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ADVANCING CANADIAN MANUFACTURING
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GROWING ALGAE

A potential cash crop for heavy CO_2 emitters

St Marys Cement cashes in on carbon
Flow Water: More than a bottling company
EMC supervisor certificate pays dividends
There's gold in Budget 2017 for innovators
Green material handling on display at ProMat 2017

Daily Manufacturing News www.plant.ca

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June 2017
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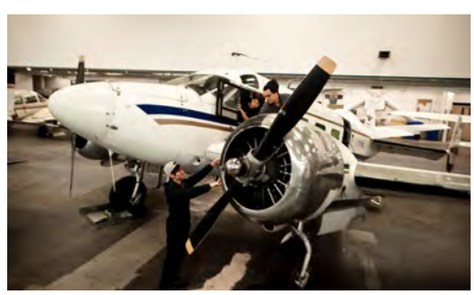

FEATURES

DEPARTMENTS

COVER IMAGE: RODNEY DAW

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Not business as usual

Is it possible for manufacturers to experience a significant pickup in growth with an expectation of prosperity after several years of lacklustre performance, while at the same time teetering on the precipice of chaos?

That appears to be the dichotomy Canadian companies face as the good times are counterbalanced by the Trump administration clown show in the US.

The maelstrom of tweets, erratic decisions (tear up NAFTA), climb downs (don't tear up NAFTA), Russian intrigue, investigations, random lunacy and now suggestions that impeachment might be in order, have created the troubling backdrop to pivotal trade negotiations that will soon take place between Canada, Mexico and the US. What's the upshot for manufacturers? As has been clear from the beginning of the Trump regime, it's not business as usual.

Manufacturing accounts for more than two-thirds of Canada's exports, and more than 80% go to the US. Canada and Mexico are preparing the ground for trade talks with the US, aiming to improve NAFTA despite the president's antics.

Reinvigorating the trade deal must be left to politics, clearer heads and fate, but whatever the outcome, companies should direct their attention to issues over which they do have some control. Doing so is essential preparation for future global trade flows.

Yet companies are ill-prepared on a number of fronts to adapt to what may turn out to be a new world order. The enthusiasm for protectionist polices in the US strongly suggests looking beyond North America – not a new message for Canadian manufacturers, except now there is some urgency for action.

This requires investment in modern machinery and equipment and smart technologies that elevate per worker productivity to more competitive levels. But Canadian firms have fallen behind investments of their global peers. Compared to a US worker, investment has slipped to 55 cents from 77 cents in 2013, and is 67 cents per dollar spent in OECD countries, according to a C.D. Howe report.

Canadian companies are not exactly embracing smart technologies. About 72% of **PLANT's** Outlook survey respondents were either not familiar with the Industrial Internet of Things (IIoT) or didn't think it was applicable to their businesses.

Globally, manufacturing executives are seeing the benefits, according to a study by the MPI Group. Implementation is up 50% and 68% of respondents plan to embed smart devices or intelligence into products. The message for Canadian companies: "Keep up."

The recent global cyber attack brings into sharp focus the need for manufacturers to have a strategy for dealing with hackers and other intrusions. Yet the Outlook report revealed only 22% of companies rated their level of preparedness as high, and 17% had taken no defensive steps. No company can afford to be the opening for an attack that could spread through a supply chain.

Companies also need to put more effort into longer-term workforce planning. Shortages of people with the right skills will become more pronounced as baby boomers retire. In 2016, 243,000 people said good-bye to the working life, but for every job created, companies had to cover for the loss of 1.8 people, according to a Conference Board of Canada study. In 2005, filling technical and skilled trades took 40 days. Now it's 60 days, raising the costs from $3,000 to $5,000 per worker.

How far ahead are most firms planning? Just two years.

Canadian manufacturers have been good at cautious optimism. The time has come for more action.

Correction: April's editorial, *No benefit to Wynne's hydro price bribe*, provided some incorrect statistics. Automotive accounts for about 12% of manufacturing GDP, and about 2.4% of Ontario's GDP.

Joe Terrett, Editor
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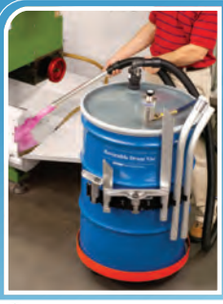
Video demo on web site | www.exair.com/18/465.htm



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The compressed air powered **Reversible Drum Vac™** will quickly fill or empty a 55 gallon drum in 90 seconds. Coolant sumps can be easily refilled, floor spills vacuumed or contaminated liquids transferred to filtration tanks in minutes.

- No moving parts - maintenance free
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- Fits standard closed head drums
- 5, 30, 55 and 110 gallon models
- Built-in pressure / vacuum relief
- Installs quickly
- Maintenance free
- Spill free - auto safety shutoff

Video demo on web site | www.exair.com/18/462.htm

Chip Trapper™ Extends Coolant Life

The **Chip Trapper™** offers a fast, easy way to clean chips, swarf and shavings out of used coolants and other liquids. The Chip Trapper vacuums in the coolant that is filled with debris, traps the solids in a reusable filter bag and pumps out clean coolant.

- CNC's, Lathes, Saws, Mills, Drills
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- 30, 55 and 110 gallon models
- Removes unwanted solids from liquid
- No motors to clog or wear out
- Safe - no electricity

Video demo on web site | www.exair.com/18/4171.htm

Maximum Lift 2-Way Drum Vac

The **High Lift Reversible Drum Vac™** will quickly fill or empty a 55 gallon drum from up to 15 feet in 85 seconds. This high powered Drum Vac has the strength to move liquids from below grade work areas, sumps or tanks! Uses no electricity nor moving parts.

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- 30, 55 and 110 gallon models
- For liquids up to 1400 centipoise
- Cisterns
- Maintenance free
- Safety shutoff

! Pump 55 Gallons in 85 Seconds | www.exair.com/18/4173.htm

Pump Faster, Higher & Thicker Liquids

EXAIR's **High Lift Chip Trapper™** offers a fast, easy way to clean chips, swarf and shavings out of used coolants and other liquids. It vacuums the coolant or liquid that is filled with debris and traps all the solids in a reusable filter bag. Only the liquid pumps back out.

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- Underground storage tanks
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- Deep hole broaching
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15 feet of lift! | www.exair.com/18/4174.htm

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BULLETINS

Hyduke Energy Services Inc. is buying structural steel manufacturer **Avalanche Metal Industries Ltd.** in Kelowna, BC. Avalanche makes production tanks, steps and ladders for the oilfield and forestry industries. Hyduke, an oilfield services company based in Nisku, Alta., said the acquisition supports its expansion into new markets and broadens its design and manufacturing capablities.

Magellan Aerospace has sold its Mississauga, Ont. facility and accompanying land for $32.7 million. The aerospace manufacturer plans to lease a new facility constructed by the buyer on the existing site.

BWXT Canada Ltd. has been awarded a $55 million contract by the SNC-Lavalin/Aecon joint venture to supply feeder pipe to Ontario Power Generation's Darlington nuclear reactor refurbishment project. The pipes transport heavy water coolant between reactors and steam generators. They'll be manufactured at BWXT's Cambridge, Ont. facility over the next five years.

Javelin Technologies is celebrating its 20th anniversary by donating licenses of its SOLIDWORKS CAD software and training services to software user groups. Packages include licenses for SOLIDWORKS Student Edition 3D design and analysis software, plus access to an online portal for resources, support and instructor-led training.

Unifor members at **Lear Corp.** in Whitby, Ont. have ratified a new collective agreement that secures the assembly of the GM Oshawa K2XX truck seats starting in January. The two-year agreement provides a $50,000 retirement incentive and a two-year pension program grow-in, which includes health care benefits.

KP Building Products is investing $3.2 million to expand its window and patio door manufacturing facility. The investment includes a state-of-the-art painting facility and additional manufacturing equipment to enhance its window manufacturing operation. The company, based in Milton, Ont., has more than 600 employees at six plants across North America.

Arcelormittal steelworkers ratify a new collective agreement

Deal includes pension improvements, better health benefits, closes wage gap

Mining at the company's Fremont, Que. site.
PHOTO: ARCELLORMITTAL

SEPT-ÎLES, Que. — The 2,000 United Steelworkers (USW) members at ArcelorMittal operations in Fermont and Port-Cartier, Que., have ratified a four-year collective agreement.

USW says the agreement was reached after the company dropped demands over a two-tier pension program. The agreement was ratified by union members May 11.

On top of pension improvements, the deal gives workers at ArcelorMittal's Fire Lake Mine contract parity with workers at the company's Mont-Wright mine. The union says the wage gap between workers was as high as $8 an hour.

The agreement includes annual wage increases between 2.2% to 3%, an increase in basic pension benefits and health benefits, and restrictions on subcontracting.

BDC earmarks $280M for Atlantic SMEs

ST. JOHN'S, NL — Atlantic small and medium enterprises (SMEs) will have access to more than $280 million in financing from the Business Development Bank of Canada (BDC).

This represents an increase of $100 million from the Canadian government-owned bank that focuses on the needs of entrepreneurs.

The financing will help companies pursue growth opportunities, including acquisitions, change of ownership transactions and investment in export strategies.

Canadian SMEs intend to spend more on investment projects in the coming year, especially to scale activities and increase productivity, says a BDC study; but 31% of the companies are having difficulty obtaining financing.

Targeted industries include information and communication technology, agri-food, ocean technology and tourism.

BDC also signed Letters of Intent with New Brunswick and Nova Scotia Business Inc. to improve the competitiveness of businesses in the two provinces.

Bad-faith bargaining at NL aerospace firm

GANDER, NL — Aerospace parts manufacturer D-J Composites was found to be engaging in bad faith bargaining with its Gander workers by the Newfoundland and Labrador Labour Relations Board.

The company that makes parts, advanced composites and bonded metal components for aerospace and other industries had locked out its 32 employees, represented by Unifor Local 597, in March.

D-J Composites tabled proposals that involved pay cuts for some employees and eliminated seniority rights.

The company, based in Augusta, Kan. – a right-to-work state – was ordered to remove proposals that attempt to eliminate seniority-based rights for Unifor members and to deliver a new offer within seven days.

The US company bought the Gander plant in 2012.

PLANT OFF-SITE

Patrick Barbieri, a mechanical engineering technologist with Hatch Ltd. (a global multidisciplinary consultancy in Montreal) pauses with **PLANT** *at the Bad Water Basin in Death Valley, Calif., the lowest point in North America. It's called Bad Water for a reason, thanks to the accumulated salts in the basin.*

When you go on a business trip or vacation, be sure to take a copy of **PLANT** with you. If we use your photo, you'll get $75. Include name, title, company, address and phone number to Off-Site, **PLANT**, jterrett@plant.ca. Photos should be 300 dpi.

"Fake News Ale" launches

Northern Maverick's charitable craft brew will help "make beer great again"

"It's going to be huge!" PHOTO: NORTHERN MAVERICK

TORONTO — An up and coming Ontario craft brewer has announced its first beer, part of a charitable line that takes a good-natured poke at US President Donald Trump.

Northern Maverick, a Toronto brewery/restaurant gearing up for a summer launch, says Fake News Ale was developed to offer "a respite from the bleak political developments of late, an easy-drinking beer that lends itself to long discussions over world events with friends.

"The beer was found to pair well with small hands, striking comb overs, huge egos and all things Mexican."

The can features a caricature of Trump at a podium performing one of his signature hand gestures.

The brewer is offering to donate 5% of every Fake News Ale sold to a charity that people will nominate and vote for at **www.northernmaverick.ca.**

Northern Maverick's 11,000 square-foot brewery/restaurant on Toronto's King West houses a 10-hectolitre brewhouse with eight 20-hectolitre fermenters, a 400-seat restaurant, a bar and a retail store.

MDA signs $5M Airbus deal for antenna subsystems

VANCOUVER — MacDonald, Dettwiler and Associates Ltd. (MDA) has signed a $5 million contract to provide Airbus Defence and Space with four communication antenna subsystems and control electronics.

MDA, a global communications and information company based in Vancouver, says its patented control electronics allows antenna movement in very fine increments, which increases the flexibility and performance of the satellite.

Airbus Defence and Space is a division of Airbus Group based in Toulouse, France that is responsible for defence and aerospace products and services.

MDA has more than 4,800 employees operating from 15 locations in the US, Canada and internationally.

Upgrade technology to compete in China

OTTAWA — Canadian manufacturers doing business in China must make technology upgrading a priority if they are to keep pace with Chinese and foreign companies, says a report commissioned by HSBC Bank Canada.

It warns that companies outside Canada doing business globally are rapidly enhancing their technologies.

How willing and how fast Canadian companies are able to adjust their operations will be vital for keeping Canada competitive in an increasingly globalized marketplace.

Shifting Chinese Demand: New Opportunities for Canadian Companies says commodities will comprise a large share of Chinese imports, but the country's shift to a consumption-led model that meets the needs of a growing middle class will increase demand for many goods and services.

Linda Seymour, executive vice-president and head of commercial banking at HSBC Bank Canada, said China is one of the largest and fastest-growing economies in the world and is forecast to grow at 6.5% compared to Canada's 2% through 2017. It's a clear opportunity for Canadian companies."

Hatch Ltd., a provider of advisory, engineering, procurement, construction management and technology services based in Mississauga, Ont., has been operating in China since 1999.

The company's technology was used to develop the QSLIC industrial complex, (China's largest producer of Potash) in Qinghai that features the world's largest state-of-the-art magnesium and calcium carbide smelter.

Lombard said the company's biggest differentiator is not low cost, but the in-house proprietary technologies it offers.

The report found Canada has global strengths in the following services sectors that are projected to face rising Chinese demand: personal, cultural, and recreational; technical; financial; and computer and information.

Global manufacturers see value in IoT

Implementation is up. PHOTO: FOTOLIA

CLEVELAND, Ohio — Manufacturing executives around the world are seeing real effects on productivity and profitability from investing in the Internet of Things (IoT), according to a study by the MPI Group.

The research and advisory firm based in Beachwood, Ohio noted a turnaround from a year ago when executives were surveyed and two-thirds of them had no strategy for implementing the IoT. Now the same proportion consider themselves IoT-competitive.

"There's been a dramatic jump in awareness of, investment in, and profits from the IoT," says John Brandt, CEO of The MPI Group, in a release. "However, many smaller manufacturers are still unsure where to start."

