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MAKING IT IN CANADA

Assembling PCBs is big business
for Microart Services

Skills Ontario wants to fill the gap
Budget 2019: What's in it for you?
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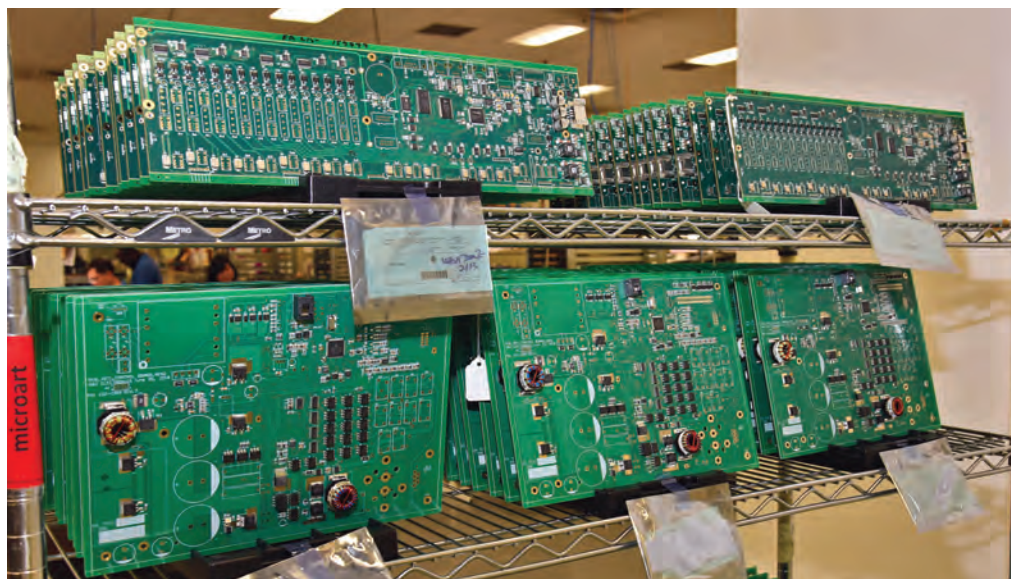
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Strategist



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COVER: RODNEY DAWES

PLANT—established 1941, is published 8 times per year by Annex Business Media. Publications Mail Agreement #40065710. Circulation email: blao@annexbusinessmedia.com Tel: 416-442-5600, ext 3552 Fax: 416-510-6875 or 416-442-2191 Mail: 111 Gordon Baker Road, Suite 400, Toronto, ON M2H 3R1. Occasionally, PLANT will mail information on behalf of industry-related groups whose products and services we believe may be of interest to you. If you prefer not to receive this information, please contact our circulation department in any of the four ways listed above. Annex Privacy Officer: privacy@annexbusinessmedia.com Tel: 800-668-2374. No part of the editorial content of this publication may be reprinted without the publisher's written permission. ©2018 Annex Publishing & Printing Inc. All rights reserved. Performance claims for products listed in this issue are made by contributing manufacturers and agencies. PLANT receives unsolicited materials including letters to the editor, press releases, promotional items and images from time to time. PLANT, its affiliates and assignees may use, reproduce, publish, re-publish, distribute, store and archive such unsolicited submissions in whole or in part in any form or medium whatsoever, without compensation of any sort. This statement does not apply to materials/pitches submitted by freelance writers, photographers or illustrators in accordance with known industry practices. Printed in Canada. ISSN: 1929-6606 (Print), 1929-6614 (Online).



Carbon pricing offers cold comfort

Two bits of news coincided in an ironic juxtaposition on April Fools Day: the beginning of the Trudeau government's carbon tax levied on Saskatchewan, Manitoba, Ontario and New Brunswick; and a troubling report that Canada's climate is warming twice as fast as the rest of the world and the warming is "effectively irreversible."

The challenge for any government is to balance climate change action with its impact on the economic well being of the country. That brings us to the carbon pricing policy and whether or not it's effective. The verdict? Likely not.

Economists favour carbon pricing for reducing global-warming emissions by charging those who emit carbon dioxide (CO₂). They declare it to be the most efficient tactic, the outcome determined by the market rather than by regulation, and the favoured result is achieved by encouraging energy users to change their behaviour.

The Trudeau government's tax starts at \$20 per tonne of greenhouse gas emissions produced by energy use, rising to \$50 by 2022. Good news for consumers though: it's revenue neutral! They'll get what the government suggests the tax will cost them back in tax credits. How that will encourage people to change their behaviour remains to be seen, but this deal is very different for businesses, and SMEs in the manufacturing sector should be alert.

Canadian Manufacturers & Exporters says the impact on Ontario could be substantial, noting the country already has a problem attracting investment.

The carbon plan contributes to the difficulty by adding cost and regulatory entanglements that hinder businesses' ability to compete globally, and these entanglements make foreign investment in Canada less attractive.

The Canadian Federation of Independent Business (CFIB) sees businesses carrying 50% of the carbon price burden but they'll get just 7% of the rebates. And there are a lot of unanswered questions about how the process will work, who gets an exemption and what documents will be required. The CFIB also dismisses the assumption that SMEs already operating under very competitive conditions can just pass the costs off to consumers.

And carbon pricing window dressing alert: a secret federal government briefing document says the price would have to go up to \$100 per tonne by 2020 and between \$200 and \$300 per tonne by 2050 to reach Canada's greenhouse gas emission commitment (30% below 2005 levels by 2030). The United Nations suggests Canada needs to cut emissions even more to prevent the worst climate-change impacts. Canada has already missed two emissions reduction targets and is on its way to being off its 2020 target by 20%, never mind the 2030 Paris Accord commitment.

The report from Environment and Climate Change Canada says the average temperature is 1.7 degrees C higher today than it was 70 years ago, versus an increase in the average global temperature of 0.8 degrees C.

Meanwhile, global emissions continue to climb. If the world keeps emitting at the same rate, by 2050 most parts of Canada will see increases of between 7 and 9 degrees C, with the extreme Arctic heating up by more than 11 degrees C. So far, Canada is responsible for 1.69% of CO₂ emissions. More than half the world's emissions come from China (26.83%), the US (14.36%) and the EU 28 (9.66%).

Government policy under the Harper and Trudeau regimes has been more political expediency than effective strategy. Future Canadian governments must acknowledge the top emitters will determine the impacts of climate change on Canada's environment. The issue must be approached more realistically based on what we can and can't control, balanced against Canada's economic health and with the hard decisions that may follow.

Joe Terrett, Editor

Comments? E-mail jterrett@plant.ca.

