



## EXPORT LEADER

Cogent Power  
leverages lean and  
a customer focus  
for market gains

How to achieve holistic reliability  
3D automation boosts Behlen's capacity  
Moving a production line in nine steps  
Christie Digital brightens Northern Lights





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# The window to a new trade era is open

Now that the global commodity boom is blown, Canada is looking to manufacturing as a driver of economic growth. With a loonie swimming in the vicinity of 75 cents US and the US economy on a roll, it should be as simple as pressing the start button on the national production line and watching the money roll in.

The Conference Board of Canada is describing these conditions, reminiscent of the 1990s and early 2000s, as a new trade era.

But there are complications that need to be addressed.

The 2008-2009 recession kicked the stuffing out of developed economies resulting in job losses and plant closures, which has limited the Canadian survivors' capacity to respond to growing demand from the US and the wider world.

A secret briefing document prepared for new economic development minister Navdeep Bains states there are significant structural obstacles interfering with a rebirth of the sector.

Like Jacob Marley's ghost in A Christmas Carol, manufacturers have been dragging behind them – seemingly for an eternity – the burdens of poor productivity, poor innovation, a failure to scale up and weak participation in global value chains. Having avoided making adequate investments in these areas, they are adding to this list of impediments a lack of enthusiasm for advanced technologies.

Indeed, **PLANT's** Manufacturing Outlook report reveals 22% of the companies responding to the survey aren't collecting productivity data, and almost 50% are doing so manually rather than using new technology tools. And only 28% have connected the shop floor to the top floor.

A failure to address the "disruption" of technological change driven in part by Industry 4.0 and the Industrial Internet of Things will further weaken their performance in global markets where the list of competitors is growing. And demand in the US shouldn't be taken for granted. Those competitors – notably China, which is moving into position as America's number one trading partner – are cutting into Canada's traditional markets.

The Conference Board benchmarked 38 industries based on their capacity to handle US demand.

Which industries are best equipped to exploit this new era? There are five, four of which are in the services area, and food manufacturing.

Six with strong demand but are short of capacity to quickly ramp up production are: wood products; pharmaceutical and medical; aerospace products and parts; other transportation (rail and shipbuilding); clothing; and motor vehicle parts.

But the Ottawa-based research firm also notes any industry can find lucrative niches in the US by approaching those markets strategically.

Manufacturers will likely be challenged to find the skilled workers they need. The Conference Board suggests looking within their firms for people they can train to fill new roles. And the loonie needn't be an impediment to purchasing machinery and equipment. Source from places like Japan where the dollar has higher value. And governments are advised to recognize that exporting industries and the regions where they are located are shifting, which will impact the labour force and transportation networks north-south and east-west.

What's the prognosis for manufacturers?

The Bains analysis suggests manufacturing rests on a solid foundation across the country and is on a firm footing to address opportunities, thanks to a solid science base and a highly educated workforce.

But Canadian companies must not put off investing in their competitiveness. The window of opportunity to capitalize fully on markets in the US and globally won't be open forever.

**Joe Terrett, Editor**

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

**PLANT** ADVANCING CANADIAN MANUFACTURING 75 YEARS

**Publisher**

Michael King  
416-510-5107  
[mking@plant.ca](mailto:mking@plant.ca),  
[mking@cienmagazine.com](mailto:mking@cienmagazine.com)

**Editor**

Joe Terrett  
416-442-5600 ext. 3219  
[jterrett@plant.ca](mailto:jterrett@plant.ca)

**Associate Editor**

Matt Powell  
416-510-5145  
[mpowell@plant.ca](mailto:mpowell@plant.ca)

**Art Director**

Kathy Smith  
416-442-5600 ext. 3215  
[ksmith@annexbizmedia.com](mailto:ksmith@annexbizmedia.com)

**National Account Manager**

Ivana Fawcett  
416-510-5202  
[ifawcett@plant.ca](mailto:ifawcett@plant.ca)

**Account Coordinator**

Barb Vowles  
416-510-5103  
[bvowles@annexbizmedia.co](mailto:bvowles@annexbizmedia.co)

**Editorial Advisory Board**

Robert Hattin, ProVantage Automation  
| Ron Harper, Cogent Power | Greg  
MacDonald, Wentworth International  
Services | Roy Verstraete, Anchor Danly

**Annex Business Media**

**Vice President**  
Tim Dimopoulos  
(416) 510-5100  
[tdimopoulos@annexbizmedia.com](mailto:tdimopoulos@annexbizmedia.com)

**President & CEO**

Mike Fredericks

**Circulation Manager**

Beata Olechnowicz  
416-442-5600 ext. 3543  
[bolechnowicz@annexbizmedia.com](mailto:bolechnowicz@annexbizmedia.com)

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**Mailing Address**

Annex Business Media  
80 Valleybrook Dr.,  
Toronto, ON M3B 2S9  
[plant.ca](http://plant.ca)  
Tel: 416-442-5600,  
Fax: 416-510-5140



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# The Truth About Compressed Air!

If you think compressed air is too expensive and noisy - read this. The facts will surprise you!

## Compare these Blowoffs

There are a variety of ways to blow the water from the bottles shown in the photo below, but which method is best? To decide, we ran a comparison test on the same application using four different blowoff methods: drilled pipe, flat air nozzles, Super Air Knife (each using compressed air as a power source), and a blower supplied air knife (using an electric motor as a power source). Each system consisted of two twelve inch long air knives. The following comparison proves that the EXAIR Super Air Knife is the best choice for your blowoff, cooling or drying application.

The goal for each of the blowoff choices was to use the least amount of air possible to get the job done (lowest energy and noise level). The compressed air pressure required was 60 PSIG which provided adequate velocity to blow the water off. The blower used had a ten horsepower motor and was a centrifugal type blower at 18,000 RPM. The table at the bottom of the page summarizes the overall performance. Since your actual part may have an odd configuration, holes or sharp edges, we took sound level measurements in free air (no impinging surface).

### Drilled Pipe



This common blowoff is very inexpensive and easy to make. For this test, we used (2) drilled pipes, each with (25) 1/16" diameter holes on 1/2" centers. As shown in the test results below, the drilled pipe performed poorly. The initial cost of the drilled pipe is overshadowed by its high energy use. The holes are easily blocked and the noise level is excessive - both of which violate OSHA requirements. Velocity across the entire length was very inconsistent with spikes of air and numerous dead spots.

### Flat Air Nozzles



As shown below, this inexpensive air nozzle was the worst performer. It is available in plastic, aluminum and stainless steel from several manufacturers. The flat air nozzle provides some entrainment, but suffers from many of the same problems as the drilled pipe. Operating cost and noise level are both high. Some manufacturers offer flat air nozzles where the holes can be blocked - an OSHA violation. Velocity was inconsistent with spikes of air.

### Blower Air Knife



The blower proved to be an expensive, noisy option. As noted below, the purchase price is high. Operating cost was considerably lower than the drilled pipe and flat air nozzle, but was comparable to EXAIR's Super Air Knife. The large blower with its two 3" (8cm) diameter hoses requires significant mounting space compared to the others. Noise level was high at 90 dBA. There was no option for cycling it on and off to conserve energy like the other blowoffs. Costly bearing and filter maintenance along with downtime were also negative factors.

### EXAIR Super Air Knife



The Super Air Knife did an exceptional job of removing the moisture on one pass due to the uniformity of the laminar airflow. The sound level was extremely low. For this application, energy use was slightly higher than the blower but can be less than the blower if cycling on and off is possible. Safe operation is not an issue since the Super Air Knife can not be dead-ended. Maintenance costs are low since there are no moving parts to wear out.

**The Super Air Knife is the low cost way to blowoff, dry, clean and cool.**

## Facts about Blowers

Energy conscious plants might think a blower to be a better choice due to its slightly lower electrical consumption compared to a compressor. In reality, a blower is an expensive capital expenditure that requires frequent downtime and costly maintenance of filters, belts and bearings.

### Here are some important facts:

- Filters must be replaced every one to three months.
- Belts must be replaced every three to six months.
- Typical bearing replacement is at least once a year at a cost near \$1000.
- Blower bearings wear out quickly due to the high speeds (17-20,000 RPM) required to generate effective airflows.
- Poorly designed seals that allow dirt and moisture infiltration and environments above 125°F decrease the one year bearing life.
- Many bearings can not be replaced in the field, resulting in downtime to send the assembly back to the manufacturer.

Blowers take up a lot of space and often produce sound levels that exceed OSHA noise level exposure requirements. Air volume and velocity are often difficult to control since mechanical adjustments are required.

To discuss an application, contact:

EXAIR Corporation  
11510 Goldcoast Drive  
Cincinnati, Ohio 45249-1621  
(800) 903-9247  
Fax: (513) 671-3363  
email: [techhelp@exair.com](mailto:techhelp@exair.com)  
[www.exair.com/18/423.htm](http://www.exair.com/18/423.htm)

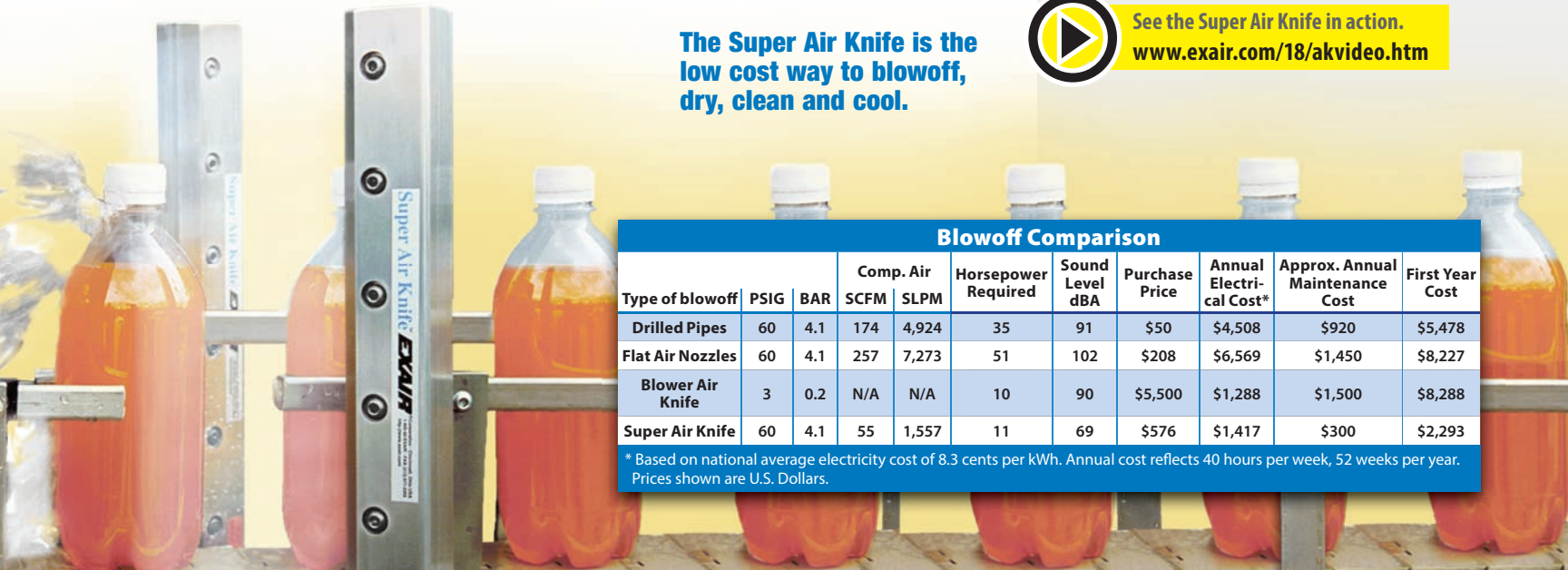


See the Super Air Knife in action.  
[www.exair.com/18/akvideo.htm](http://www.exair.com/18/akvideo.htm)

### Blowoff Comparison

Type of blowoff	PSIG	BAR	Comp. Air SCFM	SLPM	Horsepower Required	Sound Level dBA	Purchase Price	Annual Electrical Cost*	Approx. Annual Maintenance Cost	First Year Cost
Drilled Pipes	60	4.1	174	4,924	35	91	\$50	\$4,508	\$920	\$5,478
Flat Air Nozzles	60	4.1	257	7,273	51	102	\$208	\$6,569	\$1,450	\$8,227
Blower Air Knife	3	0.2	N/A	N/A	10	90	\$5,500	\$1,288	\$1,500	\$8,288
Super Air Knife	60	4.1	55	1,557	11	69	\$576	\$1,417	\$300	\$2,293

\* Based on national average electricity cost of 8.3 cents per kWh. Annual cost reflects 40 hours per week, 52 weeks per year. Prices shown are U.S. Dollars.





## BULLETINS

**Rockwell Collins**, a supplier of training and simulation technology to military and aviation customers, is acquiring Matrix SIM and Matrix StIM projectors from **Christie Digital Systems**. The global visual and audio technologies manufacturer with Canadian operations in Kitchener, Ont. will continue to manufacture the projectors, while Rockwell Collins, based in Cedar Rapids, Iowa, will handle system engineering and support. Rockwell will also have exclusive rights to sell Christie's other projection products and associated software tools.

**CN** intends to invest \$2.9 billion in infrastructure and equipment in its rail system to increase efficiency, improve safety and support long-term growth. The Montreal-based railway is spending \$1.5 billion on track infrastructure and \$600 million on rolling stock equipment, including 90 new high-horsepower locomotives. About \$400 million will be spent on other initiatives to drive productivity and improve service. Another \$400 million will be invested in positive train control technology.

**Cematrix (Canada) Inc.** has secured \$1.6 million in additional contracts, bringing the year's total to \$5.8 million (so far). The Calgary-based manufacturer of advanced cellular concrete products says the new contracts reflect the continued growth of infrastructure projects, including a large tunnel in Eastern Canada.

**Athabasca Oil Corp.** and **Murphy Oil Co. Ltd.**, both energy companies based in Calgary, have formed a strategic joint venture to develop the Duvernay and Montney oil sands plays in the Kaybob area of Alberta. Murphy will pay \$250 million to Athabasca plus an additional \$225 million to fund 75% of Athabasca's share of development capital for a maximum five-year period. Expected gross capital investment will be approximately \$1 billion in the Duvernay play.

A multi-national military consortium that is testing **PyroGenesis Canada's** Tactical Mobile Plasma System for the destruction of chemical warfare agents has added a \$159,877 contract to provide engineering services. The Montreal clean tech company manufactures plasma waste-to-energy systems and plasma torch products.

## Cascade upgrades C-130Js

Program adds 29 capabilities to the planes



The RCAF C-130J Super Hercules.

PHOTO: RCAF

**ABBOTSFORD, BC** — Services firm Cascade Aerospace Inc. has completed the Block 7.0 upgrade installation on a C-130J Super Hercules operated by the Royal Canadian Air Force (RCAF), the first time an upgrade of its kind has been completed outside of an OEM or government facility.

Cascade, based in Abbotsford, BC, will manage the installation for all 17 C-130Js in the RCAF's fleet.

The program adds 29 capabilities to the massive planes, including: link-16 tactical datalink, which enhances situational awareness by linking voice and graphic communications

between allied aircraft; a new flight management system that complies with CNS/ATM mandates and includes vertical navigation and coupled auto throttle capacity; special mission display processor; civil GPS; and ground power modules.

The Block 7.0 capabilities were selected by a multi-national C-130J Super Hercules user group that includes Canada, the US, Italy, Denmark, the UK, Australia and Norway.

Canada will be the first C-130J operator to fly a full fleet Block 7.0 upgrade, which is to be completed in October.

## Linamar, GF Automotive to build \$200M plant in NC

**HENDERSON COUNTY, NC** — Linamar Corp. and GF Automotive, a division of Georg Fischer AG, have selected Henderson County, NC as the location for a jointly owned aluminum die casting plant.

GF Linamar LLC will combine resources and capabilities of the partner companies to supply large light metal high-pressure die castings for powertrain, driveline and structural components to the NAFTA automotive, industrial and commercial markets.

The company will invest more than \$200 million in a new facility in Mills River, Henderson County, in two phases over the next seven years with production to begin by mid-2017. The plant is to create 350 jobs over the next five years.

Linamar, a global automotive manufacturer of engineered products based in Guelph, Ont., also plans to offer machining services at the plant, its fourth in the state.

Georg Fischer is a Swiss company with three divisions including GF Piping Systems, GF Automotive and GF Machining Solutions.

## SNC wins UAE aluminium contract

**MONTREAL** — SNC-Lavalin has been awarded an engineering services contract by Emirates Global Aluminium (EGA) to provide operations support services to two aluminum smelters in the United Arab Emirates.

The Montreal-based global engineering firm will provide engineering and manpower services to DUBAL and engineering and project management services to EMAL Engineering.

All engineering work and support services will be completed by workers in the Middle East, and by aluminum smelting and power specialists in Canada and the US.

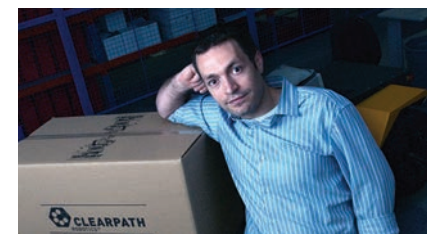
The contract ends in July 2018.

## A supply chain pro to know

Clearpath's Simon Drexler wins industry award

**KITCHENER, Ont.** — Simon Drexler, Clearpath Robotics' director of industrial solutions, has been named a Supply & Demand Chain Executive 2016 Provider Pro to Know.

The award recognizes people who have helped supply chain clients or the supply chain community meet technology challenges.



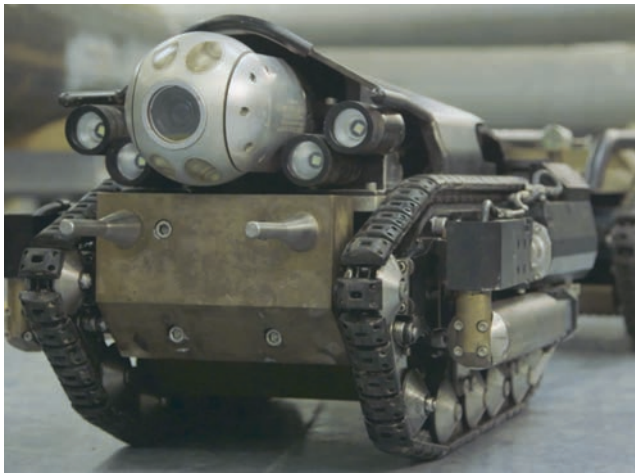
Clearpath's Simon Drexler. PHOTO: STEPHEN UHRANEY

Drexler helps supply chain and warehouse operators using Clearpath's OTTO self-driving vehicles determine how to increase efficiency and throughput with a quick ROI.

"The supply chain industry is on the cusp of the next technology revolution and it's exciting to work with leaders in the field to develop those technologies so operators can work smarter, safer and faster," said Drexler.

Clearpath, based in Kitchener, Ont., develops self-driving vehicles for industry. It recently added John Deere in Horicon, Wis. to its OTTO client list.





A crawler robot ready to roll.

PHOTO: PURE TECHNOLOGIES

## Pure Robotics makes waves

### Crawler inspects water, wastewater pipelines

**CALGARY** — Pure Technologies Ltd., a developer of pipeline inspection, monitoring and management technologies based in Calgary, has released the third generation of its robotic crawler for water, wastewater, industrial and power applications.

The PureRobotics pipe inspection system carries sensors and tools through dewatered pipe or while submerged.

The company said the system is safer than manned inspections, especially for wastewater, and where regulations are keeping people out of pipelines in favour of unmanned solutions. The crawler travels up to five kilometres.

The standard system features HD digital, pan tilt zoom, closed circuit televi-

sion for live video streams. The robot is equipped with specialized tools, including an inertial measurement unit for XYZ mapping geographic information, 3D LIDAR scanning tools, or pull condition assessment tools such as 2D laser technology that measures a pipeline's size, shape and level of corrosion.

With the new generation, the speed is doubled to 85 feet per minute to improve efficiency in the field.

The robot's track feet are modular, and change out for different styles depending on the pipeline type. The track chassis expands for large diameter pipelines.