MPI's 2017 Internet of Things Study looked at the production of smart devices and the implementation of embedded intelligence within plants, processes, and products of manufacturers around the world. Here are some highlights:

- Implementation is up, with 50% (median) of production processes now using the IoT, and 68% of manufacturers having plans to embed smart devices or intelligence into products.
- 72% report increased productivity, and 69% report increased profitability, from application of the IoT to plants and processes.
- 65% report increased profitability from sales of IoT-enabled products (embedded intelligence).
- 46% see identifying opportunities to implement the IoT as a challenge.
- 34% say not all corporate executives who need the data have access to it (worse numbers for customers and suppliers).

The study, sponsored by BDO and SAS Institute Inc. and conducted in November-December, involved 374 manufacturers.

CAREERS

Didier Drogba

Encanto Potash Corp. has announced the appointment of UN Goodwill Ambassador, philanthropist, and soccer player **Didier Drogba** to its board of directors. Drogba is a former captain and all-time top scorer of the Côte d'Ivoire national football team, having also suited up for Chelsea of the English Premiere League. Encanto Potash develops potash properties in Saskatchewan.

Patrick Butler

Wago Canada, a manufacturer of industrial electronics products, has appointed **Patrick Butler** regional sales manager for Southwestern Ontario. Butler, from Toronto, spent the last 16 years at Phoenix Contact holding various titles.

Ballard Power Systems has a new vice-president and CCO. **Rob Campbell** is joining the Vancouver-based fuel cell manufacturer following several senior leadership roles in the global cleantech and power generation industries. He'll oversee the company's global business development, sales, marketing, product line management and after-sales service activities.

Aurora Cannabis Inc., a licensed medical marijuana producer, has appointed **Glen Ibbott** CFO. He brings 20 years of experience as a healthcare executive to the company. Most recently, he was CFO at QLT Inc., and played a key role in the company's $500 million merger with Aegerion Pharmaceuticals to form Novelion Therapeutics.

The Independent Electricity System Operator (IESO) has appointed **Peter Gregg** president and CEO. He is an electricity sector veteran with more than 10 years experience, which includes a tenure as COO of Hydro One. Most recently, Gregg was president of Alectra Energy Solutions and previously served as president and CEO of Enersource Corp.

ABB, IBM bring AI to the plant floor

Combining digital and artificial intelligence capabilities

Harriet Green, general manager of Watson IoT, IBM; and Guido Jouret, chief digital officer.

PHOTO: IBM

HANOVER, Germany — A strategic collaboration between ABB and IBM combines the technology companies' digital and artificial intelligence capabilities to take gathering and analyzing plant data to the next level.

The partnership pairs ABB Ability, the Swiss industrial technology company's cross-industry digital capability, with IBM's Watson Internet of Things to bring what they describe as "real-time cognitive insights to the factory floor and smart grids."

The companies say the new suite of solutions aim to improve quality control, reduce downtime and increase the speed and yield of industrial processes by using data and taking actions that help eliminate inefficient processes and redundant tasks.

For example, inspections looking for defects have been done manually, a slow and potentially error-prone process. Watson's artificial intelligence will be deployed to find defects via real-time production images that are captured through an ABB system, then analyzed using IBM Watson IoT for Manufacturing. This will increase the volume flowing through production lines while improving accuracy and consistency.

As parts flow through the manufacturing process, the manufacturer will be alerted to critical faults not visible to the human eye.

PyroGenesis lands powder contract

MONTREAL — PyroGenesis Canada Inc. has signed its first contract and received the down payment for an order of titanium powder (Ti-6Al-4V) and Inconel from an unnamed multinational conglomerate.

The Montreal-based manufacturer of advanced plasma processes and metallurgical process equipment has developed a system that uses plasma atomization to make small, uniform, fully dense and spherical metal powders for the additive manufacturing sector.

The company began producing powders using the technology for the biomedical industry in 2001. It invested $2 million in 2015 to improve production rates and particle size distribution, which led to a pending patent and the company's decision to re-enter the additive manufacturing market.

The metal powders produced during the ramp-up phase are available for sale. The initial aim is to produce commercially pure titanium (CP Ti) and Ti-6Al-4V powders.

The company is also receiving interest in other metal powders.

Financial details of the deal were not available.

Ontario's carbon innovation challenge

TORONTO — Ontario is challenging local and international companies to develop the next generation of transformative clean technologies to help fight climate change.

The Solutions 2030 Challenge encourages companies to develop breakthrough technologies that will help Ontario's industrial plants reduce their greenhouse gas emissions, meet the targets set in Ontario's Climate Change Action Plan, and increase innovation and entrepreneurship in the province.

Ontario is providing support for the challenge with proceeds from its carbon market through the Green Investment Fund.

Eligible teams can apply through the Solutions 2030 online application portal by September 22. Selected teams will be awarded funding to take their idea through prototype and demonstration stages.

International applicants are expected to establish a significant presence in the province and help Ontario meet its greenhouse gas targets beyond 2030.

The challenge is part of the TargetGHG program, which encourages the adoption of innovative low-carbon technologies and fosters technology development targeting greenhouse gas reductions for industry emitters.

The Green Investment Fund is a $325-million down payment on the programming to support the province's new cap and trade regime.

Up to $7 million in funding is available with up to $3 million going to the winning project.

Savaria buying US medical firm for $109.5M

LAVAL, Que. — A Canadian manufacturer of wheelchair stairlifts for homes is expanding its reach in the US market.

Savaria Corp. is acquiring Span-America Medical Systems Inc. for $109.5 million. The Greenville, SC-based firm makes mattresses and beds for the medical market.

The company has manufacturing plants in Beamsville, Ont. and Greenville, SC, as well as a distribution centre in Utah.

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Shimco wins New Venture award

Recognized for commitment to innovation, technology

Representatives from Shimco, including CEO Peter Voss, accept the Cambridge Chamber of Commerce Award for New Venture of the Year. PHOTO: SHIMCO

CAMBRIDGE, Ont. — Shimco has been named "New Venture of the Year" by the Cambridge Chamber of Commerce. The award recognizes businesses or individuals that have demonstrated a significant and sustained commitment to positive business development, economic growth and diversity within the city.

The New Venture of the Year award is presented to a business that – through innovative design and technology – has improved the esthetics and functionality of its operating environment.

Since moving to Cambridge from Markham, Ont. in 2016, the aerospace manufacturer of advanced precision parts and gap management technologies has invested in new equipment, technology and workflow design to decrease lead times. Its 25,000 square-foot manufacturing facility is AS9100C-certified and current customers include Asco, Bell Helicopter, Bombardier, Embraer, Héroux-Devtek and UTC Aerospace Systems.

The company has deployed advanced lean manufacturing, with a paperless production floor, an electronic kanban system and labour-saving equipment. It has also installed two Mazak 4000 HCN horizontal machining centres and a Mazak Palletech system to create a flexible manufacturing system, which runs 32 jobs simultaneously with only one operator.

Shimco is in the process of adding a 30,000 square-foot expansion at the facility to support in-house processing, commercialization and to establish a Centre of Excellence with local research institutions.

PLANT ONLINE

Sounding off

What readers have to say about breaking news

Have you checked out **PLANT's** daily news online?

Here are some headlines that have inspired members of the Canadian manufacturing community to chime in. The comments are edited, but you can use the links to see the raw – and for some – longer versions of their remarks, plus the news stories that inspired their reactions.

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

How a call from President Trump's son-in-law started a scramble on NAFTA
http://www.plant.ca/NpwyT
The problem with NAFTA is that for manufacturers, it's one sided – favouring US companies. Canada has become a resource-based economy along with a dependence on the more precarious service sector, which is under severe cost and competitive pressures from low cost jurisdictions such as India. Manufacturing across the US and Canada has to be more balanced…

Minimum wage workers say they're surviving rather than living
http://www.plant.ca/7q4cr
The politicians should freeze all public servant wages for three years and allow the minimum wage to increase to $15 per hour.

French's ketchup will be bottled in Canada starting early May
http://www.plant.ca/RbzLC
Thank God for French's ketchup. I will not be buying Heinz after seeing the way they put farmers out of business in my hometown (Leamngton, Ont.), throwing people out of work. They have no sense of corporate responsibility to the town that made them famous.

Clark calls on Ottawa to ban coal exports after softwood lumber duties
http://www.plant.ca/Osuan
Why not just add a 24% trans-shipment fee for all coal being transported through Canada?

Trump proposes tariff of 20% on Canadian softwood lumber
http://www.plant.ca/FZO6P
OK, great. Now why doesn't Canada impose a 20% tariff on dry soups, soaps, detergent and cleaning compounds, oleo-chemicals, cosmetics, toothpaste, chemicals and foodstuffs to encourage local production…

FEEDBACK

Disingenuous tax beef

Re: Trudeau's economic policies suicidal in Trump world (Postscript, PLANT, March 2017)

Top tax rate and the one percenters. PHOTO: FOTOLIA

Gwyn Morgan's mention of income tax rates is disingenuous.

Canada's top rate of 33% applies only to the portion of one's income over $202,800; something that impacts very few "workers."

To achieve the effective personal income rate of "49% to 54%" as he claims, one must be a very highly paid CEO or similar one percenter.

Oh, I see.

Jeff Harvey
Halifax

We'd like to hear from you. Send comments to jterrett@plant.ca with your name, address and phone number. Comments will be edited.

SME hiring rises

But there's room to improve in critical areas

Businesses with less than 100 employees created 42% of new jobs in Canada between 2010 and 2016, according to CIBC Capital Markets. That figure was up from 30% between 2000 and 2010.

The rise of the self-employed has been noticeably slower than paid since the beginning of the decade, but the bank's report finds small- and medium-sized enterprises (SMEs) have been creating a more significant share of jobs since 2010.

"Beyond the threshold of five employees, there is a clear positive correlation between size and growth, with larger firms within the SME spectrum seeing progressively stronger growth recently," said Benjamin Tal, deputy chief economist at CIBC.

In 2016, more than 350,000 businesses were created, but the rate of those entering the economy declined since 2004. Just under 300,000 exited but at a more stable rate.

"Small business optimism has been grinding higher since bottoming out early last year and appears headed back to levels seen prior to the oil price shock. With the Canadian economy in recovery mode, the environment for small businesses remains constructive," Tal said.

The World Bank ranks Canada as one of the best places to start a new business, thanks to accessible to capital and a favourable tax regime, but CIBC's report highlights several gaps.

Owners aged 25 to 39 represent less than 15% of small and 10% of medium-sized businesses. Those 50 to 64 represent 47% of small and 51% of medium-sized businesses.

"One reason for this discrepancy could be related to their access to financing," Tal said. "Companies with younger owners face much more difficulty when trying to externally fund their businesses."

Women are identified as an untapped resource, representing less than 20% of majority SME ownership.

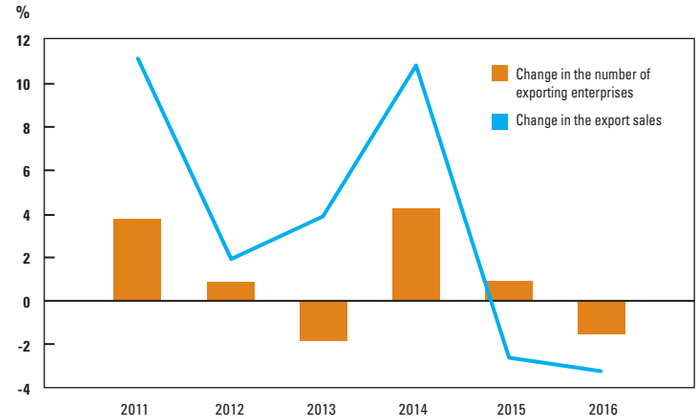
Companies have also been slow to expand revenue sources outside of Canada and North America. The report notes there is room to increase the ratio of goods and services exported to Asia and Latin America.

PLANT PULSE

ECONOMIC DEVELOPMENTS AND TRENDS

EXPORTERS IN 2016

There were 43,255 Canadian goods exporters last year, 97.4% of them SMEs and most trading solely with the US. But their number shrank 1.5% (616 enterprises) from 2015, reports Statistics Canada. SMEs accounted for most of the decline. Exporters tallied sales of $442.2 billion, although their efforts were hampered by lower energy prices for the second straight year. Since 2010, over three-quarters of all SMEs and almost half of all large enterprises have consistently exported less than $1 million worth of goods annually.



Source: CANSIM

$205.42B

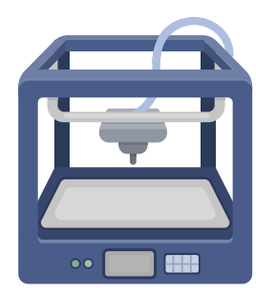
Value of the smart factory market by 2022, growing at a compound annual growth rate of 9.3%, reports research firm MarketsandMarkets. Drivers include increasing adoption of industrial robots, evolving IIoT, demand for smart automation and greater emphasis on regulatory compliances.

$31B

What the Canadian aerospace and defence sector contributes annually to GDP while supporting more than 240,000 jobs, according to Statistics Canada.

1.17M

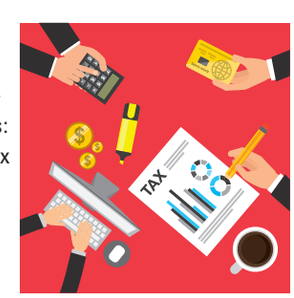
Employer businesses in Canada as of December 2015, according to Innovation, Science and Economic Development Canada. Almost all are small businesses (97.9%), 1.8% were medium-sized and 2,933 or 0.3% were large enterprises. SMEs contribute 30% of Canada's GDP.



32%

The increase in worldwide shipments of 3D printers in 2016 thanks to personal/desktop models, but there were 10% fewer industrial/professional printers shipped, reports CONTEXT, the IT market research company.

Happy anniversary Canada! While 2017 is Canada's 150th birthday, it's also the 100th year since the government of Canada introduced personal income tax as a small, wartime revenue generator. The Fraser Institute offers some 'then and now' comparisons: 2.6% of federal revenues to 51%; 2% of Canadians who file to 75%; a 3% top federal tax rate to 33%; and from $4 to $4,120 collected per person last year. Ontario's combined federal-provincial tax rate is 53.5%, third highest in the G7 behind France (54.5%) and Japan (55.9%). Compared to US states, provinces have seven of the eight highest top combined rates.