PLANT | ADVANCING
CANADIAN
MANUFACTURING

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Subscription Price

Canada \$76.00 per year, US \$154.50 (US) per year, Foreign \$174.50 (US) per year. Single Copy Canada \$12.00. Add applicable taxes to all rates. Combined, expanded or premium issues, which count as two subscription issues.

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BULLETINS

Magellan Aerospace Corp. has landed a five-year deal valued at \$48 million with the Canadian government to perform the licensed manufacture of LUU-2 illumination flares for the Royal Canadian Air Force. The flares will be delivered from the Winnipeg facility's propellant plant in Manitoba. The air-deployed flares support night search and rescue operations, producing about 1.8 million candlepower of visual illumination for five minutes. Magellan is a global aerospace company that provides complex assemblies and systems to aircraft and engine manufacturers, and defence and space agencies.

An unnamed Houston-based pipeline operator has adopted **OneBridge Solutions Inc.**'s cognitive integrity management (CIM) software-as-a-service solution for long-term use for its US and Canadian operations. The client owns crude oil, natural gas liquid and natural gas midstream assets. OneBridge is an Edmonton-based subsidiary of OneSoft Solutions Inc. in the US, which has developed machine learning and data science software that transitions legacy software applications to operate on the Microsoft Azure Cloud Platform.

Magna International has completed the \$1.23 billion sale of its Fluid Pressure & Controls (FP&C) business to **Hanon Systems**, a South Korea-based global supplier of thermal and energy management systems. The sale was announced in September 2018. The global FP&C business specializes in mechanical and electronic pumps, electronic cooling fans and other components. Approximately 4,200 employees across 10 facilities in North America, Europe and Asia will transition to Hanon Systems.

Veritiv Canada Inc. in Mississauga, Ont. will be the exclusive Canadian distributor of coated sheets from Asia Pulp & Paper, a group of pulp and paper manufacturers in Indonesia and China. This type of paper is used by commercial printers for catalogues, magazines, high-end advertising materials, annual reports, as well as other media and marketing applications. Veritiv Corp. in Atlanta is a provider of print and paper solutions.

Campbell's Soup plant assets for sale

Toronto plant's equipment valued at \$200 million



Modern soup-making equipment.

PHOTO: JOINT VENTURE

TORONTO — A joint venture group has acquired the machinery and other assets of the Campbell's Soup factory in Toronto and will be selling them privately until the end of summer. At that point, a public auction will follow for the remainder of the assets.

TCL Asset Group Inc., Corporate Assets Inc., Rabin Worldwide and Capital Recovery Group LLC value the assets at more than \$200 million (replacement cost).

They include canning and aseptic filling and packaging lines capable of handling more than 20 million cases of soup; a vegetable receiving department; multi-batch pump area; processing department; elmar canning lines; combibloc aseptic filling and packaging lines; aseptic pilot plant; labelling and case packing department; power and facility equipment; co-generation system; and general plant equipment.

The Campbell Soup Co. of Canada announced the closure of the 600,000 square-foot Etobicoke plant in January, putting 380 workers out of work. The plant shuts its doors in May. The company said the plant, which opened in 1931, was its oldest and smallest, and not suitable for retrofit. But Campbell's is also dealing with overcapacity and falling soup sales so production at the Toronto plant has been shifted to the US.

PEMAC's AMP program moving to an Alberta college

MISSISSAUGA, Ont. — The Asset Management Professional (AMP) education and certificate program from the Plant Engineering and Maintenance Association of Canada (PEMAC) is moving to a new home.

The program is transitioning, course by course, from Humber College in Toronto to Northern Lakes College in Slave Lake, Alta.

AMP introduces participants to the latest in strategic asset management thinking from recognized global organizations. Participants build knowledge and skills in risk management and knowledge management (enterprise database systems); and are introduced to tools that will be applied to strategic decision-making at each stage of the asset lifecycle.

Six courses are delivered online, each led by experienced instructors.

The transition schedule allows professionals who have started the program with Humber College to complete it there, while new candidates will work with Northern Lakes College. Successful completion of the six courses leads to the CAMP professional designation.

Arctic surf clam fishery reconciled

Clearwater Seafoods and 14 First Nations forge 50-year partnership

HALIFAX — Clearwater Seafoods Inc. and 14 First Nations communities in Nova Scotia and Newfoundland-Labrador have forged a 50-year partnership. It protects existing jobs in the Arctic surf clam fishery while creating economic benefits, employment and capacity building for the First Nations adjacent to the resource.

The agreement provides millions of dollars in benefits to First Nations through annual revenue sharing, training, leadership development and employment, plus procurement of goods and services from Indigenous suppliers.

This agreement also protects the workers at the Grand Bank Seafoods plant.

"This is a business development model that has been successful for our community in other sectors and it makes sense to extend it to the seafood industry with Clearwater, as they have industry knowledge and experience," said Chief Terrance Paul, Chief of Membertou First Nation and co-chair of the Assembly of Nova Scotia Mi'kmaq Chiefs.

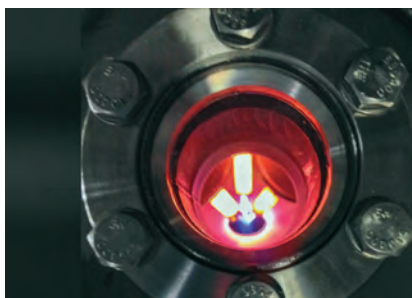


Chief Terrance Paul, co-chair of the Assembly of Nova Scotia Mi'kmaq Chiefs, and Clearwater CEO Ian Smith onboard the clam vessel Anne Risley.

PHOTO: CLEARWATER

Mi'kmaq Chiefs.

Clearwater, based in Bedford, NS, is one of North America's largest vertically integrated seafood companies and the largest holder of shellfish licences and quotas in Canada.



Process produces little or no waste.

PHOTO: PYROGENESIS

PyroGenesis unveils its NexGen system

Declares production advances for AM powders

MONTREAL — PyroGenesis Canada Inc. has unveiled a new system that produces metal powder at faster than 25 kilograms per hour for the additive manufacturing (AM) industry.

The Montreal company that manufactures and commercializes plasma atomized metal powder said its NexGen Plasma Atomization System targets higher production rates and narrower particle size distribution. This allows the production of a very targeted powder for the AM industry, with little to no waste.

Big corps more engaged with green energy activities

MISSISSAUGA, Ont. — Most large companies around the world are engaged in energy conservation and climate action activities, according to a Schneider Electric study.

The 2019 Corporate Energy & Sustainability Progress Report looks at the global trends, barriers and opportunities impacting enterprise energy and carbon-management programs.