Since its introduction, the robot has delivered data from more than 28,000 metres of pipe.

## Cutler gets federal funding for equipment

**VAUGHAN, Ont.** — Cutler Forest Products has been awarded a repayable investment of up to \$837,500 from the FedDev Ontario program.

The company, based in Vaughn, Ont., manufactures ready-to-assemble cabinetry for kitchen, bath and storage, and wholesale wood products.

The money will help Cutler acquire state-of-the-art equipment and consolidate manufacturing at its 195,000-square-foot plant in Vaughn.

The project, with private sector investment of more than \$2.5 million, is projected to create up to 40 full-time, skilled jobs by 2018.

Cutler Forest Products has three operating divisions: Cutler Kitchen and Bath, Cutler Modern Living and Cutler Distribution & Fabrication.



The Energy East pipeline route. PHOTO:TRANSCANADA

## Energy East to create 120 Quebec jobs

**MONTREAL** — TransCanada Corp. and automation firm ABB have signed a major agreement that will see ABB deliver a number of multi-million dollar electrical houses for pump stations along the proposed Energy East pipeline route.

ABB will produce at least 22 electrical houses at a new production facility in Montreal. The manufacturing agreement will create up to 120 direct jobs and 90 spin-off positions.

The order is conditional on TransCanada receiving regulatory approvals for the construction of the pipeline.

E-houses are prefabricated, modular, outdoor enclosures that house critical electrical and automation equipment required to power pump stations while ensuring safe and GHG-efficient operations. They have a lifetime of more than 30 years and will withstand extreme cold and snow conditions.

The ABB Group develops power and automation technologies.

## CAREERS



Jim Prentice

Former Alberta premier and federal cabinet minister **Jim Prentice** has joined the Washington-based Canada Institute at the Wilson Center as a visiting fellow. Prentice completed a book on energy and environmental issues. The Canada Institute raises awareness about Canada and Canada-US relations among US policymakers and opinion leaders.

**Matt Rendall**, CEO of Clearpath Robotics, a manufacturer of robotic vehicles based in Kitchener, Ont., has joined the Robotic Industries Association board in Ann Arbor, Mich. as one of four at-large directors.

Legend Power Systems Inc. a provider of conservation voltage reduction technology in Vancouver, has promoted **Mark Petersen** to vice-president engineering, and will be responsible for directing all engineering and technical initiatives. He joined the company in 2009.

Bombardier Business Aircraft, based in Montreal, has appointed 19-year company veteran **Chris Milligan** vice-president, services sales and authorized service facilities. Milligan, who began his career with the aerospace company in 1996, will be based in Dallas.

**Andrew Reid** has resigned from his duties as president, CEO and director of Xylitol Canada, a Toronto marketer of Xylitol. No reason was given for his resignation. **Matt Willer**, a vice-president of sales and marketing for Xylitol USA Inc. since August 2011, joins the board as a director. Director **Tom Kierans** has resigned from the board. The company intends to become a low-cost manufacturer of natural sweetener.

Send appointments, retirements and personal accomplishments of note to [jterrett@plant.ca](mailto:jterrett@plant.ca).

## Micronization plant ramps up for graphite production

**TORONTO, Ont.** — Great Lakes Graphite Inc. is in the final stages of commissioning its Matheson Micronization Facility in Matheson, Ont. to begin producing micronized natural flake graphite and micronized synthetic graphite products.

When operating at capacity, the plant will process approximately 10,000 tonnes of high-carbon graphite concentrate per year.

The company's products are used in grease, lubricating fluids, drilling fluids, brake pads and battery components.



## Can-Am unveils Spyder F3 Turbo at Daytona

Does 0-100 km/h in 4.3 seconds, 0.4 km in 12.3, but it's just for show

**DAYTONA BEACH, Fla.** — BRP unveiled a turbocharged Can-Am Spyder three-wheel motorcycle concept at the Daytona International 2016 Can-Am Duel.

BRP (Bombardier Recreational Products), a manufacturer of land and water recreational vehicles that include the Can-Am, Ski-Doo and Sea-Doo brands, says the vehicle, powered by a Rotax 1330 cc turbocharged and intercooled engine, goes from 0-60 mph (0-100 km/h) in 4.3 seconds and does a quarter-mile (0.4 km) in 12.3 seconds.

The SPORT mode allows controlled rear tire drifts.

"BRP's Rotax engineers challenged themselves to develop a turbo version of the Can-Am Spyder F3 engine, which resulted in this high-performance vehicle. Our team then fine-tuned everything to unleash its potential," said Rénauld Plante, director, Can-Am Spyder engineering. "This concept showcases the advantages of a Y-frame design, such as a lower centre of gravity, the ability to drift and superb tire grip during aggressive cornering."



NASCAR Sprint Cup Series driver Jeffrey Earnhardt straddling the Can-Am Spyder F3 Turbo Concept. PHOTO: BRP

But the Spyder F3 Turbo won't be sold to regular folks. It was designed as a tribute to NASCAR. BRP says it's not planned for production.

BRP's Can-Am brand is the sponsor of the Can-Am Duel At Daytona, as well as the Can-Am 500 in Phoenix in November.

## Comet Biorefining builds first sugar plant in Ont.

**LONDON, Ont.** — Comet Biorefining Inc. will build its first commercial scale biomass-derived sugar facility in the TransAlta Energy Park in Sarnia, Ont.

The plant, capable of producing 60 million pounds per year, comes online in 2018 and will provide dextrose sugar from locally sourced corn stover and wheat straw. Corn stover consists of residues left in the field after harvest including stalks, leaves, husks and cobs.

Comet's proprietary process converts agricultural and forest residues into high-purity dextrose sugars to be transformed into bio-based products including organic acids, amino acids and bioplastics that can replace traditional petroleum-based materials.

The company also operates a demonstration scale plant in Rotondella, Italy.



TM4's MOTIVE motor.

PHOTO: TM4

## TM4 to supply motors, inverters to Ballard

**BOUCHERVILLE, Que.** — Fuel-cell developer Ballard Power Systems has selected TM4 Inc. to supply MOTIVE high rpm electric motors and inverters to be coupled with new compressor units on its FCvelocity-HD7 fuel-cell power module.

The Vancouver-based developer of clean energy fuel cell products said TM4's motors were selected because of their high quality, high power density, and cost optimization process.

A subsidiary of Hydro-Québec, TM4 manufactures electric and hybrid powertrain systems for the automotive and recreational vehicle markets.

## SMEs paying taxes have it easy

Canada among top 10 globally for ease of payment

**TORONTO** — You may not think much of Canada's system of taxation, but when it comes to paying, we have it pretty easy compared to other countries, according to the World Bank Group, IFC and PwC's annual Paying Taxes report.

It measures the overall ease of payment for SMEs based on the number of tax payments per year, the time required to

compile and submit returns, and a company's total tax liability as a percentage of pre-tax profits. The good news for Canadian SMEs is they're in the top 10 worldwide and the leader among G7 nations.

On average Canadian companies had a total tax rate of 21.1% of commercial profits compared to a 40.8% rate globally. Mexico is 51.7% while the US (53 in the



PHOTO: THINKSTOCK

rankings) comes in at 43.9%.

In 2014, 46 economies increased their rate, while 41 decreased their tax burdens.

Canadian companies average eight tax payments per year and take 131 hours to comply with requirements. The global average is 25.6 payments and 261 hours. The report notes electronic filing continues to ease the burden of tax administration.

Paying taxes became easier for medium-sized companies globally, but the focus has moved from reducing tax rates to embracing technology and relieving their compliance burden.

The eight countries ahead of Canada are Qatar, UAE, Saudi Arabia, Hong Kong, Singapore, Ireland, Macedonia and Bahrain.

## Mitsui invests \$25M more in Sarnia succinic acid plant

**MONTREAL** — Mitsui & Co. Ltd., partnering with BioAmber Inc. in a Sarnia, Ont. bio-based succinic acid plant, is investing an additional \$25 million in the joint venture for 10% of the equity, increasing its stake to 40%.

Mitsui, a Japanese trading, investment, and service enterprise, will also play a stronger role in the commercialization of bio-succinic acid produced at the plant.

BioAmber, a renewable materials company based in Montreal, will maintain a 60% controlling stake in the joint venture.

"We are very happy with Sarnia's fermentation and plant operations performance to date and the JV has received quality certifications from more than 90 customers," said Hidebumi Kasuga, general manager of Mitsui's specialty chemicals division.

Bio-succinic acid is used to make a variety of products found in polyurethanes, paints and coatings, food additives, personal care products, biodegradable plastics, and industrial lubricants.



## Seagull takes on the KATFISH

Kraken's towed sonar system hunts naval mines, underwater IEDs

ST. JOHN'S, NL — Kraken Sonar Systems Inc. will supply its KATFISH towed sonar system to Elbit Systems Ltd., a major international defence contractor based in Israel.

The system is for use on Elbit's Seagull, an unmanned surface vehicle (USV), which rapidly reconfigures for a wide array of missions such as anti-submarine warfare and mine countermeasures.

Kraken's KATFISH, an actively controlled, intelligent towfish platform, generates real-time, ultra-high (3 cm) resolution seabed imagery and maps for a variety of military and commercial applications.

The manufacturer of acoustic sensors and underwater sonar systems says the ability to generate centimetre-scale sonar resolution in all three



*The Seagull USV from Elbit Systems can be fitted with Kraken's KATFISH sonar payload for remotely operated mine countermeasures and underwater intelligence.*

PHOTO: KRAKEN

dimensions has the potential to provide significant improvements in the detection, classification and identification of small seabed objects such as underwater mines and IEDs.

Towed sonar systems acquire sonar data at high speed and in real-time. Onboard processing enables real-time analysis of so-

nar data, significantly reducing post-mission analysis time.

KATFISH received a non-refundable financial contribution of up to \$495,000 from the National Research Council of Canada's Industrial Research Assistance Program.

Kraken is a subsidiary of Kraken Sonar Inc. based in St. John's, NL.

## NRCan, Mohawk launch casting program

HAMILTON, Ont. — A casting course to be co-delivered by Natural Resources Canada's CanmetMATERIALS laboratory and Mohawk College will support the training of skilled casters.

The partnership includes the recent relocation of the college's casting equipment from its Archie McCoy Memorial Foundry Lab to NRCan's facilities in the McMaster Innovation Park in Hamilton.

In 2014, Mohawk College closed the Archie McCoy lab and a portion of its casting equipment was transferred to NRCan, so third-year casting students could attend lectures and gain in-lab experience from government scientists and technologists.

Established in the 1940s, NRCan's CanmetMATERIALS laboratory is the largest research centre in Canada dedicated to metals and materials processing, fabrication and evaluation.



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## Tembec suspends work at Senneterre sawmill

**MONTREAL** — Tembec has suspended operations at its Senneterre sawmill, blaming weakness in the North American softwood lumber market and high wood supply costs in the Abitibi-Témiscamingue region.

The suspension will affect 148 jobs.

Tembec, based in Montreal, is a manufacturer of lumber, pulp, paper and specialty cellulose.

It has operations in Canada and France that employ 3,250 people.

## Ontario invests \$100M to boost cleantech

**TORONTO** — Ontario is investing nearly \$100 million from the Ontario Green Investment Fund into projects that will reduce greenhouse gas emissions, increase energy efficiency and support cleantech innovation and jobs.

The government, partnering with the Ontario Centres of Excellence, is investing \$74 million on a cleantech innovation initiative to reduce greenhouse gas emissions by encouraging large industrial plants to adopt leading-edge technologies, and by supporting entrepreneurs who are developing solutions.



Kathleen Wynne at Morgan Solar.

PHOTO: GOV. OF ONTARIO

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Another \$25 million is going to a Green Smart energy efficiency study delivered by Canadian Manufacturers & Exporters.

It will target 100 plants to identify how investments in advanced technology and productivity are impeding the sector. The compilation of best practices will help build a stronger and more agile manufacturing sector.

## Essar Steel Algoma appeals CITT dumping decision

**SAULT STE. MARIE, Ont.** — Essar Steel Algoma is challenging a Canadian International Trade Tribunal (CITT) decision that steel plate imports from Russia and India are not injuring the Canadian steel industry.

The steel company, based in Sault Ste. Marie, Ont., wants the Federal Court of Appeal to overturn the CITT's Jan. 6 decision regarding what it claims is dumped and subsidized hot-rolled carbon steel plate and high-strength low-alloy steel plate.

The CITT ruling followed a finding by the Canada Border Services Agency (CBSA) in December that the imports had been dumped into Canada at margins as high as 98%.

The decision means these imports are exempt from dumping or countervailing duties.

Essar Steel Algoma believes the CITT made several fundamental errors of law.

If its appeal is successful, duties will be imposed on steel plate from India and Russia for an initial period of five years.



## 2016 looks sluggish

Business investment is under pressure

**OTTAWA** — Adjust your economic growth expectations for 2016 downward. Canada's prospects are slipping from earlier predictions, notably by The Conference Board of Canada, which is adjusting its forecast from 2% to 1.7%.

This follows a disappointing 2015, when an earlier forecast of 2.4% for the year was adjusted to 1.9%, and ended at 1.2%.

Blame further deterioration in oil prices, while household spending, exports and manufacturing have failed to pick up the slack. "Stronger economic growth will not happen until next year when a recovery in the non-energy sector is finally expected to take hold," said Matthew Stewart, associate director of the Conference Board's national forecast.

The Ottawa-based research firm warns oil prices will likely remain below US\$50 a barrel until the end of 2017 and not exceed \$40 this year, which will contribute to the decline of business investments for the third consecutive year by 2.4%.

Energy firms are expected to cut capital spending by 16% following last year's 24% reduction, as building construction declines due to sluggish demand and rising vacancy rates. Machinery and equipment spending is hampered by weak business confidence, sluggish global growth and the impact a weak loonie has on the purchase of foreign machinery. And consumer spending will rise by just 1.9% this year, mostly because of weak employment, disposable income gains and record high debt levels.

However, exporting will be aided by the weak loonie and a resurgent US with volumes forecast to expand by 2.5%, which will add 0.6 percentage points to the Canadian economy.

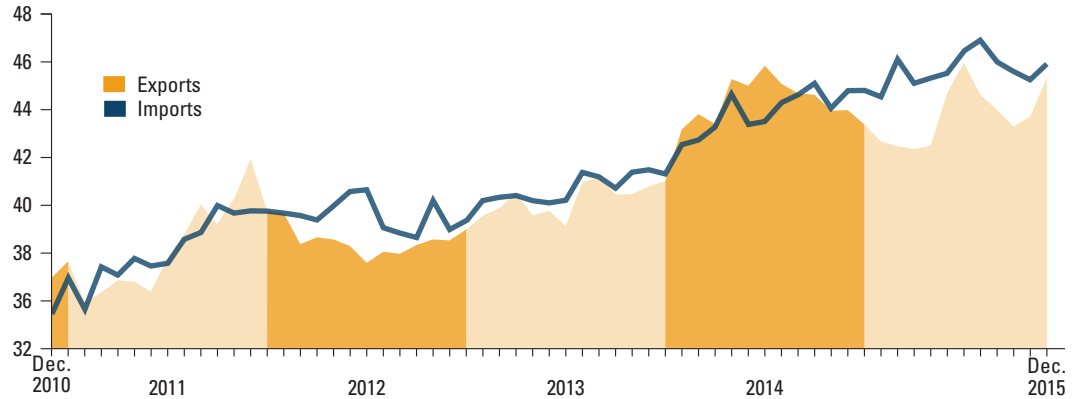
Also look to the federal Liberal government's election pledge to pump more than \$10 billion into the economy in fiscal years 2016-17 and 2017-18. This adds about 0.3% to real GDP growth this year.

# PLANT PULSE

## ECONOMIC DEVELOPMENTS AND TRENDS

billions of dollars

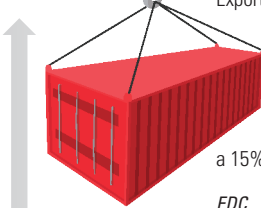
### EXPORT GROWTH



Canada increased its exports in December by 3.9%. Volumes were up 2.1% and prices 1.8%. Trade to the US increased 2.9% to \$33.9 billion and to other countries by 7% (\$11.4 billion). Year over year, total exports increased 3.4%. Increases related to manufacturing include industrial machinery and equipment (12.1% for the year), aircraft and other transportation equipment (20.3%), consumer goods (21.9%), and motor vehicles/parts (26.7%). Imports increased in December by 1.6%, volumes were up 1.5% and prices rose 1.6%. Imports for the year were up 2.5%.

Statistics Canada

**630**



SMEs that used Export Development Canada's Export Guarantee Program in 2015, which now guarantees up to 100% of a bank loan (it was 75%). That's a 15% increase over 2014.

EDC

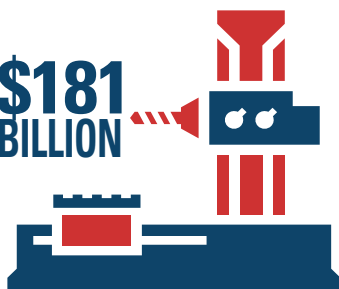


**1%**

Employment gains in manufacturing for the year as of January, which represents about 17,100 jobs. December showed a 0.6% decline, or 11,000 jobs.

Statistics Canada

**\$181 BILLION**



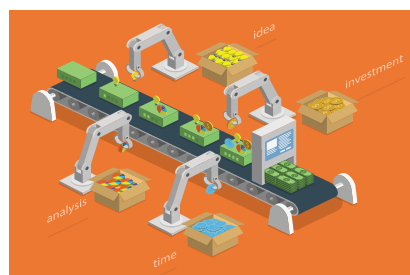
The amount to which worldwide demand for machine tools is projected to climb through 2019. Gains will be driven by market growth in China (accounting for 40%) and other developing nations.

Freedonia Group

**56%**

Percentage of 365 manufacturers surveyed who identify new product development as their top growth strategy over the next three years, followed by focusing on North America (55%) and expanding sales and distribution channels (52%).

PLANT's 2016 Manufacturers' Outlook



**\$111 BILLION**

What more than three-quarters of Canadian SMEs surveyed by the Business Development Bank (BDC) plan to invest in their businesses this year. BC and the Territories (14%) are most inclined to spend, followed by Ontario (2%). Alberta SMEs intend to invest 27% less than they did last year.

Three-quarters of planned investments will come from 10% of the companies. Top reasons for investing were for growth (77%) and to boost productivity or efficiency (75%). A lack of confidence in the economy is the main factor limiting investment for 48%.

# Exporting POWER

## COGENT LEADS WITH LEAN AND A CUSTOMER FOCUS

How does a lean journey result in a company's export success? The answer might surprise you.

BY KIM LAUDRUM

On Harper, president of Cogent Power Inc., beamed as he accepted the 2015 Ontario Export Award for Leadership last November. Between 2011 and 2014, Cogent's US exports – mainly transformer cores for power generation utilities – grew more than 250%. Since September, Cogent's growth energized its leaders to expand facilities to include a new 125,000 square-foot plant next to an existing 110,000-square-foot one in Burlington, Ont.

And this growth is expected to continue. As the demand and use of electrical energy increases, North America's supply infrastructure is due for some modernizing. The need for creative solutions to make transmission and distribution more efficient has never been greater.

As one of the largest producers of toroidal cores in North America, Cogent is well positioned to take advantage of this expanding market. Already exporting to the US and Mexico – in addition to sales to BC Hydro and Quebec Hydro – the company is becoming the go-to manufacturer for utilities across the continent.

How did it get to this point?

"We had lots of challenges and it didn't happen overnight," says Harper from Cogent's Burlington head office.

The company's roots go back to the early 1980s when Bob Brigs started an electrical steel product company. Supplier Dofasco was nearby, as were sea ports to reach customers. By 2002 the company, then called Cormag Inc., became Cogent Power Inc. The following year, Cogent moved into the Burlington headquarters and plant. In 2004, the company closed its plants in Monterrey, Mexico and Bridgeport, Conn. and consolidated everything in Burlington where Cogent manufactures transformer cores for electrical utilities.