CLOSING THE CARBON CYCLE

POND CONVERTS CO_2 INTO REVENUE

Its technology helps heavy emitters turn what's going up their smokestacks into algae for high-value food additives.

BY KIM LAUDRUM

Attention all manufacturers struggling to reduce greenhouse gas emissions! There is hope.

Climate change policies and the challenges that come with them are a reality that industrial companies must deal with. BC has imposed a carbon tax, while Ontario is busy auctioning off carbon credits for its confounding cap and trade program. At the federal level, Canada has made commitments to greenhouse gas (GHG) reductions under the Paris Accord.

Problem is, industry believes these efforts to do more for the environment come at the expense of Canadian competitiveness, particularly among manufacturers already coping with factors such as exorbitant electricity costs (yes, you Ontario).

Battling climate change and how companies can do more for the environment is complicated. So far policy, and the manner in which government has gone about implementing it, has not been popular among manufacturers.

But a company just north of Toronto is working to make the transition for manufacturers to the low carbon economy an easier one. Pond Technologies Inc. in Markham, Ont. has developed a technology that pulls CO_2 emissions from a plant's smoke stack and converts them into different types of algae.

That's right. Algae.

"People don't understand carbon dioxide. They think it's bad, but it's actually necessary. If we didn't have any CO_2 we wouldn't have plants," explains Pond CEO Steve Martin. "What we need is a closed carbon cycle."

The company, now with 14 employees, started in 2007 amid a looming global economic slowdown and escalating oil prices. Martin, wanting a better world for his young son, found inspiration in a *Washington Post* article that described how to grow algae. "I thought, 'Right. Let's do that.' And we started the company literally the next day."

Pond's process uses photosynthesis to convert those harmful emissions, which are further refined into downstream options for revenue generation such as biomass, biofuels and bioplastics. Pond can also grow algae for high-value food additives such as astaxanthin, chlorella,

Demonstration bioreactor at Pond's Markham, Ont. facility.

Peter Howard presents some algae fresh from the bioreactor.

PHOTOS: RODNEY DAW

Photosynthesis (red light) produces algae.

and spirulina using beverage-grade CO_2.

Algal biomass produces the same amount of energy as the equivalent amount of coal, and can be refined to produce higher grade fuels such as diesel and ethanol. The company says implementing its algae production system provides enough energy to replace fossil fuels used in most industrial processes and means of transportation, which account for most GHG emissions.

Pond's innovation captured the attention of the National Research Council of Canada (NRC). With the NRC's help, Pond built an algal biorefinery at a St. Marys Cement plant in St. Marys, Ont., a big deal for companies like cement-makers, who right or wrong, are often seen as industry's heaviest carbon emitters. St. Marys saw the Algal Carbon Conversion (ACC) biorefinery as a green solution that helps it start to shed that reputation. So far, the ACC program has attracted $40 million in NRC funding.

The NRC has two full-time employees working with Pond's bioreactor at the cement plant, alongside two of the company's technicians.

As for cement makers like St. Marys, there's an economic opportunity many producers wouldn't be willing to pass up. Martin explains that a tonne of $C0_2$ emissions would produce about a half tonne of algae, which would generate about $1,000 in byproduct revenues (at the low end). The carbon in carbon dioxide is incorporated directly into the carbohydrates, lipids and proteins that make up the algae. A tonne of cement sells for less than $200, so Pond's economic case is strong: there's more money in a plant's CO_2 emissions than there is in

the cement itself.

"It's an interesting way to look at it. It could be in future we could be mining limestone to make algae and cement is the byproduct," Martin says.

In Ontario's York Region, Pond is working with the City of Markham, Markham District Energy and the NRC to convert carbon dioxide waste emitted from the city's energy systems. The project put Pond in contention for the NRG COSIA Carbon XPRIZE, a national competition backed by the Canadian Oil Sands Innovation Alliance (COSIA) and NRG with a $20 million grand prize. The competition is meant to accelerate potential solutions for CO_2 emissions that could be applied to Canada's oil sands operations.

Pond Technologies is one of 27 teams advancing in the global competition to develop breakthrough technologies that convert carbon dioxide into valuable products.

Because the company is one of three Ontario-based semi-finalists, it's also eligible for consideration for a share of a $2.5-million fund established by the Ontario Centres of Excellence (OCE) to help companies develop and demonstrate ideas as they progress in the Carbon XPRIZE competition.

Martin, who has a background in fibre optics, teamed up with Peter Howard, a biologist and now Pond's vice-president of sustainability. He's also team leader for the project vying for the Carbon XPRIZE.

"People confuse innovation with invention," Martin says. "People tend to think of innovation as running in straight lines: from lab to market. But often the people working in the lab don't have the shared vocabulary with the people looking to exploit the technology for commercial gain."

Innovation focus

Pond's team comes from a diverse background. Emidio Di Pietro, vice-president of engineering, came to Pond from the automotive sector. So did Tony Di Pietro, Pond's supply chain director. And there's a group of chemical engineers, environmental scientists, control and automation engineers, lab researchers and site managers that fill out the team. That diversity allows Pond to take a multi-disciplinary approach to innovation, which Martin believes is something too few companies do.

When the company started, there was a lot of good work already done on growing algae, but it was done in "islands" and there were gaps to fill. What was missing from the research was something Martin was able to bring to the table: the light.

Understanding how light – specifically red light – works under water proved to be a significant factor. Gaining control of it helped Martin and Howard bring it all together.

"We are a society fuelled by combustion. We burn things to make things. So the most manufactured product of humans is carbon dioxide. All those automobiles, airplanes, steel, cement are just byproducts," he says.

For example, manufacturing a tonne of steel produces three tonnes of CO_2. But Martin notes carbon emissions came from plant material in the first place, such as oil or coal.

"We're now digging it up and burning it. But we aren't doing anything to close the loop to turn it back into something stable. That's what Pond does," he says. "The first question you might ask is, 'What grows faster than anything else?' The answer is algae."

It uses a lot of CO_2. And as strange as that sounds, if you want to grow a lot of algae, there isn't enough CO_2 available to do it. Doing so requires highly concentrated CO_2 emissions, and those are found most at sites of heavy industry.

"The nice thing about algae is that it absorbs the other stuff in the smokestack as well, such as the oxide of nitrogen.

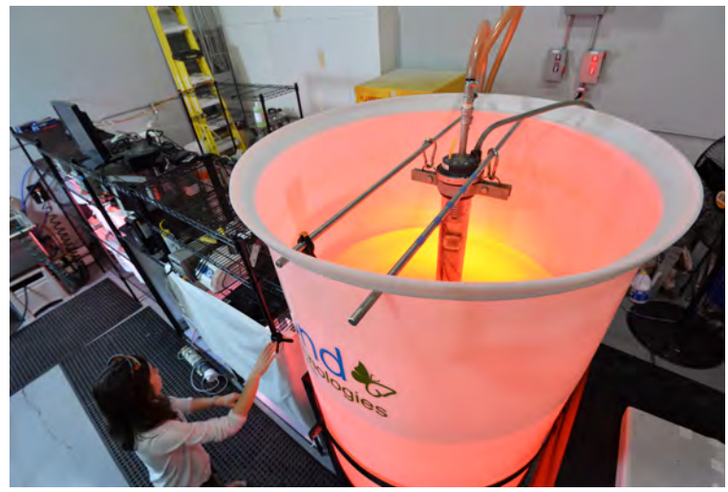
The algae works well as animal feed because of its high profiles of fatty acids, starches and proteins. And partners in the oil sands are interested in using algae as an organic peat moss for soil amendment. Bio-oils can be "squeezed" out of it too.

Martin isn't just looking at climate change through green coloured glasses. He recalls drives across the Burlington Skyway bridge and seeing steel plant smoke stacks dotting Hamilton's skyline.

"I would look at all those emissions and think, 'Geez, that's awful!' Now I think, 'Look at the opportunity!" Martin quips. "We can put an algae plant on all of those [smoke stacks] and keep all this industry going. We can keep all these people employed. We can make all these products here. It makes [Canada] a more sustainable country, and it makes us money."

Pond's next step is to develop a commercial-scale plant with partner Stelco. The company is also working with the Ontario government to co-fund a full-scale plant that generates the financial returns and illustrates clearly the advantages of adopting its technology.

"You know what Pond's real innovation was?" Martin asks. "We tried it."



A look inside the bioreactor.

How Pond's bioreactor works

The Pond Technologies bioreactor takes a slipstream of the emissions from industrial stacks and runs it through a bank of tubes. Water and light are added in the tubes to algae cells, which then grow, absorbing the carbon. The process is akin to photosynthesis.

"All we are really doing is what algae does naturally," says Emidio Di Pietro, Pond's vice-president of engineering. "It receives light, it consumes CO_2, and with nutrients it grows. It's a single-cell organism that either increases in size or multiplies. And we can accelerate it's growth."

Using energy-efficient LED lights to stimulate algae growth is a key part of Pond's innovation. Keeping the light within no more than 16 inches (40.64 centimetres) of the water ensures optimal growth.

The algae can be used many different ways: dried and used as biomass (this is really carbon sequestration); using the biomass for soil remediation, a possible solution for cleaning up oil sands tailing ponds; and as biofuel.

Or, using food-grade CO_2 (which adds the fizz to pop) and a different strain of algae, Di Pietro says it's possible to produce food-grade additives, high in proteins and rich in Omega-3s, Omega-6s, and Omega-9s.

By adjusting the light, wavelength and strain of the algae, he sees the potential for commercialization being greater than the market for carbon capture alone.

Kim Laudrum is a Toronto-based business writer and regular contributor to PLANT. E-mail klaudrum@rogers.com.

Comments?
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Manufacturing cement products creates a lot of carbon dioxide, but it can be used to grow one of nature's greenest revenue sources.

BY JOE TERRETT, EDITOR

Stephen O'Leary, director of NRC's algal carbon conversion flagship. PHOTO: NRC

St Marys Cement puts CO_2 TO WORK

HARVESTING ALGAE CREATES A NEW, GREEN REVENUE STREAM

The pressure is on for heavier industrial operations to reduce greenhouse gas emissions, chief among them carbon dioxide. The manufacture of cement products emits a lot of CO_2, but what if this byproduct could be converted into something useful that adds to the revenue stream?

St Marys Cement in St. Marys, Ont., southwest of Stratford, is testing a technology that could lead the way if the plant's pilot biorefinery project works out.

The facility is one of 25 cement plants operated by Votorantim Cimentos, the world's eight largest producer, headquartered in Sao Paulo, Brazil.

St Marys is hosting a collaborative research project that involves the National Research Council of Canada's Algal Carbon Conversion program, and Pond Technologies Inc., a cleantech firm based in Markham, Ont. that's providing the technology.

Its 25,000-litre photobioreactor takes CO_2 emitted from industrial smoke stacks to grow different kinds of algae used for biofuels, bioplastics, land reclamation and food additives.

Capturing CO_2 for the Pond Technologies bioreactor. PHOTO: POND

In Ontario, the company produces about 2 million tonnes of CO_2 a year, says Martin Vroegh (former director of environmental affairs for Votorantim Cimentos, North America; now senior director, greenhouse gas reduction technologies, Ontario Centres of Excellence). In 2007, the company completed an emissions trading project that involved controlling NOx and SO_2, putting it in a position to trade the allowances and make some money from being green.

"Recognizing that, we started to look at what we could do to add value to CO_2, our second most manufactured product," Vroegh says. "If we keep looking at CO_2 like it's a waste, it will continue to be a waste, a pollutant and an emission."

Around that time he was introduced to Pond Technologies (then called Pond Biofuels), which had ideas about using CO_2 to grow algae and needed access to some flue emissions. It came with its own funding, and so St Marys provided the footprint and a pipeline from the stack.

NRC had been exploring the potential of algal carbon conversion during the same period and by 2011 had decided to collaborate with industry, contributing its expertise in the biology of algae and its conversion into commercial products. Pond's expertise was in the design and production of the bioreactors. Its smaller project with St Marys set the stage for a three-way partnership in 2015 to set up the pilot biorefinery.

Stephen O'Leary, director of the algal carbon conversion flagship at NRC, says the total cost of the pilot plant is $4.3 million over 18 months of the project: six months to get it up and running and a year of collecting data. Production costs will be measured over the next year against the energy required to

grow the algae and move it.

The bioreactor, which he describes as large, internally illuminated box 5 x 2.5 x 2 metres deep, represents the largest deployment at an industrial site but it's pre-commercial scale.

"We're hoping the data from this plant will help us understand how to continue to work with Pond and other industries interested in deploying this technology, whether it's cement plants, power generating stations or the oil and gas industry, to scale up from pre-commercial to commercial."

Checking an algae sample. PHOTO: POND

Vroegh describes Pond's technology as "phenomenally powerful" as it aims several thousand watts of LED lighting at the bioreactor. "Pond has basically built a greenhouse that grows stuff at ridiculous rates."

High growth rate

In fact, Pond, which has invested more that $15 million in its technology, claims a growth rate of more than 20 times that of nature's work in open ponds.

About one tonne of algae consumes 1.8 tonnes of CO_2, says Steve Martin, CEO and chief scientist at Pond. "Everytime you hold a kilogram of our algae in your hand, you're actually holding two kilograms of smoke stack gas that did not go up the pipe."

The algae are harvested from the system as a paste, and almost all the water is recovered, then returned to the system.

Martin says there is no end to the products that could be made from the paste, among them toothpaste, biofuel, animal feed; and using clean-source CO_2, some strains can be used for nutrient supplements. There's also an application for land remediation at decommissioned industrial sites, such as mines.

Industry is accustomed to seeing cleantech as a cost. Seeing it as a revenue source represents a new way of thinking. "It's a paradigm shift that is difficult for industry to understand because it's not set up for it," Martin says. But a steel plant having onsite biorefineries managing CO2 emissions to produce algae is likely more profitable than making the steel.

Votorantim Cimentos doesn't need a lot of convincing there's value in managing the environmental impact of its manufacturing processes. Energy use accounts for about 40% of manufacturing cost in the cement industry, and its Bowmanville, Ont. cement plant is helping to lower those costs. The facility was the first certified to ISO 50001 and it's the flagship for rolling the energy management standard across other plants.