Here are some highlights from the survey of more than 300 global professionals responsible for energy and sustainability at businesses with more than \$100 million in annual revenue:

- Nearly 60% have goals they've shared with customers, investors and other stakeholders.
- 28% are specific and ambitious in their goals, joining established initiatives such as RE100, science-based targets and zero waste to landfill.
- Companies operating in multiple geographies are nearly 10% more likely to make a public commitment than those in one region.
- Europe-based businesses set public goals more often than their North American peers (65% versus 58%).
- Most publicly committed companies (59%) see environmental concerns as the primary driver, above financial considerations (52%).
- These companies are more likely to implement advanced technology such as on- and offsite renewables, battery storage and electric vehicles.

Schneider Electric is a supplier of energy management and automation technology based in Mississauga, Ont.

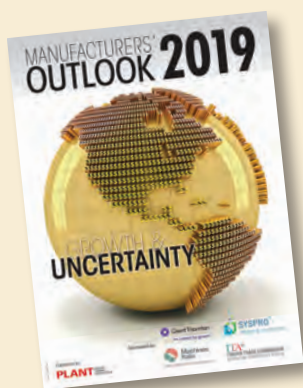
FEEDBACK

Rountable disappointment: No women

I just received my copy of the *PLANT Manufacturers' Outlook 2019*. There are many business issues affecting Canadian manufacturers and you have provided a concise and accurate picture for your readers to understand and it provides a great base for further discussion within our company.

My only disappointment was the roundtable panel did not include any women representatives.

There are many women involved and leading Canadian



manufacturing companies. As corporate boards look to be more inclusive with more women as members, I would like to see this roundtable also push for a 50/50 representation in the future.

*Doris Valade, CEO
Malabar Super Spice Co. Ltd
Burlington, Ont.*

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

\$100M for SMEs impacted by steel and aluminum tariffs

OTTAWA — The Liberal government in Ottawa is offering steel and aluminum SMEs and users impacted by US tariffs on the metals \$100 million in funding.

The Trump Administration in Washington imposed tariffs of 25% on steel and 10% on aluminum imports from Canada and other countries claiming they were a threat to national security.

The initiative will provide 300 manufacturers and users across Canada with non-repayable contributions for projects that enhance productivity and apply advanced technologies that will help them scale up and find new markets.

In 2017, Canada's steel and aluminum industry employed more than 33,500 people and contributed \$8.9 billion to the country's gross domestic product.

CAREERS

Bombardier has appointed **Steeve Robitaille** senior vice-president, general counsel and corporate secretary. Robitaille succeeds



Daniel Desjardins who will continue to serve as a special advisor to Alain Bellemare, president and CEO of the Montreal-based global transportation company. He has been serving as chief legal officer, executive vice-president, merger and acquisitions for WSP since 2017.

Boralex Inc., an operator of renewable energy projects based in Montreal, has appointed **Patrick Decostre** as vice-president and COO. **Nicolas Wolff**



will replace him as vice-president and general manager of Boralex Europe. Previously, he was vice-president and general manager of Vestas Western Mediterranean, a wind energy company based in Denmark.

Patrick Decostre



Nicholas Wolff

Algoma Steel Inc. has appointed **Michael McQuade** CEO. Prior to becoming a director of the Sault Ste. Marie, Ont. steelmaker in 2018, he held a number of executive positions at Stelco Inc., including president in 2014. He succeeds **Kalyan Ghosh** who served as CEO prior to and during the successful restructuring of Algoma's business in 2018. Ghosh resigned from the company to pursue other opportunities.

Martin Brassard is the new president and CEO of Heroux-Devtek. The global company based in Longueuil, Que. manufactures landing gear, actuation systems and components for the aerospace market. Brassard joined the company in 1994 and has held several key roles since then. In 2014, he was promoted to vice-president and COO.

CellCube wins 100-MW US project

Moving into grid capacity applications for its energy storage systems



CellCube energy storage system.

PHOTO: CELLCUBE

TORONTO — CellCube Energy Storage Systems Inc. has signed an agreement with a US-based energy asset development company to develop up to 100 megawatts (MW) of energy storage systems for deployment throughout the US.

Financial details and the name of the customer were not provided.

The Toronto-based supplier of energy storage systems said the market enables offtake agreement resources for independent system and regional transmission operators through product and service deliveries into scheduled projects. They'll be deployed over the next 24 to 36 months.

The systems will be placed as standalone plants or co-located with solar to offer power market-traded energy supply and ancillary services.

CellCube develops, manufactures, and markets its energy storage systems based on vanadium redox flow technology and has more than 136 project installations.

The company recently acquired the assets of Gildemeister Energy Storage, the German manufacturer of CellCube energy storage systems.

Stelco signs on with Canvass for AI

TORONTO — Canvass Analytics Inc., a provider of artificial intelligence (AI) software for industry, has signed a deal with Stelco that will see the Hamilton steel maker use the platform.

Canvass Analytics leverages AI and machine learning to transform previously unconnected data into predictive analytics.

The Toronto company's technology bridges the gap between workforce knowledge and curated Internet of Things inputs to minimize energy consumption, increase throughput, reduce downtime and extend the lifetime of a plant's assets.

BI Intelligence predicts global manufacturers will invest \$70 billion in IoT solutions in 2020, up from \$29 billion.



PLANT ONLINE SOUNDING OFF

What readers have to say about breaking news

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

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

UK government defiant as Parliament takes control of Brexit

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

➤ May is beating a dead horse. She wants it to be her legacy and is willing to do anything to get it. Britain would be better off to cancel Brexit for the time being, then put a package together to promote to the [EU] well in advance of actually doing anything.

USMCA getting a boost from Trump, business group

<http://www.plant.ca/3mGvV>

➤ The tariffs on steel and aluminum for Canada and Mexico have to go. Canada has given up enough.

Wind turbine catches fire at Nova Scotia wind farm

<http://www.plant.ca/b0EhK>

➤ Why don't wind turbines have automatic fire-extinguisher systems (halon?). Can't be that hard or expensive to do.

➤ Why is there no requirement for automatic internal fire suppression and for a fail-safe mechanism that locks or at least brakes the nacelle main shaft if fire is detected? Why is the blade coating flammable?

BC not trying to stop Trans Mountain, aims to protect environment: lawyer

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

➤ So it's all about the environ-

ment and killer whales. Then explain how Vancouver and Victoria are able to dump their raw sewage untreated into the very waters they profess to protect for killer whales. How does the BC government square the expansion of ferry operations or expanded traffic for natural gas or even the intrusive whale watching industry? Doesn't the same argument stand against their projects of profit? Selective environmental stewardship on interprovincial projects doesn't hold water. The fact remains the NDP government campaigned on stopping this pipeline at all costs. Obtaining a legal opinion after the fact does not change the song you sang.

Trump raises possibility of walking away from China deal

<http://www.plant.ca/JEm5n>

➤ Really!! When did Trump ever learn the meaning of the word egregious?

