing in their businesses. The **PLANT** Manufacturers' Outlook 2019 survey shows 70% use internally generated cash, followed by 32% who are financing with bankers and 16% who are funding through private investors (16%). Each method has its pros and cons.

Meanwhile, emerging service providers are helping manufacturers access what's dubbed the business incentives marketplace, worth close to \$300 billion in grants, contributions, and interest-free loans to Canadian companies.

Reinvesting profits offers autonomy. There are no interest rates to pay, as with a bank loan. No one outside needs to know details of the company. And there's no equity in the business to concede, as private investors often demand. But could that money be better placed somewhere else? As a manufacturer, you may be an expert in making widgets, but how much do you



*Business incentives include grants, contributions and interest-free loans.*

PHOTO: ADOBE STOCK

# Showing you the **MONEY** WHERE MANUFACTURERS CAN TURN FOR INVESTMENT

know about turning your business into a growing concern?

"It's great if your company is one of those that generates enough cash flow to finance capital expenditures," says Dan

Leslie, senior vice-president and head of corporate banking (Canada) at HSBC Bank Canada. "But sometimes you need to look at the mix of capital and the balance sheet to see how deploying

capital will affect your overall business."

Leslie asks manufacturers to consider if spending hard-earned cash is the best idea when they could be leveraging financing from the bank. What's the opportunity cost of that expenditure? When the business is in growth mode, principal payments can be deferred while the company gears up cash flow. Also consider new demands on cash flow for other payments, such as wages and overtime.

The bank can help mitigate risk, especially when purchasing machinery and equipment offshore. "The currency could move against you. A bank can help lock in foreign exchange rates. We're primarily a relationship bank, not a transaction-based bank. We are there for the long-term view. We are there to provide advice," Leslie says.

That includes where to find support you can leverage such as funding from the National Research Council's Industrial Research Assistance Program (IRAP), which provides money for innovation. Or Export Development Canada (EDC), which helps insure receivables.

"If you wind up with a banker familiar with manufacturing, generally speaking, it's a pretty good experience for companies," says Al Diggins, chair of the Excellence in Manufacturing

## Financing resources

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### NRC IRAP

<https://nrc.canada.ca/en/node/341>  
The National Research Council of Canada Industrial Research Assistance Program (NRC IRAP) helps SMEs build innovation capacity and take their ideas to market.

### ONTARIO NETWORK OF ENTREPRENEURS

[www.onebusiness.ca](http://www.onebusiness.ca)  
A collaborative network built to help Ontario businesses succeed, including starting, growing and financing.

### BANKS AROUND THE WORLD

[www.relbanks.com/canada](http://www.relbanks.com/canada)  
A comprehensive list of Canadian banks.

### EXPORT DEVELOPMENT CANADA (EDC)

[www.edc.ca](http://www.edc.ca)  
Canada's export credit agency, provides insurance and financial services, bonding products and small business solutions to Canadian exporters and investors and their international buyers. Also supports Canadian direct investment abroad and investment into Canada.



Consortium, the Owen Sound, Ont.-based non-profit that helps manufacturers attain excellence. But, he cautions, not all lenders have manufacturing exposure.

"Manufacturing is a lot more complicated now than it once was," Diggins says. He should know. Years ago he opened one of the first commercial lending centres for Royal Bank. "Banks today won't take on a manufacturer at risk."

Today, there is much more to consider when calculating risk, including equipment, technology, cybersecurity, foreign rates and regulations, he says. Investing profits into the business is important. "That's a clear indication you believe in the business, which is a good indicator to other investors should you need them down the road."

For good or for bad, typically if a company is in growth mode, there are gobs of money

available through angel investor groups, Diggins says. "That's a very good source of funding and sometimes they offer expertise in management along with it. They can be structured so that some (angel investors) are hardly involved. They just want a place to park their money. Or, they are very much involved. That can be a good thing or not. It depends on how well everyone gets along."

The caveat is you have to do your due diligence to ensure you are attracting the right investor. Often, if it's not a good fit for the bank, it will refer the manufacturer to angel investors. Diggins mentions Bluewater Investors in Ontario and others that can be found through the Ontario Network of Entrepreneurs.

Even if you do find a willing angel investor, negotiate terms you can live with. How much equity are you willing to part with? How much control over

## Big money

Montreal-based automotive part manufacturer Raufoss Canada received a \$7 million loan for equipment in 2016, according to *Report on Business* magazine's list of Top 50 Canadian organizations that received government funding. FCA Canada Inc. (Chrysler) topped the list then with an \$85.8 million chunk of cash from the Jobs and Prosperity Fund to be used for innovation.

operations are you willing to give up? What if they don't share your values?

Diggins describes one entrepreneur he knows who went the angel investor route. A few years down the road the new investor wanted to take the company in a different direction, one that didn't match his values. In the end, the angel investor bought the company but it was a gut-wrenching decision.

There are options for manufacturers turned down by the bank. One entrepreneur Diggins knows had a contract with a Big Three automaker. He needed to purchase a \$500,000 piece of equipment. When the banks turned him down, the federal Business Development Corp. (BDC) helped him out.

In Canada there is about \$26 billion per year in funding available to companies. "That's larger than our venture marketplace," says Teri Kirk, CEO and president of Fundingportal.com. Many Canadian companies also qualify for opportunities in the UK and the US where there is \$250 billion available. That's just under \$300 billion in grants and incentives looking for an entrepreneurial match.

While there is a lot of money available, it's difficult both to identify the appropriate programs and to successfully apply for them, according to findings

# "MACHINES CAN LEARN BUT THEY CAN'T READ MINDS."

Brendan Daniel, Chief MAXOLUTION® Engineer, Canada.

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from both the Ontario Drummond Report and the federal Jenkins Report, Kirk says.

The good news is that many of these programs are targeted to manufacturing, R&D, innovation and growth for manufacturers. "That isn't always the case in the venture marketplace, which is more targeted to sciences," she says.

Fundingportal.com writes programs that help companies carry out those pre-steps to find the right programs.