The company is also working on another project that diverts commercial and construction wood debris from landfill where it would decompose and create methane, another greenhouse gas that's more harmful than CO_2. The construction waste will replace a portion of the coal used to fire the cement kilns to make products used in construction. "A lot of people like to say 'cradle to grave.' We like to say 'cradle to cradle' and to bring it full circle in our lifecycle analysis," Vroegh says.

By doing so, the Canadian operations of Votorantim Cimentos are demonstrating that what's good for the environment is also good for business.

Comments?
E-mail jterrett@plant.ca.

Start-up to deliver lower bottling costs. PHOTO: THINKSTOCK

Bottoms UP!

BOTTLE WASHING FOR SMALL BREWERS

A Nova Scotia company is looking to capitalize on Canada's craft beer craze by providing smallish brewers with a bottle washing service to lower costs and improve their environmental footprint.

Atlantic Bottle Wash Inc.'s Dartmouth, NS facility will sort, wash and palletize glass bottles collected from local Enviro-Depots for sale to Nova Scotia microbreweries.

The price for washed bottles is significantly lower than new bottles, but it's cost-prohibitive for many of Nova Scotia's craft breweries to collect and wash them. Atlantic Bottle Wash wants to fill that void, and is backed by a $250,000 repayable investment from the Atlantic Canada Opportunities Agency's Business Development Program to make it happen.

The company is also investing $250,000 in the venture led by beer and wine industry veteran Andre Anglehart. He was formerly the Atlantic district manager for St. Catharines, Ont.-based W.P. Bottle Supply where he worked with Nova Scotia-based microbrewers for many years.

The start-up's waste reduction and reuse activities will divert glass bottles from transport out of province and into the waste stream.

Atlantic's facility in Dartmouth's Burnside neighbourhood will initially process standard 341 millilitre bottles and provide them to three local breweries – Propeller, Garrison and Boxing Rock. Recycled bottles will be sold back to the beer makers for between 19 and 21 cents a piece, saving them up to 30% per bottle.

The energy saved by recycling and washing one glass bottle is enough to power a standard 60-watt light bulb for more than six hours.

Atlantic Bottle Wash expects to recycle approximately 7 million containers annually, which would save 2.8 million kilowatt-hours of energy. That's enough power to light up more than 250 homes for a year.

A commitment to mindful HYDRATION

HOW TO DISRUPT THE BOTTLED WATER INDUSTRY

Flow's Aurora, Ont. plant processes 45,000 litres of water per day. PHOTO: FLOW WATER

Flow Water commits to the environment with a high-quality, healthy beverage in a Tetra Pak container.

BY MATT POWELL, ASSOCIATE EDITOR

Flow Water Inc. doesn't want to be just another bottled water company. In fact, it's not really a bottled water company at all, but rather a producer of Ontario-sourced, high-quality artesian water with a commitment to sustainability that includes the container.

The company has opened a 21,000 square-foot plant in Aurora, Ont., a York Region town about an hour north of Toronto, that will oversee the entire supply chain from a pristine spring water source to packaging. Doing so, the company's founder Nicholas Reichenbach says, minimizes waste, energy and water consumption.

Flow sees itself as a disruptive force in the $15 billion North American bottled water industry. It merges the popular premium water category, which has grown 62% over the past two years, with a sustainable, eco-first business model. On its web site, Flow calls what it does "mindful hydration."

"We wanted to provide an alternative for consumers who desired high-quality mineral water, but don't want to drink out of plastic or glass [because of] environmental and health concerns," says Reichenbach.

The plant, which processes about 45,000 litres of alkaline spring water (transported in sterilized tanks) per day, is equipped with a Tetra Pak A3/Flex filling machines. The water quality is protected from compromise by a quick flash of ultra violet light.

Reichenbach decided to partner with Tetra Pak, the innovative food packager (Canadian headquarters in Toronto) because it produces the most advanced non-plastic, non-glass vessel for beverages.

"When we approached Tetra Pak, we saw it as a leader in renewable packaging. Its promise to me was to bring our package to 100% renewable resources by 2020," says Reichenbach. "This was a promise no one else could give."

Tetra Pak is also Flow's largest financial partner, which is joined by the Business Development Bank of Canada (BDC) and Export Development Canada (EDC).

Scalable production

Flow adds to its green with Bullfrog Power, which will provide the plant with 100% pollution-free electricity.

Reichenbach says the plant is built to scale and capable of producing 100,000 packs a day, but there's also enough space to bring in three more machines. That would increase daily output to 300,000 units.

Flow's natural alkaline spring water is drawn from a family-owned artesian spring in Ontario's Bruce County. The water collects essential minerals, electrolytes and has an alkaline pH of 8.1 at the source. With zero industrial processing and all-natural filtering, water goes straight from the earth into eco-friendly packaging – a non-PET and BPA-free Tetra Pak paperboard carton that's 100% recyclable and up to 70% renewable.

The Aurora plant is the only facility in North America licensed to use Tetra Pak's DreamCap, which is made of plastic derived from sugar cane.

It only takes four employees to operate the machinery that produces about two packs per second and up to 7,200 packs per hour. The facility will sustain 10 new jobs, which may double by next year.

Reichenbach considered a site in Bolton but decided on Aurora because of its proximity to the Greater Toronto Area. The municipality's lower cost per square foot, an aggressive business development strategy and proximity to the Bruce County spring were also key to the decision.

Flow's beverage is sold at more than 4,500 Canadian retailers including Whole Foods, Loblaws, Rexall, Metro Ontario and Quebec, Overwaitea Food Group, Sobeys, Safeway West, Farm Boy, International News, UNFI Distribution, Wallace & Carrey and boutique fitness studios. The company also runs a milkman-style delivery service in Toronto, Vancouver and Montreal.

"Consumers want to invest their money in brands that are responsible for delivering healthy, better-for-you products, and they're demanding better-for-you packaging for the environment," says Reichenbach.

By meeting these needs, Flow Water is also demonstrating that making a difference to the environment and making money don't have to be mutually exclusive.

Comments?
E-mail mpowell@plant.ca.

EMPLOYEE ENGAGEMENT

CREATE OWNERS AND FORM NATURAL WORK GROUPS

Manage rules, create owners out of employees and organize natural work groups to enhance the benefits of lean.

BY RICHARD KUNST

In *The Fearless Monkey* author Dennis Heijin dedicates a portion of the book to the importance of providing customer service and how corporate rules can diminish the ability of an organization to deliver. He proposes the need for rules management.

A principle of lean is how to increase employee engagement; or how to encourage them to act as "owners", something that this example of customer interaction did not demonstrate:

A retail store did not have sufficient stock of an item, but the Customer Service Desk did offer to order more for 40% in advance; however, it would take four to six weeks for delivery to the store. The customer service rep was asked if the store could call with a more precise delivery time once the replenishment order was made? "No, they didn't have the time to do that!"

"Customer service" lost that retailer a significant order that was subsequently filled online.

Every value stream should be viewed and critiqued through the eyes of the customer, but you should also review the rules. They may make sense in many situations, but how much can they be bent to satisfy customers?

Internal value streams focus on continuous process improvement and ensuring employees don't waste time on frivolous activities. But look at employees through a different lens, and you'll see they're providing you with their "Gift of Time," a non-renewable resource that – once used – becomes experience.

How you treat them reflects how they perceive their standard of the standard of performance, even if the rules support something different, and it starts even before the beginning of the workday. How appealing is the employee entrance and the cafeteria? Is it well organized, clean and does it project professionalism? These attributes act subliminally on employees.

For example, a company that made components for the food industry needed to improve internal quality performance. It adopted simple good manufacturing practices (GMP) rules: no jewellery, and employees were required to wear hair and beard nets. Within days, quality dramatically improved, which was attributed to increasing the level of expectations conveyed through the GMP requirements.

This pride in the brand continues into the workplace. A clean, organized and well engineered work environment channelling 5S+1 allows employees to deliver professional results without searching for the proper tools or incurring any of the other eight deadly wastes.

And never underestimate what the "Gift of Time" can deliver. During a turbulent business

Make the most out of the employees' "Gift of Time." PHOTO: FOTOLIA

cycle, a company workforce facing layoffs was challenged to improve materials yields as a way to offset the need to reduce labour. During a 30-day window employees found and implemented enough changes to more than offset the need for labour reduction. All of this plus first time quality, delivery performance and throughput improved, making the company more competitive.

Other lean attributes also deliver benefits. Teams conduct reflections while establishing goals during daily quick stand-up meetings. Total productive management is a nice pre-cursor to standardized work, while acting as an alarm clock for the human brain to insure a safe secure and comfortable environment is maintained. Policy deployment keeps teams aligned to a common goal, and visual standard work instructions share current best practices.

Creating a team

One of the silent covenants of lean is to create an environment where the employee works without disruption. It's all about muscle memory. An employee engrossed in a process develops a rhythm that's like a dance.

When you put employees together social dynamics lead to four phases that develop them into a team: forming, storming, norming and performing. Watch for it, understand it and wait for the evolution to transpire.

Empowering natural work groups allows the team to self govern and deliver outstanding results without the need for command and control.

Structure and support consists of small groups of employees, geographically close, that share defined operational and continuous improvement tasks to achieve common goals. Work groups and organizational support groups operate with clearly defined roles and responsibilities.

Natural work groups go through a transition process before operating as a unified, empowered team. The transition needs to be understood by plant leadership. The number of phases as well as the required time will depend on the current level of workforce engagement and on the natural work group vision defined by the leadership. A strong indicator of the group's readiness for transition is their effectiveness in achieving performance goals (health and safety, quality, throughput, productivity and continuous improvement). These should be closely monitored and serve as the basis for the entire process.

The group needs to be quantified. Supply them with a "report-out board" that covers:

- monitoring daily progress to achieve goals and objectives;
- job rotation and multi skill development;
- quality compliance;
- safety;
- suggestions for improvement;
- product enhancements;
- employee attendance, which indicates engagement; and
- rumour dismissal.

Fully engaging employees as owners of the business, creating natural work groups and reinforcing their efforts by deploying lean strategies will ensure manufacturing activities are successfully accomplished.

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. E-mail rkunst@kunstartofsolutions.com.

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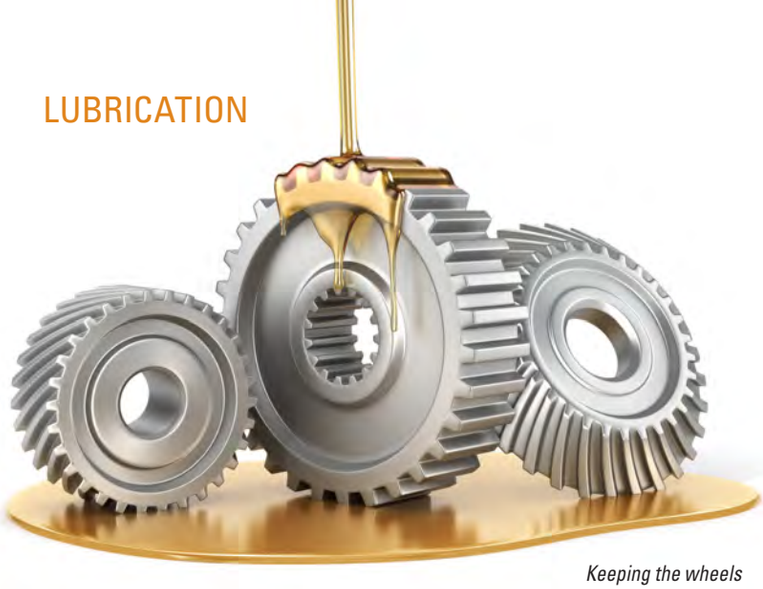
Natural work groups

- Establish a structure
- Set boundaries and norms
- Create a process for team leader/coordinator selection
- Pilot implementation for full deployment
- Educate supervisors and team leaders as applicable
- Share plant vision and business objectives, manufacturing system vision and objectives, group objectives, roles and responsibilities



Keeping the wheels of industry turning.
PHOTO: FOTOLIA

Back to BASICS

WHAT YOU NEED TO KNOW ABOUT LUBES

Experts look at the fundamentals of oil and grease lubrication and provide some nuggets of wisdom.

The wheels of industry won't turn without proper lubrication. Getting it right is key to reducing the amount of friction and wear in the moving parts of machinery.

The Hamilton section of the Society of Tribologists and Lubrication Engineers (STLE) is all about getting right. It hosted some experts who reviewed the fundamentals.

Jim Arner, lubrication expert with Pirr Tribology Solutions in Toronto, reminds maintenance pros that the oil film is key to successful lubrication.

The three lubrication regimes are hydrodynamic (full film lubrication), elasto-hydrodynamic (lowest friction coefficient), and mixed boundary (separation of surfaces by asperity contact). Base stocks account for most formulations and provide the lubricating film.

Proper formulation demands improved engineering design to cope with higher operating temperatures, higher pressures and increased operating hours in today's industrial equipment, but he notes employee safety and environmental factors must also be considered.

He recommends using additives to protect the surfaces coming into contact with the lubricant; to protect the lubricant during service; and to improve performance.

Mathieu Noualy, a technical advisor at Shell Canada in Mount Albert, Ont., emphasizes the importance of oxidation stability. The base constitution is important because it determines the usable life of the oil. Oxidation reduces oil life and blocks filters and valves. All lubricants eventually oxidize, though the rate varies with operating conditions, of which temperature is the most critical.

How long do turbine oils last? As a rule of thumb, five to eight years in gas turbines, 10 to 15 years in steam turbines, 25 years or more in hydroelectric turbines, and one to three years in jet engines.

Noualy said it pays to use synthetic oils, which offer these advantages:

- High oxidation resistance at high temperatures.
- High viscosity index.
- Low pour point, low carbon-forming tendencies, low volatility and low gas solubility.
- Reduced friction, resulting in better energy efficiency.
- Increased film strength.

Many compressor fluids are compatible. Mineral oils are compatible with poly alpha olefins and diester synthetic fluids, but the addition of mineral oil will have an adverse effect on performance. He warns mineral oils and poly alpha olefin synthetic fluids are not compatible with polyalkylene glycols and silicon-based fluids, so take "extreme caution" when converting systems using these fluids.