Allegations Trudeau interfered in SNC-Lavalin case concern OECD

<http://www.plant.ca/CrRr9>

➤ Trudeau's replies for the last several months to all questions have been evasions and pre-written by office staff to mislead and misdirect any attempt at solving the problems facing the country.

MO tried to persuade Wilson-Raybould, not intimidate her: Butts

<http://www.plant.ca/VHtb8>

➤ None of his "testimony" is valid since he refused to take an oath. This is the same guy that ruined Ontario with the "green" energy "windfall" to put Ontario in more debt (per capita) than Greece and California. "Liberals used their majority on the committee to reject an opposition proposal to recall Wilson-Raybould to respond to Butts's comments." This tells the whole story!

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Brewers crying in their suds



Triple tax hot for beer drinkers.

PHOTO: ADOBE STOCK

Brewers of Canadian beer aren't too happy with Federal finance minister Bill Morneau's 2019 budget. The "Investing in the Middle Class" plan appears to be doing so with help from the escalating booze tax put into effect in 2017. That's the third increase in two years. Beer Canada, which advocates for

companies that make about 90% of domestically made suds, wanted to see and end to the tax on alcoholic beverages. It's a sneaky tax that accounts for 47% of a pint, aimed at the brewers and built into production costs. Since it's automatic each year, the increase isn't debated in Parliament. Beer Canada says the annual hike bumps up GST/PST/HST and other taxes, doubling and tripling the tax hit to our wallets. How much is the hit? Hard to say. It's also a complicated tax that varies depending on the product and percentage of alcohol. So cheers middle-class Canadians! When the price of your favourite cold one goes up each year, don't blame the poor brewers.

EV subsidies don't add up

Since transportation accounts for about 25% of Canada's greenhouse emissions, some jurisdictions have opted to ladle out dollar incentives to encourage people to buy electric vehicles (EVs). Since 2012, Quebec has spent more than \$220 million in subsidies to "encourage" purchases, says the Montreal Economic Institute, and the spending will continue. But the MEI notes this policy is very expensive, with very little impact on emissions. If Quebec achieved its dubious objective of having a million EVs on the road by 2030 – 20 times more than it has now – it would only reduce GHG emissions by 3.6%. Here's some more math: So far the \$8,600 subsidy cost taxpayers a little under \$300 of GHGs not emitted. With the new \$5,000 federal subsidy, the cost per tonne jumps to more than \$450, or 23 times the carbon market price or the federal tax amount. Meanwhile, Canada isn't even close to meeting its Paris Accord obligations (30% below 2005 levels by 2030). In fact, a report by Canada's auditor general says the country is likely to miss the old 2020 Copenhagen target by nearly 20%.



Paris Accord commitment: 30% below 2005 levels by 2030.

PHOTO: ADOBE STOCK

Get smooth on CBD beverages

Canada's food and beverage sector is in for a bit of disruption. The burgeoning cannabis industry is moving into edibles (regulations will be in place Oct. 17). Companies will be adding drinks infused with cannabidiol (CBD) to the other concoctions that will be available for good health, as in therapeutic. CBD is non-psychoactive, so nobody is getting high on one of these tipples. But "users" are supposed to experience reduced anxiety, nausea relief, decreased muscle and joint pain, among other benefits. Let's not leave out the pets.



Cannabis-infused soft drinks.

PHOTO: ADOBE STOCK

The cannabis producers are also expecting CBD-for-Fido to garner a large share of the market. Canadian company Tilray has acquired Manitoba Harvest, which gives it access to a broad portfolio of food products distributed across the US and Canada. And Molson Coors's Canadian arm is working with Hydropothecary to produce cannabis-infused drinks. Time for a new Molson beer slogan: "Let's get smooth."

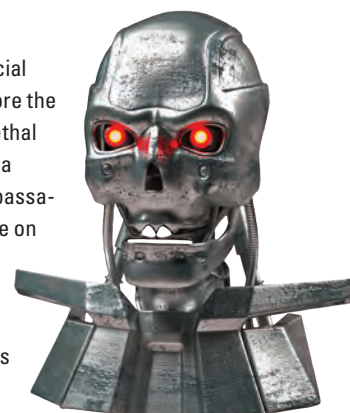


The federal government, Prime Minister Trudeau himself, and all party leaders must be very clear with the Americans that this trade agreement will not be ratified until tariffs and quotas are removed from the equation.

United Steelworkers Canadian director Ken Neumann and Quebec director Alain Croteau, referring to the US-Mexico-Canada Agreement (USMCA) awaiting Canadian ratification.

AI and killer robots

With all the talk about Industry 4.0 and artificial intelligence, it was only a matter of time before the discussion got around to killer robots (aka Lethal Autonomous Weapons Systems). Yes, that's a thing. Associate Press reported Japan's ambassador to the United Nations-backed Conference on Disarmament told experts his country has not developed fully autonomous weapons systems, and has no plans to do so. Phew! Nobushige Takamizawa noted some positives of autonomous weapons systems under human oversight, such as saving labour and reducing collateral damage. But killer robot opponents fear one day the machines could conduct wars without human control. Have we learned nothing from the Terminator movies and the global mischief Skynet instigated? Manufacturers, be leary of all this AI and IIoT stuff. Fertile conditions for the autonomous production of Terminators. Yikes!



Watch out for this guy.

PHOTO: ADOBE STOCK

An aging workforce

Be nice to older workers

If manufacturers think there's a problem finding skilled people now, just wait. Longer term, Statistics Canada is projecting the overall participation rate in the labour force will decrease, mainly because of the aging population. As time passes, those aged 55 and older will represent a growing proportion of employees.

The agency warns aging has important consequences for the Canadian economy. With more people leaving and fewer people entering the labour market, some sectors face the prospect of shortages. And a lower overall participation rate will likely put pressure on fiscal revenues, which fund essential social and economic services and programs.

Nationally, older workers could make up more than 25% of the labour force in 2036, compared with 21% in 2017 or 11% in 1976.

Meanwhile on a more immediate timeline, a 2017 labour analysis based on the next five and 10 years, reports manufacturers in nearly every one of the 15 regions studied will have to overcome a recruitment gap to sustain production and grow.

The *Future of the Manufacturing Labour Force* by Canadian Manufacturers & Exporters, and the Canadian Skills Training and Employment Coalition notes demand for skilled workers will surpass supply in 14 of the regions over the next 10 years.

Manufacturers need to address the effects of its aging demographic. Older workers are staffing key occupations and they'll be leaving their jobs over the next 10 years.

The report warns replacing them will be the most important human resources issue for manufacturers. The top four hiring challenges will be machinists, millwrights and industrial mechanics, welders and manufacturing managers.