It aggregates the data on all of the programs, then matches companies in seconds to the right programs. "We can pre-qualify them. We can help them better understand which programs they are not going to get funded for," Kirk points out. "We can give them an idea of how much money they're likely to get, which is a really important consideration. That you don't want to be applying for \$20 million when what you are more

likely to get is \$2 million."

The average amount an SME is likely to access is between \$100,000 to \$1 million, mainly for micro-projects. Larger companies can access these funds, too, for small projects, such as wage subsidies. Or, they can access level three funding for projects worth under \$10 million or the highest level for projects worth more than \$10 million. Kirk says governments typically fund one-third to one-half of a project.

### Funding changes

It's quite the task to stay up to speed on all the government grants a manufacturer can access. "The funding is always changing. Only a handful of programs are over five years old," says Igor Chigrin, author of a book on the subject (*Get Funded*) and a government-funding expert at Fair Grant Writing in the Greater Toronto Area.

"Funding is often limited by changes in government budgets

and the government is not that good at communicating changes, but it's absolutely worthwhile," Chigrin says. "Government funding can give manufacturers the cash they need, and often it's not repayable."

There are six main categories targeted for government funding:

1. Equipment purchasing
2. Skills training
3. Export marketing
4. Research & Development
5. Software
6. Hiring

He suggests identifying the programs you qualify for and make note of the deadlines, the eligibility requirements and the availability of the grants, details that unsuccessful applicants overlook. It's mandatory to call the programs to ensure funding is available. "It's always a good idea to establish a relationship with a funding agency early on."

It could take two to six weeks or six to eight months for

approval, depending on the requirements. "Before you actually get your money you have to submit claims and demonstrate two things: you have expenses, and you have accomplishments. The main benefit to the manufacturer is productivity improvement. Chances are you will get more funding if this is the case."

Chigrin offers this advice to manufacturers looking to invest access grants and contributions: "If this is the road they want to take, it requires patience."

Finding adequate funding to invest in your business can be challenging, but there are sources to tap and resources available that point to the best way forward.

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*Kim Laudrum is a Toronto-based business writer and regular contributor to PLANT. E-mail [klaudrum@rogers.com](mailto:klaudrum@rogers.com).*

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## SOFTWARE

More than 95% of the data comes from human interaction.

BY STEVE GAHBAUER

Maintenance has evolved from simple repair after breakdowns to amazingly predictable strategies. These, however, require the handling of more data to enable better decision-making and more effective work management. And concentrating on the “people asset” is key.

So says Erika Mazza, the CMMS and asset management data specialist at the regional municipality of Durham in Ontario. She understands the business needs of a computerized maintenance management system (CMMS), which include identifying improvement opportunities and the optimization of maintenance strategies. She made a case for the importance of people in a presentation at the 2018 Ottawa MainTrain maintenance, reliability and asset management conference, convened by the Plant Engineering and Maintenance Association of Canada (PEMAC). Mazza said positive maintenance actions are triggered by people who understand how their functions are vital for machinery and systems health. In asset management, people usually perform complex activities as part of a bigger picture, and they should always be a priority. A CMMS or enter-

### Operations view

A CMMS offers multiple core maintenance functionalities that include (but are not limited to):

- Equipment data management
- Preventive maintenance
- Labour
- Work order system
- Scheduling/planning
- Vendor management
- Inventory control
- Purchasing
- Budgeting
- Asset tracking



Managers at all plant levels rely on data to create reports and make decisions.

PHOTO: ADOBE STOCK

# Managing your CMMS

## PEOPLE ARE THE MOST IMPORTANT ASSET

prise asset management (EAM) system are just tools.

The evolution of computerized maintenance and asset management systems went from CMMS (maintenance management) through ALM/EAM (asset lifecycle management) to APM (asset performance management). Soon smart machines will let us know their condition and automatically request service to comply with their assigned state of good repair.

One benefit of having this new way to predict and manage a plant's assets is the improvement of people's work conditions. Although we are entering the era of IIoT and smart machines, most plants use CMMS or EAM, where more than 95% of the data comes from human interaction. A system administrator configures the master data and keeps it up to date; maintenance managers add maintenance plans, asset attributes, bills of material and

set the threshold for machine connectivity; and regular users will request service based on their observations of how a machine is performing.

### Key roles

A very important trio – planner, stock manager and workforce – complete the workflow process, adding more data and completing the historical equipment record through planning of work orders, managing parts, and recording activity results, failure data and meaningful closing comments. These roles are key to enriching the equipment history and keeping existing data up to date.

This trio of people is the closest to the assets. They identify opportunities for improvements or issues that require attention. These people can update equipment conditions and nameplates, and even help optimize existing PM programs. Managers at all plant levels rely on this data and then create reports to

make decisions, adjust priorities and understand asset performance.

Is the data fit for its intended uses in operations and maintenance decision-making?

There are five characteristics of high quality data:

- Data needs to be accurate to be useful. It helps reduce response and decision-making time.
- Completeness is also important. Partial data is only a small part of the picture.
- Consistency is key when entering data. Fields are set to specific characteristics. Those not set to a specific value require a robust set of standard business processes that spell out the format and syntaxes of the data entry.
- The recorded data must be aligned with the corporate strategic goals and should support the evaluation of KPIs. If information is used properly, a plant will excel in competitive markets, strengthen its reputation, maximize its profits and reduce maintenance expenses.
- New and current data is more valuable than old, outdated information. Timeliness enables real-time insights on the performance of equipment and workforce.

Reliability of data is directly tied to its source – and that source is people. But people can be unpredictable, hard to reset or reprogram, they're easily dis-

tracted, highly multifunctional, unique, autonomous and sensitive. These factors make people liable to commit errors that will compromise the integrity of the asset data.

Mazza says errors are the outcome of multiple human and organizational factors. The human factor link is a combination of decision, learning, performance, omission and memory. Avoiding blame but instead focusing on

factors contributing to a problem helps to identify practical solutions. One way to do this is to categorize the type of human errors that prompt situations, such as missing failure data on work orders, logging unrealistic labour hours, or even choosing the wrong equipment to track maintenance history. Using root cause analysis and other strategies identify the ultimate cause of the human error, helping to

build strategies that prevent the occurrence and recurrence of human errors when data is entered into the CMMS/EAM.