"That could be anything from a core the size of a wedding ring to a toroidal core that is 2,000 plus pounds that we'll ship in logs to go into power generation. Everything is custom," says Matt Stimac, Cogent's manager of engineering and quality.

With government legislation throughout North America driving electrical utilities and transformer manufacturers to come up with innovative ways to increase efficiencies, Cogent also

*(Left) Cogent's toroidal transformer cores. (Middle) Transformer cores enter a blast furnace. (Right) Cogent adopted its lean manufacturing processes from the Toyota 5S system.*







Cogent president Ron Harper (left) chats with assembly workers Tim Vaughn (middle) and Elvis Agard (right).

PHOTOS: RODNEY DAW

makes amorphous metal distribution transformer cores. They can achieve a 70% reduction in no-load loss. This means the electricity that enters the transformer isn't lost before being transferred to the home, office, or institution using it.

### Congested facility

Cogent, part of the India-based Tata Steel Europe, also manufactures distributed gap wound cores, flat-stacked sheet products, fully assembled step-lap cores, toroidal core products, slit steel, and other custom products requiring electrical steels and magnetic materials. It sources its steel cores from Allegheny in the US and its electrical steel from ORB in the UK.

The diverse supply of materials and the cells required for each manufacturing process took up a lot of space at the Burlington plant.

"We had become so congested in this facility that we were leasing space elsewhere for finished goods and warehouse distribution," says Stimac.

And they were busy.

"We are slitting up to two million pounds a week here."

Something had to give.

Cogent embarked on its lean journey in 2004. "We were hoping to better manage our processes," Stimac explains. "In North America and especially in Canada there's always pressure to go to lower labour-cost countries, such as Mexico (for manufacturing). Even though our labour costs are higher, if we do things more efficiently, we can maintain our footprint here in Burlington."

Under the watchful eye of George Gautreau, business excellence leader, and Sani Kovachevic, quality systems leader, Cogent undertook an examination of its manufacturing processes through the Toyota 5S

*Continued on page 14*





## LEADERSHIP

Continued from page 13

system. It reduced wasted space, resources, effort and improved efficiencies.

One of the biggest lessons learned from Cogent's lean journey was "realizing our lean journey never ends. I'm always thinking, 'how do we make our product 10 times better,'" says Stimac. "We had so much growth in 2013 and 2014 but we were constrained by space. One of my biggest challenges was trying to keep the plant operational as we moved to the new plant next door. We more than doubled our space. Our order volume was high, but we couldn't allow the move to slow us down."

Already continuous improvement processes are evident. Cogent now runs two lines in the flat stack assembly area with one worker instead of two. In the amorphous cell throughput was increased by 50% and the weight of what was being processed from 90 pounds per hour to 140 pounds per hour. Wherever possible, Cogent will retain employees displaced by automation and reassign them.

Indeed, Cogent offers a four-to six-month apprenticeship program in lean manufacturing. A half-dozen or so employees at a time are encouraged to take the program to understand the company's aims and to embrace the lean way of thinking. After graduation, the employees return to the floor with renewed thinking



Ron Harper with Cogent's Ontario Export Award for leadership.

PHOTO: RODNEY DAW

and engagement in their work. They also pass along to others what they've learned.

It took three to five years to develop a lean plan.

"We did a lot of work on our vision, our mission, our purpose, what we're strongest at," Harper explains. "We identified who we are, why we do what we do and we have developed a fairly clear value proposition for long-term success. We are an integral part of our clients' business strategies. We are a trusted advisor and ally."

For example, the value proposition for US clients is providing them with a capacity to grow. Cogent earned Supplier of the Year kudos in 2015 for its

successful supply transformation with American manufacturer Power Partners Inc. (PPI). For more than 50 years PPI made its own transformer cores until it began sourcing from Cogent. PPI is one of the largest distribution transformer manufacturers in North America.

### Customer success

"Cogent's team has been an integral part of our company's success, has demonstrated a model supply partnership, and we are a better company in working with them," Cammie Bell-Garrison, vice-president of supply chain for PPI said of the award.

Grand Transformer in Grand Haven, Mich. was a new Cogent client in 2015. The idyllic town has the envious distinction – unfortunate for Grand Transformer – of just 3% unemployment. The client used to purchase laminations from Cogent to build its own transformers but, with such a small labour pool to draw from, Grand Transformer was challenged. Cogent stepped in. "Now we're sending them full cores," says Stimac.

The client can now direct its resources elsewhere.

Harper notes a smaller client grew its business 20% thanks partly to Cogent's value proposition.

"Lean is often misunderstood," Harper adds. "In our training, lean starts with what your clients value. That will start the approach off very differently than looking to lean to help you deliver at a lower-cost value. If you do that you'll miss what customers value. You'll also miss the input from others on your team. Plus, employees will be more engaged in their work and what they're doing to impact the clients' needs."

Inspired by Jim Womack and the Toyota system and others, Harper cites the two pillars of the lean journey. One is the lean methods for continuous improvement. The other supports respect for people.

"In transcribing lean principles to the North American market the people side and the client value side were dropped," but it's in building relationships that a company will be successful in the long term, he says.

Harper, past president of AME Canada (and a director on both the Centre of Skills and development Training, and the Ontario Centre of Excellence for Materials and Manufacturing) identifies the qualities a leading export company should embrace as: understanding the market dynamics of the country or region where products are being sold; and having a clear value proposition for long-term success.

He considers exports key to manufacturers' success, and they represent a significant portion of Canada's GDP. "We can't operate our businesses very well on an island. Business transcends borders more now than it ever has. To succeed in exporting, you'll need to rely on one-on-one business relationships."

Cogent is doing so and leading by example.

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

**Comments?**

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

## LEADERSHIP WINNER

The Ontario Export Awards recognize excellence in international trade.

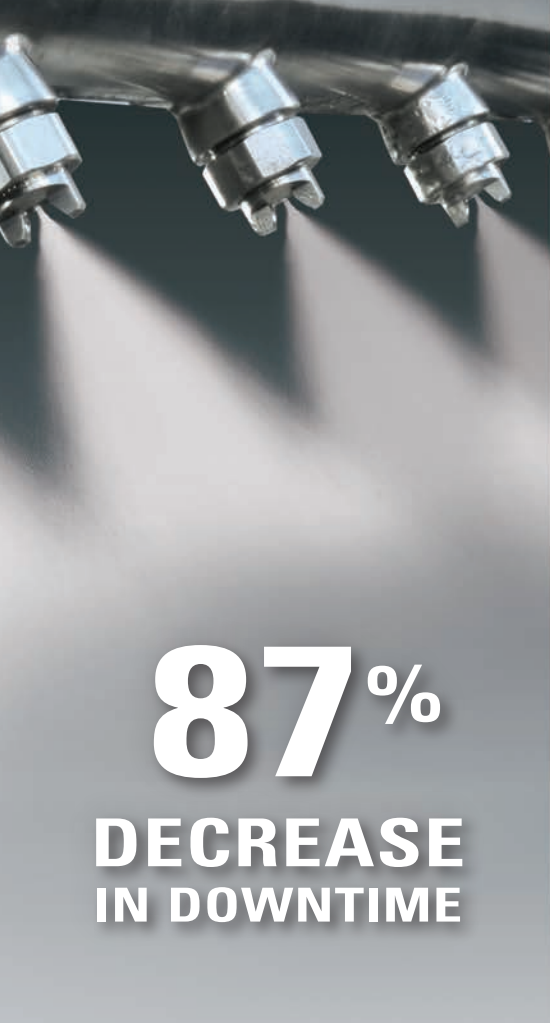
Cogent Power Inc., winner of the 2015 Leadership award, has created more than 100 full-time jobs in the past four years. It converted its value proposition over a five-year span from product price and quality to B2B trusted advisor/strategic ally, which has contributed to its success, especially in the US. Cogent has also developed deep strategic supply relationships with steel producing mills in Japan, the US and Europe to create an integrated, unique and differentiated approach to supply chain management.

---

*The Ontario Exports Awards are produced by Annex Business Media and CanadianManufacturing.com. Partners include PLANT magazine and several other Annex publications.*







# 87%

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IN DOWNTIME**



# 75%

**REDUCED  
CLEANING TIME**



# 80%

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IN SCRAP**

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**Cleaning time reduced by 75%** – Manual cleaning of powder residue in blenders after each batch resulted in a significant production loss for a food producer. Solution: Two TankJet® 75 tank cleaners automate the cleaning process; production time increased by two hours per shift.

**Scrap decreased by 80%** – Sesame seeds that didn't stick to dough due to inconsistent moisture application were eroding profitability for a food processor. Solution: An AutoJet Modular Spray System that precisely controls the volume of water applied and makes automatic adjustments when line speed changes.



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## EXPORTING

This federal initiative shares eligible expenses for initiatives in developing markets and is expected to help up to 1,000 companies annually.

BY PLANT STAFF

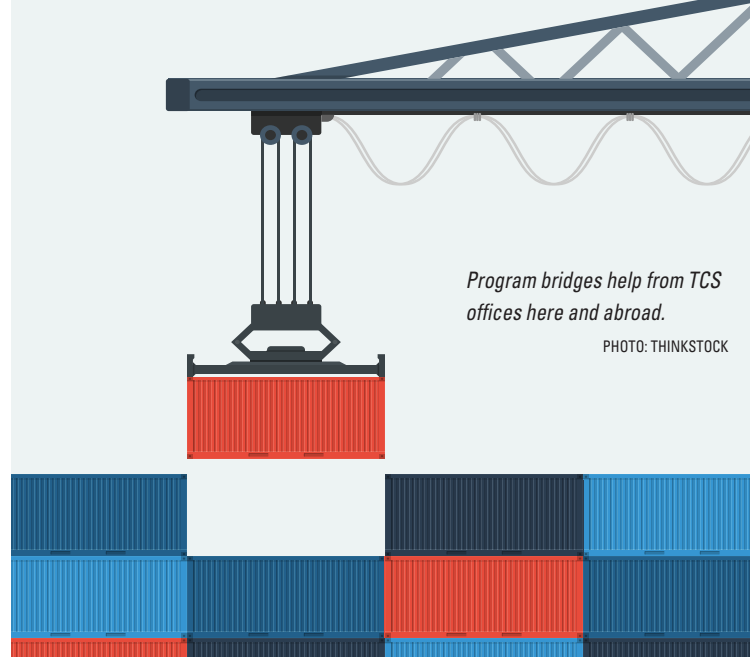
Small- and medium-sized enterprises (SMEs) now have a tool that will make it easier to expand their horizons by providing an incentive to develop and diversify export markets.

CanExport program, operating through the Trade Commissioners Office (TCS) in partnership with the National Research Council's Industrial Research Assistance program, will provide \$50 million over five years to Canadian SMEs seeking new export opportunities, particularly in high-growth markets.

CanExport, which will share the cost of eligible expenses for initiatives in developing markets, is expected to help up to 1,000 companies annually.

"We are encouraging Canadian companies to look more outward," says Elise Racicot, CanExport's program manager.

She said many SMEs are not accustomed to exporting or they have experience only with more traditional markets and are con-



# Export ELIGIBLE?

## CANEXPORT HELPS SMEs NAVIGATE GLOBAL MARKETS

cerned about the risk of developing new opportunities that can boost their prospects abroad.

The program provides a "bridge" between the assistance that companies get preparing for international markets from regional TCS offices and the help they receive from missions abroad that make introductions and facilitate contracts.

SMEs generated 25% of Canada's export sales in 2013, totalling \$106 billion, according to Statistics Canada. The same report suggests SMEs generated a similar share of exports in the manufacturing sector.

"[SMEs] need to take the risk themselves, but we're sharing it with them," Racicot says.

Eligible companies for CanEx-

port funding must:

- be a for-profit company in Canada, either incorporated or a limited partnership;
- have a CRA business identifier number;
- have up to 250 full-time equivalent employees; and
- have \$200,000 to \$50 million in annual revenues.

The program is "wide open" to all markets, except for countries where sanctions apply.

Proposals will be evaluated based on the viability of the applicant's export business case and whether the project is expected to yield incremental results and benefits to Canada.

There will also be an emphasis on how activities align with the Canadian government's trade strategies and their market potential, the company's export readiness and its business history.

Proposed activities must be part of the applicant's long-term international business development strategy, and can include:

- International business development events such as exhibiting at trade shows, participating at conferences, trade missions, business-to-business meetings and visits. Action-oriented activities, such as planning targeted meetings with buyers or matchmaking events, have greater value.
- Promotional and marketing tools and materials such as the adaptation of marketing tools for specific markets and website development.
- Research and studies such as custom market research via a business consultant or market intelligence reports.

Non-repayable contributions will be determined on a cost-sharing basis and can represent (but not exceed) up to 50% of eligible expenses. The TCS expects payments to range from \$10,000 to a maximum of \$99,999 per year. Applications will be assessed within 25 business days.

Visit the CanExport program's Applicant Guide at <http://tradecommissioner.gc.ca/canadexport>.

Comments?

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

## READING LIST

### Retirement help

A guide for 50-plus procrastinators

Mortgages, kids, cars and all the other expenses associated with the good life can put saving for retirement into the procrastination zone. If you're a 50-something manufacturing executive or manager with a retirement plan that needs some work, the Chartered Professional Accountants of Canada (CPA Canada) has just the book for you.

*The Procrastinator's Guide to Retirement* offers strategies, practical tips and tools to help develop a realistic plan that works. And it includes free spreadsheets to navigate the maze of retirement issues.

Canadian author David Trahair, a chartered accountant and personal finance trainer, offers these sample tips:

**1. Canada Pension Plan.** Should you retire early (free-

dom 60 anyone?) or wait until 65 or later? The penalty for early election is now 7.2% per year (it used to be 6%).

**2. Old Age Security.** If you were born in 1957 or earlier you can still receive it starting at 65. If you were born in 1963 or later, you'll have to wait until 67. Those born in the years between have to wait for a number of months after age 65.

**3. Registered Retirement Savings Plan.** Save money in an RRSP to augment your CPP and OAS. The Procrastinator's Number Cruncher will help figure out the complexities.

**4. Future spending.** Track current spending to forecast expenses during retirement, an important factor when determining what kind of work your RRSP will have to do.

Visit [cpacanada.ca/financialliteracypublications](http://cpacanada.ca/financialliteracypublications).







More than one in four exporters saw annual profit growth of 20% or higher.

PHOTO: THINKSTOCK

# Think DIVERSIFICATION

## EXPORTING CRITICAL TO EXPANDING CANADIAN MANUFACTURING

BY PLANT STAFF

**S**MEs must consider a diversified business strategy if they want to achieve stronger financial results, according to a study by the Business Development Bank of Canada (BDC).

The report, based on a survey of 998 companies, concludes that in today's economy, diversified small and mid-sized enterprises have a far better chance of succeeding and prospering than undiversified businesses. "The message is clear – diversification is a critical strategy for Canadian businesses to succeed in these challenging times," says Pierre Cl roux, chief economist and vice-president of research at BDC. "Business owners who fail to do so may be missing growth opportunities and putting their company under unnecessary risk."

BDC also found risks and opportunities vary by sector. Exporting is the most critical diversification strategy for manufacturers. More than one in four companies that export had 20% annual profit growth or higher in the last three years versus just 8% of those with no regular exports.

In the resources sector, having clients in multiple cities is the best predictor of strong revenue and profit growth. Seven in 10 resources companies with clients in more than one city had 10% or higher annual revenue growth in the past three years versus just three in 10 companies with clients in only one city.

### Business growth

BDC's advice to SMEs is to:

- **Harnesses core strengths.** Think about how existing assets (buildings, machinery, staff, expertise) can be used for other purposes.
- **Ensure financial stability.** Don't jeopardize existing operations. Consider the least costly and complicated options. New markets come from relatively small changes to existing products or services.
- **Address weaknesses.** Constantly stress-test the business. What would happen if you lost your biggest client or faced an economic shock? Solutions could include adding a few more regular clients or adapting an existing product or service.

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



Supervisors need training too. PHOTO: THINKSTOCK

## Prepping your leaders

Train new supervisors  
as you would apprentices

BY HUGH ALLEY

**M**any supervisors get their jobs because they're the best in a crew. Once appointed, they're left to fend for themselves. It's presumed a good operator that gets along with peers makes a good supervisor. Such qualities help but they're not enough.

You wouldn't put a good manual machine operator on a multi-axis CNC milling machine without training. So why put someone in charge of million dollars worth of wages (for a crew of eight to 15 people and more for materials) without providing training?

Think of supervisors as apprentices with four specific skills to learn, regardless of industry.

1. How to deal with inadequate performance.
2. How to train new staff on new methods.
3. How to make local improvements to the way work is done.
4. How to set priorities.

Supervisors don't need to be outstanding in all four, just competent. Some people argue there should be a fifth item – communication – but that's embedded in the four listed skills.

The new CertWork designations ([www.CertWork.com](http://www.CertWork.com)) jointly sponsored by Canadian Manufacturers & Exporters and the Canadian Labour Congress, are valuable tools for developing new leaders.

The program assumes managers will be directly involved in helping new leads and supervisors learn their craft.

If you expect to appoint new leads or supervisors, start by supporting them as they learn the new role.

*Hugh Alley is a consultant based in Port Coquitlam, BC who helps companies quickly achieve significant performance gains. Call (604) 866-1502 or e-mail [hughalley@gmail.com](mailto:hughalley@gmail.com).*

## AUTOMATION

A robotic welder works with a high-tech software package to produce one-of-a-kind building designs in real-time.

BY MATT POWELL, ASSOCIATE EDITOR

Sean Lepper says the robotic welding system now housed in Behlen Industries looks a lot different from the initial plans three years ago when the company decided to take a plunge into the world of advanced automation.

That's not a bad thing.

Lepper, vice-president and general manager of the Brandon, Man.-based manufacturer of pre-fabricated buildings, says the system isn't the company's first foray into automation, but it's the first programmable system that creates custom steel products using 3D software.

"The highly customized nature of our product makes it hard to get into automation," says Lepper, noting that the company is accustomed to working with steel beams spanning as long as 60 feet.

"The software allows us to manipulate how the robots mount, the way they move, how they move the beams and the size of beams we're able to work with."

Behlen is Canada's largest manufacturer of steel building systems and is the first to produce frameless steel buildings.

The structures for industrial, commercial, recreational and institutional facilities, registered to ISO 90001 and CSA A660 (the quality standard for steel building systems), are shipped globally. One of the company's more notable projects include the PEAK 2 PEAK gondola terminals used in Vancouver during the 2010 Winter Olympics. It also produced the roof for the Gangneung Arena in South Korea, ahead of the 2018 Winter Olympics.

About 250 skilled workers are employed at the Brandon manufacturing facility that produces up to 30 loads of steel every week. About 80% of the steel is sourced from Canadian suppliers, including those in Hamilton. There's also a design and engineering facility in Cambridge, Ont., which employs about 30 people.

Every project is customized, and welding robotics were used mostly for predefined, repetitive tasks with little to no variability. Almost everything was done manually, so Behlen recognized it was necessary to gain the benefits of robotics and advanced software in welding, without having any limitations.

Lepper says the system, put into operation last April, improves quality, boosts capacity and there are fewer production errors.

"The biggest challenge was making a com-



Behlen's robotic welder in action, improving quality and boosting capacity.

PHOTO: BEHLEN

# Behlen's BUILDING BOT

## 3D AUTOMATION BOOSTS CAPACITY

mitment to the software side of the project because it was a big change for us and it has forced us to fundamentally change how we operate," Lepper adds. "This is a major opportunity for us to drive down our costs."

### Diversifying markets

The system also alleviates production bottlenecks by providing readily available capacity during on- and off-peak production cycles.

Low oil prices are dragging down its Alberta customer base, but the company is diversifying its markets in Ontario and overseas.

Behlen was careful to ensure the combination of software, robotics and processes were chosen strategically and innovatively. The robotic welding cell had to handle highly-variable, low-volume work.

The three-step process starts with a detailing program rarely used in the pre-engineered steel building sector. Behlen's engineers create a hyper-detailed and organized 3D model, including the specs for individual parts of a project.