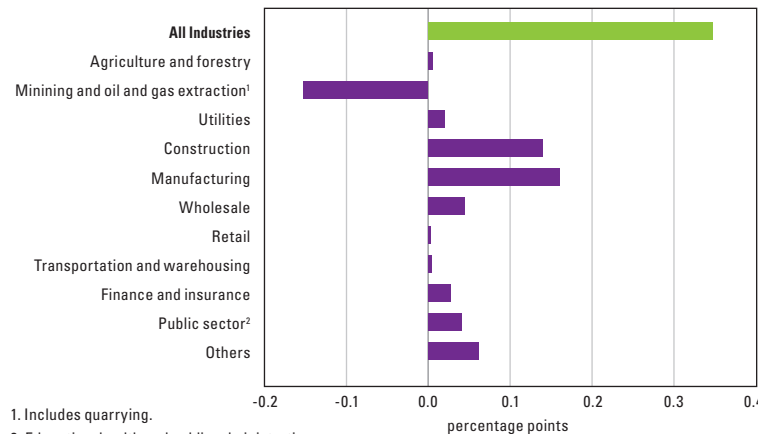
Statistics Canada says there are many factors driving the increase in working seniors, including better health and longer life expectancy; higher levels of education; and their financial security.

What does this mean for manufacturers? Be nice to your older workers. You might need to convince them to stick around.

PLANT PULSE

ECONOMIC DEVELOPMENTS AND TRENDS

MANUFACTURING GDP RECOVERS



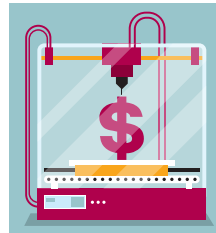
1. Includes quarrying.

2. Education, health and public administration

Source: Statistics Canada

Real gross domestic product expanded 0.3% in January, offsetting declines in November and December. The rise was widespread with 18 of 20 industrial sectors showing increases. The output of goods-producing industries increased 0.6%, led by growth in manufacturing. It rose 1.5%, more than offsetting declines during the previous two months. Growth was widespread across subsectors in both non-durable and durable manufacturing. Services rose 0.2% with all but one sector increasing.

**\$1.77
MILLION**



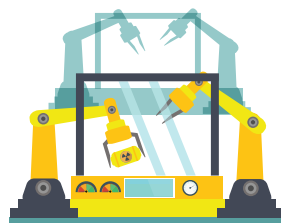
Average investment in machinery, equipment and technology for 2019 by all respondents to the **PLANT** Manufacturers' Outlook 2019 survey. Of those, 19% were not making any significant investments: top reason, not necessary for continuing operations (29%).



**\$279
BILLION**

Goods for use as an intermediate input for domestic production, the second largest expenditure for Canadian enterprises. Manufacturers account for 60%. Goods were mainly bought from other Canadian businesses (\$184 billion). *Statistics Canada*

**\$54.45
BILLION**



Value of the global industrial robotics market by 2024. North America's automation market has been doing a lot of buying. In the first nine months of 2017, 27,294 orders valued at approximately \$1.97 billion, were sold in North America.

ResearchAndMarkets.com

8,400

Job vacancies in manufacturing (up 20.9%) in Q4 of 2018. Over the same period, the job vacancy rate rose 0.4 percentage points to 3%, coinciding with year-over-year payroll employment growth.

Statistics Canada



**35.5
MILLION
TONNES**

The annual amount of loss and waste representing 58% of the commodities entering the Canadian food system. Of that, 11.2 million tonnes or 32% is avoidable. Avoidable waste is equal to 94 CN towers, at a value of \$49.5 billion (51.8% of the dollars consumers spend on food) and 56.5 million tonnes of CO₂ equivalent. Although 4 million Canadians have insufficient access to food, an estimated 86% of the avoidable waste that occurs along the value chain is not rescued and redistributed. Source: Value Chain International, *The Avoidable Crisis of Food Waste – Technical Report*

MADE IN CANADA

MICROART SERVICES MAKES IT BIG IN PCB ASSEMBLY

Smaller customers, smaller volumes and connectivity are driving growth.

BY KIM LAUDRUM

It may surprise some to learn that there's a booming electronic component manufacturing industry right here in Canada.

While many have sub-contracted such work overseas, it turns out there are 530 or so small- to medium-sized firms contributing to a \$1.9 billion domestic industry.

They specialize in printed circuit board (PCB) design and assembly, among other things. And they are doing well. Really well.

Mark Wood, CEO of Microart Services Inc., says that when he started with the company 15 or so years ago, it was doing \$3 million or \$4 million a year in sales. "We're 10 times that. We'll do \$40 million this year."

The Markham, Ont.-based company, which employs 279 people at its 42,000 square foot plant, has experienced 16% annual growth compounded over the past 10 years, according to Wood. "Solid," he emphasizes.

In fact the company has also made the *Canadian Business* list of Canada's fastest growing companies at number 85 among manufacturers and 485 overall.