### Platform for reliability

The presenter noted it's possible to influence behaviours and outcomes by ensuring there's a platform that enables human reliability when deploying a new system, re-launching existing systems or sustaining the operations

of CMMS/EAM. Some strategies include efficient ergonomics; practical processes and systems; a variety of training; clear communication; and motivational ideas to engage and promote a sense of ownership.

Mazza cautions these strategies are successful only if they keep in mind people and their idiosyncrasies. Human assets are complex, and the level of interaction with the CMMS/EAM and expectations of it are different. Each strategy should be moulded to their role as much as possible. Communicate how everybody has a piece of the puzzle as part of the big picture, and communicate any changes that impact the type of KPIs and data drivers required to support the plant's strategic plan. Change management is a key to staying up to date and record relevant, useful data.

People learn, communicate and engage differently. Understanding these characteristics and building the systems and processes with them in mind by gaining a sustainable culture that will endure, evolve and continuously improve. When dealing with human reliability for asset data integrity there are many efforts, like user-centred design and error tolerance design, to make technology better suited to operation by human beings. Any piece of data input into the system must be aligned with the plant's strategic plan and goals, so the information that comes from people will be useful and meaningful.

Mazza said as technology keeps evolving, so should we. But never forget that technology is nothing without smart people using it to the best of its functionality and harvesting it to get new insights.

*Steve Gahbauer is an engineer, a Toronto-based business writer and a regular contributing editor. E-mail gahbauer55@gmail.com.*

### Comments?

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## CCOHS SAFETY TIPS

Ensure comprehensive orientation and training are in place.

While young workers are thinking about starting new summer jobs and others are re-joining the workforce, manufacturers should be aware this “newness” to the world of work could be hazardous to new or returning employees’ health.

Research from the Institute for Work and Health (IWH) reveals the risk of a lost-time injury is more than three times greater for new workers with more than a year’s experience on the job. In 2017, there were 31,441 accepted lost time claims by young workers (aged 15-24) in Canada and 23 died from work-related injuries or illnesses, according to the Association of Workers’ Compensation Boards of Canada (AWCBC).

Employers are responsible for creating and fostering a safe and healthy work environment while protecting everyone’s health and safety.

Ensure a comprehensive orientation program is in place with roles and responsibilities immediately communicated to new hires. This sets the tone for the workplace and ensures that workers are starting on safe footing.

New workers are different from young workers – they aren’t necessarily entering the workforce for the first time. They could be returning to work after an absence such as maternity leave or an injury, and it’s possible conditions and procedures have changed since they were last on the job. Or they could be working for the same company, but in a new role or at a new location and facing new hazards for which they’re not prepared or adequately trained. These workers should also undergo the orientation program and have an opportunity to review and discuss their return to work, ask questions and receive appropriate training.



Encourage young workers to ask questions.

PHOTO: ADOBE STOCK

# Ready to WORK

## PREPARE FOR YOUNG RECRUITS

All workers need to know their rights, which include knowing what hazards are present and how to protect themselves, the right to participate in keeping their workplace healthy and safe, and a right to report unsafe conditions and practices. They also have the right to refuse dangerous or unsafe work, making sure to follow specific procedures when doing so.

### Safety training

Timely and effective training is essential when starting a new job. The IWH study showed just one in five workers in Canada received safety training in their first year with a new employer. Learning on the job or waiting several months for a classroom course are not good options. Effective training methods include:

- Hands-on or simulation training (before starting the actual work).

- Mentoring by experienced workers.
- Apprentice programs.
- Clear and concise written procedures.
- Practice time and an opportunity to ask questions and obtain feedback.
- Programs written in an active voice with clear instructions.
- Grouping equipment or tasks with similar functions.

Here are some suggestions for employers that will help create a healthy and safe work environment:

- Be a safety leader and walk the talk.
- Develop a comprehensive health and safety program.
- Work with your health and safety representative and/or committee to identify and control hazards.
- Assign suitable work. Avoid assigning jobs to inexperienced workers that involve

long training times, a great deal of responsibility, critical or risky tasks, or working alone.

- Instruct workers not to perform any task until they have been properly trained.
- Provide detailed training on equipment, safety features and control systems.
- Communicate with the worker about the job tasks clearly and frequently, repeating and confirming training over the first few weeks of work.
- Encourage workers to think in a safety-minded way about all of their work, and ask someone if they don’t know or are unsure about something.
- Train workers on what to do in case of fire, injury or other emergency.

Encourage workers to always ask a supervisor to go over any procedures or practices until they feel comfortable proceeding, and seek feedback to make sure they’re performing tasks correctly.

Workers should also be properly fitted with personal protective equipment (PPE) and shown how to wear it, clean it and store it properly.

And stress the importance of immediately reporting accidents or unsafe conditions to a supervisor.

Young and other new people, as well as those who are retraining or returning from an absence, must be properly prepared for the job at hand. Workers, parents and employers all have a role to play ensuring everyone is on safe footing.

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*The Canadian Centre for Occupational Health and Safety (CCOHS) in Hamilton contributed this article. CCOHS provides information, training, education, management systems and solutions that support health and safety programs and the prevention of injury and illness in the workplace. Visit [www.ccohs.ca](http://www.ccohs.ca).*

**Comments?**

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## THINK LEAN

Have work at every station so the incoming crew begins immediately.

BY RICHARD KUNST

A shift exchange is when you have a production line running smoothly and the next team of workers arrive to continue with the flawless execution of process; however, people bring certain traits into the mix.

During the last 30 to 60 minutes, expect most people to start cleaning the work area, which includes running out the line. But this is wrong. They should leave the line wet.

If they feel a big clean up is needed at the end of the shift, they haven't learned the McDonalds golden rule: if you have time to lean you have time to clean! All processes are prone to micro stoppages or have some wait time within them, and these are opportunities to clean and sustain the work area.

Here's a typical scenario: the outgoing shift is busy cleaning and returning the work to order, so there's no immediate action from the incoming shift. Typically the last shift left the area disorganized and the incomers have to spend time getting it in order before they can commence production. This presents two situations: a lack of 5S, where everything has a place (this does not mean it's in the perfect place, but in a location known to the employees who can quickly modify it to meet their own work processes); and adjustment to the mood of the employee. Typically he/she arrives full of energy wanting to do a good job but must pause to adjust the work area, thus sapping that energy and likely souring the mood. A bad mood promotes marginal quality within the process, and marginal quality leads to poor productivity.