That model, which is imported into BIM systems and can be shared with clients, is then fed into a second piece of software, where a robotic simulation program uses touch-sensing with the robotic arm to detect

any potential errors or clashes. The result is a real time, visual simulation of the weld.

In phase three, the \$1 million robot arm goes to work using a metal-cored arc welding technique.

"We don't use it on heavy and huge beams, it's more useful on medium-sized jobs to make rigid frames, but it's not suitable for all the work we do," says Lepper.

Behlen says the robot churns out customized welding jobs three times faster than its human counterparts. But that doesn't mean the company is going to lay off any of its shopfloor workers. Lepper says the robotic system will compliment them and allow the Brandon facility to produce more structures.

In fact, when the robot came online last year, Behlen was in the process of hiring 15 additional welders to handle the extra capacity.

It comes down to process and continuously improving Behlen's operations. Lepper says the robotic weld system will help the company achieve that goal.

"Flow is critical. The fewer times we have to pick things up and put them down, the better we're going to be."

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



## SAFETY

A new industry-driven association will improve safety while aiming to lower costs.

BY NEAL CURRY

Canadian Manufactures & Exporters (CME) has long been recognized as the voice of manufacturing in Manitoba, both by industry and government. The association's mandate is to strengthen the competitiveness of its members and industry by helping to achieve growth in domestic and international markets. So it was only natural for SAFE Work Manitoba to approach CME and establish an industry-driven safety association to support the manufacturing sector.

In January, CME officially launched Made Safe at Arne's Welding in Winnipeg. The initiative will be overseen by a safety council that includes representatives from industry, workers and safety professionals. The council will report to the CME board of directors.

While participation in Made Safe is not conditional on membership with CME, it's the association's hope that by sharing resources, training and office space, the two groups will be able to accelerate the advancement of manufacturing in Manitoba.

Not only will an industry-wide safety program keep workers safe, it will lower business costs by improving productivity, reducing waste and creating opportunities for further reductions in WCB premiums as experience improves both for individual firms as well as the manufacturing sector.

Many CME members have worked diligently to improve injury rates in manufacturing, and we have seen the development of excellent programs driving impressive safety records.

Many companies lack the resources to develop and manage necessary programs in-house. Collaborating on training, tools and services will benefit manufacturers and create safe and healthy



Program to accelerate manufacturing in Manitoba. PHOTO: THINKSTOCK

# Manufacturing SAFETY for Manitoba

## CME LAUNCHES MADE SAFE INITIATIVE

workplaces for employees.

CME and Made Safe staff have been working to solidify industry support. With support of the companies represented on the CME Manitoba board of directors, Made Safe has:

- secured the commitment of manufacturing executives, safety professionals and

workers to serve on the first Manufacturing Safety Council;

- solicited support from CME member companies (feedback has been positive);
- in concert with Safe Work Manitoba, solicited support from the broader manufacturing community;
- obtained signed letters of sup-

port from 23 companies. Within those companies, the 50% threshold has been reached in airplane repair, vehicle manufacturing and plastic material manufacturing, representing \$287 million in payroll;

- secured the staff and programs of the AMC Safety program within Made Safe to provide a core of well-trained staff delivering 30 safety courses and professional direction on the implementation of safety management systems; and
- started work on new office spaces that will see CME Manitoba and Made Safe staff work side-by-side to share resources and leverage skills.

Over the coming months, the Made Safe team will work towards launching the Made Safe website and formalizing services, making new member recruitment a priority for this year.

### STANDARDS

#### ISO 45001 is coming

BSI invites comments on the draft version of the safety standard



The International Labour Organization (ILO) reports 6,300 people die every day as a result of occupational accidents or work-related diseases. In addition to the tragic human toll, estimated losses account for 4% of global GDP each year.

The draft ISO 45001 *Occupational health and safety management systems – Requirements*, better addresses improved global safety standards. It's intended to replace OHSAS 18001 (not a full international standard) and is now available from the BSI Group ([www.bsigroup.com](http://www.bsigroup.com)), a business standards company, for comment until April 15.

Download it from <https://drafts.bsigroup.com/Home/Details/55801>.

The BSI Group Canada Inc. in Mississauga, Ont. notes ISO 45001: is a single internationally-agreed standard suitable for all organizations worldwide; it aligns with other key management system standards; and the requirements that direct organizations to design a management system are less prescriptive.

Look to the end of the year for publication of the final version.

*Neal Curry is the executive director of Made Safe and former chair of the CME Safety and Health Committee. E-mail [info@makesafe.ca](mailto:info@makesafe.ca).*

**Comments?**

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



## THINK LEAN

Understand what sparks customer demand and its ordering methodology, then identify the opportunities.

BY RICHARD KUNST

A big part of adopting and implementing lean principles is identifying waste and eliminating it to reduce costs and maintain competitiveness. But there's another side to lean: balancing capacity and capability to match customer demand.

Do we really do a good job of integrating customers into our value stream? Most manufacturers are afraid to speak of anything beyond introducing new products, features and attributes of existing products since customers will be looking to get more while paying less. So they guess about potential customer demand and build an infrastructure to deal with sudden surges and surprises.

A key element of the lean enterprise is level loading, or Hiejunka. This requires intimate customer involvement, so how do we get there?

First categorize your customers and the products they purchase into runners, repeaters and strangers. Conduct an extended enterprise value stream map, digging deep into your customer's business to determine how demand is generated and accumulated before an order is triggered. This may reveal some exciting opportunities since your customer's ordering methodology may not be as sophisticated as you imagined.

Next, work with your customer to establish the products it orders on a kanban system.

### Hiejunka

A Japanese word meaning "levelling." It represents a technique used in the Toyota Production System and lean manufacturing that reduces mura (unevenness), which reduces muda (waste) in production and processes.



A key element of lean is balancing production with customer demand.

PHOTO: THINKSTOCK

# How to achieve customer INTIMACY

## BRING THEM INTO YOUR VALUE STREAM

Web cams view inventory stock locations, which eliminates the need for your customer to place orders. Supporting the customer with kanban will get you closer to the actual demand without feeling the effects of an ERP filter.

Link your customer's kanban

system with timed delivery milk runs. Once your customer knows when your shipment will be arriving, orders and support systems will be put in place to maximize resources. Based on your analysis, optimize the cube and size of your trucks, and the length of the run. When an outbound route

is established, use the backhaul route to pick up supplies or return reusable packaging.

Your operation will optimize as you anticipate predictable demand. Once runners are operating smoothly on a kanban-induced timed delivery route, it's fairly easy to integrate repeaters and ultimately strangers into your production planning strategy.

You know how to use these simple tools internally, so leverage them to make customers even more committed to your success.

*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.kunst-solutions.com](http://www.kunst-solutions.com). E-mail [rkunst@kunstofsolutions.com](mailto:rkunst@kunstofsolutions.com).*

**Comments?**

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

### CREATE A VISUAL ENVIRONMENT

As you walk the aisles in your plant, look for evidence of:

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- **No waiting/no delays.** Materials, parts, tools, paperwork arrive on time. Permission to engage in the work is visibly in place.
- **No wondering/no secrets.** Procedures are standardized and visually displayed. All the information you need to do quality work is at your fingertips – accurate, complete and visible.
- **No obstacles/no detours.** It's a straight shot to where you need to go. No detours around equipment, racks, people or material.
- **No extras.** The area contains just what's needed, nothing extra, nothing just-in-case.
- **No injuries.** Safety procedures are built into the process of work.
- **No waste/no red ink.** The workplace is clean, well ordered, self-explaining, and self-regulating. Waste is identified before it accumulates. Material and information flows through the workplace at an accelerated pace.



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## INSIDE MAINTENANCE

Managing plant assets and protecting investments in them is mission critical.

BY STEVE GAHBAUER

Managing maintenance departments holistically is a must as focus shifts from reactionary maintenance, repair and periodic overhaul of equipment to providing reliability through total asset management. The emerging concept in this field is evidence-based asset management (EBAM), which bases decisions on data plus credible evidence, using the most advanced decision-making tools available.

Putting an effective system in place requires a strategic asset management master plan that ensures all stakeholders buy in, particularly senior management.

Maintenance management systems were discussed by a variety of presenters at a MainTrain conference convened by the Plant Engineering and Maintenance Association of Canada (PEMAC).

Christer Idhammar, one of the presenters and founder of consulting firm IDCON Inc. in Raleigh, NC, noted technology is okay, but improving reliability through better maintenance is 90% about people and processes, and only 10% about technology. The question is: do you focus on the right things, or just on doing things right? Everybody doing it right the first time, every time is the only way for a culture of excellence to be achieved.

Take planning and scheduling, for example. Serge Doucet, a maintenance planning specialist at ProSigma Reliability and Maintenance Professional Services (based in Longueuil, Que.), said planning is about how to best perform a job, while scheduling determines when the job should be done. When there is no planning and scheduling, the work order backlog is out of control, emotions take over when prioritizing work orders, equipment history in the CMMS is incomplete, and there are no performance indicators. Also,



*Good maintenance delivers improved safety, lower energy consumption and reduced costs.*

PHOTO: THINKSTOCK

the equipment? And are there standards for reliability and maintainability?

### Changing roles

There are other questions to ask. For instance: are operators doing 50% of basic equipment inspections and essential care? Are operators trained to do basic equipment inspections and essential care? Are stores organized to support efficient maintenance? Do KPIs drive better performance? Do you know how many maintenance people are the “right” number? What’s the expected attrition rate, which can drive up backlog, overtime and contractor hours.

Another aspect that needs to be factored into the mix is changing rules.

Roop Lutchman, the lead for consulting firm GHD Inc. in Mississauga, Ont., noted there are specific drivers for optimal asset management. Existing rules don’t apply because businesses face new challenges. Here is Lutchman’s top 10 list of new rules:

- Business planning in silos is replaced by whole business planning.
- Operation by gut feel and intuition is changed to comprehensive risk management.
- Siloed ad hoc decision-making gives way to optimized decision-making.
- Meaningless KPIs are replaced by LOS-driven performance management.
- The proliferation of non-integrated systems is fixed by system rationalization and integration.
- Under the old rules, the focus was on process efficiency; under the new rules, the focus is on effectiveness.
- Instead of low wrench time, the focus is on high pay-off activities.
- Managing lifecycle phases in silos is replaced by sequencing the asset value chain.
- Supervising and managing

# The ZEN of HOLISTIC reliability

## MAKING DECISIONS BASED ON DATA AND EVIDENCE

some repairs take forever, there is a majority of emergency work orders, maintenance employees are shuffled all day, and maintenance supervisors struggle every morning over what work to assign to which crew.

### Minimizing total cost

A good planning and scheduling environment ensures all maintenance tasks are captured on a work order that’s part of an effective priority system, and that standard procedures are continually updated and optimized. The benefits are a decrease in delays, getting more work done with the same number of people, reduced downtime and increased in equipment availability.

Ramesh Gulati, the asset management and reliability-planning manager of the aerospace testing alliance AEDC/ATA-Jacobs in Tennessee, emphasized the obvious: best practices and asset lifecycle management help minimize the total cost of ownership, which consists of acquisition cost (20% to

25%), installation cost, operation and maintenance costs (70% to 80%), and disposal costs.

Most of the cost of ownership is in the operations and maintenance phase (O&M) and depends on how assets are designed, built, installed, commissioned and operated. Ergo, reliability, maintainability, sustainability and safety are attributes that should be designed in.

It follows that operators and maintenance professionals are involved in the early stages of equipment design and development. Create a plan, establish procedures and test performance during commissioning. This is important because most O&M costs for the lifecycle of an asset are fixed during the design/build phase.

Ask yourself these questions regarding lifecycle cost (LCC): Is equipment specified and bought based on long-term best LCC or on the lowest bid? Are the operations and maintenance departments involved in early specifications and the design of

people changes to leaders of change.

- Ad hoc innovation and continuous improvement changes to formalized innovation collaboration and continuous improvement.

New rules offer obvious benefits. They include improved response to customer needs; lower taxes; reduced failures and production delays; business costs are minimized; and financial crises are averted.

An effective maintenance strategy also includes applying machine diagnostics. Condition-based maintenance (CBM) has become a key strategy for improving maintenance reliability. Bill Winkler, an electrical consultant with the Canadian Copper and Brass Development Association, warned poor control of electric motor efficiency creates significant costs that are often invisible.

CBM and predictive maintenance

determine the reliability of equipment. PdM identifies the changing conditions that alert the owner to an increasing risk of functional failure, or when the equipment will cease performing as required. CBM is used to make planned maintenance decisions based upon tests and inspections. Both control and manage costs associated with the equipment lifecycle and productivity.

Equipment failure is expensive, but it can also be catastrophic. A holistic reliability and maintenance management system goes a long way to ensuring physical assets continue to be primary revenue generators.

*Steve Gahbauer is an engineer, a Toronto-based business writer and a regular contributing editor to PLANT. E-mail [gahbauer@rogers.com](mailto:gahbauer@rogers.com).*

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

## MATERIAL HANDLING

### Record NA lift truck sales

Electric units account for more than 63%

Looks like 2015 was a good year for material handling. North American lift truck orders hit a record high of 225,534 units (all classes and excluding exports), reports the Industrial truck Association (ITA). And it's the first time sales were higher than the industry's pre-recession level of 215,000 units in 2006.

Electric lift trucks accounted for 141,846 units, 63.4% of the total and an 8% increase over 2014, which is at least partly due to an emphasis on reduced emissions in work environments. Engine-powered lift trucks accounted for 83,688 units, or 36.6%.

"From a global perspective, overall world lift truck sales in 2015 were over 1 million units with North America being one of the largest markets," said ITA president Brian Feehan.

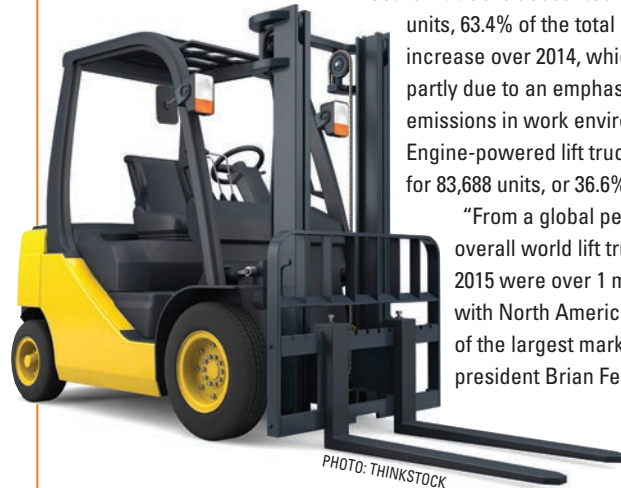


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## CANADIAN HIGHLIGHTS

New projection mapping brings greater visual clarity to the celebration of all that is Canada.

BY PLANT STAFF

A Canadian developer and manufacturer of visual and audio technologies is brightening up the Northern Lights. Not the Aurora Borealis. It doesn't need the help. But the Northern Lights Sound and Light Show that illuminates Ottawa's Parliament Hill again this year will be even more dynamic than previous presentations thanks to new projection mapping from Christie Digital Systems Canada Inc.

The show, which celebrates all that is Canada in a 30-minute audio-visual extravaganza, uses 19 3DLP projectors (with content provided by id3) made in Kitchener, Ont. by Christie Digital.

The company, a wholly owned subsidiary of Ushio Inc. in Japan, creates visual technology systems for a range of uses such as retail displays, events, mission critical command centres, classrooms and training simulators.

Its US headquarters is in Cypress, Calif., but the research and innovation teams are located in Kitchener, where the company has one of the largest manufacturing facilities in the region. It employs close to 700 people, including more than 250 engineers.

The company's 306,000 square-foot Kitchener plant has 105,000 square-feet of manufacturing area, and there's an additional 60,000 square-foot training facility.

Thanks to Christie Digital's expertise, the Northern Lights show will be twice as bright with twice the contrast compared to the previous "Mosaika" show, which used nine of the manufacturer's projectors.

"The brightness is so much stronger than before, especially in certain areas on the Parliament building that – for the Mosaika show – were mapped with only one projector," says Jean-Marc Beauvalet, manager of technical services at the Department of Ca-



Parliament Hill lit up by the Northern Lights Sound and Light Show.

PHOTO: DEPARTMENT OF CANADIAN HERITAGE

# A brighter NORTHERN LIGHTS

## CHRISTIE DIGITAL PROJECTORS ENHANCE PARLIAMENT HILL EXTRAVAGANZA

nadian Heritage, which is responsible for Northern Lights.

He says three projectors make it possible to see some of the most succinct images or the more distant visuals used in the presentation.

The new show employs a 7.1 audio track with narration, 44 moving lights and more than 100 LED lights that depict a journey through Canada's history on the 472-foot long, six-story high Parliament Building and 302-foot tall Peace Tower.

### Seamless images

The projection trailer in the centre aisle is covered with LED screens on three sides. The projectors work together to form a "seamless" image on the front façade of the Centre Block, which is flooded with light from more than 150 moving and static lighting fixtures. These include 50 automated lights, some producing more than 16.5 million different hues, and 38 low-energy LED lights that produce more than 4.2 billion different hues.



The 3DLP projector.

PHOTO: CHRISTIE DIGITAL

Two computers with more than 15 kilometres of wiring, 150 kilometres of cabling plus 7.5 kilometres of fibre optic cable control the system. High-impact lighting with smoke effects help to enhance the experience.

And for the first time, the show will use a colour laser to punctuate transitions and add depth. The show's system includes more than 2,500 individual signal connections, all of which must work together and there are four different networks, one of which is entirely dedicated to the laser's safety systems.

Ten different servers deliver almost 200 gigabytes of processing power and 80 gigabytes of video RAM.

The image projected on the Centre Block is up to 35 million pixels. Compare that to a high definition television screen that displays more than 2 million pixels at a time.

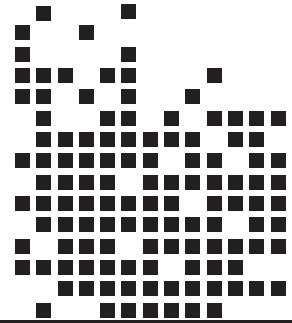
The setting is kept tidy by hiding the equipment behind a "Vaux Wall" that is shrouded by trees and shrubs at the base of the building.

The show, divided into five books, employs a variety of illustrative styles and dramatic performances to depict Canada's people, partnerships, exploration, military service and valour, and diversity.

Northern Lights is the sixth edition of the Sound and Light Show on Parliament Hill since 1984, and runs for five summers (2015-2019). Catch the 2016 show from July 9 to Sept. 10.

Comments?

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



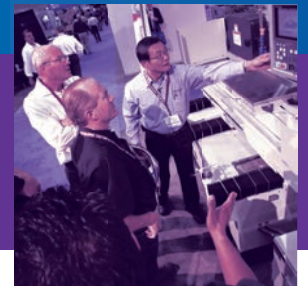
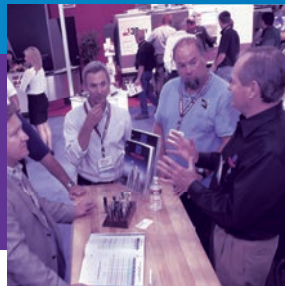
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## SECURITY

Breaches are increasing in sophistication, frequency and severity.

Only 37% of Canadian organizations believe they're winning the cyber security war, according to a study by Scalar Decisions Inc. That's a 4% decrease from a 2015 study.

The information technology integrator based in Toronto cited insufficient numbers of in-house personnel and lack of in-house expertise as the greatest challenges.

The *Cyber Security Readiness of Canadian Organizations* report also found most respondents believed that cyber security crimes in their organizations are increasing in severity (80%), sophistication (71%) and frequency (70%).

Loss of intellectual property was experienced by 33% of respondents in the last 24 months and 36% believed it caused a loss of competitive advantage.

The average total cost of cyber attacks in the last 12 months was approximately \$7 million per organization. But the study found cyber security spending has increased slightly from last year, with an average 11% of the IT budget dedicated to information security (versus 10% in 2015).



PHOTO: THINKSTOCK

# Cyber attackers are WINNING

Respondents reported an average of 40 cyber attacks per year, a 17% increase over last year's report; but only 38% indicated their organizations had systems in control to deal with advanced persistent threats.