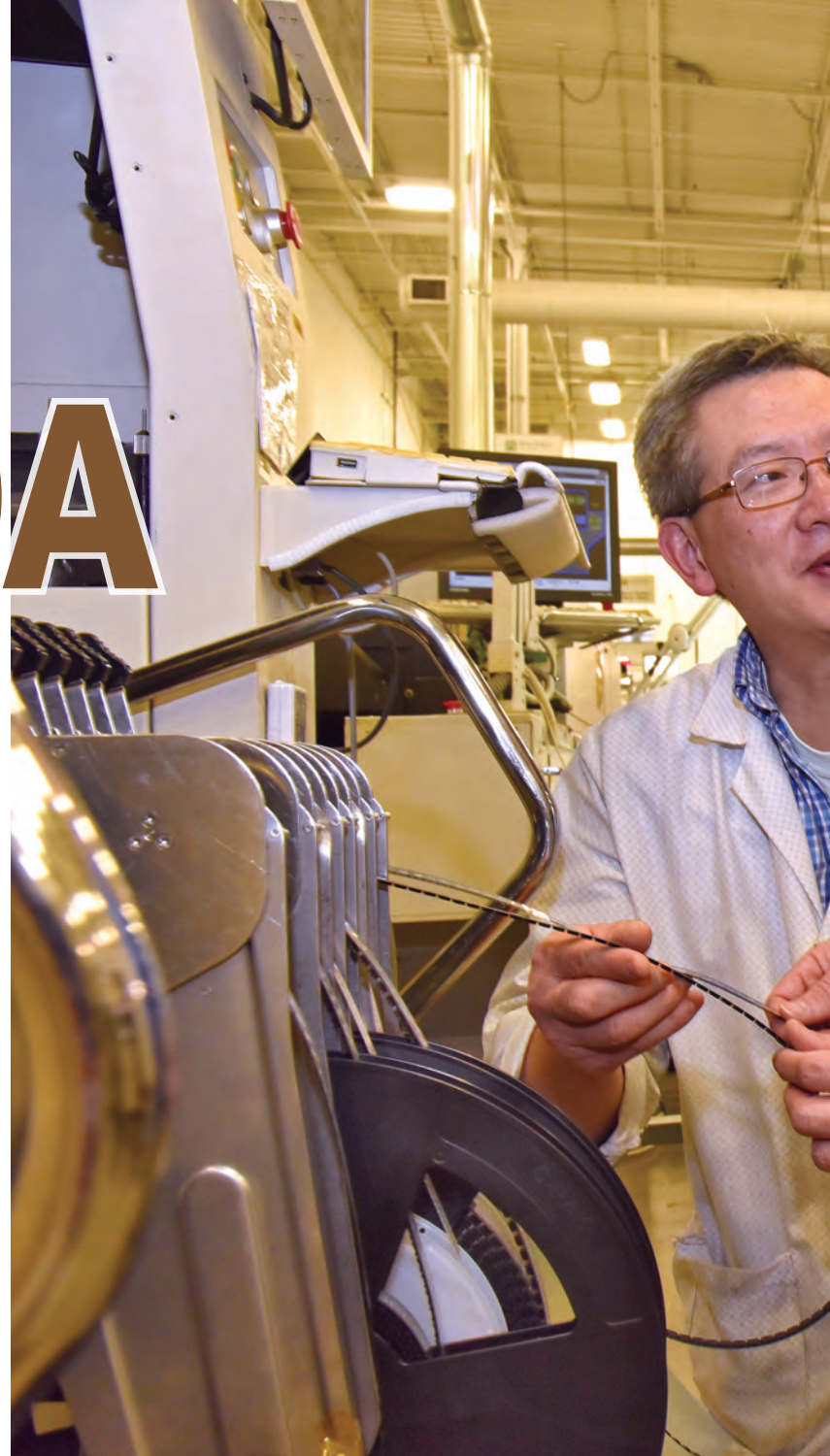
What's driving Microart's

growth? "Most circuit board assembly companies chase large volumes. But we're good at servicing small customers and small volumes," he points out. "We try to treat all customers the same, whether they need 50 or 500 boards. We attract a lot of start ups and as they grow, we grow with them."

Bernie Lewe founded Microart in 1981 as a printed circuit board design house only. "This was back in the days before computers when design was done by hand using coloured crayons, then coloured tape," Wood explains. Once computers came along, circuit board design was getting easier so the company got into assembly.

Fifteen years ago, Lewe sold the company to father and son team Peter and Tyler Fisher. Wood was brought in to run it and Lewe stayed on. Wood, a graduate of George Brown College who had worked in printed circuit board design and assembly, became the manager. In 2018, Peter and Tyler sold the firm to Wood. Lewe is still there three days a week.

(L-R) Overlooking the warehouse, SMT and through-hole areas of the plant. Printed circuit boards waiting for through-hole process. Operator loading hand-placed through-hole components.





Mark Wood inspecting SMT components currently loaded on feeders that are being placed by the pick and place machine.

PHOTOS: RODNEY DAW

Microart has nine surface mount lines (three are high-speed SMT lines) and three X-ray machines at the Markham location. Wood says they have no problem making capital equipment investments because of the pace of growth.

Now manufacturers seek Microart to help them implement sensors and chips on hardware products ranging from communications satellites to paintball guns. "Sensor manufacturers are doing a booming business," Wood says.

Building unique boards

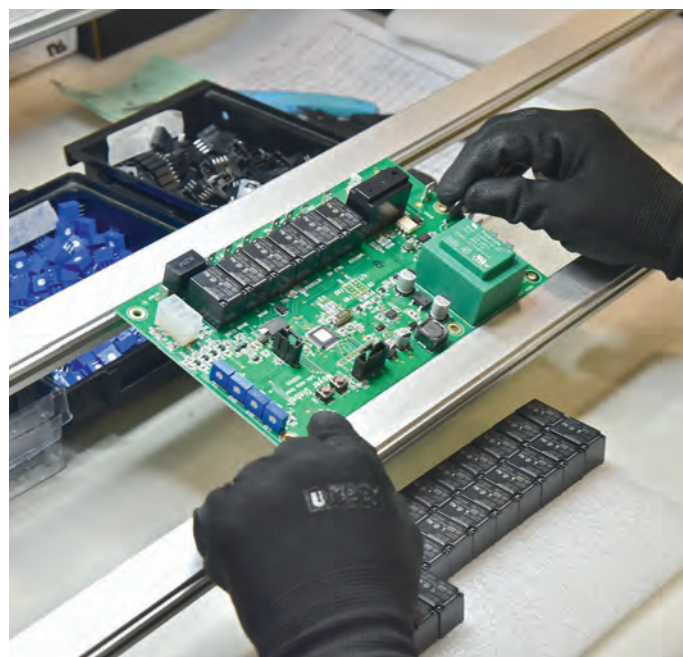
Connectivity is a big factor. "Data is driving the growth," Wood says. Microart's business in medical devices connected to the Internet of Things (IoT), for example, is "expanding dramatically."

Think monitors for weight loss, the heart, blood pressure and blood glucose levels for diabetics. When connected, these devices collect data, offer analysis, help pinpoint problems and provide alerts to patients and their healthcare workers.

"There doesn't seem to be any part of the body they don't monitor now," Wood says, adding most of the market is for home sensors to help keep the costs of hospitalization down.

Connectivity is creating residual business on a monthly basis for those who are manufacturing products with a data stream. "It's really accelerating. The product is a means to an end. Now you can stay in touch with the customer. Hardware is like software. They know more about your business than they did before," Wood says.

For example, heavy equipment manufacturers offer their customers preventive maintenance by connecting machinery to indicate when bearings are



about to wear out. Such a service could save customers time, equipment wear and money.

Because of this the supply chain has improved, Wood says. "The supplier already knows that you are out of something before you do."

Microart expanded its operations a year ago, opening a new plant in Buffalo, NY. Eight people work one shift on two surface mounting lines, and there are plans to hire "probably 12 more," Wood says. "The new plant hasn't gone the way we expected. It has attracted Canadian businesses seeking to meet 'Build in USA' requirements."

Microart is the only company Wood knows of that offers an apprenticeship training program for printed circuit board assembly. In-house trainers are certified IPC. "We also train some customers," he says.

Building unique boards

In any given month, Microart will serve 300 different customers. The firm is now building 1,000 to 1,100 unique boards. Using ERP software from Nivision Dynamics, a share point system helps them track the status of the boards as they proceed through assembly in the shop.