We like productive employees in a good mood so how do we get there?

First thing to remember is you



Team members preparing for a shift change.

PHOTO: ADOBE STOCK

# Changing SHIFTS

## ENGINEER THEM TO IMPROVE PRODUCTIVITY

worked very hard to hire professionals, so it's your responsibility to provide them with a professional work environment that defines your brand. People will be wowed by the look even if your processes can still be improved.

### Robust 5S+1

Process improvements are more likely to be found within a clean and well-organized work environment than a messy and cluttered area. This is where the power of a robust 5S+1 program comes into play.

Before you embark on a 5S+1 journey, meet with your team and define the look of your brand. Most organizations spend

a lot of time defining the corporate logo, but it also defines the look of your operations; hence the "no tape" rule. As soon someone tapes a note or notice on a wall or door, the brand's image suffers.

What does leaving our processes "wet" mean?

Instead of allowing an employee to ramp down as the end of a shift approaches by conducting cleaning exercises and running out the line, they'll be operating at peak performance to the end of the shift. When the buzzer sounds, they walk away from their stations as the incoming crew takes over.

There should be work at every station so the incoming crew

begins immediately by providing value with work situated in front of them.

Engineering a good shift exchange just makes sense from both a productivity and profit perspective.

*Richard Kunst is president and CEO of Cambridge, Ont.-based Kunst Solutions Corp., which helps companies become more agile, develop evolutionary management and implement lean solutions. Visit [www.kunstofsolutions.com](http://www.kunstofsolutions.com). E-mail [rkunst@kunstofsolutions.com](mailto:rkunst@kunstofsolutions.com).*

**Comments?**  
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## FACILITY

Updated products incorporate sensors, LED lights, audible/visual alarms and interlocking controls.

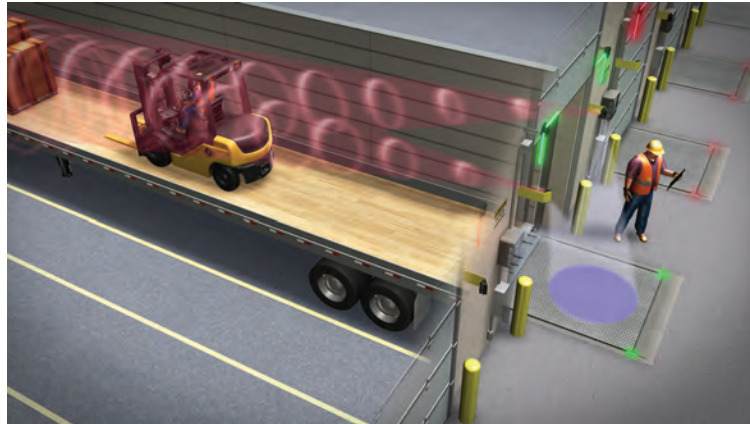
BY CHAD DILLAVOU

As one of the busiest areas in any facility, it's no surprise that almost 25% of all industrial accidents take place in the shipping and receiving area. Potential hazards are growing as loading docks try to keep up with more frequent fulfilments.

At a minimum, basic interior and exterior light systems deliver timesaving communication. According to a survey conducted by HR Magazine, 48% of employees said confusing direction led to an average of 40 minutes of lost productivity per day. All of this lost time leads to potential accidents, missed shipments and longer delivery delays.

Many updated dock safety products incorporate sensors, LED lights, audible/visual alarms along with interlocking controls to minimize human error. Products are offered as standalone options or can be added as a retrofit. From inside the building to outside on the drive approach, these breakthrough solutions help to implement comprehensive safety protocols into the dock operations of any facility.

One of these solutions is a sensor-based system that projects a blue light onto the leveller whenever activity is detected inside a trailer. Workers are alerted that a forklift, pallet jack or pedestrian could be exiting at any moment. Complementing commonly implemented blue safety lights, this solution allows pedestrians additional warning time to react to potential hazards. In some instances, it integrates with an advanced control



A sensor-based system projects a blue light onto the leveller when activity is detected inside a trailer.

PHOTO: RITE-HITE

## Let there be LIGHT

### NEW DEVICES MAKE YOUR DOCK OPERATIONS SAFER

box to keep the vehicle restraint locked until activity inside the trailer stops, ensuring the truck does not pull away with a pedestrian or forklift inside.

#### Trigger alarms

Dock workers have to think about safety outside on the drive approach. Most collisions here typically involve a semi-tractor trailer rather than a forklift. "Struck-by" and "caught-between" injuries are real risks loading dock workers face daily.

Given ambient noise and the distance between a loading dock and the engine of a semi-tractor trailer, which can be in excess of 21 metres, inattentive or distracted dock workers may not hear a trailer backing toward them until it's too late. OSHA has even identified semi-tractor trailers as the second leading cause of backover fatalities in

the US. However, these accidents are not uncommon in Canada, or the rest of the world. In fact, New Zealand recently recommended the incorporation of reversing alarms and cameras in semi-tractor trailers while France introduced an increased dock bumper size to create a "refuge zone" between tractor trailer and building wall.

In Canada, *The Globe And Mail* reports from 2011 to 2015 workers in transportation and storage were the second most likely to suffer traumatic injuries resulting in death. The five-year total of 326 was only surpassed by the 467 fatalities in the construction industry. While these numbers are staggering, taking the proper safety precautions can prevent approximately 70% of these fatalities and associated costs.

One such precaution incorpo-

## SUPPLY LINES

### DIVERSE POWER

Diverse Electronics, electronic component distributor and production equipment and consumables supplier in St-Laurent, Que., has added Mean Well power supplies to its lineup.

Taiwan manufacturer Mean Well makes more than 10,000 models of AC/DC power supplies, DC/DC converters, and DC/AC inverters, and offers a comprehensive line-up of LED drivers.

With this partnership, Diverse Electronics has become the only franchised distributor with stock in Canada.