Overall, as 80% identified webborne malware attacks as the greatest threat to IT networks,

followed by rootkits (65%).

High performers, representing 53% of the sample, spend 43% more of their IT budgets on information security (compared to low performers) and were more likely to have a cyber security strategy fully aligned with business objectives and mission.

High performers were also 28%

## IT PROS CITE LACK OF INHOUSE EXPERTISE

more confident that they're winning the cyber security war.

The survey conducted in October involved 654 respondents from IT and IT security practitioners from a wide variety of industries.

**Comments?**

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

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# CANADA AT WAR

## HIGHLIGHTS FROM PLANT IN THE 1940s

With the outbreak of the Second World War in 1939, Canada was challenged to create a strong industrial base almost from scratch.

BY JOE TERRETT

This is a significant year for **PLANT** Magazine. It marks 75 years of service to Canadian industry. When the first issue landed in 1941, it represented a change in name from **Heating, Cooling & Piping** and a new readership focus. *PLANT Administration* targeted busy executives in positions of authority over industrial plants and institutions at a time when Canada had been at war with Germany and its Axis allies since 1940.

Manufacturing activity had increased 31% from 1940 to 1941 and by 1943, 75% of all exports were war-related.

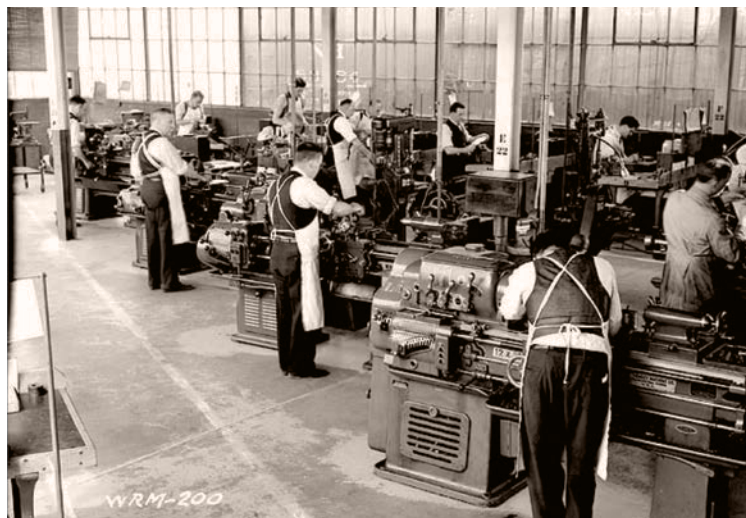
The Canadian War Museum notes government had taken full control of the economy, and turned it into a weapon of war. It established C. D. Howe's Department of Munitions and Supply, and the Wartime Industries Control Board in 1940, then applied tough wage and price controls in 1941. Britain got interest-free loans, was given war supplies in January 1942 and surplus production was donated to Canada's allies through the Canadian Mutual Aid Board.

Finding production efficiencies was key. Teatime, for example, would be conducted with handleless cups. It was noted 9 million of them could be produced in the same time 3 million cups with handles could be made.

Such were the conditions when **PLANT**, in its March 1942 editorial, warned manufacturers that they would be "squeezed."



Universal carrier driving up a slope at the Ford Motor Co. PHOTOS: LIBRARY AND ARCHIVES CANADA



Manufacturing Bren guns and shells.



Manufacturing uniforms in Toronto.

# 75 YEARS

It called on management "not to lose any time in figuring ways to prolong the life of present equipment wherever possible, arrange substitutes for a swiftly growing list of things formerly considered necessities, find new ways of doing things faster and better, develop even finer labour relationships than have existed in Canada in past years, pay ever-increasing attention to the health and morale of workers, raise efficiencies to points previously considered impossible, and at the same time, while doing all of these things, cut operating costs to the lowest consistent point."

### Notable economies

The key reason was to aid the war effort, but there was a second one – to ensure Canadian business continued to operate under its own power without subsidies and "resulting outright state control."

**PLANT's** call for industry to be more efficient is as relevant today, but there were other, unique issues to deal with during wartime.

The article *Cost-cutting Milestones in Canadian Industry and Business* describes "notable economies" put into practice to offset the squeeze between price ceilings and wartime expenses. An example cites how biscuit manufacturers were saving paperboard. They eliminated small cartons and standardized on a minimum size; reduced the

*Continued on page 28*



Continued from page 27

size of inside flaps; reduced the size of waxed and glassine paper by ½ in. to 1 in.; standardized cracker caddies and corrugated boxes for bulk goods; packing biscuits, cookies or crackers not less than 12 to a container; and allowed grocers a premium up to the original cost of corrugated shipping cases when they were returned.

Canners were saving tin plate by using smaller cans for food items.

In the June 1942 issue, *Caution needed in blacking out* warned that painting out factory windows was resulting in a lot of broken glass. The black paint stopped the sun's rays and converted them into heat, and without sufficient room to expand, the windows, especially large sheets, would break.

"The more translucent the pigment and the lighter the colour of paint, the less chance of breakage exists," it advised.

With many young men heading to the war theatre, manufacturers were hiring more women, but *Wolves Howl* — and *whisper too* warned management that saboteurs were attempting to disrupt the war effort by spreading false rumours of immoral conditions in Canadian plants. This was interfering with hiring at a time when workers were needed to meet the escalating need for war materials.

But even during the dark days of the war, **PLANT** was looking ahead to the end of the conflict in its November 1942 issue, noting "rehabilitation of industry, relaxation of wartime government controls and an intensive employment program are some of the main problems facing Canada in the post-war era of reconstruction..."

Dr. Cyril James, head of the

committee on reconstruction noted the following: "The rehabilitation of Canadian industry will involve changing machines, changing tools, getting additional raw materials and perhaps changing the source of supply. It may mean the deliberate decision to abandon certain plants, or it may involve the rehabilitation of these plants so that instead of producing explosives they can produce silk stockings, or instead of producing tanks, they can produce washing machines or refrigerators."

### Post war practices

*Five Musts for After the War* listed:

- Government must relax wartime controls.
- Industry must be reshaped for peacetime production.
- Every able and willing worker must have a job.
- There must be a programme of publicly financed construction projects.
- Men and women must be educated for business trade they wish to enter.

At war's end in 1945, the Wartime Industries Control Board was dissolved and as the decade concluded, **PLANT's** December 1949 editorial was back to practical matters, arguing the benefit of good public relations and identified its best agents as employees. "If they like their work, like their company, admire the men who run it, and think the products are good, they are good will ambassadors of incalculable value."

Such wisdom is applicable today as manufacturers short of employees with needed skills use social media, reviews and other PR tools to attract talent.

### Comments?

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

## GOVERNMENT

# Wynne rated worst for fiscal management

Fraser Institute analysis ranks Clark and Couillard best



Ontario premier Kathleen Wynne at Ryerson University in Toronto to announce a \$22.75 million investment in the IBM Innovation Incubator (I3) Project.

PHOTO: ONTARIO GOVERNMENT

Canada's premiers were evaluated based on spending, taxes, deficits and debts.

When it comes to managing provincial finances, Ontario premier Kathleen Wynne has the worst record, according to an analysis by the Fraser Institute.

*Measuring the Fiscal Performance of Canada's Premiers* ranks them based on government spending, taxes, and deficits and debt. Those who managed spending more prudently, balanced their books and paid down debt, and reduced or maintained competitive tax rates ranked higher.

The public policy think tank rates BC's Christy Clark and Quebec's Philippe Couillard as having the best records at managing provincial finances. Clark ranked first in fiscal performance scoring 78.5 out of 100, followed by Couillard (78.2) and Saskatchewan's Brad Wall (77.1).

Wynne's 61.4 placed her sixth overall, yet last among sitting premiers (four of the ranked premiers are no longer in office).

"Ontario's persistent deficits and mounting government debt are key reasons for Premier Wynne's poor performance," said Ben Eisen, associate director of Ontario prosperity studies at the Fraser Institute.

In the government spending category, Nova Scotia premier Stephen McNeil ranked first (92.6 out of 100), followed by Couillard (90.1) and Clark (84.4). Former Prince Edward Island premier Robert Ghiz (22.8) was last, having increased spending, on average, faster than the rate of economic, inflation and population growth.

In the taxes category, former Alberta premier Alison Redford (90.2) ranked first, largely due to Alberta's then single-rate personal income tax system and lowest corporate income tax rate during her term in office, followed by Wall (78) and Manitoba premier Greg Selinger (64.3). Former New Brunswick premier David Alward (27.7) ranked last, having increased key tax rates on both personal and corporate income.

In the deficits and debt category, Wall ranked first scoring a perfect 100 because he ran a surplus during his tenure and reduced Saskatchewan's debt burden. Clark (89.4) and Couillard (87.5) rounded out the top three, with former Newfoundland and Labrador Premier Tom Marshall ranking last after substantially increasing the province's debt burden.



BC premier Christy Clark. PHOTO: KRIS KRUG



Quebec premier Philippe Couillard. PHOTO: ASCLEPIAS

## RESEARCH

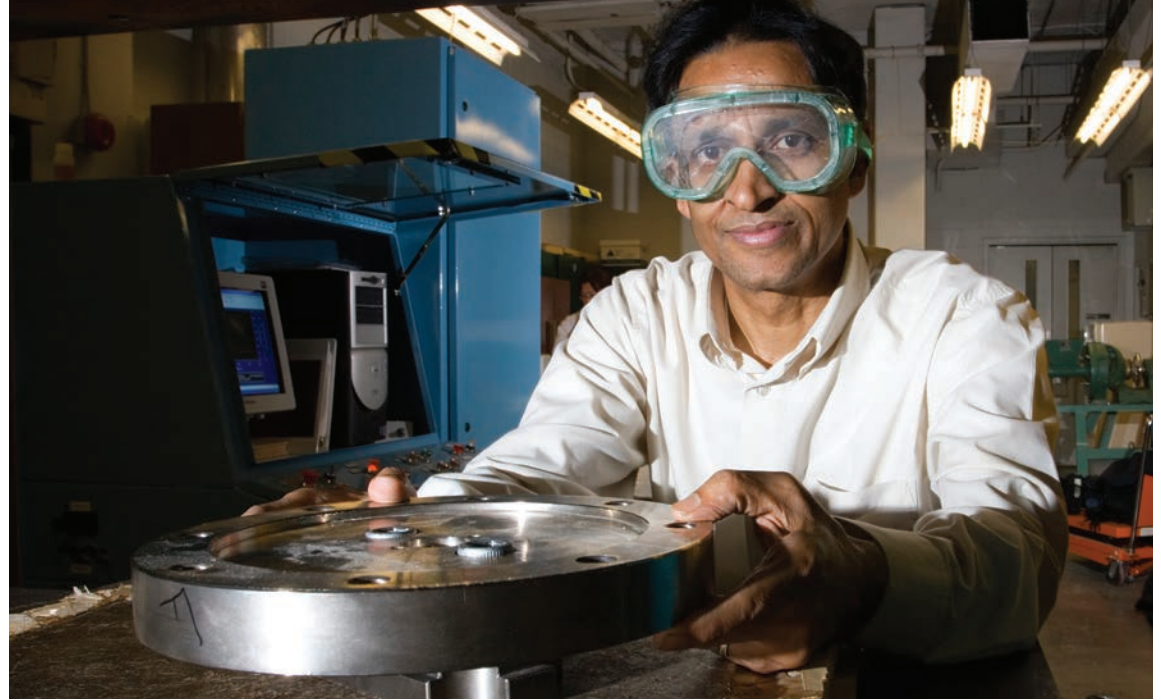
The Networks of Centres of Excellence program has come to an end after aiding in the research and commercialization of automotive innovations.

The national automotive research network called AUTO21 is winding down operations because federal funding is no longer available. It wraps up in March after completing two seven-year cycles through the Networks of Centres of Excellence (NCE) program.

Looking back to the beginning, universities, government, automakers and their suppliers came up with the plan for a pan-Canadian research network to improve the safety and sustainability of automobiles and the competitiveness of Canada's \$85-billion-a-year auto industry.

Launched in 2001, AUTO21 was the largest and probably broadest initiative NCE ever funded. This wasn't just engineers talking to engineers. It involved professionals of all stripes, from medical doctors and nurses to scientists, sociologists, lawyers, psychologists, geographers, human kinetics people and artists.

Prior to AUTO21, there were relatively few automotive researchers in Canada. Today, as the network nears the end of its 14-year mandate, nearly 200 researchers and more than 400 highly trained graduate and



Dr. Mohini Sain, dean of forestry at the University of Toronto, co-leads AUTO21's Hybrid Biocomposites for Automotive Applications project.

PHOTO: AUTO21

# AUTO 21 WINDS down

## IT'S A WRAP AFTER A 14-YEAR RUN

post-doctoral students from across the country are collaborating with some 120 companies and other external partners on 38 research projects. Since 2001, the network has trained more than 2,500 young professionals who are contributing to the competitiveness of a sector that supports more than 500,000 direct and indirect jobs, and represents 12% of Canada's GDP and a large portion of exports.

"It takes experts from multiple

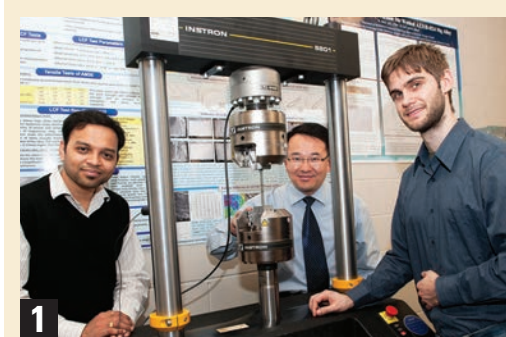
fields, working closely with industry partners, to come up with solutions that address the three biggest challenges that continue to face the automotive sector: cost, quality and performance," says Dr. Peter Frise, scientific director and CEO of AUTO21 in Windsor, Ont. "That includes helping companies meet stringent fuel economy, emissions and safety regulations, all while meeting consumer demands for new features such as vehicle

connectivity, enhanced comfort and infotainment."

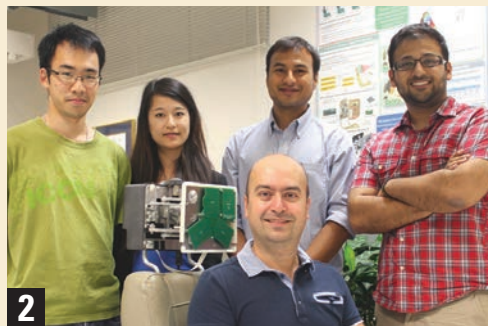
Ottawa has invested \$81.1 million in the network over the past 14 years, matched by approximately \$68.8 million from its partners. These investments have changed the industry and society in ways it could never have imagined.

Just ask residents in Winnipeg, a city once known as the car theft capital of North America.

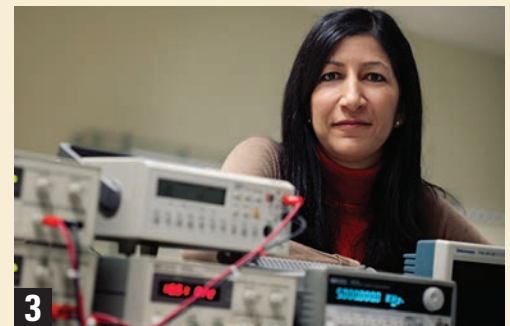
*Continued on page 30*



1



2



3

### SOME AUTO21 RESEARCHERS

1. Daolun Chen (centre), a professor at Ryerson University and leader of the laser welding and durability of advanced high strength steels project.
2. Nima Ziraknejad, founder and CEO of NZ Technologies Inc., which is applying

sensing and vision techniques to estimate details of a vehicle occupant's head to properly position the headrest.

3. Soumaya Cherkaoui, a professor at the Université de Sherbrooke, leader of the Multi-Vehicle Communication and Perception for Safety project.



*Continued from page 29*

Today, car thefts have dropped an astounding 90% and vehicle insurance premiums have been cut by more than \$30 million. Manitoba's Attorney General credited this success to an AUTO21 project on antisocial behaviour and the automobile. The network is now working to replicate these results in other Canadian cities.

In Ontario, AUTO21 researchers worked with Waterloo to implement eco-friendly driving techniques that have shown to reduce fuel and carbon emissions from fleet vehicles by 10% to 20%.

Saving more children from death or injury is another priority. A project with Magna International led to the development of a safer booster seat that's easy for parents to install and more appealing to children who complained that existing products were uncomfortable and too "babyish." That research led to the launch of Clek Inc., a Toronto company that exports its products worldwide.

### Industry partners

"Canada has fabulous health records so we were able to study the impact of restraint systems on children here. This is knowledge that will inform our future products and safety approaches globally. It would have been much tougher to do this research outside of Canada," says Blake Smith, Ford's director of environment, energy and vehicle safety, and AUTO21's chair.

Ford and Magna are among several industry partners that have benefited from AUTO21's substantial research output that includes more than 7,750 peer-reviewed scientific papers and more than 300 patents, licences and agreements. Several of those patents are held by Dr. Mohini Sain, the dean of forestry at the University of Toronto and a pioneer in the development of bio-based industrial materials. His collaboration with Ford, Magna and The Woodbridge Group led to the founding of Greencore Composites Inc., a clean tech company based in Sarnia, Ont. that uses

renewable materials from wood pulp and agricultural waste to create strong composite materials for automotive parts. The manufacturing process uses less energy and the components are lighter, resulting in fewer greenhouse gas emissions and less reliance on petroleum-based plastics.

"This type of research would have been difficult to do without industry's support. That's essential if you want to turn fundamental research into an application," says Sain.

Frise says results from AUTO21 research have already moved into production. "You can buy a car right now that's made in Canada that has AUTO21 bio-based plastics in it. And, if you drive a Toyota that has aluminum wheels on it, those wheels come out of a plant in Burnaby, BC that uses mould release technology developed by AUTO21 researchers."

A recent independent economic impact study found that AUTO21's research has provided a 12 to 1 return on investment for partners and generated more than \$1.1 billion in estimated economic and social benefits.

Dave Pascoe, Magna's vice-president of engineering and R&D, says the network's greatest legacy has been its ability to bridge the gap between universities and industry.

"Universities are very good at doing fundamental research but there are gaps in bringing that research to market. By working with an industry partner, you're assured of working on topics that are relevant to industry and have a direct route to commercialization. It turns all that time, effort and money into a bigger return for the Canadian economy," says Pascoe.

AUTO21 will continue its technology transfer activities for another year to deploy the knowledge created in the research program.

*This is an edited version of an article contributed by AUTO21.*

**Comments?**

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



*GM plans a fleet of autonomous Chevrolet Volts.*

PHOTO: GM

## GM Canada teams with Communitech

Lab will accelerate disruptive innovation in urban mobility, connected vehicles

BY PLANT STAFF

General Motors Canada cut a "digital ribbon" in early February to open "2908 at Communitech," making it the first automotive company in Canada to establish a lab presence at the leading Waterloo, Ont.-based accelerator.

The "2908" evokes a vision of General Motors 1,000 years after the company's founding in 1908 in Canada.

"One of GM's top priorities is to disrupt traditional automotive business models, including our own to anticipate customers' needs, today and long into the future," said Stephen Carlisle, GM Canada's president and managing director.

"With changing technology, we see tremendous opportunities for GM, Ontario and Canada in an automotive future that is increasingly electric, connected, shared and autonomous."

Initial areas of focus will explore advanced smartphone applications and new ride-sharing services and approaches. The team will also consider new partnering opportunities to incubate new ideas for urban, multi-modal transportation systems that combine public transit and ride-sharing, while advancing the mandate of GM's Canadian Engineering Centre in Oshawa to build a fleet of autonomous Chevrolet Volts.

Last year, GM Canada was awarded new connected car software and engineering mandates and recently announced it would build the autonomous vehicles at its Oshawa, Ont. facility to support GM's autonomous vehicle test program at its Tech Centre in Warren, Mich.

The 2908 team will also explore opportunities in multi-modal transportation including new ways for customers and cities to integrate e-bikes. GM recently announced a \$500 million investment in Lyft and its plan to develop autonomous ride-sharing vehicle programs together.