Pressure to perform

Hydraulic oils transmit power and they're the largest volume oil lubricant type consumed in industrial applications, says John Sherman, technical and development manager of American Chemical Technologies Inc., a manufacturer of synthetics based in Fowlerville, Mich.

Hydraulic fluid systems are categorized by operating pressure. Greater the pressure, the greater the performance requirements. Low-pressure systems are in the 500 to 1,500 psi range; medium pressure covers 1,500 to 3,500 psi; and high-pressure systems are in the 3,500 to 7,000 psi range.

Advantages of hydraulic power include constant force, infinitely variable speed, reversibility, flexibility, reliability and high horsepower-to-weight ratio. The disadvantages are noise, fire hazard, complexity and a tendency to leak.

Sherman lists the functions hydraulics must perform as wear and corrosion protection, hydrolytic and oxidative and thermal stability, resistance to air entrainment and foaming, and the ability to emulsify water. Viscosity must be right for the application and exhibit low compressibility.

Base stock for mineral oil hydraulic fluids originates from crude oil. It provides the basic properties of the lubricant: viscosity and viscosity index; pour point and flash point; oil or water compatibility; and seal and paint compatibility. Additives supplement or add new properties to the base stock such as steel and copper corrosion protection, de-foaming and anti-wear protection. They're also added to improve pour point and viscosity index.

There is an environmental factor to consider. Sherman warns the potential for leaks and spills in hydraulic systems is greater than other lubricant types due to their inherent requirements. They include high pressures, flexible hoses, many seals and O-rings that may degrade and leak hydraulic fluid, and systems used in mobile equipment that's often close to or on bodies water. There's no single acknowledged standard for environmentally acceptable hydraulic fluids, but there are some guidelines from OEMs, independent associations and government environmental labels.

There are compelling reasons for using hydraulic oils in appropriate applications but it's also a good idea to look at other lubricants for industrial machinery. — *Steve Gahbauer*

A lubricant's job

- Reduce friction and minimize wear
- Reduce noise and vibration
- Prevent corrosion
- Cool parts
- Disperse combustion products
- Act as a sealant
- Transmit power

Comments?
E-mail jterrett@plant.ca.

CCOHS SAFETY TIPS

Marijuana on THE JOB

TIME TO UPDATE YOUR ALCOHOL AND DRUG POLICIES

Prepare for workplace issues related to the medical and recreational use of cannabis.

As the number of Canadians who are prescribed medical marijuana grows and the federal government looks at a new legislative framework for its legalization and regulation, what does this mean for the workplace?

The federal government has announced plans to legalize marijuana with a target date of July 1, 2018. However, the possession of marijuana (cannabis) is still illegal in Canada under the Controlled Drugs and Substances Act, although it's permitted for individuals with a medical prescription.

To keep pace with these changes, update your company's alcohol and drug policies.

Treat non-medical use of marijuana in substantially the same way as the use of alcohol under your current policy. Policies permitting the prescribed medical use would be either as an "accepted" result of a random drug test, or as a form of accommodation. When making accommodations, as with any prescription, employers have the right to prohibit impairment on the job, particularly in safety-sensitive positions.

Impairment occurs when the chemicals in the smoke pass from the lungs into the blood vessels and are carried throughout the body to the brain.

Develop a workplace policy that is clear about the implications of impaired on-duty workers. PHOTO: FOTOLIA

Immediate effects include a feeling of euphoria and a state of relaxation, changes in perception, time distortion, deficits in attention span, momentary body tremors and impaired motor functioning. Health Canada states, "Using cannabis or any cannabis product can impair your concentration, your ability to think and make decisions, and your reaction time and coordination. This can affect your motor skills, including your ability to drive."

Defining and assessing impairment poses a significant challenge when developing and implementing policies. Because of the evolving legal issues, consult with legal experts to develop company policy and be clear on the implications of impaired on-duty workers.

Impairment challenge

Clearly articulate that medical use of marijuana does not negate workplace policies for safe job performance.

Review any workplace policies involving drug and alcohol use, in consultation with the health and safety committee and unions. Focus the policy on "impairment" or "under the influence" and the ability to do the work safely. Make policies inclusive and consider any prescribed drug or substance that's used medically (or otherwise).

An employee should advise the employer if a medical procedure or treatment will affect safe job performance.

If your company has a substance use/abuse policy, it may be necessary for that employee to disclose the medical use of marijuana.

Treat marijuana in the same way as any other prescription drug that could affect performance and present a safety risk, and have clear policies in place that deal with impairment.

This article was contributed by the Canadian Centre for Occupational Health and Safety. The Hamilton-based organization provides information, training, education, management systems and solutions that support health and safety programs, as well as the prevention of injury and illness in the workplace. Visit www.ccohs.ca.

Comments?
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AUTOMATION

Industrial risk

Focus on managing four areas

Manufacturers are subject to a number of risks, such as product recalls, data breaches and worker injuries.

Rockwell Automation says risk management should focus on where problems originate. The automation company based in Milwaukee recommends addressing four areas:

- **Equipment obsolescence.** Modernize production systems to minimize downtime and improve quality, safety and security.
- **Quality.** Harness the power of existing operational data to improve quality management and drive adherence to regulatory requirements.
- **Safety.** Address safety in crucial areas of culture, compliance and capital to reduce the number of safety incidents and improve operational performance.
- **Security.** Embrace end-to-end security across facilities and enterprises to protect people, intellectual property and physical assets.

Repetition and feedback reduce training costs and production errors.

BY HUGH ALLEY

Engineer teaching an apprentice how to use a TIG welder. PHOTO: FOLOLIA

Repetition strengthens SKILLS

IMPORTANT WHEN LEARNING NEW TASKS

Recently I was in a workplace where I learned a new skill – sort of. It involved learning to distinguish between two kinds of living plants, one a desired species and one not. We were shown perfect examples of each, and we could see the difference. But when these species are young, they look very similar.

We didn't get a chance to try the new skill and get feedback. "Just get started and feel free to ask questions," the supervisor said. But whenever we were stumped, we would lose five minutes or so of working time to find one of the supervisors and then walk back to the work area. In the first hour I lost at least 20 minutes and I suspect everyone else did, too, unless they guessed. I guessed, and made some mistakes.

When people are learning, repetitions help them to master the new skill, and they need immediate feedback to know the skill was executed correctly. This lowers training costs and reduces error rates.

The evidence suggests eight to 10 repetitions takes the learner to a useful level of competence. It's not a hard and fast rule, but it is a helpful guide.

At that level, most people reach 70% to 80% of full performance. They're not the fastest, but they're not making mistakes as minds and muscles develop memory for the task.

Contrast that to training in most plants where it's rare to have someone do more than a couple of reps before they're left on their own. "I'm sure they'll pick it up," is the assumption made. But with so few repetitions, it's likely they won't pick up on the nuances, while developing some bad habits.

That can be expensive, especially if the component they're working on will be buried deep within a product that's destined for shipment to domestic or global markets.

What should our supervisor have done?

Start with a dozen samples for us to work our way through. Those samples would have brought the subtle differences to our attention. If we could accurately distinguish them apart, the supervisor would have been reasonably confident we'd choose well in the workplace.

Hugh Alley is an industrial engineer based in the Vancouver area who helps organizations achieve significant performance gains in delivery, quality and cost in a short timeframe. Call (604) 866-1502 or e-mail hughralley@gmail.com.

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The EMC-Harvard course develops critical thinking, leadership and management skills, while delivering ROI and other benefits.

BY JOE TERRETT, EDITOR

Applied learning in the workplace leads to more confident supervisors. PHOTO: FOTOLIA

Building better SUPERVISORS

CERTIFICATE PROGRAM BOOSTS PLANT FLOOR LEADERSHIP

There are people working on any plant floor with obvious leadership abilities who would be well suited to future management roles, and there are managers and supervisors who have the potential for advancement to the next level. But they could use some help tuning up their people skills and management chops.

The Excellence in Manufacturing Consortium (EMC), partnering with Harvard Business Publishing, offers training to develop problem-solving skills related to process improvement, coaching and managing a team, and dealing with "difficult" interactions.

The EMC-Harvard Supervisory Certificate Program is 10 weeks of intense personal development for participants who in turn deliver lasting direct hard to measure benefits.

"The idea was to present a flexible way for high-potential employees and supervisors to develop themselves over a specific timeline," says Jean-Pierre Giroux, EMC's director of human capital development based in Ottawa. "Students and their companies have to commit to the time requirement, which is 50 to 60 hours, five to six hours a week."

Giroux says participants learn through webinars, online meetings with Harvard professionals and industry experts, online learning, networking and by completing a company-approved workplace performance project that deals with a challenge and delivers real benefits.

"Most training is geared to the individual. This program looks at the individual and the company," says Giroux.

In the project segment of the course, participants are asked to establish metrics to assess the impact on the bottom line. Experience shows the ROI ranges from $5,000 to $500,000 a year, but there are plenty of intangible benefits, including better communication on the plant floor, more efficient processes and improved productivity.

Bisor Kostov completed the course, finishing about a year ago in June. The plant manager of TMF Foods Ltd. in Stoney Creek, Ont. has been performing a management role for 20 years.

"I never realized how much we can go beyond that [experience]," he says.

The company, just shy of 110 employees, makes meat products for the food service and retail markets in an 85,000 square-foot plant. About 68 people work in production and 40 in the office.

Measurable benefits

TMF (The Meat Factory) has been sending people through the supervisory course since 2015 and so far four groups of two have earned certificates.

Kostov's project involved dividing the two meat production lines so they could be shut down one at a time for changeovers.

Before, both had to be shutdown to avoid cross-contamination from water and chemicals, taking them out of production. He estimates savings at $30,000 a year. But he has applied the

$500,000 benefit

One of the big wins from the EMC-Harvard supervisory certification program was a project that involved waste reduction through strategic pallet packing.

The unidentified manufacturer was getting less revenue from its smaller packages despite first-grade quality.

The workplace performance approach involved analyzing the packing process to integrate smaller tubes, without affecting customer satisfaction. The solution was to implement new pallet-packing techniques.

As a result, the company achieved annual savings of $500,000 per machine through recaptured inventory that doesn't require rework.

principles more broadly, netting additional savings. By analyzing the use of packaging film, the company was able to reduce the amount used, saving another $30,000 a year, and he estimates more efficient production lines are saving about $10,000 month.

Communication on the plant floor was always pretty good, but Kostov added a feature that came from the course. "After we identify a production problem, I call the group together to brainstorm. Before, I would try to solve the problem myself."

EMC member Rose Integration in Carleton Place, Ont. has put three groups through the program, the latest involving five employees. Its high-end machining keeps 75 skilled workers busy in a 30,000 square-foot plant, where they make complex components for the aerospace and defence, exploration and mining, rail and communication markets.

Engaging employees

Plant manager Ryan Bishop is already seeing significant changes in the way the latest group is interacting with their teams. For the most part, the graduates are millennials (25 to 35), either machinists taking on new roles who have not been supervisors.

"It wasn't natural for them to engage with other employees, to have difficult interactions or try to rally the troops. They were having a hard time getting to that point," Ryans says.

They have more confidence now and he's seeing different body language when they're talking with employees.

"They're engaging them, asking questions that need to be asked, using the tools they learned in the course, and applying root cause analysis rather than blame. They're actually trying to dig into the problem."

The group's project involves reducing set-up time by 10%. "We think the payoff will be worth it," says Ryan, who sees a potential $125,000 benefit.

That's a pretty good ROI for a cash investment of $2,000 per participant, with discounts for EMC members who register two or more candidates.

Ryan urges companies to also invest time in their supervisors while they're involved in the course. Rose Integration allows participants an hour each week of the course for webinars and some time for the learning portion.

The program is national, although most of the participants come from Ontario. More than 300 certified graduates represent 92 companies, 20% of them repeat customers and EMC estimates the total ROI from projects tops $10 million.

The sessions are offered three times a year: winter, spring and fall. The next one is Sept. 18. And stay tuned for a similar course aimed at production workers.

Contact Jean-Pierre Giroux at jp.giroux@cmn-rmc.ca for more information.

Comments?
E-mail jterrett@plant.ca.

Government policies streamline the application process. PHOTO: FOTOLIA

Innovation HIGHLIGHTS

WHAT'S IN IT FOR YOU?

Accessing funding for innovation and R&D is a lot easier.

BY MATT POWELL, ASSOCIATE EDITOR

The Trudeau government's budget for 2017 doesn't appear to offer much for manufacturers to get excited about. Tax rates remain static, the capital gains tax was left as-is and there aren't any changes to the popular accelerated capital cost allowance for new machinery and technology. But the budget does provide room to manoeuvre, and there are useful measures for ramping up innovation.

First, some caution is warranted. Jim Menzies, a partner and Canadian manufacturing industry leader at Grant Thornton Canada LLP in Toronto, warns there could be significant implications for manufacturers should the US drastically reduce its corporate tax rate to 15%, well below the 27% Canadian benchmark.

"The fact that the government didn't tinker with corporate taxes is a big positive," Menzies says. "It doesn't, for the time being at least, have US companies operating in Canada considering a move home. But if the US drops tax rates significantly, all bets are off: Canada loses its tax advantage and that will have a significant impact on jobs and investment here."

Looking beyond the Trump factor, there are some elements in Budget 2017 manufacturers should be happy with. The plan outlines the government's vision of Canada as a high-tech, highly skilled, innovation player providing advanced products and services to the world. Policies are designed to streamline access to government funds.

"The government is taking an extremely successful approach to innovation," says Martha Oner, a partner and national leader of R&D and government incentives at Grant Thornton LLP (Canada) in Kitchener, Ont. "The strategy creates a one-stop shop, which alleviates a lot of pain for a lot of companies frustrated by the historical lack of clarity and what's required to apply for these programs."

A group of superclusters combine to create the Innovation Canada platform. The plan earmarks $950 million to accelerate growth in six sectors, including advanced manufacturing, clean technology and digital technology. None of the money is new

R&D

New procurement program

BY PLANT STAFF

Federal Budget 2017 emphasized streamlining processes for innovation and R&D funding, boosting investment and encouraging more new technology.

The proposed Innovative Solutions Canada (ISC), a new $50 million procurement program, allocates a portion of funding from federal departments and agencies to early stage research from Canadian innovators and researchers in exchange for access to products and services.