### NANUK IN THE US

Plasticase Inc., a manufacturer of injection-moulded cases that protect equipment, is expanding into the US.

Plasticase USA Inc. extends the reach of the manufacturer's Nanuk protective cases.

The company, which recently acquired a European distributor in The Netherlands, will launch eight new Nanuk products this year.

### ECO-PACKAGING

Cascades Sonoco, a joint venture of Cascades Inc. and Sonoco Products Co., has inaugurated the expansion of its facility in Birmingham, Ala., and its new production line of eco-friendly packaging.

The US\$17 million investment means the facility will now produce a water-based coating to create recyclable, repulpable and compostable containers.

The coating replaces the non-compostable applications used in the design of folding carton take-out containers. It also replaces wax used in the corrugated industry.

Cascades, based in Kingsey Falls, Que., makes packaging and other paper products using recycled fibre.

Sonoco is a provider of packaging and other industrial products.

rates vehicle restraints with external sensors to trigger audible and visual alarms that help alert outside dock workers that activity in the drive approach has been detected.

Additionally, outside cameras with an interior monitor provide real-time views of vehicle restraints to ensure they're properly engaged. This reduces processes that place personnel out on the busy drive approach. Some options allow for interchangeable views between two of three general locations: rear impact guard (RIG), rear wheel and nose of the trailer in the case of those being spotted. The views are available to in-plant loading dock workers on advanced dock controls or through a standalone screen. This system helps to keep boots off the ground, which is the best defence against back over accidents.

The most basic light communication systems are still key. Red/green interior and exterior dock lights, which indicate a trailer is locked and safe to enter are the most standard and simple solutions for communication and safety. However, with more frequent shipments, these interior lights are not always visible as stacked pallets obscure a lift driver's view of them on the control panel.

Enhanced solutions to this everyday occurrence have been developed with the help of highly visible LED lights placed in the upper corners of dock doors. These elevated lights allow forklift operators to determine the red/green signal even when control box lights are not visible. This same principle extends onto the leveller. LED lights placed in the rear corners of the leveller communicate to forklift operators inside the trailer that it's safe to securely load/unload.

Finding the right system that incorporates dock equipment with sensors and LED lights, audible alarms and real-time video cameras minimizes risks in a traditionally dangerous place, and helps to put any manufacturer on the path to a safer future.

---

*Chad Dillavou is a product manager at Rite-Hite, a manufacturer of loading dock equipment, industrial doors, safety barriers and industrial fans based in Milwaukee, Wis. Visit [www.ritehite.com](http://www.ritehite.com).*

**Comments?**

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# LEADING EDGE

Innovative ideas for plants

## SAFE ROBOT COLLABORATION

### HC10 and 10DT eliminate pinch points

Robots and humans can work together safely. Dual channel torque sensors in all joints of Yaskawa Motoman's HC10 and HC10DT constantly monitor force to quickly react to contact with an operator and stop.

The six-axis models eliminate operator pinch points while through-arm utilities hide cabling, reducing the risk of snagging or interfering with other equipment.

Using the Smart Pendant, the HC10 is hand-guided for easy positioning while the HC10DT (direct teach) has three easy-to-use buttons for intuitive robot path programming.

Teaching new program paths using precision hand guiding allows quick deployment or redeployment on demand, decreasing system downtime.

Whether operating at full speed on industrial mode or collaborative speed on PFL mode, cycle times are optimized based upon risk assessments and process requirements.

Payload for both models is 10-kg with a 1,200 mm reach that performs a broad range of material handling, machine tending or light assembly tasks.

The HC10 robot is controlled by Yaskawa's YRC1000 controller, which doesn't require a transformer for input voltages ranging from 380 to 480 VAC.

The HC10DT is controlled by the ultra-compact YRC1000micro. Its small footprint and lightweight cabinet are well suited for factories with high-density layouts where stacking of controllers may be required.

Yaskawa Motoman makes industrial robots. Its Canadian office is in Mississauga, Ont.

**[www.motoman.com](http://www.motoman.com)**



Hand-guiding the HC10DT.

PHOTO: YASKAWA



Supports customer deployments.

PHOTO: HMS

## TALK2M MAKES ROUTER SETUP EASY

### Enhances Ewon Cosy's network access

HMS Networks is taking the Ewon Cosy industrial remote access router a step farther with Talk2M Easy Setup by simplifying the configuration of the Ewon Cosy or Flexy network.

A new wizard guides you through the most common internet connectivity settings.

Once completed, the file is saved locally on the PC, to a USB flash drive or SD card. Finally, the storage media is plugged into the Ewon product and the router connects to the Talk2M Secure Cloud.

HMS Networks Inc. is a Swedish supplier of industrial communication technology with US headquarters in Chicago.

**[www.ewon.biz](http://www.ewon.biz)**



## AUTONOMOUS LIFT AND DELIVERY

### Features Seegrid vision technology

Raymond Corp.'s automated Courier 3030 stacker shares the workload between machine and operator.

This dual-mode autonomous forklift handles and transports products between connected manufacturing and warehouse facilities. It also transports different pallet sizes and types, plus reverse-motion and auto-engagement functions optimize workflow and increase productivity.

Seegrid provides the vision-guided technology combining horizontal transport and vertical pallet lift. The operator drives the forklift along the chosen route as 10 cameras record the path and obstacles so the vehicle is capable of functioning without a driver all day, everyday.

Capacity is 6,000 to 8,000 lb. and the maximum ramp elevation/incline is 5%.

Raymond, based in Greene, NY, makes manual and electric lift trucks.

[www.raymondcorp.com](http://www.raymondcorp.com)



*Transports different pallet types.*

PHOTO: RAYMOND

## PINPOINT AIR COMPRESSOR LEAKS

### Inspect the entire plant in hours



*FLUKE ii900 sonic industrial imager.*

PHOTO: FLUKE

The Compressed Air and Gas Institute says the average system loses 30% of its air through leaks, but locating them is time-consuming and tedious.

The Fluke ii900 Sonic Industrial Imager quickly pinpoints compressed air, gas and vacuum system leaks visually, even during peak production. Maintenance teams can inspect the entire plant in a matter of hours and export the images.