## RECYCLING

The record \$1.5 billion Powerball jackpot produced sales of more than 1.3 billion tickets, some of which will be made into paper products.

BY MATT POWELL, ASSOCIATE EDITOR

While three people were big winners in January's incredible \$1.5 billion American Powerball jackpot, there were more than 1.3 billion losing tickets.

That's a lot, but many of them are being recycled and made into paper products at a plant in Alabama by the Swedish Cellulose Co. (SCA). The global manufacturer based in Stockholm, has Canadian headquarters in Oakville, Ont. and a plant in Drummondville, Que.

The Drummondville plant, founded in 1996, produces 96 brands of TENA incontinence products that are distributed across Canada and the northeastern US.

The company, with more than 44,000 employees around the world, produces personal care products (toilet tissue, kitchen towels, handkerchiefs, napkins), publication papers, solid-wood products and forest-based biofuel.

And for every pound of lottery tickets it recycles, it makes 89 Tork-brand paper napkins, which are sold to commercial customers such as coffee shops, arenas and airports.

SCA recycles about one million tonnes of paper material in North America every year, according to Susan Michini, the company's communications director. The tickets are sourced from recycling suppliers across the country, except those from Alabama, where



Napkins recycled from lottery tickets at SCA's Barton, Ala. plant.

PHOTO: SCA

## Lottery

# LEFTOVERS

## SCA GIVES NEW LIFE TO LOSING TICKETS

it's illegal to repurpose lottery tickets.

They arrive at the company's Barton, Ala. plant, which is equipped with paper-processing equipment that's strong enough to handle the high levels of ink found on lottery and scratch-off tickets, in bails.

### Paper processing

After sorting by colour and paper-type, the paper is moved to a pulper that begins the de-inking process, cleaning and brightening the fibre. Usable fibre is separated from contaminants such as clay, ink and ash.

A pulp slurry remains, which is sprayed onto rollers and dried to form a five-tonne parent roll. It's cut into smaller rolls, then embossed and folded into individual napkins and paper towel rolls before heading to the packaging line.

With so many lottery players hoping for the big win, chances are SCA will continue to have an abundant supply of material generated by disappointment and unfulfilled dreams, to make products with a more practical use.

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

## EMISSIONS

### Carbon reporting needs an overhaul

Key information is missing from responsibility reports

Carbon reporting from the world's largest companies lacks consistency, making it almost impossible for stakeholders to compare performance easily and accurately, according to KPMG's Survey of Corporate Responsibility Reporting.

KPMG member firms reviewed the carbon information published by the world's largest 250 companies in annual financial and corporate responsibility reports. Although 80% discuss carbon in these reports, the type and quality of information published varies dramatically.

Only half of the companies (53%) revealed carbon reduction targets in their company reports and, of these, 33% provided no rationale to explain why the targets were selected.

The type of emissions reported varies considerably. While most companies report on emissions from their own operations (84%) and from purchased power (79%), only half (50%) report on emissions in their supply chains.

Even fewer (7%) include information on emissions resulting from the



Types of emissions vary. PHOTO:THINKSTOCK

use and disposal of their products and services.

Around half (51%) of the companies that do mention carbon in their reports refer readers to detailed information in alternative sources such as the CDP database for investors. The other half does not.

Other key findings include:

- One in five large companies in high carbon sectors such as mining, construction and chemicals does not report carbon in its annual financial or corporate responsibility reports.
- European companies have a higher quality of reporting than companies elsewhere in the world.
- Companies in the transport and leisure sector produce the highest quality reporting; oil and gas provide poorest quality.

KPMG's study follows a recent proposal to the G20 by the Financial Stability Board for a task force to develop consistent climate-related disclosures for companies to help lenders, insurers, investors and other stakeholders understand material risks.





Roxul's Milton, Ont. headquarters.

PHOTO: ROXUL

## Roxul's Milton HQ achieves LEED Gold

80,000 square feet of its stone wool insulation helps

**R**OXUL Inc.'s North American headquarters in Milton, Ont. has earned LEED Gold certification in the New Construction category from the Canada Green Building Council (CaGBC).

The win ranks the company's head office among Ontario's most energy-efficient new buildings.

The Leadership in Energy and Environmental Design (LEED) rating is recognized as the international mark of excellence for green buildings in 150 countries. LEED Gold is the second highest attainable level.

The company's headquarters has more than 86,000 square feet of its own stone wool insulation products, which reduce energy consumption. The building is modelled to use 100 kWh per day of energy, while the average building uses 300 to 400 Kw/m<sup>2</sup>.

Its open-concept floor plan maximizes natural lighting throughout the office and includes motion-sensor lights and HVAC systems, drought resistant landscaping, rain water harvesting and grey water reuse.

### Green features

ROXUL's own Energy Design Centre – a resource and education hub for architects, designers and specifiers – was involved in the building's design and energy modelling to ensure advanced green features exceeded building codes. Thermal couples, relative-humidity sensors and heat-flux meters installed in the roof, walls and below-grade insulation monitor the in-situ performance of Roxul's insulation.

Decibel meters measure the variation in sound between the exterior and interior of the building. The captured data is recorded and uploaded to a third-party system, where it will be used to underscore the long-term performance of the building's green construction and provide a real-time educational tool.

Roxul, based in Milton, Ont., is a subsidiary of Rockwool International, the world's largest producer of stone wool insulation. It has additional production in Byhalia, Miss. and Grand Forks, BC.

**Comments?**

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

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## ELECTRICAL SYSTEMS



Make electrical benchmark measurements, then review plans and drawings to confirm they meet objectives.

PHOTO: THINKSTOCK

# Moving your PRODUCTION line?

## WATCH FOR DISRUPTIONS TO SYSTEMS THAT COULD LEAD TO GLITCHES OR FAILURES

Follow nine key steps to ensure the installation works properly when systems are back online.

Moving or reconfiguring a production line can disrupt a complex and finely tuned system. Electrical distribution systems, variable frequency drives (VFDs), programmable logic controllers (PLCs), lighting, communication circuitry, controls, emergency stop systems,

and more are susceptible to unanticipated changes ranging from glitches to outright failures. Problems at the unit level may cause failures at the system level, such as unexpected tripping of conveyor drive systems, communication system failures, overheated equipment, an unsafe electrical system, and costly downtime.

Problems arising from a move may not be immediately visible when you return a line to service. In fact, symptoms of potentially

serious problems may appear long after installation and setup are complete. These problems may crop up: motors are noisy or burn out prematurely; equipment shuts down for unclear reasons; sensors and detectors don't function properly; and operator complains of ergonomic problems.

Many of the things that need to happen when you move or reconfigure a production line are obvious, but the less obvious include finding and correcting

*Continued on page 34*

## SUPPLY LINES



Scotch Vinyl Electrical Tape in action.

PHOTO: 3M

### 70 YEARS OF SCOTCH ELECTRICAL TAPE

Scotch Vinyl Electrical Tape has been with us for 70 years, and 3M Canada (in London, Ont.) is celebrating with a full year of tips and tricks, fun facts, videos, contests and more.

3M's story began in 1902, when the Minnesota Mining and Manufacturing Co. was established. A few decades later, when World War II caused a shortage of rubber, 3M scientists produced a viable alternative: vinyl, which is stronger and less prone to rotting and corrosion than the rubber and resin infused cloths that were commonly used at the time.

The ubiquitous tape is now in its 17th incarnation.

Visit [www.3M.ca/Electrical-Tape](http://www.3M.ca/Electrical-Tape) for announcements.

### TINGLEY BRINGS SAFETY TO CANADA

A US provider of protective footwear and clothing is expanding into Canada.

Tingley Rubber Corp., based in Piscataway, NJ, has opened a Quebec City sales office and a distribution centre in Brampton, Ont.

It also appointed the Defender Sales Agency Ltd., to drive sales across Canada.

Initially, Tingley will roll out its full line of industrial apparel and non-safety waterproof footwear followed by high-visibility and safety footwear products in the third quarter.



## ELECTRICAL SYSTEMS

EMI problems; replacing worn-out and outdated equipment; upgrading equipment where it makes sense to do so; and ensuring motor drive systems are delivering clean power, free of harmonics, at the right voltage after the move.

Here's a nine-step checklist that serves as a starting point to plan a production line move, keep it on track, realize the opportunities for replacements and upgrades, and help troubleshoot when the move is done.

### 1. Establish benchmarks for the existing production line.

Take key voltage and current readings at panelboards and other supply points while the existing line is operating. After the move is complete, you can compare the pre-move to post-move readings to validate the new setup and troubleshoot if necessary. Look for any circuits at or near their limits, so you can add capacity to the new line or redesign as needed.

use a handheld digital multimeter (DMM) or a power quality analyzer to check for variations between the phase voltages in a three-phase system. When using a DMM, any phase voltage reading that deviates by more than 1% to 2% from the average value warrants corrective action.

Power quality analyzers provide a more detailed analysis. The solution for unbalanced voltages is to distribute single-phase loads evenly across all three phases at panelboards and switchboards.

### 2. Review proposed electrical plans and drawings for the new production line.

Are the plans the best they can be and do they meet your objectives? Ensure plans comply with electri-

may overheat and fail well before reaching their expected 20-year lifespan.

If a branch circuit may have more than the recommended 3% voltage drop, consider increasing the size of the conductors. Although using larger wire costs more, it will be more than offset by the reduction in downtime. Upsizing conductors may require upsizing conduits. Check the Canadian Electrical Code. Limit the voltage drop for combined feeder and branch circuits to 5%.

### 4. Ensure you have the correct cabling between VFDs and motors.

VFDs are the most common adjustable speed motor drives on plant floors. Because output is a series of sharp-edged voltage pulses (rather than the smooth sine waves of 50- or 60-hertz power), give special consideration to the length and type of cable that runs from the

output cabling and lengths have been met.

- Use recommended cabling and add load reactors on VFD outputs as needed.
- Minimize electromagnetic interference in communications and control circuits.
- Properly ground all systems and equipment.
- Run VFD output cables and all control cables in separate conduits.
- Keep VFD cables at least a third of a metre away from shielded control circuits and a metre away from unshielded control circuits.
- VFD power and control cables that cross should do so at right angles.

### 5. Evaluate equipment for upgrades and replacement.

New technologies may be available to improve productivity and reduce energy costs. As a rule, when capital equipment needs to be replaced, get a higher efficiency model.

Improvements that increase worker safety, comfort and the general work environment often result in higher productivity and worker satisfaction.

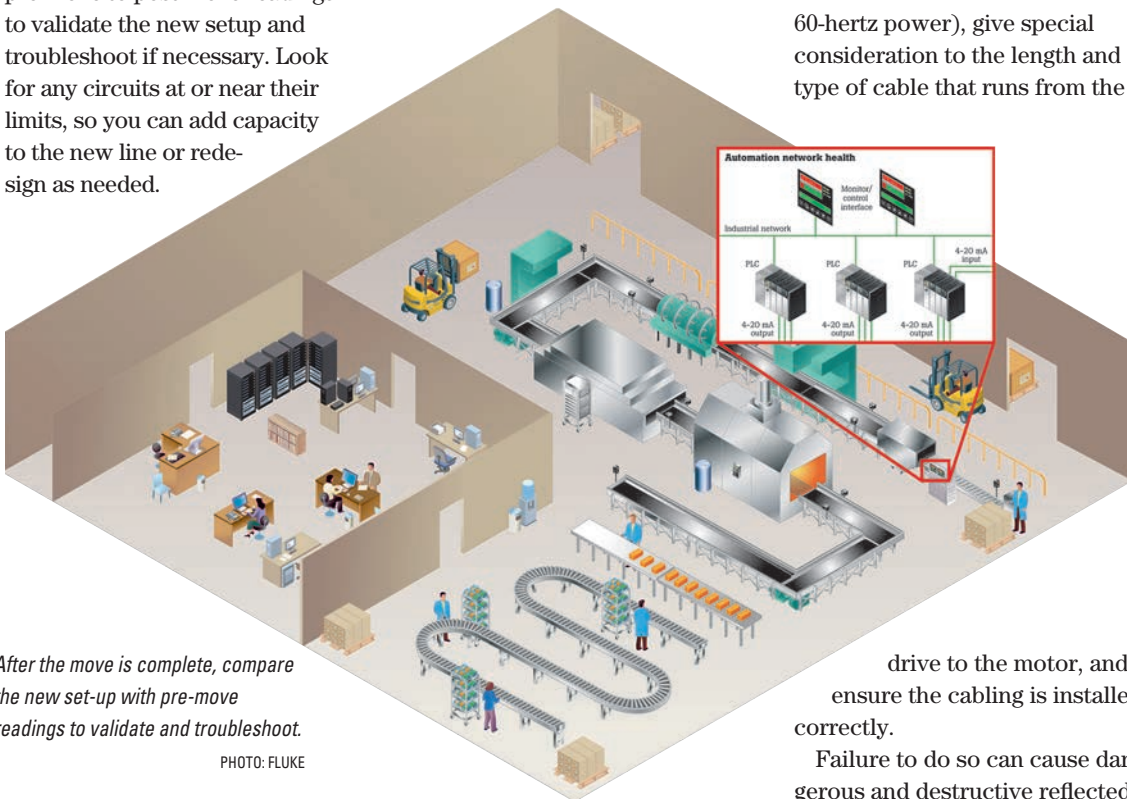
One of the biggest problems on automated production lines is small power glitches that damage PLCs, so consider adding PLC protection.

Adding VFDs to control centrifugal pumps and fans saves a lot of money. For example, at 9 cents per kilowatt hour, reducing the speed of a 25-horsepower motor from 1,800 rpm to 900 rpm reduces its hourly operating cost from \$1.68 to \$0.21, a reduction of more than 80%.

Moving a production line is a good time to upgrade the lighting system. Replacing older T-12 fluorescent fixtures and HID with newer T-8 and T-5 fluorescents reduces costs significantly. Consider change to LED lighting where appropriate.

### 6. After the move is complete, check all safety circuits and emergency stops.

Understand and comply with the requirements of regulatory agencies, such as sounding warnings before conveyors



After the move is complete, compare the new set-up with pre-move readings to validate and troubleshoot.

PHOTO: FLUKE

Even better than voltage readings, do a power quality survey for complete picture of the state of the electrical system, including any harmonics, voltage sags, and other problems. Look for existing problems in the initial power quality survey so you can correct them in the new layout.

Whether you choose key readings or the survey, be sure to look for voltage imbalances at panelboards. They can cause three-phase transformers and motors to overheat. You can

cal codes and verify the efforts of everyone involved in the project are coordinated.

### 3. Calculate the expected voltage drops for any circuits you are increasing in length or to which you are adding loads.

Limit the voltage drop at the farthest equipment to 3%. Equipment may not operate properly below its design voltage. Computers may lock up, electronic equipment and controls may give spurious alarms or fail completely, and motors

drive to the motor, and ensure the cabling is installed correctly.

Failure to do so can cause dangerous and destructive reflected waves in the drive cable.

Reflected waves cause higher voltages to appear at motor terminals – as high as 2,000 volts on a 480-volt motor – which is a safety hazard. They stress motor insulation, shorten motor life and can cause immediate motor failure.

VFDs may have been trouble-free but changes to the setup – especially to cabling – can introduce reflected waves. Do the following:

- Verify that manufacturers' recommendations regarding VFD



Ensure safety audits and emergency stops are working correctly.

PHOTO: THINKSTOCK

start, having emergency stops at operator locations, and having emergency circuit resets. PLCs must de-energize outputs when an emergency stop is actuated, and motors must shut down if a PLC goes offline.

Verify that safety circuits and emergency stops are installed as specified in the electrical drawings.

Also verify correct operation of every circuit as part of the production line startup.

**7. Verify grounding for safety, code compliance, and electrical noise reduction.** An oscilloscope is the easiest way to detect electrical noise. Noise causes equipment to operate in an unexpected or less-than-optimal manner. For example, a VFD connected to a motor with unshielded cable can cause 80 volts or more of electrical noise to appear in nearby, unshielded communication wiring, and 10 volts or more of noise to appear in nearby shielded cables. Electrical noise creates operational problems on the plant floor, which may appear in the following ways:

- Bad communications, such as when noise affects the function of a 4-20 mA control loop signal.
- Sporadic shutdowns.
- Intermittent communications.
- PLCs that reset in a seemingly random fashion.
- Earth ground devices tripping.
- 5-volt supply level going up and down with sensitive equipment.

**8. Complete a power quality survey after installation to identify potential problems and establish benchmark recordings for the electrical maintenance program.** The power quality survey gives you a complete picture of the state of the electrical system, including any harmonics, voltage sags and other problems. Benchmark readings are valuable resources for establishing or maintaining an effective predictive maintenance program.

**9. Test the line for correct operation.** Before resuming production, thoroughly test the line for correct operation. This is a good time to bring in line operators and get feedback. Be sure everyone who was involved with the line move is present when you restart the line so they can assist with troubleshooting and final adjustments.

A checklist provides a map and an agreement about what needs to be done, and a reminder to check that all tasks are completed. This will go a long way to ensuring your new production line is safe and operating correctly when it goes back online.

*This is an edited version of an article provided by Fluke Electronics Canada LP, a manufacturer of electronic test tools and software, based in Mississauga, Ont. Visit [www.fluke.com](http://www.fluke.com).*

**Comments?**  
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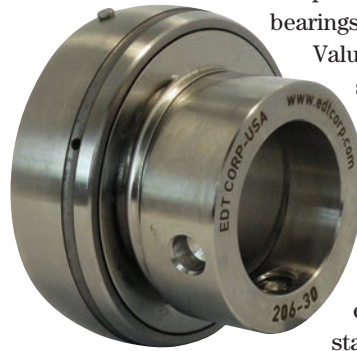
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Choice series 440 stainless steel eccentric lock bearings have a 304 stainless steel locking collar. For shafts

440 stainless steel.

that turn in one direction, the eccentric collar continually tightens. Silicone single lip seals under ss flingers protect the lubricant: either grease, or F, or any of a variety of food-grade solid lubricants available for different environments. EDT's custom anti-rotation pin fits into all brands of housings; shaft sizes range from 203 ring 1/2 in. to 214 and 215 ring sizes in inches and metric.

The Classic series are 440 stainless setscrew locking, wide inner ring, inserts. They come with grease or with any of a variety of food grade solid lubricants. Stainless flingers over silicone single lip seals protect them. A custom anti-rotation pin allows drop-in fit to most manufacturers' housings.

EDT is a bearing manufacturer located in Vancouver, Wash.  
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Air bearing stages are used for metrology, photonics alignment, semiconductor, flat panel display, precision scanning and clean room applications.

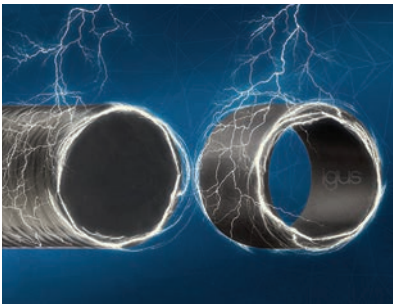
The compact A-141 features

preloaded air bearings and an integral optical linear encoder. With an overall height of 38 mm, it fits in small spaces. There are no electrical cables to manage. Ironless linear motors provide smooth motion with no cogging or attractive forces. Position information down to 20 nm resolution comes from integrated linear encoders.

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PI is a manufacturer of precision motion control equipment based in Auburn, Ma.

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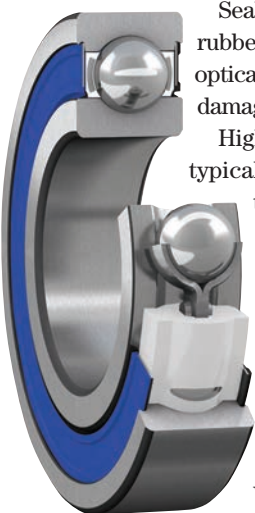
The F2 material comes in 14 bearing diameters, as well as machinable bar stock. It's self-lubricating, maintenance-free and has been tested and engineered for durability. iglide F2 also resists dust and debris, and stands up to high loads and speeds.

igus is an East Providence, RI manufacturer of plastic bearings.