The program takes some of the risk out of innovation.

Final details are to come, but it's anticipated there will be two parts to ISC. The first is being compared to the successful US Small Business Innovation and Research (SBIR) program. The government acts as a strategic investor in projects that meet specific requirements related to commercialization and R&D needs.

Tesla, considered an "archetype of Silicon Valley Innovation," is the most famous graduate of the program. It received nearly $500 million as a government-guaranteed loan to develop its Model S electric car.

The second will be modelled after a system used in the UK since 2001.

The government earmarks a share of its procurement budget that's assigned to SMEs through competitive R&D contracts.

According to the Canadian Advanced Technology Alliance (CATA Alliance), an Ottawa-based innovation lobby group, the program will only be successful if it permits a portion of the funds to be used for commercializing innovations.

Eligible costs would include website development, search engine optimization (SEO), attending symposia and exhibiting at conferences.

– $800 million is drawn from last year's quota for innovation, while another $150 million comes from public transit and green infrastructure allocations.

Oner is a fan of the supercluster approach, pointing to the success of Communitech in Kitchener, Ont. The hub consists of more than 800 companies in the information technology, digital media, biomedical, aerospace, environmental technology and advanced manufacturing sectors. It aims to connect them with government agencies, academic institutions, tech incubators and accelerators.

That means significant funding dedicated to the development of technologies related to the Internet of Things and artificial intelligence, which will align with developments in the global manufacturing space.

Canadian Manufacturers & Exporters (CME) is also pleased with the supercluster approach.

"We expect government will work with manufacturers to get this cluster off the ground quickly, and the need is urgent," says Dennis Darby, CME's CEO.

He notes 36% of CME's membership has identified the cost and risk of seeking new opportunities as a leading domestic barrier to achieving export success.

Programs consolidated

For automotive and aerospace manufacturers, the Strategic Innovation Fund combines four previous funds into a five-year initiative worth $1.26 billion. The intention is to consolidate existing business innovation programming from programs including the Strategic Aerospace and Defence Initiative, Technology Demonstration Program, Automotive Innovation Fund and Automotive Supplier Innovation Program.

To support the program expansion, the budget will provide another $200 million over three years to supplement existing funding, of which $100 million will be new funding and $100 million drawn from the $1 billion to support clean technology announced in Budget 2016. Refundable and non-refundable assistance will be provided based on risk sharing.

CME is confident the fund, still available to the aerospace and automotive sectors, will attract new, high-quality business investments, while expanding to other emerging sectors such as clean technology and agri-food.

Another initiative of note is the private sector Canadian Business Growth Fund, designed to fill the gap between small-scale start ups and mid-tier corporations.

"There's a significant lack of funding in this space, where most smaller firms are depending on friends, family or angel investors to grow, and are eventually acquired by larger firms," says Oner. "We're not seeing the reinvention of small and medium-sized businesses that create jobs and sustain the tax system."

A group of Canadian banks and insurance companies have created the fund and plan to invest up to $1 billion over the next decade.

Investments in SMEs will finance growth and scale up existing operations. Typical investment amounts will range between $3 million and $20 million.

Although described as a stand pat, status quo affair, Budget 2017 does offer some features that manufacturers should take advantage of to help them get ahead, despite the uncertainties arising from the Trump administration.

Comments?
E-mail mpowell@plant.ca.

Incubators, accelerators and developers collaborate with industry and academia to nurture research and development

BY PLANT STAFF

Centennial College's aviation lab. PHOTO: CENTENNIAL COLLEGE

New projects boost INNOVATION

AEROSPACE, AUTOMOTIVE AND ENTREPRENEURS TARGETED

Canada's innovators are getting a boost thanks to funding and project announcements involving the aerospace and automotive industries, and IBM's incubator program.

First up is Centennial College, which received $2.3 million in funding from the Natural Sciences and Engineering Research Council of Canada (NSERC) to develop a next-generation landing gear for energy efficient aircraft.

The Toronto-based college will work with Safran Landing Systems, a manufacturer of aircraft landing and braking systems in Ajax, Ont. They'll develop an electric-actuated system to replace heavy hydraulics. Manufacturers are aggressively pursuing weight reduction efforts to make more energy efficient aircraft.

Centennial's landing gear research program is worth nearly $8 million, and represents the largest applied research initiative in its 50-year history. The college is opening a new $72 million, four-acre aerospace campus at Downsview Park next year at the former de Havilland of Canada site. A new hangar will be large enough to accommodate commercial jets.

The project has received $25.8 million from the Ontario government, and another $18.4 million in Strategic Investment Funds from the federal government.

Moving on to Quebec, MacDonald, Dettwiler and Associates Ltd. (MDA) is establishing a Satellite Centre of Excellence in Montreal with $3 million in non-refundable funding from the province.

The Vancouver-based global communications and information company is getting $45 million as a royalty-based contingent venture loan to develop a next-generation, digital payload satellite system project.

Innovators will benefit from the IBM Innovation Space – Markham Convergence Centre at IBM's Canadian headquarters in Markham, Ont. The tech giant and ventureLAB, a Markham-based non-profit that helps start-ups and entrepreneurs find their feet, are providing a space that brings innovators together with funding agencies, researchers, experts and mentors.

The hub is part of the IBM Innovation Incubator Project, a $54 million initiative between IBM, and Ontario Centres of Excellence (OCE) to propel 'made in Ontario' innovation.

The Markham space is currently hosting 25 start-ups and entrepreneurs.

Members include OCE, the National Research Council-Industrial Research Assistance Program (NRC-IRAP), Markham Board of Trade, Markham Small Business Centre, Innovation York and Seneca College.

Smart tech

Peytec, an Internet of Things (IoT) developer using the space, has developed a system that provides real-time physical asset management to improve and automate supply chain, packaging, warehousing and distribution processes in the manufacturing and logistics sectors.

On the automotive side, Magna International in Aurora, Ont. is investing $5 million to boost leadership in the development of Canada's artificial intelligence (AI). The auto parts manufacturer is providing the money to the Vector Institute, an all-new independent AI research think-tank in Toronto.

The facility will specialize in deep and machine learning. The research aims at attracting, developing and retaining some of the best and brightest in AI.

And Hong Kong-based automaker Infiniti has opened an accelerator program in Toronto to grow companies focused on IoT and smart city initiatives.

The program is produced in partnership with Multiplicity, a Toronto-based nonprofit that provides education and mentorship to start-ups. INFINITI LAB launched in Hong Kong two years ago. The Toronto facility represents the first to of its kind to launch in Canada.

Selected start-ups will work closely with corporate and industry partners including: Techstars; OMERS Ventures; TELUS Ventures; the City of Toronto, and Fleet Co. They'll provide access to technology, mentorship and education during the month-long program.

Comments?
E-mail mpowell@plant.ca.

Embrace AUTOMATION

...THEN MANAGE THE SIDE EFFECTS

BY PLANT STAFF

More on the pros and cons of advanced technologies, this time from the Bank of Canada.

Senior deputy governor Carolyn Wilkins told the Toronto Board of Trade in an April speech that automation, artificial intelligence and other innovations will benefit the Canadian economy by boosting productivity and living standards. But less desirable side effects on the labour market and income distribution would have to be managed.

Wilkins encouraged Canadian businesses to embrace new technologies and create what she calls "inclusive prosperity."

She conceded technological innovations often change the types of workers needed and lead to greater income inequality. Smoothing the transition requires updating education, skills training and creating continuous learning environments. Resisting protectionism will also be critical, because trade openness drives productivity growth.

Underwhelming productivity growth since the early 2000s has cost Canada dearly. If productivity had continued to grow as it did in the late 1990s, Wilkins said Canada's GDP would have been 23% higher in 2016 – an extra $13,000 for every Canadian.

The good news is Canada has an opportunity to make up for lost time. Innovations in artificial intelligence, robotics and other fields could give productivity a big boost by automating an expanding range of tasks. Yet many are uneasy about what automation means for workers.

Don't blame technology

Indeed, technological improvements have eliminated jobs in manufacturing. If the clock were rolled back on productivity by 20 years, 750,000 more people would be needed. However, job losses in manufacturing have been offset by gains elsewhere. Wilkens said roughly 82% of the prime-age population is now employed, which is about 13 percentage points higher than 40 years ago.

Automation has been mostly restricted to manual or procedural tasks. Now technology automates a growing number of cognitive and non-routine tasks. But eventually new jobs are created to supply the goods and services people buy with the extra income.

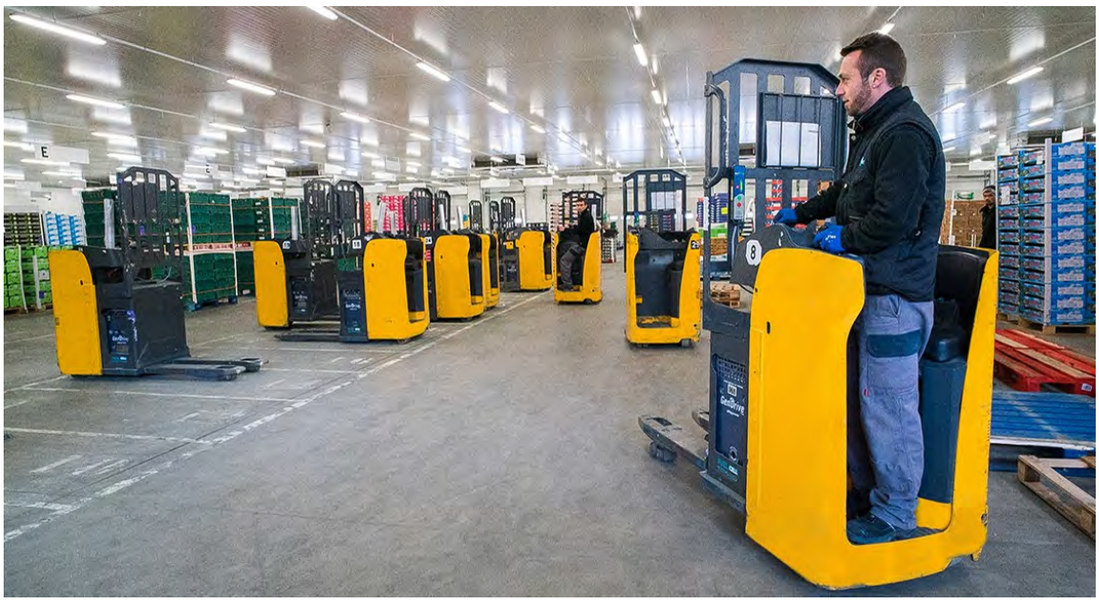
Wilkins warned that blaming the machines is not the way forward.

"If we seek out and embrace new technologies while successfully managing their harmful side effects, we will create inclusive prosperity," she said.

Comments?
E-mail mpowell@plant.ca.

CIEN | CANADIAN INDUSTRIAL EQUIPMENT NEWS

MATERIAL HANDLING



Multiple savings with multiple hydrogen forklifts. PHOTO: AIRLIQUIDE GUILLEMIN/LUCAS

Going green at ProMat 2017

HYDROGEN FORKLIFTS AND OTHER SOLUTIONS

The material handling and logistics show's sustainability centre promoted energy efficiency, reusing materials and saving space.

BY PLANT STAFF

Canadian industry is under growing pressure to deal more aggressively with its carbon emissions. The Trudeau government is keen on levying a price for carbon and it's pushing provinces without some kind of fee to apply a tax, or like Ontario and Quebec, set up a cap and trade program.

Every manufacturer is a carbon emitter regardless of intensity and whether it's for environmental, altruistic, practical or public relations reasons, carbon action will play a bigger role in business strategy. An area that offers opportunities for carbon savings is material handling, which received some attention at ProMat 2017 in Chicago April 3 to 6.

One way companies operating forklift fleets in plants or distribution centres can reduce the size of their carbon footprint is by switching to hydrogen-powered vehicles. Most forklift manufacturers offer hydrogen-capable units and there are plenty of benefits, chief among them zero carbon emissions. Hydrogen gas combines with oxygen from the air to produce electricity, discharging only water.

Air Liquide, which supplies the hydrogen and delivery systems, showed ProMat attendees what's involved.

Its hydrogen station has two modular components: the automatic refuelling control panel and the dispenser, which includes the tube and nozzle. Stations are installed in the heart of the facility's logistics platform for fast recharging. They can be positioned in several strategic locations, rather than having the centralized hub that would service electric forklifts. This reduces travel time, which boosts productivity.

Switching to hydrogen fork-

SUPPLY LINES

Pump partnership

KSB Pumps in Mississauga, Ont. is partnering with ONTOR Ltd., a Toronto-based distributor of equipment and supplies for HVAC systems, to extend its reach in the building services market.

The Megaline used in HVAC systems or for pressure boosting building water services is one of the pumps available through the partnership.

IoT benefits

MES manufacturing consulting firm Factora Solutions has joined the GE Digital Alliance Program.

This collaboration gives clients access to digital tools, technologies and domain expertise as they develop Internet of Things (IoT) capabilities leveraging the GE Predix platform.

Factora's Canadian offices are in Trois-Rivières, Que.

Data centre allies

Rittal Corp. is partnering with Hewlett-Packard Enterprises, the multinational IT company based in Palo Alto, Calif., to deliver modular data centres to the global market.

The alliance will focus on computing challenges related to the Internet of Things (IoT) and Edge networks.

Rittal, based in Schaumburg, Ill., makes industrial and IT enclosures.

Machine vision AI

Cognex Corp. has acquired ViDi Systems SA, a Swiss maker of machine vision software.

ViDi uses artificial intelligence techniques to improve image analysis in applications where it's difficult to predict potential image variations. The software distinguishes between acceptable variations and defects.

Cognex, based in Natick, Mass., manufactures machine vision technology.

lifts also saves space. No need for storing heavy spare batteries operators would have to lug in and out of their vehicles.

Vehicles run longer and provide more consistent power because they don't slow down like electrics, which lose 14% of their speed over the last half of the charge. And fuel cells last longer: about 10 years compared to five or six years for lead-acid batteries.

Air Liquide Canada (based in Montreal and part of the multinational Air Liquide Group based in France) supplied the hydrogen, filling station and infrastructure to power Walmart's forklift fleet in Balzac, Alta. The retailer wanted an alternative to the traditional lead-acid batteries powering forklifts at its 400,000 square-foot perishable food distribution centre.