The 7-in. LCD touchscreen overlays a SoundMap on a visual image to quickly localize the leak and a straightforward, intuitive interface isolates its sound frequency to filter out loud background noise.

Fluke makes electronic test tools. Fluke Canada is based in Mississauga, Ont.

[www.fluke.com/ii900](http://www.fluke.com/ii900)

## MOTORS HANDLE FOOD INDUSTRY PRESSURE

### Withstand tough washdown conditions

ABB's IEC Food Safe stainless steel motors withstand rough treatment from frequent high-pressure sanitation in food and beverage processing plants.

The IP69 water-protection-rated motors have encapsulated winding that allows them to outlast general-purpose products in tough washdown conditions. External surfaces are self-draining, with no crevices to collect particles. Markings are laser etched onto the frame, avoiding channels and ridges where contaminants could accumulate and there are no motor shrouds to harbour food particles and allow bacteria to breed.

Power ranges from 0.18 to 7.5 kW, in 2 to 6 pole versions for 230 to 690 V at 50 or 60 Hz. Frame sizes are from 71 to 132.

ABB is a Switzerland-based, global industrial technology manufacturer with Canadian headquarters in Saint Laurent, Que.

[www.abb.com/ca](http://www.abb.com/ca)



*Self-draining surfaces.*

PHOTO: ABB



**BUCAN**  
BUCAN ELECTRIC HEATING DEVICES INC.

[www.bucan.com](http://www.bucan.com)










## PRODUCTS AND EQUIPMENT

### SENSORS

#### GET RELIABLE POSITION FEEDBACK

Void of internal electronics, AC-operated sensors operate with higher accuracy and longevity in areas with high temperatures, vibration and shock. But they can't provide digital output on their own.

The NTC-6000 LVDT signal conditioner from NewTek Sensor Solutions converts unconditioned position feedback from



NTC-6000 LVDT signal conditioner.

AC-operated LVDT, RVDT or LVDT half bridge sensors to digital output for use by PLCs, data acquisition systems and data loggers. Reliable position feedback is delivered in

4-20 mA, 0-5 V, 0-10 V or RS-485 formats.

The signal conditioner connects up to 30.5 m away from an AC-operated sensor. For example, the AC-LVDT could be installed on a packaging line with extreme vibrations and shock, verifying critical dimensions, roller or tension arm location, or product flatness with the signal conditioner mounted remotely in a benign location.

The NTC-6000 LVDT provides AC excitation while retrieving the sensor's unconditioned position output for conversion into analogue or digital output that's communicated to a control system.

For multiple sensors, units digitally communicate with up to 16 devices simultaneously and are connectable in a master/slave configuration.

NewTek Sensor Solutions manufactures LVDT-based linear position sensors for a variety

of industries in Pennsauken, NJ. [www.newteksensors.com](http://www.newteksensors.com)

#### WIRELESS DETECTOR INCLUDES CO GAS



High-resolution detection.

United Electric Controls has added carbon monoxide (CO) to the list of gases detected by the latest Vanguard WirelessHART gas detector that also features new mounting flexibility.

The high resolution Vanguard version 1.2 has broader range for alarms at higher values and accuracy at lower values. The CO sensor also avoids false alarms resulting from temperature drift, by providing high zero stability and accuracy over large temperature ranges. The sensor has a low stabilization time for installation and calibration at the same time.

FLEXmount installation augments standard mounting. The magnetic option enables installation on I-beams without drilling; a universal option uses

adjustable clamps that enable installation on pipes from 3- to 12-in. diameter without a hot work permit.

Other new features include: new WiHART communication accessories to extend system range; a touchscreen configurator that streamlines onboarding of the monitor to a WirelessHART network; and upgraded diagnostic software, which detects and pre-warns of system faults.

United Electric Controls, based in Watertown, Mass., is a global supplier of switches, transmitters, sensors and controls.

[www.ueonline.com](http://www.ueonline.com)

### CONTROLLERS

#### HIGH PERFORMANCE MOTOR CONTROL

The compact CL4-E motor controller from Nanotec delivers high performance for both brushless DC motors and stepper motors.



Easy programming.

## FUTURE-READY INDUSTRY 4.0 NETWORKS - NOW



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[www.lappcanada.com](http://www.lappcanada.com)



### MATERIAL HANDLING

#### AUTONOMOUS LIFT AND REACH

Yale's dual-mode pantograph robotic lift truck maximizes vertical storage space by autonomously depositing and retrieving loads from locations as high as 30 ft., and reaching into double-deep storage.

The JBT-intelligent truck uses a combination of sensors and 3D cameras to outperform the productivity of operator-driven trucks.

All of Yale's robotic vehicles use infrastructure-free navigation technology that eliminates the use of wires, magnets or tape. It notes existing structural features such as walls, pillars or racking for easy route adjustment and fast startup.

When necessary, operators switch to manual mode to handle excess volume or other unexpected demands.

Yale Materials Handling Corp., based in Cleveland, markets materials handling lift truck products.

[www.yale.com](http://www.yale.com)



Uses sensors, 3D cameras.



With a peak power of 1,050 W and rated current of 6 A, additional heat sinks are not required.

It's controlled via CANopen and Modbus RTU, or programmed for stand-alone operation and is controlled via digital and analogue inputs.

Use the CL4-E for field-oriented control by encoder, Hall sensors, or sensorless. Additional safety for the tolerances of 48 V battery packs and power supplies is provided by the 58 V operating voltage.

Parameterizing and programming is easy with the free Plug&Drive Studio software.

Nanotec, based in Feldkirchen, Germany, manufactures motors and controllers for industrial automation and medical engineering.

<https://en.nanotec.com>

## IDENTIFY BAD MACHINE BEHAVIOUR EARLY

*Uses artificial intelligence.*



Omron Automation Americas has a new solution for human-machine collaboration.

Reduce the risk

of bad parts or equipment damage by detecting issues early and resolving them promptly with the Sysmac AI Controller. It handles several key steps in the data-driven decision process for predictive maintenance.

Its AI machine learning capability identifies abnormal machine behaviour without being explicitly programmed to do so. Since there could be many different factors and measurements that indicate an issue when observed together, automating the feature extraction process saves time and resources.