"We can allow our customers in through a portal so they can see the status of their job," Wood says. "We buy all components, put them into a kit. It could be one bin or many depending on the job. Once the backend work is complete, including the design program and stencil, the boards are loaded onto SMT feeders through the paste process. An automated optical inspection verifies we've done it correctly."

Any solder joints that can't be visibly inspected are x-rayed. An automated wave solder machine or low volume hand solder might be used on some selected solder mechanisms. Once that's done, the product is tested then shipped to the customer, or it's assembled into the customer's product.

Although Microart ships to some 50 countries, 90% to 95% of the jobs are delivered within



(Top-bottom) Partial assembled PCBs waiting for manual hand assembly.
Operator cleaning assembled board after selective soldering.
Fully assembled boards being tested.

North America.

David Olive has known Wood for 30 years. Olive is a partner in Netonix LLC, which designs, manufactures and distributes equipment worldwide for the WISP (wireless internet service provider) industry in New Holland, Pa.

"Mark introduced us to a company that wanted to manufacture something he knew we could help them with. We didn't

have the volume to go to China," Olive says. "You have to have someone on the ground if you're dealing with China. If you're a Tier One customer in China you might be okay, otherwise you need to be there to monitor things. Microart is good in that they can jump to your needs and do a good job. And the Canadian dollar helps."

Barry Papoff is COO of Markham, Ont.-based Arcx. The

firm provides plant operators with an error-proofing system for assembly lines. Key to this system is the logic controller, connected to the Industrial Internet of Things (IIoT). It collects metrics, such as cycle time or errors. It also offers an interface for training the operator in each basic step of the process. Microart assembles the device.

Why does Arcx have its engineered product manufactured in Canada rather than, say China?

"Labour rates are rising in China," Papoff says. "They've risen five times since I've been dealing with manufacturers in Beijing. It's getting harder to find low-cost geographies." Also, start-up product costs at a distance "create quite the barrier. Design to prototype to manufacture can be done at a much faster rate here."

He appreciates Microart's flexibility.

"There has been a renaissance of hardware and electronics manufacturing within Ontario," Papoff notes. "We have an ecosystem fed by a number of large electronic global companies. Research in Motion (now Blackberry Ltd.), for example, sprinkled the ecosystem with all these bright people. We have angel investors and good technology incubators. That seeds things and creates start ups. Microart is a small, local company with a good reputation. Mark has a finger on the pulse of the local community and business needs," he says.

Ultimately, Papoff wants to support the local community "because this is where Mark's children and my children are going to grow up and look for jobs."

Some of those opportunities will surely be in the growing Canadian electronic component manufacturing industry.

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

Comments?
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PRESSURE POINT

Skills Ontario offers the province three recommendations for improving engagement.

BY JOE TERRETT, EDITOR

Filling skills gaps continues to be a challenge for manufacturers. The **PLANT** Manufacturers' Outlook 2019 survey shows it to be one of the greatest challenges for 46% of manufacturers, third on a list behind costs and pressures on pricing.

Canadian Manufacturers & Exporters' management issues survey found 69% of respondents are facing immediate skills shortages, while 75% expect to face shortages over the next five years. There are two key reasons: rapidly changing technology is changing skills needs; and there are not enough young people choosing careers in manufacturing-related fields.

Ontario, Canada's manufacturing heartland, will face a shortage of 190,000 workers in 2020, and 560,000 by 2030, according to research by the Conference Board of Canada.

The Excellence in Manufacturing Consortium (EMC) has been tracking skill vacancies with its ManufacturingGPS online resource, which provides benchmarking tools for human resources, labour, skills and capabilities needs (<http://manufacturingGPS.ca>). The Owen Sound, Ont. non-profit that helps manufacturers become more competitive identifies the positions most in demand as: production/machine operators; welders; maintenance and trade; sales, business development; and development engineers and quality.

First the good news: EMC sees a big jump in technology investment (8.3% between 2017 and 2018) as a reason for spending on training.

But over the past two years there has been a worrying shift



Training on a CNC machine.

PHOTO: ADOBE STOCK

Filling the skills GAP

INCREASE ENGAGEMENT AND BUILD MOMENTUM

around what are the major recruitment challenges for hard to fill vacancies, with the low number of applicants moving from third position to number one.

"Employers need to take another look at how they're recruiting and consider non-traditional ways," says Jean-Pierre Giroux, EMC's national director, skills and talent development.

Some non-traditional strategies include foreign-trained workers and training unemployed people, but manufacturers are also being encouraged to look at how they bring people into the sector.

"A lot of companies still have HR practices that belong in the 1970s and 1980s," Giroux says.

Companies need to change the way they operate. For example, manufacturing is typically viewed as full-time work, but he says many millennials don't necessarily want to work 40 hours a week. They'd rather do 20 to 30

hours, so manufacturers need to look at how they can accommodate them, and eventually convert them to full time.

A bigger role

Skills Ontario, the not-for-profit and registered charity focused on bringing more young people into skilled trades, wants to build on the work it has been doing for the past 30 years and alleviate some of the challenges sectors such as manufacturing are experiencing. Now it has an opportunity to do so in a significant way as the Ontario government under Premier Doug Ford moves to wind down the Ontario College of Trades. The OCoT is the regulatory body established under previous Liberal governments to govern skilled trades. The Ford government intends to develop a replacement model that reduces regulatory burdens for businesses, in line with its Making Ontario Open for Business Act.

This presents an opportunity for Skills Ontario to play a bigger role. It has built an expansive network of stakeholders in the apprenticeship system that includes businesses, educational institutions at all levels, unions, students, apprentices and tradespeople. It runs programs and skills competitions, provides resources and it aims to do more, but needs additional resources to do so.

The organization has outlined how it can help build the momentum in the promotion of skilled trades careers in a Jan. 29 presentation to the government's Standing Committee on Finance and Economic Affairs, and it has included recommendations for improving engagement among stakeholders, especially students looking at career choices.

"There are a lot of good things going, but they're not tied together," says Ian Howcroft, CEO of the Waterloo, Ont.-based organization. "We see Skills Ontario tying them together."

He sees the province's move to an apprenticeship ratio of 1:1 as a positive. "It will make it easier and provide more opportunities for smaller employers to hire an apprentice and make it easier for an apprentice to find a placement."

But the presentation notes some of the issues that need attention in the current model, such as the ongoing stigma at-

tached to trades and technology careers, as well as the inefficiencies and complexities of the system.

“In some ways it’s archaic and cumbersome with no clear path for many students. Even if you want to pursue an apprenticeship, it’s hard to find your way through,” Howcroft says.

Skills Ontario believes the governance/regulatory elements should be separate from the promotion and awareness of ap-

prenticeships and skilled trades, allowing for greater flexibility and effectiveness.