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

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SKF is a Swedish-based global supplier of bearings, seals, mechatronics, lubrication systems and services with Canadian operations in Toronto.

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

## SMALLER AA DRIVE REPLACES SINAMICS G120C

Siemens Sinamics G120C drive now comes in a smaller frame size. The AA replaces the previous G120C frame size A in power ratings up to 2.2 kW (3 hp), including communication variants for USS, PROFIBUS, PROFINET and EtherNet/IP.

It saves up to 32% overall volume but requires no re-engineering when migrating from the G120C FSA on current jobs. Overall dimensions on the smaller unit, designed for use with PROFIBUS and USS variants, are only 173 x 73 x 155 mm.



Saves 32% overall volume.

## BEARING FINDS ITS GROOVE

Timken's 6000 series deep groove ball bearings with super-finished raceways and controlled internal geometries run quiet in a wide variety of applications and conditions.

The finish and tight tolerances deliver higher operating speeds under proper lube conditions.

They're single, double shielded, sealed and combinations of those with an outer diamond snap ring. Seals are tested to withstand high debris conditions and retain grease.

The bearings come standard with high performance grease that withstands temperatures of -29 to 177 degrees C.

The Timken Co. manufactures bearings, transmissions, gearboxes, belts, chain and related products in North Canton, Ohio.

[www.timken.com/products](http://www.timken.com/products)



High performance grease.

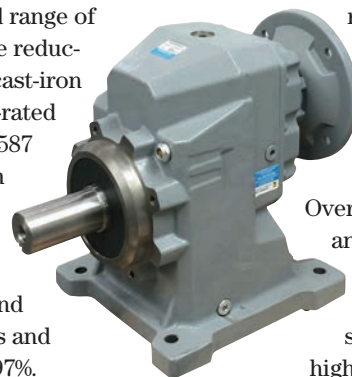
## LECENTRIC HELICAL REDUCER LINE EXPANDED

Grove Gear's expanded range of LeCentric helical in-line reducers includes four new cast-iron models that are torque-rated from 5,974 lb.-in. to 18,587 lb.-in., with a maximum input of 1/3 to 40 hp.

Units are available with ratios up to 680.03:1, with double and triple reduction designs and efficiencies as high as 97%. A wide range of removable bases and mounting hardware makes the new reducers a drop-in replacement for industry-standard configurations.

The new units are rated for applications in general material handling, food and beverage industries, with options available for washdown and harsh environments.

Modular design and bolt-on output flanges allow easy field modification to configure the LeCentric for bolt-on



Four new models.

replacement of dozens of popular reducers.

Hardened and ground AGMA Class10 or better gearing delivers high efficiency and quiet operation.

Oversized ball bearings on input and output shafts, optimized bearing spans and high-strength steel shafts provide superior torque transfer and high overhung load capacities.

Housings are precision machined to control alignment of bearings and gearing. Premium Viton seals provide extra protection from contamination or loss of lubricant.

The reducers are factory filled with premium Mobil Glygoyle 460 polyalkalene glycol lubricant.

Grove Gear, based in Union Grove, Wis., manufactures standard and custom gear drives.

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



## PRODUCT FOCUS

### POWER TRANSMISSION

#### SMALL SERVO MOTOR, HIGH POWER DENSITY

The PD6-C brushless DC servo motor from Nanotec has an integrated controller that delivers high power density for its size.

Two versions of the Plug&Drive motors include a high-pole stepper in various lengths with a maximum nominal torque of 8.8 Nm, and a low-pole BLDC with a flange size of 80 or 86 mm and a nominal output of 534 W. Both types are for 12 to 48-V supply.



Two motor versions.

The motor controller and the encoder with 4096 increments are integrated in the motor, limiting cable to the communication connection and power supply.

All Plug&Drive motors use field-oriented control via encoder and operate in torque, speed, or positioning mode. Reference values are set either by clock-di-

rection, two analogue inputs, or the CANopen field bus.

The controller is programmed with NanoJ V2 so real-time programs for time-critical applications run directly on the motor. In stand-alone operation the motor will carry out complex control tasks without a field bus connection. A USB port is available for parameterization.

Nanotec is a German manufacturer of motors and controllers for high-quality drive solutions with operations in Stoneham, Ma. <http://us.nanotec.com>

#### SOFT START RELIEVES DRIVE STRAIN

Eliminate uncontrolled starting and mechanical strain on your drive components with SK135E/SK175E soft start drives from NORD Gear.

They're used in a distributed control system and mount directly on or near the motor.

AC Motors directly connect to their power source exhibit heightened power consumption during starting and stopping and demand up to seven times the rated current irrespective of load. This can create irregular starting and shutdown, as well as put unnecessary strain on all the components.

The drives regulate the three major functions of a motor start-



Regulates major starter functions.

er and controls them to protect equipment and what you are moving. They have either ASi or Profibus DP onboard networking.

SK 135E's basic functions include: 2x digital input and 2x digital output; 4x DIP switches; up to four configurable potentiometers; an RS 232 diagnostic interface via RJ12; an EMC line filter; temperature sensor input (TF+/TF-); electromechanical motor brake control; motor overload protection; diagnostic LED's flux monitoring (minimum current); mains, motor phase and minimum current monitoring; and automatic phase sequence detection.

SK175's additional functions include onboard networking ASi or Profibus DP; and two digital inputs.

Nord Gear is a manufacturer of drive systems based in Waunakee, Wis.

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

#### ROLLING RING DRIVES A LEVEL WIND

Amacoil Inc.'s Uhing rolling ring level winding drives spool cable, and other materials, with specific spacing between rows.

The standard drive creates a smooth, even, level wind with adjacent rows of material. The option – a set screw inserted into one or both ends of the drive housing – allows measured spacing of spooling rows. No complex electronics or programming is needed.



Lever sets pitch.

On a standard rolling ring level winding drive, the pitch is set using the pitch control lever on the unit. Setting the pitch determines the linear speed at which the drive will move along the shaft. The pitch is usually set to match the diameter of the material being spooled to form adjacent rows on the reel.

With the set screw option, one end of the screw protrudes into the drive unit housing. The end of the screw contacts the rolling ring assembly and holds it at a specific angle relative to the shaft. As a result, the drive will begin travel across the shaft at the pitch lever setting, but after reversal, it will travel back at a higher or lower speed depending on the set screw adjustment.

This creates equal spaces between the rows of material being spooled. No adjustments to motor speed or other controls are necessary.

Amacoil, based in Aston, Pa., is the North American distributor of Uhing rolling ring linear drives and assemblies.

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



Rated 12 to 60 VDC.

#### VERSATILE CONTROL FOR DC MOTORS

BGE servo motor controllers from Pittman Motors with integral output stage control brushless and brushed DC motors.

The compact four-quadrant positioning motion controllers operate in stand-alone with digital or analogue IO or as a slave in a CANopen network with device profile DSP 402, protocol DS 301. They're rated from 12 to 60 VDC input voltage and 4 to 20 A continuous output current.

Information about the motor's rotor position is supplied to the positioning controller by an encoder or integrated Hall sensors contained within a brushless motor. The controls incorporate

### FLUID CONTROL

#### GEARBOXES HANDLE HEAVY AGITATOR DUTIES

Chemineer's Model 20 HT/GT agitator gearbox is specifically handles agitator duties for chemical, ethanol and biofuels, water and wastewater, and power industries.

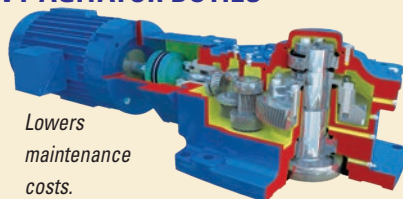
A standard commercial gearbox uses smaller shafts and larger bearing spans for higher deflection and reduced wear. Bearings and gears last longer, which lower maintenance costs and boost productivity.

Double and triple reduction gearing options to decreases gear loads and noise levels. Helical/spiral bevel (HT) and all helical bevel (GT) gears reduce energy costs.

A case carburized gearing reduces wear while reverse rotation capability boosts process flexibility.

Chemineer, a subsidiary of NOV, is a manufacturer of fluid agitation and control products based in Dayton, Ohio.

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



Lowers maintenance costs.

protection against over-voltage, low voltage and excessive temperature.

If four-quadrant digital speed control is desired, the control is commanded to run in either direction, stop and hold with torque, and stop without torque (coast) through digital inputs. Other inputs switch between programmed speeds or allow for a variable analogue speed reference.

Accel/dec ramp for the motor are programmable. The control offers the capability for a motor to function as a stand-alone or programmed servo, which interfaces to the rest of the machine via digital and analogue IO.

Operation modes include analogue or digital torque control, analogue or digital speed control and digitally selectable position control (relative, absolute, and modulo). The controls incorporate protection against over-voltage, low voltage and excessive temperature.

Pittman, based in Harleysville, Pa., makes motion products. [www.pittman-motors.com](http://www.pittman-motors.com)

**LOW BACKLASH, HIGH-EFFICIENCY GEARBOXES**

EXSYS Tool Inc.'s EPPINGER PE (planetary eco) and PP (planetary precision) gearboxes handle applications that require low backlash, high efficiency, shock resistance and a high-torque-to-



Easily mount to motors.

weight ratio.

They're energy efficient, easily mount to a variety of motors and come in five sizes, with each one a single, dual or triple stage design.

Each variant is available as a precision design with reduced backlash.

Transmission ratios are from  $i = 3:1$  to  $i = 512:1$ .

Planetary bevel gearboxes combine BT (bevel torque) with the pre-stages of its PE units gearboxes, creating an innovative solution for various applications, achieving high-output torque and extremely high-transmission ratios up to  $i = 320$ .

They come in eight sizes and easily mount to a range of motors.

EXSYS Tool Inc., based in Tampa, Fla., is the exclusive importer of German-made EPPINGER solutions.

[www.exsys-tool.com](http://www.exsys-tool.com)

**HEATING**

**HEATER OPTIMIZES TEMPERATURE UNIFORMITY**

Watlow's FLUENT high-watt density, low-mass heater provides on-demand heating fast in analytical and semiconductor applications.

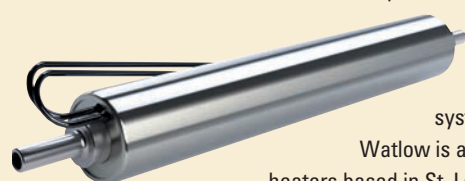
An internal baffle promotes turbulent flow and high efficiency, while a high-watt density layered heater circuit, low profile axial lead exit and internal thermocouple boost limit control.

Powered by a thermal spray technology, the heater makes use of its entire surface to produce heat to optimize heat transfer and temperature uniformity.

FLUENT, in sizes from 250 to 4,000 W, replaces the traditional immersion-type heater or a

heater wrapped around a tube as part of a thermal system.

Watlow is a manufacturer of industrial heaters based in St. Louis.



Sizes from 250 to 4,000 W.

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

**TEST AND MEASUREMENT**

**GAS CORRECTOR SIMPLIFIES FIELD REPAIRS**

Honeywell Process Solutions (HPS) EC 350 PTZ gas volume corrector uses pressure, temperature and compressibility factors to accurately measure gas volumes.

Program the bracket-, wall- and rotary-mount device in the field, then employ a multi-line keypad interface to simplify operation.

HPS is a developer of automation and testing equipment based in Houston.

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



Keypad interface simplifies operation.

**Power Meets Profitability Guaranteed.**

The Model 1020 is not only incredibly powerful—recovering up to 5 tons of even the heaviest materials per hour—it's also uniquely portable, so it goes almost anywhere. With a 99% efficiency rating, noise levels below OSHA standards, and a performance guarantee, it's more than a cleaning system; it's a business asset.

**VAC-U-MAX 1020MFS 10 & 15 HP Continuous Duty Vacuum**

- 50% more vacuum power than other industrial vacuums
- Move mountains of material through hundreds of feet of hose
- Vacuum rates up to 10,000 lbs per hour
- One-man portable, fits through a 34" doorway
- Versatile: Portable Vac or Breakaway Central Vac
- XP electrics and HEPA filtration available

Let us solve your industrial vacuum cleaning challenges. Visit [vac-u-max.com/vacuum](http://vac-u-max.com/vacuum) or call 800-VAC-U-MAX.



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WET/DRY • AIR OPERATED AND ELECTRIC DRUM-TOP • CONTINUOUS DUTY • COMBUSTIBLE DUST CENTRAL SYSTEMS • CONTINUOUS-BAGGING • LIQUID & SLUDGE • FLAMMABLE LIQUIDS SUBMERGED RECOVERY • METALWORKING • PHARMACEUTICAL • STEEL SHOT INTERCEPT HOPPERS & PRE-SEPARATORS • HSE / INDUSTRIAL HYGIENE SOLUTIONS



## PRODUCTS AND EQUIPMENT

### PUMPS



Available to  
125 hp/90 kW.

### PUMPS ENHANCE ENERGY EFFICIENCY

Armstrong Fluid Technology has introduced two new series of horizontal end suction design envelope (DE) pumps with sensorless integrated controls to boost energy savings.

Both the DE 4200H and DE 4280 Series include easy-to-use sensorless control and enhanced connectivity to BAS to achieve significant efficiency improvements.

The DE 4200H (125 hp/90 kW) pumps come with split-couplings and outside balanced seals while the DE 4280s (7.5 hp/5.5 kW) are close-coupled.

Integrated controls eliminate the need for VFD wall space or mounting with extra cable runs. Other features include built-in harmonic mitigation, and soft start and motor adaptation.

Field alignment on DE 4200Hs isn't necessary following installation or field service and maintenance is easy thanks to an outside seal and split coupling.

Armstrong is a manufacturer of fluid flow equipment in Toronto. [www.armstrongfluidtechnology.com](http://www.armstrongfluidtechnology.com).

### GO DEEP WITH DWT PUMPS

KSB's B-Pumps extract water from deep wells or boreholes, with their intake and impellers located at the lower end of a long vertical tube and discharge nozzle positioned at the top.

Customizable impeller stages meet head and flow requirements for specific applications, such as water supply or irrigation systems and the circulation of cooling water in industrial plants.

Deep Well Turbine (or DWT pumps) mount the motor on a pedestal that sits above the tube where it is dry and readily accessible for service.

They're modular so the length of the assembly is varied by changing the number of tube and drive-shaft stages, up to a suspended depth of 120 m.

There are 12 pump sizes from 6- to 2-in. diameters. The maximum delivered head of the B-Pump family is 160 m. Flow rates of up to 2,600 m<sup>3</sup> per hour are available.

KSB Pumps Inc., part of the KSB Group, is a pump manufacturer based in Mississauga, Ont. [www.ksb.ca](http://www.ksb.ca)



Only two moving parts.

### INTERNAL GEAR PUMPS GO WITH THE FLOW

G Series sealed internal gear pumps from EnviroGear Pumps have only two moving parts and operate equally well in both directions with a positive, non-pulsating flow.

Drive-end access for maintenance and adjustments is easy with multiple inlet and outlet positioning.

The cast iron and stainless steel pumps handle challenging industrial applications involving both thin and highly viscous liquids up to 431,000 cSt.

They're interchangeable with 95% of the internal gear pumps on the market.

EnviroGear Pumps, part of PSG, a Dover company, is a manufacturer of internal gear pumps based in Grand Terrace, Calif. <http://envirogearpump.com>

### S SERIES PUMPS FOR DEMANDING INDUSTRIAL APPLICATIONS

Blackmer S Series self-priming, double-ended positive displacement pumps (with/without external timing gears and bearings) handle demanding applications.

Twin and triple screw designs provide complete axial balancing and timing technologies eliminate metal-to-metal contact.

The pumps are ATEX-certified for explosive or dangerous environments, and address challenges found in the oil and gas, process and marine industries.

They come in four lines:

- Twin screw WTG double-suction, self-priming with external bearings and timing gear transmissions for the delivery of fluids free of solid substances and/or with little abrasives.
- Twin screw with non-timing

(NTG) gear transmission with a single-suction design for transferring lubricating fluids with higher viscosities, such as bitumen and residual oil.

- Multi-phase twin screw pumps for medium- to low-pressure applications in the water and oil and gas industries.
- Triple screw pumps for handling clear, lubricating liquids without solid content that provide a smooth constant flow across a wide range of viscosities, temperatures and pressures.



Twin and triple screw designs.

Blackmer is a manufacturer of rotary vane and centrifugal pumps, and reciprocating compressor technologies based in Grand Rapids, Mich.

<http://blackmer.com>

### POWER CONVERSION

#### CONVERTERS HANDLE SPACE CRITICAL POWER

MicroPower Direct's ML300RU low cost 3 W DC/DC converters provide the wide input range, compact SMT packaging, tight regulation, long term reliability and economy required for space critical, board level power distribution applications.

Sixteen models operate from 4:1 inputs (24 or 48 VDC), provid-



RoHS-compliant.

### MACHINING

#### TOOLHOLDER EASES MICRO-MACHINING

SCHUNK's TRIBOS-RM precision toolholder makes it easy for users to pay special attention to detail in micro machining applications thanks to an ISO interface.

The unit achieves steady clamping that won't distort the toolholder. Run-out accuracy is less than 0.003 mm, making the unit suitable for use with small tools, and handles spindle speeds up to 60,000 rpm.

It comes in sizes ISO 10 D 1 to 6 mm. The balancing grade is G 2.5 at 25,000 rpm.

Schunk is a manufacturer of machining equipment based in Lauffen am Neckar, Germany. It has Canadian operations in Mississauga, Ont.

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



Handles spindle speeds  
up to 60,000 rpm.

ing outputs of 3.3, 5, 12, 15, 24, ±5, ±12 or ±15 VDC. Features include an input/output isolation of 1,500 VDC, line/load regulation of ±1.2% max, and continuous short circuit protection. All models are RoHS compliant.

The converters are packaged in a miniature, SMT case with an industry standard pin out and come on tape/reel for automated production equipment.

All models handle temperatures between -40 to 80 degrees C without heat sinking. They're cooled by free-air convection.

MicroPower Direct is a supplier of power conversion products based in Stoughton, Mass.  
[www.micropowerelectronics.com](http://www.micropowerelectronics.com)

## NETWORKING

### ANTENNAS IMPROVE DATA THROUGHPUT

Pulse Electronics Corp.'s Panther combination GPS/multiband antenna improves data throughput



40 dB isolation.

and navigation for telematics and location-based applications.

Port-to-port isolation ensures signal clarity and an optional magnetic mount base makes the unit easy to install and remove.

Five connectors access five antenna solutions, including two MIMO cellular and two dual-band MIMO WLAN and one for a global navigation satellite system (GPS plus Glonass).

The antennas deliver more than 40 dB isolation across Wi-Fi-to-WiFi ports, and more than 15 dB isolation from LTE-to-LTE ports with a voltage standing

wave ratio of <1.5:1 (LTE bands) and 1.4:1 in WiFi bands.

Isolation is enhanced by a GPS low noise amplifier filtered for out-of-band rejection of more than 55 dB rejection at 1,710 and 2,170 MHz bands and over 75 dB rejection at 824 and 960 MHz bands.

The antennas measure approximately 147 x 160 x 75 mm.

Environmental specifications include IP67 ingress protection and mil-standard testing for humidity, vibration, thermal shock, and accidental drop. Cable length is standard at 17 ft. with either SMA or RPSMA connectors.

Pulse is a manufacturer of industrial electronic components based in San Diego, Calif.  
[www.pulseelectronics.com](http://www.pulseelectronics.com)

## SWITCHES

### SERIES 45 HANDLES HARSH ENVIRONMENTS

EAO Corp.'s Series 45 line of pushbuttons, indicators and switches address safety and reliability issues in machinery and industrial automation applications, especially in severe conditions.

The 45 line meets IP69K for dust penetration and liquid ingress prevention.

They're also resistant to aggressive cleaning agents, oils, lyes and other chemicals, and functionality isn't impaired by high humidity and extreme fluctuations in temperature.

EAO is a switch manufacturer based in Switzerland.



IP69K-rated.