Collecting raw data is completely automated

by the new AI controller operating on the edge within the machine, ensuring higher data fidelity and consistency. The controller automatically creates data models from correlation analysis and monitors machine status based on that model.

This is not a cloud solution. No internet connectivity or IT infrastructure/service is required. The hardware is based on the Sysmac NY5 IPC and the NX7 CPU and includes Omron's AI Application Components, a library of AI predictive maintenance function blocks. Several additional AI specific utilities are included.

Omron Automation is an industrial automation supplier based in Hoffman Estates, Ill. with Canadian headquarters in Toronto.

<https://industrial.omron.ca>

## Industrial Literature Review

### 1/4 TON OF REFRIGERATION



EXAIR Vortex Tubes produce up to 10,200 Btu/hr. with no moving parts. Stainless Steel Vortex Tubes convert an ordinary supply of compressed air into two streams; one hot and one cold. Temperatures are adjustable from -45°

to 121°C. Applications include cooling hot melts, cutting tools, welding horns, electronic controls, soldered parts and gas samples.

[https://exair.co/18\\_130](https://exair.co/18_130)

EXAIR Corp.

## EVENTS

### MainTrain 2019

#### PEMAC

Sept. 16-19, Edmonton

The Plant Engineering & Maintenance Association of Canada (PEMAC) conference. Professional development for asset management, maintenance and reliability professionals in every industry that invests capital in equipment and facilities. Visit [www.pemac.org](http://www.pemac.org).

### Canadian Manufacturing Technology Show (CMTS) SME

Sept. 30-Oct. 3, Mississauga, Ont.

Canadian Manufacturing Technology Show (CMTS) is Canada's national stage for manufacturing technologies, best practices and industry connections. Live technology, keynotes, panel discussions and technical sessions. Visit <https://cmts.ca>.

### Pack Expo Las Vegas

#### PMMI

Sept. 23-25, Las Vegas

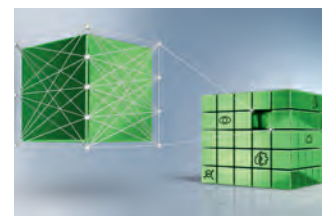
Presented by the Association for Packaging and Processing Technologies. Co-located with Healthcare Packaging EXPO. More than 2,000 exhibitors covering a 900,000 square-foot show floor featuring packaging machinery in action. Visit [www.packexpolasvegas.com](http://www.packexpolasvegas.com).

### Advantage through Excellence - Future of Manufacturing Excellence in Manufacturing Consortium (EMC)

Oct. 9-10, Vaughan, Ont.

Excellence in Manufacturing Consortium (EMC) conference. Peer-to-peer networking and sharing of global best practices. Streams include: Advanced Manufacturing & Innovation; Export Development and Growth; Operational Excellence; Future State of Manufacturing; and Plant and Best Practice Tours. Visit [www.futureofmfg.ca](http://www.futureofmfg.ca).

## PLANTWARE



*Tap into new machine learning.*

## MACHINE LEARNING FOR CONTROL SYSTEMS

Beckhoff's TwinCAT 3 machine learning provides system openness, working in real-time and handling demanding tasks such as motion control.

Rather than designing solutions for specific tasks and then turning the solutions into algorithms, desired algorithms are instead learned from exemplary process data. This opens up new possibilities and optimization in many areas, including predictive maintenance and process control, anomaly detection, collaborative robotics, automated quality control and machine optimization.

Models are trained in an ML framework, such as MATLAB or TensorFlow, then imported into the TwinCAT runtime via the Open Neural Network Exchange Format. New functions for this purpose are the Machine Learning Inference Engine for classic ML algorithms (such as SVM and PCA); and the Neural Network Inference Engine for deep learning and neural networks.

The execution of a trained ML model can be performed directly in real-time with a TwinCAT TcCOM object.

With smaller networks, system response times of less than 100 µs corresponding to a TwinCAT cycle time of 50 µs are supported. Models are called via PLC, C/C++ TcCOM interfaces or a cyclical task.

Through seamless integration with control technology, the multi-core support is also available for machine-learning applications.

Beckhoff Automation Ltd. in Mississauga, Ont. is the Canadian branch of the German manufacturer of automation technology.

[www.beckhoff.com/machine-learning](http://www.beckhoff.com/machine-learning)



# Industry 4.0: What's new at the fair?

BY JAYSON MYERS

**F**ew words properly describe Hannover Messe, the largest industrial fair and showcase for advanced manufacturing in the world. Overwhelming and awe-inspiring come close.

The fair spreads over 27 halls covering the area of almost 90 football fields. Each year, a quarter of a million people pass through the gates during its week-long run. Many come in suits because the fair is a place where technologies and best practices in innovation management are discussed and business deals are made. There are also young attendees – students, apprentices and today's technology experts. You can feel the buzz.

Then there's the technology itself. Hannover is the place to go to see the latest in digital factory and IT solutions, industrial controls and automation systems, robotics, energy systems, motion and drives, leading-edge manufacturing research and start-ups. There are robots playing ping-pong, robotic birds flying overhead, even robots playing the piano. All very neat, but the real magic is in the range of high-tech solutions on display that cover every aspect of product design and development, production systems and connectivity. You come away from Hannover thinking that if a technology solution doesn't already exist, it soon will.

This year's fair took place during the first week of April. It didn't disappoint (except for difficulties in finding a reasonably priced hotel nearby).

I was impressed by the opening ceremony. German Chancellor Angela Merkel spoke, along with Stefan Lofven, the Prime Minister of Sweden, this year's guest country. Both talked about technology trends and the future of manufacturing. Their speeches were well informed, strategic and weighty in technical details. Both spoke passionately about how technology is transforming manufacturing, what governments need to do to encourage innovation, and the need to ensure economic benefits of next generation manufacturing are shared broadly across society. I left the evening event thinking about how important and yet how fragile our open economy is, and that we need to hear from more far-sighted political leaders as knowledgeable as Merkel and Lofven.

Each year the fair highlights leading-edge technologies. Last year, it was all about additive manufacturing and virtual and augmented reality.