It put 95 Plug Power GenDrive units to work at the facility running on Ballard Power Systems FC VeloCity 9SSL and FCgen 1020 ALS fuel cells.

Noticeable benefits

The switch reduced operating costs by $1.1 million over seven years and the facility avoids 53,000 tonnes of carbon emissions a year. Walmart now has 500 vehicles in operation in three facilities, which include distribution centres in Cornwall, Ont. and Bartlesville, Okla., with hydrogen systems managed by Air Liquide.

ProMat featured other useful sustainability solutions at its Sustainable Facility Solution Center that promote energy efficiency, reuse materials and saving space.

Here some highlights:

Lighting changeover. Foreverlamp, (**foreverlamp.com**) a supplier of "big lumen lighting" based in Los Angeles, makes LED replacement or new lighting for large spaces such as distribution facilities and plants. Its RS Series replaces 750- and 1,000-watt metal halide lamps, providing up to 52,000 lumens. GS, PS and HS versions cover 18,000 to 27,000 lumens compatible with 400 watts through 175-watt pulse and probe start ballasts. HB high-bay fixtures replace a 400-watt HID with a 60% energy cost savings compared to MH and HPS systems.

Cardboard redux. It's all about reusing corrugated cardboard boxes at Box Latch Products, (**https://boxlatch.com**) based in Pewaukee, Wis. The manufacturer makes plastic latches that slip between the openings to hold down the flaps. They replace the tape, glue and straps that destroy corrugate cardboard containers after a single use. The idea is to use the boxes several times, then recycle them. The company claims integrating the box latches saves 10% to 90% of material costs. This also saves a lot of worker wrangling of tape, glue and straps, plus it's good for the environment. Every ton of cardboard box that's reused saves nine cubic yards of landfill, 380 gallons of oil, 4,000 kilowatts of energy, 7,000 gallons of water and 17 trees, while reducing energy use by 64%, water by 58% and eliminates 60 pounds of air pollution.

Recover space. Storax America, (**www.flexspace360.com**) a high-density storage partnership involving Storax Solutions (based in England) and Flexspace (Charleston, NC), tackles the efficiency issue with two products that help maximize storage space. The Poweracks mobile storage racking system employs a moving aisle, which provides direct access to every pallet location and greatly reduces the number of static access aisles required. The recovered space then converts to usable inventory space. A tunnel rack system leaves operators free to execute other tasks.

Comments?
E-mail jterrett@plant.ca.

PRODUCT FOCUS
TEST, MEASURE

STATION SPEEDS LEAK TESTING

Test units in one stand.

Sciemetric Instruments Inc., an Ottawa-based provider of Industry 4.0 smart technologies has a turnkey station that boosts the speed and accuracy of leak testing.

The 3675 combines up to three of Sciemetric's 3520 Series leak test units in one stand, controlled by a single sigPOD controller. Use the station to conduct tests including pressure decay, mass flow and others with pressure or vacuum.

The station is customizable for plant requirements, including any geometric concerns (such as orientation) with the leak tester and the tested part. This includes remote mounting of the 3520 units, pneumatic connection kits and more.

The rugged T-frame construction stands just 28 x 33 x 62 in. high.

www.sciemetric.com

PROBE PROVIDES OPTICAL ISOLATION


60 MHz oscilloscope.

The Teledyne LeCroy HVFO103, a fibre-optically isolated 60 MHz oscilloscope probe, measures small signals floating on a high-voltage bus in power electronics.

Optical isolation between the probe tip and the oscilloscope input reduces adverse loading of a device under test. It also reduces noise, distortion, ringing, overshoots and transients on the measured signal.

A single laser and fibre optic cable provide optical isolation and modulated signal, plus data communication. Tips are available for various operating voltage ranges.

The probes are supplied by Saelig Co. Inc., a Teledyne distributor for North America based in Fairport, NY.

www.saelig.com

PRODUCTS FOR DIMENSIONAL METROLOGY AND GAUGING

The MarSurf PS 10 from Mahr Federal uses a smartphone-like 4.3-in. TFT touch screen display on the shop floor to measure 31 roughness parameters using a list of "favourite" functions.

Measure smaller shafts and turned parts with the MarShaft SCOPE 250 plus with its 4 million pixel matrix camera. The system measures parts up to 250 mm in length and 40 mm in diameter with a maximum permissible error of less than 1.5 µ.

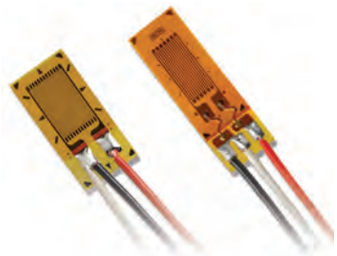

Handheld to advanced systems.

Mahr Federal's line of mechanical comparative gauges can be configured for wireless data transmission with the MarCator 1086 or 1087. They speed part inspection, reduce the complexity of data collection and improve the quality control process.

The manufacturer of measurement instruments is based in Providence, RI.

www.mahrexactly.com

LEADS FOR HOT STRESS ANALYSIS



Handles up to 204 degrees C.

Micro-Measurements has added a new, optional pre-attached Teflon lead wire for its CEA- and WK-series strain gauges. Option SP35 supports high-temperature stress analysis requirements to 204 degrees C in automotive, aerospace or any other structural material.

It's particularly useful for higher temperature composite materials testing, eliminating the need for soldering on the test article. And it has no impact on strain gauge resistance tolerance or strain range specifications.

Option SP35 includes 3 m of 30-AWG, twisted, etched Teflon lead wires (330-FTE). The etching ensures any protective coatings applied over the installation will bond and seal to the cable.

Gauge lead wires are pre-attached via solder to the strain gauges to support specific requirements to 177 degrees C and 204 degrees C. Their three-wire quarter bridge configuration cancels any potential cable thermal output that may occur in response to temperature changes.

Micro-Measurements, based in Lavern, Pa., makes resistive-foil sensors for high-precision strain measurement.

www.micro-measurements.com

LASER ACCURACY IN SLS, SLM

The BeamChec profiling system from Ophir ensures accurate laser performance in additive manufacturing applications such as selective laser sintering (SLS) and selective laser melting (SLM).

Consistent energy must be delivered to the material so the power density is just right. BeamChec measures the critical beam parameters: focal spot size, laser power, and laser power density at the build plane, and changes in spot size and power density over time.

The device integrates a high resolution CCD camera for spatial measurements and a NIST-traceable power sensor for a complete analysis of the laser power density profile. The camera is precisely located at the build plane to make an accurate power density model of the working laser beam. A splitter directs a small percentage of the beam from the fibre laser to the camera, with the rest directed to the integrated power sensor.

Checks critical beam parameters.

Ophir is a manufacturer of instrumentation based in North Logan, Utah.

www.ophiropt.com/photonics

MATERIAL HANDLING

CONVEYOR MOVES DELICATE MATERIALS GENTLY

Manual and automatic start/stop.

Flexicon's flexible screw conveyor's manual jack screw gently tilts down and rolls, discharging bulk materials such as sub-micron powders or large pellets into processing equipment without separating blends. Fully lowered, the conveyor rolls through doorways as low as 7 ft. and aisles as narrow as 42 in.

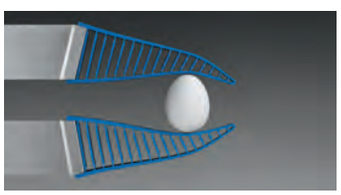
It's mounted on a caster frame with a support boom and 316 stainless steel hopper grate. There's a sanitary quick-release clean out cap, quick-connect discharge box access cover, and a stainless control panel.

An HMI controls manual and automatic start/stop and speed adjustment, and liquid-tight compression fittings allow washdowns during changeovers.

Material flows through the hopper into an adapter that charges the conveyor. The top-driven flexible screw self-centres within the tube. Clearance between the screw and the tube wall minimizes grinding and prevents contact with bearings or seals.

Flexicon is a manufacturer of material handling equipment based in Bethlehem, Pa.
www.flexicon.com

GRIPPERS IMPROVE AUTOMATED HANDLING APPLICATIONS



Based on fish tails.

Festo's DHAS adaptive gripper fingers handle odd or variable shapes, or delicate objects in pick-and-place automation.

The FDA-listed polyurethane fingers, resulting from a bionics project to develop advanced products by mimicking nature, use the Fin Ray Effect based on the physiology of fish tails. They adapt to the contour with tweezer-like safe gripping.

Moving elements combine positive and friction-based gripping, while providing a large contact area for contoured surfaces.

They insert into narrow containers or environments; grip and transport parts with irregular shapes and different diameters; and provide soft, non-destructive gripping and low-vibration transport of fragile parts.

The 60-, 80- and 120-mm grippers, which don't need to changed to handle different sized shapes, also install on the end of collaborative robots, where they turn or insert objects.

Festo is a industrial control and automation manufacturer based in Esslingen am Neckar, Germany. It has Canadian offices in Mississauga, Ont.
www.festo.com

PREVENT UNSECURED LIFT OPERATIONS

Stores up to 500 user pass codes.

Wildeck Inc.'s LiftLok VRC safety system prevents untrained or unauthorized personnel from performing lift operations.

The mechanical or hydraulically-operated vertical reciprocating conveyors have a basic key switch or 10-key pushbutton digital keypad.

Authorized lift operators enter a unique four-digit user/pass code, or swipe their pre-programmed proximity credentials tag (key fob) on the digital keypad.

Two administrative level programming codes simplify installation.

Although access to the lift is typically assigned to only a few authorized personnel, the system stores up to 500 user pass codes.

Wildeck is a manufacturer of material handling and safety products based in Waukesha, Wis.
www.wildeck.com

CABLES

CONNECTION KITS ELIMINATE HEAT SHRINKING

UL-listed, CSA-certified.

EasyHeat's low-profile quick connection kits help field engineers terminate self-regulating heating cables faster and cleaner in industrial applications where liquids must be kept at a specific temperature for processing.

Quick-setting silicone and slip on connectors eliminates heat guns and shrink tubing. The silicone adhesive is applied cold and doesn't require any heating to cure. When the adhesive is applied, the boot connector quickly completes a termination.

The SRME kit terminates the cable ends, while the SRMP Power-End kit joins cables inside a power connection box.

Each UL-listed and CSA-certified kit covers five complete connections.

Easy Heat is a subsidiary of the Appleton Group, a manufacturer of industrial electrical products based in Rosemont, Ill.
www.easyheat.com

SWITCHES

SWITCHES ARE EASILY REPLACED

NEMA-rated.

AutomationDirect's F25 limit switches are NEMA 3, 3S, 4, 4X, 6, 6P, 13, and IP67-rated for industrial environments.

All UL-listed and CSA-certified

switches have three modular, interchangeable, plug-in components: operating head, switch body, and wiring receptacle. Operating heads (side rotary, top and side push, and wobble stick) are mounted on top of the switch body in any of four positions.

A plug-in component allows easy replacement of a damaged switch in the field without rewiring.

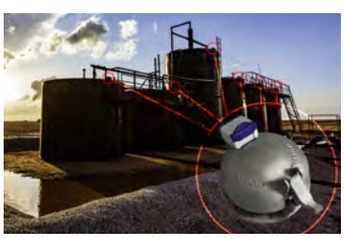
Made of a die-cast zinc housing, the fully assembled switches feature a 90-degree adjustable head. Snap action contact versions are available on all units.

Nine side rotary switches come with fixed and adjustable length stainless steel levers and Nylatron or metal rollers.

AutomationDirect is a supplier of industrial automation equipment based in Cumming, Ga.
www.automationdirect.com

SENSORS

REMOTE TANK MONITORING



Modbus or digital alarming.

SignalFire's Hatch Watchdog monitors the status of tank hatches to guard against accidental emissions.

When tank hatches remain ajar, they can release vapours into the atmosphere. The Hatch Watchdog sensor tracks the angle of the tank hatch and wirelessly reports status (open/closed/cracked) and changes to a central gateway that formats and transmits data to a control centre for remote monitoring.

Modbus or digital alarming is available at the gateway and the unit also operates as a standard wireless node.

The operating range is 0.80 km and the sensor has a battery life of more than five years.

To activate the sensor, an operator presses the zero button for approximately two seconds until a LED flashes to record the "closed" position. Longer setup reduces the chance of the sensor being zeroed by mistake. The zero button is protected by a housing that guards against accidental activation from someone bumping into it.

SignalFire is a manufacturer of wireless telemetry products based in Hudson, Mass.
www.signal-fire.com

MONITOR SIGNALS ACROSS THE PLANT

Backlit, triple display.

Extech Instruments' SD900 and SD910 3-channel DC current and DC voltage data loggers extend monitoring of milliamp and millivolt signals throughout the plant.

These compact instruments provide Excel formatted readings directly to an SD card.

Both models have a large, backlit, triple display showing all three readings simultaneously.

The SD900 logs DC current from 0 to 20 mA with high resolution (0.01 mA). The SD910 records DC voltage in one of two ranges, 0-300.0 mV with 0.1 mV resolution or 0-3000 mV with 1 mV resolution.

Sampling rates are set from once every two seconds to once every 10 minutes. An SD card stores up to 2.7 million readings but capacity is expandable up to 16 GB using additional SD cards.

And readings are time- and date-stamped for quick access to critical time periods.

Extech Instruments, based in Nashua, NH, makes handheld test and measurement tools.
www.extech.com

WORKHOLDING

GET A GRIP ON MACHINING POTENTIAL

Fixtureworks' TriMax vises and low-profile TriGrip carbide grippers maximize a machine's potential with multiple part clamping, quick-change components and easy adjustment in 5-axis and machinist applications.

Maximizes pull-down.

The carbide gripper inserts provide clamping without dovetail workpiece preparation. The triangular grippers with serrations for steel, hardened steel, titanium and aluminum have two rows of teeth at different angles to maximize the pull-down effect.

The rubber gripper pads are constructed of black nitrile rubber moulded to a 1/16-in. aluminum backing mounted flat, contoured or formed to round or sharp corners.

The pads come in smooth, fine hatch or course hatch with standard pad heights of 1/4 in. and 1/2 in., plus custom sizes with counterbore hole mountings configurations are also available.