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



FLOW RACKS WITH  
PLACON® ROLLER CONVEYORS

# RETHINK MFG.

## WITH CREFORM FLOW RACKS

Creform® flow racks. A simple, yet effective way to ensure that manufacturing runs at peak performance. Built for ergonomics, efficiency and FIFO inventory management, each incorporates flow lanes and levels to present containers and parts at assembly stations, machine loading points and for other material handling applications. When used in combination with workstations, carts and AGVs, Creform flow racks are an integral part of the systems approach to industrial material handling.

**Create other economical, flexible, reliable structures and AGVs.**



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CARTS



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## PRODUCTS AND EQUIPMENT

### ENCLOSURES



NEMA 4-and 4X-rated.

#### ENCLOSURES KEEP MOISTURE OUT

AutomationDirect has added over 200 NEMA 4 and 4X enclosures and subpanels to its Hubbell-Wiegmann line. They're equipped with three-point handles that house electrical and electronic controls, terminals and instruments used in outdoor applications, plus regularly hosed-down and wet areas.

Aluminum single-door and lift-off cover wall mount enclosures have been added for applications where a lightweight, corrosion-resistance is required for electrical, electronic or pneumatic components.

Bodies and doors are made of 2-mm aluminum with external mounting plates on top and bottom, and stainless steel screws and clamps that are water-tight.

Gasketed screw cover enclosures are constructed with 14- or

12-gauge carbon steel or G-90 grade galvanized steel. The units have an ANSI-61 gray polyester powder-coated finish and stainless steel screws that thread into sealed wells to prevent liquid and dust ingress.

Automation Direct is a supplier of industrial automation products based in Cumming, Ga. [www.automationdirect.com](http://www.automationdirect.com)

### WELDING

#### VRTEX SIMPLIFIES WELD TRAINING

Lincoln Electric's VRTEX Engage weld training module provides easy virtual reality arc welding training to a student's desktop without the need for actual metal, gas or a dedicated welding booth.

The standalone, foundational system sets up easily to help educators train welders more efficiently and engage students



*Simulates short arc, spray and pulse welding.*

in exploring the possibilities of a welding career or degree programs in engineering and related fields.

The module addresses introductory welding curriculum, including safety, machine and process selection, welding procedure set-up and welding theory, incorporating valuable STEM features into the learning process. The VRTEX welding transfer modes simulate short arc, spray and pulse welding.

The system includes a touch-screen monitor, virtual reality welding gun, tracking device and work surface. All are contained in a lightweight, portable, hard-shell carrying case with rollers for easy transportation.

Students view a demo of each weld, perform the weld and replay their own weld with the instructor, which provides instant feedback and assessment. This allows trainers to immediately evaluate their understanding of basic welding safety, procedure set-up and more.

Lincoln Electric is a manufacturer of arc welding products based in Cleveland.

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

### HOSES AND TUBING

#### TUBING WITHSTANDS HARSH ENVIRONMENTS

Parker Hannifin's Parprene thermoplastic tubing withstands the rigours of peristaltic pump applications thanks to its flexibility and fatigue and abrasion resistance.

It operates in applications up to 135 degrees C and is chemically compatible with a range of rubber and thermoplastic products.

The tubing comes in Series G for general industrial applications and Series F for food, beverage and dairy applications. Both are avail-



*Sizes from 1/8 up to 5/8 OD.*

able in standard sizes ranging from 1/8 up to 5/8 OD.

Parker Hannifin is a manufacturer of motion and control products based in Cleveland.

[www.parker.com/pfd](http://www.parker.com/pfd)

### ROBOTICS



*Adapts easily to different applications.*

#### MOTION PLATFORM CUTS CYCLE TIMES

The IRBT 2005 track motion platform for robot and transfer applications from ABB Robotics cuts cycle times by up to 50% in arc welding, material handling, machine tending, and sealing and dispensing applications.

It comes with two carriages as a robot track, with additional plates to carry necessary process equipment and up to three carriages as a transfer track.

One-metre lengths are connected to form a track between 2 m and 21 m, so it adapts easily to different applications. An IRC5 controller runs the robots and the motion platform together, with proprietary QuickMove and TrueMove functionalities that boost acceleration and path precision.

The compact platform comes in two variants: standard with covers on the rails and rack only or fully covered. It accommodates ABB's IRB 1520, IRB 1600, IRB 2600 and IRB 4600 medium robot families.

The system combines with other accessories such as part positioners (for payloads up to 1,200 kg) to index different fixtures into an automation cell and transfer materials between different working stations.

ABB is a manufacturer of automation and robotics technologies based in Zurich with Canadian headquarters in Montreal.

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

### SENSORS

#### THE FORCE IS WITH THESE LOAD CELLS

tecsis LP's XLP58 "pancake" load cell measures force in both tension and compression for packaging machinery, extruding processes, cranes and weighing and batching operations.

Available in industry-standard sizes and bolt patterns, the bonded foil, strain gauge load cells handle harsh environments thanks to an all-welded construction that resists off-centre and side loading, which boosts overload capacity to 300% and save overload of 150%.

Standard output is 2 or 3 mV/V, based on range, or amplified to 0-5 VDC or 4-20 mA in operating in temperatures between -65 to 120 degrees C. It comes in diameters from 2.5 to 14 in. and measure loads from 5 to 500,000 lb.



*Output of 2 or 3 mV/V.*

Pull plates, built-in amplifiers, load buttons, and dual bridge configurations are optional.

tecsis LP is a sensor manufacturer based in Worthington, Ohio.

[www.tecsis.us](http://www.tecsis.us)

## TOOL AND MOULD



Automation ready.

### PROVIDE TEXTURE IN A SINGLE SET-UP

LASER P 400 3-axis and LASER P 400U 5-axis machines from GF Machining Solutions provide repeatable laser texturing and structuring for small parts, such as cutting tools, small inserts and micromachined workpieces.

A patented, dual laser head includes both a fibre nanosecond laser and femtosecond pulsed laser for texturing and engraving with a single setup.

The 400 family has a 48.4 x 87.8-in. footprint is easy to incorporate into an existing production environment and accommodates workpieces of up to 23.6 x 15.7 x 9.8 in., while the LASER P 400U accommodates workpieces with a maximum diameter and height of 4.7 in.

They're also automation ready for unattended night and week-

end operation.

GF Machining Solutions, based in Lincolnshire, Ill., is a manufacturer of products for the tool and mould making industry.

[www.gfms.com/us](http://www.gfms.com/us)

### THREE NEW MILLING GRADES

Walter has added three new milling grades to its machining product line with higher cutting speeds that deliver longer tool life.

The WKK25S (for the machining of cast iron materials) with Tiger-tec Silver PVD cutting tool material provides greater hardness (from 2200-2500 Vickers to 2500-2800); higher crystallization; and significantly decreases the number of micro defects in the coating surface.

WSM45X, with Tiger-tec Silver CVD and post treatment, is used for machining stainless steel (ISO M) and super alloys (ISO S).

The WNN15's high power impulse magnetron sputtering coating technology reduces friction and build-up edge, and resists flank wear with good cutting edge stability.



Longer tool life.

Walter is a manufacturer of metalworking products based in Waukesha, Wis.

[www.walter-tools.com/us](http://www.walter-tools.com/us)

## AUTOMATION

### CYLINDERS REDUCE MACHINE DAMAGE

Festo's DSBC cylinders provide three choices for end cushioning, including proprietary, PPS technology, that self-adjusts automatically to changes in air pressure, speed and load.

Variants come with manually adjustable cushioning (PPV) or fixed elastic end cushioning (P) that reduce damaging stress and vibration on the cylinder and machine.

The ISO 15552-compliant cylinders come in seven diameters up to 125 mm with stroke lengths of up to 2,800 mm.

Self-adjusting PPS technology eliminates initial cushioning set up and manual adjustments to



ISO 15552-compliant.

change loads.

A powerful, patented piston absorbs up to five times more cushioning energy in the end position than earlier models. Options matching the cylinder to individual applications include variants for slow speed, low friction or unlubricated operations.

Multiple configurations provide high heat or corrosion resistance, explosion-proofing, leak-free protection and hard scraping.

Festo is a manufacturer of automation technology with offices in Mississauga, Ont.

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

## MACHINE VISION

### MACHINE VISION AT PC SPEEDS

Cognex Corp.'s In-Sight Micro 8000 smart cameras perform at PC speeds optimizing resolution, speed and performance on even the fastest production lines but in the same form factor as a traditional "dumb" GigE Vision camera.

They're equipped with In-Sight Explorer software that combines the step-by-step EasyBuilder setup with the power and flexibility of spreadsheet view.

The In-Sight Micro 8000 series measures just 31 x 31 x 63-mm and includes Power over Ethernet, minimizing cabling use in tight spaces for robots and hard-to-reach machinery.

They deploy almost anywhere on the production line for guidance, inspection, gauging and industrial identification applications.

Cognex is a manufacturer of machine vision technology based in Natick, Mass.

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



Deploys anywhere.



*makes any space a more productive place*



Canadian Portable Structures Ltd.

Manufacturers of Pre-Assembled & Modular Structures

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Visit us at [www.cdnportable.com](http://www.cdnportable.com)





## PRODUCTS AND EQUIPMENT

### MATERIAL HANDLING



20 cycles per minute.

#### CASE PACKER INCREASES THROUGHPUT

Standard-Knapp's 949 Tandem pic-n-place servo-operated case packer takes the company's Soft-Catch lift table and adds precision product lifting with a proprietary technology that eliminates breakage.

The packer made with a heavy-duty stainless steel tubular frame operates 24/7 at speeds of up to 20 cycles per minute and is suited for partitioned and partitionless RSC case packing.

A 2-axis, servo-controlled delta robot provides precision control of two cases throughout the entire Pic-N-Place motion, packing the last case without operator

intervention.

Multiple product types and sizes are easily changed over with a user-friendly HMI touch-screen panel and adjustable lowering heads, which are also easily changed to accommodate greater product variation.

Standard-Knapp is a manufacturer of packaging machinery based in Portland, Conn. [www.standard-knapp.com](http://www.standard-knapp.com)

#### SETTLE PRODUCTS WITH GOOD VIBRATIONS

Best Process Solutions Inc.'s vibratory tables settle product contents in drums, bulk bags, portable bins, bulk boxes,



Flat deck table.

gaylords, lever packs, concrete, foundries and moulds.

Air- or electric-powered models with load capacities up to 10 tons come in configurations, including jogger tables, light duty, flat deck, grid deck, grid deck with rollers, flat deck with scale,

and grid deck with scale for all bulk process industries.

Best Process Solutions is a manufacturer of custom-engineered, bulk-processing equipment and systems based in Brunswick, Ohio.

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

### MOTION CONTROL

#### LARGE FLOW BOOSTERS INCREASE VALVE THROTTLING SPEED

ControlAir Inc.'s Type-6500 aluminum and Type-6600 stainless steel large flow capacity volume boosters are aimed at applications that require high flow capacity and remote pressure control.

IEC 61508-certified and rated to SIL 3, the boosters are used to increase throttling speed of large volume control valve actuators and work in conjunction with a valve actuator for safety-related functions.

They're used in temperatures between -40 to 93 degrees C and handle up to 250 psig (17 BAR) supply pressure and deliver an output pressure up to 150 psig (10 BAR). Flow capacity of up to 400 scfm (11,320 NI/min) is possible. Exhaust capacity is 100 scfm (2,830 NI/min).

ControlAir Inc. is a manufacturer of pneumatic and electro pneumatic controls based in Amherst, NH.

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



# NEED TO KNOW...

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## PLANTWARE



Supports protocols as master or slave.

### GATEWAY TO HARSH ENVIRONMENTS

Divebiss Corp.'s enhanced HEC-Gateway Controller couples industrial communication buses and the Internet of Things (IoT) in harsh environments. It translates between various industrial bus protocols and cloud communications with the Divebiss VersaCloud M2M platform.

Two RS232 serial ports support MODBUS RTU/ASCII protocols as either a Master or a Slave device and they're directly programmable via the Structured Text programming language. This allows the implementation of custom protocols for communicating to bar code scanners, RFID readers, or other serial devices. A GPS is optional.

One CAN port is isolated, NMEA compliant and fully supports the SAE 1939 and NMEA2000 protocols. Wi-Fi connectivity handles MODBUS TCP Server and Client communications, as well as IoT communications with the VersaCloud M2M platform. There's optional cellular capability too.

Divebiss is a manufacturer of industrial electronics based in Fredericktown, Ohio. [www.divebiss.com](http://www.divebiss.com)

### EASY INTERFACING WITH MOTOMAN ROBOTS

The SPI Pendant graphical interface for Motoman robots used in plastic injection moulding quickly creates and modifies programs without needing to know Yaskawa Motoman's proprietary INFORM robot-programming language.

A "Setup Wizard" provides a series of configuration options for robots, conveyors, de-gating stations and other applications. Program flow is achieved with the icon-driven interface without robot programming.

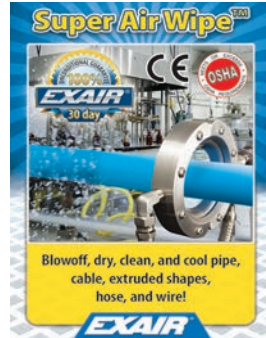
Programs are created by defining a sequence of easy-to-understand job actions. The SPI Pendant Interface generates a program in Yaskawa Motoman's native INFORM language and controls it using standard EuroMap 67 or EuroMap 12 formats.

The interface is used with select DX200 robots.

Motoman Robotics, based in Dayton, Ohio, manufactures robotics technology. [www.motoman.com](http://www.motoman.com)

## Industrial Literature Reviews

### SUPER AIR WIPE BLOWS, DRIES, CLEANS AND COOLS



EXAIR's Super Air Wipe is ideal for pipe, cable, extruded shapes and hose. A 360° airstream adheres to the surface of the product. The split design makes it easy to clamp around the surface, eliminating the need for threading. Applications include drying of inks, paint and silk screen printing; cooling hot extruded shapes; blowoff of water, dust, plating, coatings and contaminants. [www.exair.com/18/125.htm](http://www.exair.com/18/125.htm)

EXAIR Corp.

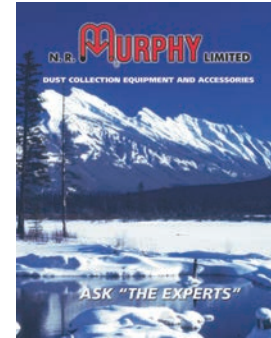
### FLIR TG165 IMAGING IR THERMOMETER



The FLIR TG165 Imaging IR Thermometer bridges the gap between single spot infrared thermometers and FLIR's legendary thermal cameras. Equipped with FLIR's exclusive Lepton micro thermal sensor, the TG165 lets you see the heat so you know where to reliably measure it. Easily find unseen hot and cold spots for instant troubleshooting. Store images and data to show customers and include in reports. [www.flir.com/tg165](http://www.flir.com/tg165)

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## EVENTS

### Reliability 2.0 ReliabilityWeb April 11-15, Las Vegas

An education and networking conference for maintenance reliability and asset management professionals. Visit [www.reliabilityconference.com](http://www.reliabilityconference.com).

### Partners in Prevention 2016 WSPS April 26-27, Mississauga, Ont.

The conference provides opportunities for training and networking with health and safety professionals. Visit [www.wspcs.ca](http://www.wspcs.ca).

### Energy Summit 2016 EMC/NRCAN May 17-18, Niagara Falls, Ont.

Canada's leading energy subject-matter experts share best practices in industrial energy efficiency. Visit [www.emccanada.org](http://www.emccanada.org).

### RAPID SME May 16-19, Orlando, Fla.

The annual conference and exhibition returns for its 26th year. Uncover the latest trends in 3D printing, scanning and additive manufacturing. Visit [www.rapid3devent.com](http://www.rapid3devent.com).

### Global Petroleum Show DMG Events June 7-9, Calgary

The conference featuring companies from 84 countries welcomes C-level executives, engineers, industry experts and more from all walks of the energy industry. Visit <http://globalpetroleumshow.com>.

### EASA 2016 Convention and Exhibition EASA June 12-14, Toronto

This event from the Electrical Apparatus Service Association covers the environment and waste management industries. Visit [www.easa.com/convention](http://www.easa.com/convention).





# Energy efficiency makes good business sense

BY MATT POWELL, ASSOCIATE EDITOR

“ The message is clear: Ontario will be greener and industry will be participating ...”

The high cost of Ontario’s electricity is a concern for manufacturers grappling with bloated bills with more costs to come as the province’s cap and trade emissions reduction scheme looms.

The Liberal government doesn’t have a very good record when it comes to managing energy, what with the ongoing criminal cases against two former McGuinty aides over two cancelled gas plants, or its sloppy approach to renewable energy development. Taxpayers may as well have tossed money into backyard fire pits, except they’d probably get dinged for the carbon emissions.

Meanwhile, the Wynne government is attempting to cast shade on the bungling of its predecessor, committing Ontario to more aggressive sustainability targets, the development of cleaner technologies and operational energy efficiencies.

The message is clear: Ontario will be greener and industry will be participating.

Since that’s the reality, manufacturers must do a better job of their energy management by taking advantage of cleaner technologies and making use of incentives to improve operations.

In February, Premier Kathleen Wynne announced the province would invest nearly \$100 million from the \$325 million Ontario Green Investment Fund to develop projects that will reduce greenhouse gas emissions, increase energy efficiency, support cleantech innovation and create jobs. The commitments include \$25 million for a study to be led by Canadian Manufacturers & Exporters that will examine energy efficiency and identify how investments in advanced technologies and productivity are impeding the sector.

Investment in Canadian clean energy rose by 88% in 2014 to nearly \$11 billion, according to Clean Energy Canada. Almost half of that was in Ontario, where more than 20,000 megawatts of (more costly) renewable energy capacity is to be online by 2025. That represents about half of the province’s installed capacity.

So how green is your plant? How does energy efficiency (meaning conservation) fit into your strategy?

Annex Business Media (publisher of **PLANT**) and the Independent Electricity System Operator (IESO) conducted a study of how manufacturers must better manage electricity use. The report, which provides insights from 510 companies, found 51% of them identified energy management as a priority, but most had not taken action to increase their energy efficiency; 56% didn’t have energy efficiency targets and 62% hadn’t performed an energy audit in the past five years. The 85% that had completed an energy audit reported cost savings.

SMEs, which make up over 99% of the province’s businesses, may argue they don’t have the resources to make energy efficiency a priority, but there is help and it’s relatively easy to access. IESO’s SaveONEnergy program helps small businesses with the installation costs of energy efficient equipment and improving the efficiency of their buildings. The program completed more than 81,000 projects between 2011 and 2014, saving more than 600 gigawatt-hours of electricity.

One project involved a Windsor-based automotive parts supplier that cut its energy costs by \$168,000 annually. The company received an incentive of more than \$71,000 (about 50% of total project costs) after completing an audit by its local utility. It identified the plant’s air compressor system as an opportunity for savings. The system didn’t have a “turndown” capability and was needlessly wasting energy.

A new compressor system was installed along with a sequencing unit and new dryers to reduce energy demand by 206 kilowatts, translating into energy savings of more than 1.7 million kilowatt-hours.

Between setting and shattering NHL records, Wayne Gretzky once said “you miss 100% of the shots you don’t take.” Manufacturers would be wise to consider the Great One’s advice.

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

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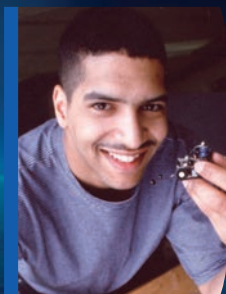
### KEYNOTE SPEAKERS



**Martin Ford**

*Author*

**Rise of the Robots:  
Technology & the Threat  
of a Jobless Future**



**Dr. James McLurkin**

*Google*

**Dances with Robots:  
One Engineer, 112 Little Robots, Toys,  
Insects & Star Wars Movies**



**Ziya Tong**

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**Leadership and  
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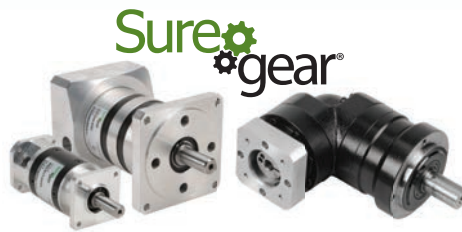
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