This year the focus was on developments in machine learning, cobots and factory-wide 5G networks. Workshops, which usually set the stage for what's next, covered smart materials; smart

products and production processes; scalable, smart factories; customer-driven value networks; end-to-end life-cycle engineering for products and production processes; and new ways of generating revenue through data-based services.

Hannover demonstrates that the technologies of the future exist today. Whether or not they can be deployed in a profitable and manageable way remains open to question. Will it be possible to find the skills sets or business partners needed to operate at an optimal level?

In a way, that was what Merkel and Lofven were also saying. As it is with public policy, a lot more than technology needs to be considered when making decisions about the future of any business.

The political leaders of Germany and Sweden emphasized technology is simply a tool. They reminded everyone advanced technologies will demand new ways of working, new business partnerships, plus new technical and managerial skills.

The Hannover fair amply demonstrates that the tools at our disposal today are both potent and potentially game changing. But the face-to-face meetings, the workshops and business discussions that take place at the fair are really the most valuable reasons for attending. They draw attention to the fact it's how advanced technologies are managed that really counts.

Canadians are an important part of the discussion. They were prominent at the fair with the Government of Quebec leading a delegation of 140 business leaders. Another 20 manufacturers from Atlantic Canada participated in a delegation and a number of technology companies displayed their latest industry solutions. Canada was also highlighted throughout the first two days of business meetings as a preferred country for European companies to find technology and business partners in advanced manufacturing.

We should pay more attention to what happens in Hannover each April. What's new at the fair usually sets the standards for manufacturing not only in Europe but around the world.

Hannover Messe takes place from April 20 to 24 next year. It's well worth a visit. Just book your hotel room well in advance!

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*Jayson Myers, the CEO of Next Generation Manufacturing Canada, is an award-winning business economist and advisor to private and public sector leaders. E-mail [jayson.myers@ngmcanada.com](mailto:jayson.myers@ngmcanada.com). Visit [www.ngmcanada.com](http://www.ngmcanada.com).*

**Comments? E-mail [jterrett@plant.ca](mailto:jterrett@plant.ca).**

THIS YEAR HANNOVER MESSE FOCUSED ON DEVELOPMENTS IN MACHINE LEARNING, COBOTS, AND FACTORY-WIDE 5G NETWORKS...





# WHAT IF...

## YOU COULD SAVE MILLIONS OF LITERS OF WATER BY MAKING A FEW SIMPLE CHANGES?

### REPLACE NOZZLES AT THE FIRST SIGN OF WEAR

Worn nozzles spray over capacity, resulting in water waste. Check nozzle flow rates regularly; visual checks won't detect wear. Replacing nozzles that are spraying just 15% over capacity can save millions of liters of water. Using less water means you'll reduce chemical and energy use too.

### AUTOMATE TANK CLEANING

Automated washing of tanks, totes, drums, vats and more will ensure thorough, repeatable cleaning using the least amount of water possible in the shortest amount of time. Processors often reduce cleaning time by as much as 75% and water use by 50% or more.

### RIGHT-SIZE YOUR NOZZLES

In many operations, lower capacity nozzles can be used without compromising product/process quality. We helped one processor save more than one billion liters of water annually on conveyor cleaning. Evaluate and test your nozzles to see if you can experience similar benefits.

Reducing water use is good for the environment and the bottom line. Let us help you make some of the simple changes described above.

We help companies around the world reduce water, energy and material use, decrease waste, minimize environmental impact and improve worker safety. Let our spray technology advance your sustainability initiatives.

**MAKE EVERY DROP COUNT!**

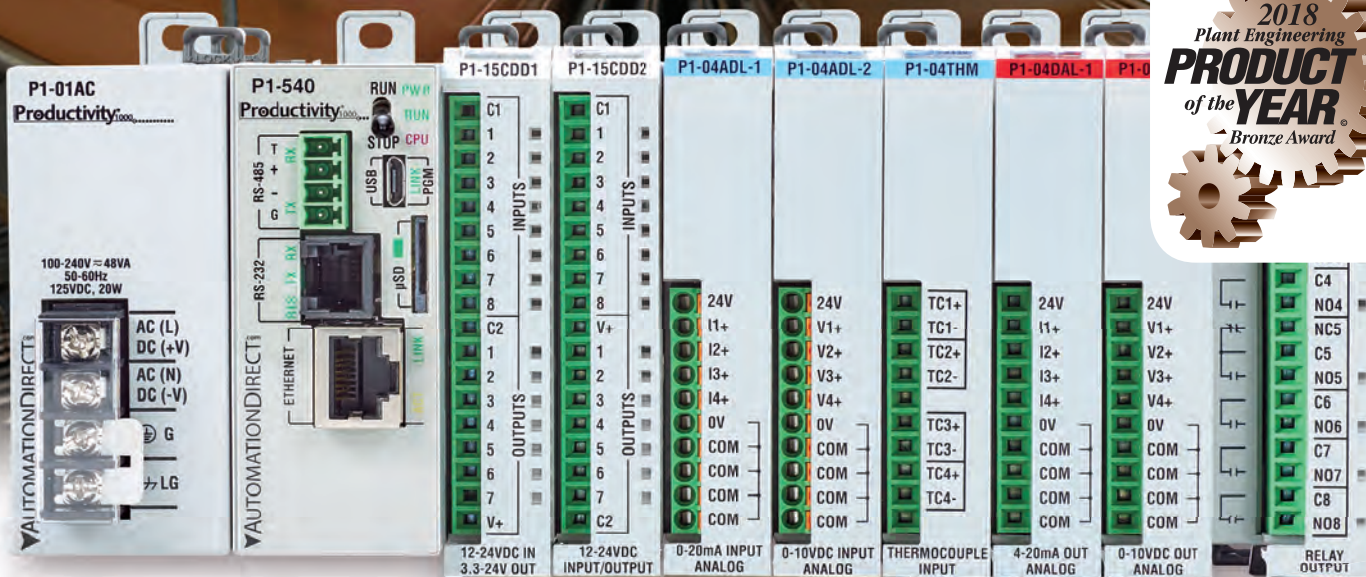


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