FixtureWorks is a manufacturer of machine tool and material handling components based in Fraser, Mich.
www.fixtureworks.net

POWER SUPPLY

POWER SUPPLIES PROTECT AGAINST SHORT-CIRCUIT FAULTS

MicroPower Direct's MPM-10SV single output 10 W AC/DC power supplies handle industrial systems that require 277 VAC operation, such as power bus applications.

Six standard models operate from a universal input of 85 to 305

VAC to provide tightly regulated outputs of 3.3, 5, 9, 12, 15, and 24 VDC. Filtering is up to EN55022 Class B, input-output isolation of 3k VAC, and there's tight line/load regulation.

All models are protected for overload, over voltage and short circuit faults. They're approved to EN 60950, and are CE-certified and RoHS-compliant.

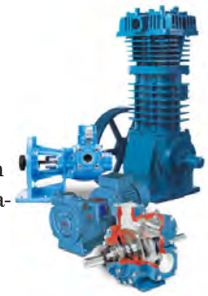
The power supplies come in a 2.16 x 1.77 x 0.826-in. PCB mount case and operate between -40 to 70 degrees C.

MicroPower Direct is a manufacturer of power conversion and supply products based in Stoughton, Mass.
www.micropowerdirect.com

PUMPS

VANE PUMPS ARE MAINTENANCE-FREE

Blackmer Pumps' sliding vane pumps maximize performance and reliability in LPG applications, such as cylinder filling, motor fuelling, bulk transfer in liquid terminals, vaporizers, and on bobtails and transports.



Seal and ball bearing construction.

The LG, LGL and TLGLF models have a number of vanes that slide into or out of slots in the pump rotor. When the pump driver turns the rotor, centrifugal force, push rods, and/or pressurized fluid causes the vanes to move outward in their slots and bear against the inner bore of the pump casing to form pumping chambers.

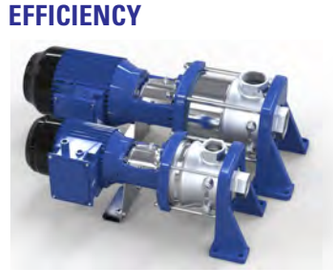
As the rotor revolves, fluid flows into the pumping chambers and passes the suction port, moving around the pump casing until it's squeezed into the discharge piping.

The ductile iron pumps have an internal relief valve, a mechanical seal and ball bearing construction that maximizes reliability. Symmetrical bearing support assures even loading and wear for long life.

Vane replacement is completed without removing the pump from the piping system to simplify maintenance.

Blackmer is a pump manufacturer based in Grand Rapids, Mich.
www.psgdover.com/blackmer/home

MOVITEC BOOSTS ENERGY EFFICIENCY



26 m3/h flow rate.

KSB Pumps Inc.'s Movitec high-pressure pumps configure for in-line installation, with the inlet and outlet nozzles on opposite sides of the pump for applications such as water distribution, water treatment, cooling water supply, boiler feed and pressure boosting.

They mount horizontally, with the inner threaded inlet nozzle parallel to the axis of the pump and the outlet nozzle positioned to feed a vertical or horizontally aligned outlet pipe.

The pumps, which come in five sizes with a number of different stages, reduce energy costs using efficiency-optimized stainless steel stage casings and impellers. Easy-to-replace cartridge-type mechanical seals ease maintenance and ensure long service lifetimes.

Maximum flow rate is 26 m3/h and the maximum discharge head is 195 m. They handle fluids at temperatures between -20 to 140 degrees C.

KSB Pumps Inc. is a pump manufacturer based in Mississauga, Ont.
www.ksb.ca

CONNECTORS

CONNECTORS INSTALL EASILY

IP67-rated.

BinderUSA's miniature IP67 connectors have an M16 flange socket with square flange mounting that's critical in measurement and control applications.

Soldered or crimp terminations simplify installation, especially on thick panel walls. This is particularly useful when the connectors are installed on thick panel walls.

Pin count ranges from 2 to 19 contacts rated at 250 to 60 V, and a 7-3 A current.

Binder is a connector manufacturer and subsidiary of Franz Binder GmbH & Co. based in Camarillo, Calif.
www.binder-usa.com

PLANT WARE

Software manages plant changes

Boosts performance.

Plant owners/operators need to know who is interacting with control systems and when changes have been made.

Honeywell Trace from Honeywell Process Solutions replaces paper-based records and spreadsheets with an automated documentation and change management software that provides a single, integrated view of complex system interactions.

It shows managers and others how the facility is divided and views changes that have occurred to a group of components over collected snapshots. The software doesn't impact the engineering system during collection periods so operations continue as usual during data snapshots.

Personnel learn how changes impact performance through system health reports, better understand data flows and logic, and avoid problems during maintenance.

Engineering teams maintain their network and hardware topology without having to redraw it every time a change is made.

Honeywell Process Solutions is a suppler of industrial technology based in Houston.

www.honeywelltrace.com

Industrial Literature Reviews

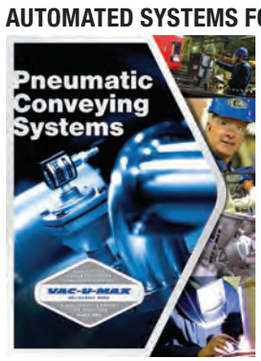
1/4 TON OF REFRIGERATION

EXAIR Vortex Tubes produce up to 10,200 Btu/hr. with no moving parts. Stainless Steel Vortex Tubes convert an ordinary supply of compressed air into two streams; one hot and one cold. Temperatures are adjustable from -50° to +250°F. Applications include cooling hot melts, cutting tools, welding horns, electronic controls, soldered parts and gas samples.
www.exair.com
EXAIR Corporation

HIGH PRECISION TIMING BELTS WITH BACK COVERS

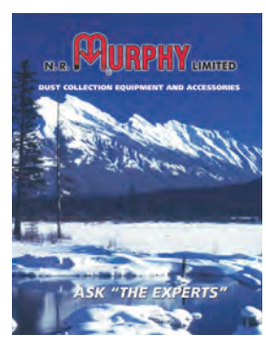
BRECOflex CO. LLC offers high precision timing belts with a variety of backing materials and surface textures. Materials include solid and foam polyurethanes, natural, synthetic rubbers, silicone and PVC. Polyurethane timing belt accessories include pulleys, clamps, tensioners and slider beds. The B208 catalogue contains full specifications including coefficient of friction, typical application uses, and flexibility ratings.
www.brecoflex.com
BRECOflex

AUTOMATED SYSTEMS FOR CONVEYING



This brochure offers a detailed overview of the VAC-U-MAX range of pneumatic conveying components and automated systems. These include conveying, weighing and batching of powders and bulk materials in food, pharmaceutical, chemical and petrochemical processes.
www.vac-u-max.com
VAC-U-MAX

DUST COLLECTORS FULL LINE LITERATURE GUIDE



This guide outlines N.R. Murphy dust collectors, installations, capacities, styles and models. N.R. Murphy Limited has been in business for 65 years and has thousands of satisfied customers. "Dust Collectors are all we do, so get it done right the first time. Just Ask the Experts www.mrmurphy.com."
Murphy Ltd.

EVENTS

EMO Hannover
VDM
Sept. 18-23, Hannover, Germany
This global machine tool trade fair presented by the German Machine Tool Builders' Association (VDW) will feature the latest metalworking, innovations, solutions and services. This year's theme is "Connecting systems to intelligent production." Visit www.emo-hannover.de.

MainTrain 2017
PEMAC
Sept. 23-25, Saskatoon
Convened by the Plant Engineering & Maintenance Association of Canada (PEMAC). Features multi-track educational workshops, exhibit hall, keynote speakers, tours and panel discussions on real issues and concerns asset management pros are facing. The event is capped off with the PEMAC awards banquet. Visit www.pemac.org/conference.

CMTS 2017
SME
Sept. 25-28, Mississauga, Ont.
A national manufacturing event featuring the latest advances in machine tools, tooling, metal forming and fabricating, 3D printing/additive manufacturing, automation, design engineering and plant management. Visit http://cmts.ca/general-info.

Lubrication fundamentals
STLE Hamilton
Nov. 2, Hamilton
The Hamilton Section of the Society of Tribologists and Lubrication Engineers (STLE) presents a seminar on lubrication fundamentals that will cover: what tribology is; oils; greases; filtration; lubricant application; lubricant audits and an open panel discussion. Visit www.stle.org.

FABTECH 2017
FMA, SM, PMA, CCAI, AWS
Nov. 6-9, Chicago
North America's largest metal forming, fabricating, welding and finishing event featuring 1,700 suppliers. Presented by Fabricators & Manufacturers Association (FMA), SME (Society of Manufacturing Engineers), Precision Metalforming Association (PMA), American Welding Society (AWS) and Chemical Coaters Association International (CCAI). Visit www.fabtechexpo.com.

National free-trade opportunity missed

BY JACKSON DOUGHART

The newly-minted Canadian free-trade agreement is no great accomplishment. Instead of free exchange, most of the deal's convoluted text entrenches protectionism with some 130 pages of exemptions.

All of the negotiations leading up to the deal – and now these hundreds of pages of rules – leave the country with nothing more than managed trade.

This is vanilla reform.

The federal government should have mustered the political will to demolish trade barriers by parliamentary fiat instead of playing the role of honest broker between local chieftains. Ottawa could also lead on harmonizing regulations, standards and qualifications by imposing mutual recognition in trade matters. After all, that's its constitutional realm.

Instead, the agreement strengthens the idea of provincial prerogative.

Unfettered exchange between provinces is not a pie-in-the-sky idea; it's fundamental to Confederation. Based on the intentions of the founders, the right of provinces to inhibit the movement of goods and labour across boundaries is no more legitimate than their right to print money, form an army or secede.

The best that can be said of the deal is it forces provinces to explicitly list the trade barriers they intend to maintain. Unfortunately, several industries remain heavily protected, including financial services and investment, energy, real estate, legal services, tourism, agriculture and fisheries.

The exclusion of alcohol from trade liberalization is a particular disappointment. In their list of exemptions to free trade, the provinces reserve control over regulating, supplying, transporting and selling alcoholic beverages through provincial liquor monopolies. To boot, the main text affirms the right of provinces to "maintain, establish and authorize monopolies."

The agreement mandates a special working group to recommend better trade in alcohol a year from now. But there's no good reason this class of products to be excluded.

Once again, we're kicking the can down the road instead of picking it up – typifying what these negotiations have become over the years.

STATE CONTROL OVER ALCOHOL AMOUNTS TO GOVERNMENT PREVENTING COMPETITION FOR ITS OWN BENEFIT, AT THE EXPENSE OF BUSINESS AND CONSUMERS…

The argument for trade in alcohol is already well established; nothing that the working group discovers or recommends will change the fundamental equation.

State control over alcohol amounts to government preventing competition for its own benefit, at the expense of business and consumers. None of the provinces' legitimate regulatory functions – setting the minimum age for consumption and purchasing, licensing establishments, taxation – requires the establishment of liquor control monopolies.

Rather, these entities are government cash cows. They force consumers to pay high prices, restrict the opportunities of local producers and penalize cross-boundary exchange. The notable case of Gerard Comeau, a Tracadie, NB man charged in 2012 for bringing too many cans of beer home from Quebec, illustrates this absurdity.

The court decision in Comeau's case also lends credence to the dubious nature of provincial barriers. New Brunswick Judge Ronald LeBlanc ruled that restrictions on alcohol are unconstitutional, as they are designed to preserve the provinces' "monopolistic hold on this important source of revenue."

All four Atlantic provinces have growing craft brewing industries. They would be considerably aided by better access to markets across Canada. Consumers would benefit from greater selection and lower prices. Yet Atlantic governments join their western counterparts in restricting the import of Canadian beer and wine from one jurisdiction to another.

If Atlantic delegates had put the interests of their residents first, they would have dropped alcohol from their exemptions list and lobbied other provinces to do the same. Instead, they doubled down and protected government interests.

Canada's perverse localism is premised on the idea that competition and exchange between citizens of the same country is a dangerous idea.

By entrenching so many trading exemptions, the trade deal represents a missed opportunity.

Jackson Doughart is research co-ordinator at the Atlantic Institute for Market Studies (AIMS.ca).

Comments? E-mail jterrett@plant.ca.

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fluke.com/TeamSuccess

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- Contacts, footprint and mounting similar or identical to other leading brands
- Die cast zinc housings for industrial applications
- NEMA ratings: 3, 3S, 4, 4X, 6, 6P and 13
- IP67 ingress protection rating
- Push, wobble or side-rotary heads available
- Heads adjust in 90-degree increments
- Levers (when present) are adjustable to any angle
- ½" NPT conduit opening
- SPDT and DPDT snap action configurations available

Heavy Duty Metal IEC Limit Switches

Starting at $17.50

- Contacts, footprint and mounting similar or identical to leading brands
- Die cast aluminum housings for industrial applications
- Conduit openings in ½" NPT or PG13.5 sizes
- Single or multiple conduit openings for connection flexibility
- Splined shafts for fine actuator adjustment
- Eight different actuators, including roller levers and plungers
- Six interchangeable combinations of contact blocks

Double-Insulated Plastic IEC Limit Switches

Starting at $27.50

- Electrically-isolated PBT bodies for corrosive environments
- Single conduit openings in ½" NPT or PG13.5 sizes
- Splined shafts for very fine actuator adjustment
- Actuators include: roller levers, plungers and wobble sticks
- Six interchangeable combinations of contact blocks

Miniature Double-Insulated Plastic IEC Limit Switches

Starting at $14.50

- Small bodies for mounting in tight spaces
- Electrically-isolated PBT body for corrosive environments
- Single conduit openings in ½" NPT or PG11 sizes
- Splined shafts for very fine actuator adjustments
- Actuators include: roller levers, plungers and wobble sticks
- Six interchangeable combinations of contact blocks

Compact Limit Switches

Starting at $21.00 (*NEW* models available)

- Die-cast metal housings
- 3 meter cable or M12 quick disconnect available
- Connections exit from bottom or right available
- 1 N.O. and 1 N.C. contact on all units
- Compact size with standard 25mm hole spacing
- Wide offering of head actuators
- Epoxy resin-filled for IP67 rating
- Snap-action and slow-make/break contacts available

Also Available

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Replacement Contact Blocks

Research, price, buy at:

www.automationdirect.com/limit-switch

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www.automationdirect.com/canada

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