Its first recommendation is for the Ontario government to scale up successful programming. Skills Ontario notes 91% of its audience (students and apprentices age 10 to 29) were likely to pursue a career in the skilled trades or technologies – yet the organization was only able to reach a small fraction of that group with its current resources.

Expand outreach

Skills Ontario delivers presentations to approximately 120,000 Ontario youth, which represents about 10% of the student population between grades 7 and 12. The submission notes there’s a significant opportunity to expand this outreach and engagement, including reaching younger students as well as influencers such as parents, teachers and guidance counsellors.

Recommendation two calls

for engaging non-traditional or under-represented groups in skilled trades, such as young women, indigenous groups and new Ontarians.

For example, Skills Ontario piloted a program for Indigenous youth in 2011, which complemented its Liaison Program and involved the hiring of three full time Indigenous staff members. They have been building relationships in schools and communities, while tailoring programs and activities to serve them.

There’s also significant demand for programming aimed at female elementary students. The Elementary Young Women’s Conference provides events and programs aimed at young women in grades 7 to 12. But this and other events at the Skills Ontario Competition have significant wait lists.

Recommendation three calls for single-window access for apprentices. Stakeholders find it difficult to access good quality information and the apprenticeship system. The organization suggests it would be an appropriate conduit for such an approach on the promotional side.

Howcroft described Skills Ontario as a potential hub for the many organizations operating in the skills space to better co-ordinate what’s going on across the province and ensure the limited resources everyone has are used to best advantage. “Given our strengths, history, staff, network and volunteers, we’re well-placed to work with the government to achieve some of its goals and objectives with regard to modernizing apprenticeships and building a better skills system in Ontario.”

The challenges manufacturers face finding people with the right skills to fill vacancies lends some urgency to the Ford government’s plans to rejig the province’s skills model. Cutting the regulatory burden is smart but its new plan should also look at how stakeholders can work more effectively.

Comments?

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PERFORMANCE

Explain linkages when teaching a process.

BY HUGH ALLEY

A healthcare practitioner observing another practitioner noticed he made some key decisions without asking the family members about the patient. "How can he make good decisions when he doesn't have that critical information?" she asked.

It was clear that he didn't see his job as including efforts to collect information. In his silo, the job was to make the decision.

The same problem often occurs in manufacturing. We ask employees to make decisions, but they struggle. Either they don't have needed information (not their job because someone said they don't want the operator speaking to the customer) or they lack guidance about how to weigh the information they have. In both scenarios, the result is a decision that is less than ideal.

One company removed two weeks from its build cycle after sales started collecting all the information engineering needed when the order was taken. Sales people didn't like the extra work, but when they noticed there were fewer follow-up questions, a better buying experience for customers and faster delivery, they were willing to do it.



Information silos lead to less than ideal decisions.

PHOTO: ADOBE STOCK

overall process by adding a small amount to their work. For example, sales may not be interested in production details. But salespeople at one company were willing to take on some additional data entry once they understood it would reduce the error rate and the delivery time of their orders. In their market, that was a competitive advantage.

The take away? When you are explaining a new process or teaching an employee new to a process, be sure to explain the linkages. How does this step of the process affect the later stages? How do others depend on the work being demonstrated or taught?

When staff members have this understanding, they'll work more effectively, and less likely to take short cuts with the inevitable side effects.

Make better DECISIONS

LIBERATE INFORMATION FROM JOB SILOS

Even better, products weren't stalled while the production crew waited for clarification.

Unrecognized silo focus

The silo problem is particularly acute for products that must be configured or engineered, but it shows up even in simple operations. For example, in

metal forming, if the customer's desired radius isn't known, the operator doesn't know which profile to use in the press. This delays either the design process or the production process.

Most people are unaware of their silo focus. Fortunately, when they do become aware, they're willing to improve the

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

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FINANCE

Some of the key measures with pros and cons from key industry associations.

BY PLANT STAFF

The Trudeau government's 2019 pre-election budget is big on spending and some measures will help Canadian manufacturers. There are provisions for skills and training, innovation, regulatory reform and business measures, among others.

The Canada Training Credit is for people 25 to 65 and is applied to tuition, training costs and related fees. The annual \$250 credit goes into a national account and accumulates to a lifetime maximum of \$5,000. There's also an Employment Insurance training support benefit. It provides up to four weeks paid leave every four years (55% of average weekly earnings) to help cover living expenses when it's necessary to leave work for additional training.

There are innovation measures of interest. Several programs are related to the forestry sector involving up to \$251 million over three years, starting in 2020-21. There's also \$100 million over four years going to the Strategic Innovation Fund starting in 2019-20, which will promote innovation through collaboration between academia, not-for-profits and the private sector.

Additional funding of \$38 million will be provided over five years for Futurpreneur Canada, aimed at young entrepreneurs.

And \$100 million over three years aims to stimulate economic growth in Western Canada, provide incentives for innovation and attract investment.

Shawn Casemore, president of the Excellence in Manufacturing Consortium (EMC), a non-profit that helps manufacturers become more competitive, is pleased to see the government investing in human capital. "More specifically we welcome the significant investment that is



Some measures in Budget 2019 benefit industry.

PHOTO: ADOBE STOCK

Budget BUSINESS

WHAT'S IN IT FOR CANADIAN MANUFACTURERS

being made in work-integrated learning – preparing students for the workforce – which is much needed in the Canadian manufacturing sector.”

Canadian Manufacturers & Exporters (CME) is encouraged to see a commitment to increasing funding for skills training. “One quarter of a billion dollars and creating 40,000 new work integrated learning spots is certainly welcome and will help address chronic labour challenges,” said Dennis Darby, CME’s president and CEO. “However, manufacturers continue to be concerned about the overall competitiveness of the industry as no significant changes to business taxes or other measures to help business investment were announced.”

The national association is encouraging the government is upholding the Accelerated Capital Cost Allowance and export supports, and it’s pleased to see investment in more reliable internet service to rural areas, elimination of the income threshold for accessing the enhanced credit under SR&ED, and continued

support for regulatory reform. “But these measures will not be sufficient to stimulate the level of investment that is required in the industry and the Canadian economy more generally,” he said in a statement.

No tax review

A TD Economics report noted little in the budget to address international competitiveness issues. “There was again no mention of a longer-term tax system review (both corporate and personal) to address how the economic reality has changed since the Carter Commission’s report more than 40 years ago,” said chief economist Beata Caranci and senior economist Brian DePratto in their report.

The Canadian Federation of Independent Business (CFIB) said the new Canada Training Benefit and the EI Training Support Benefit raise concerns about the role of employers – both in ensuring the training is relevant to the world of work and in administering the time away from the workplace.

CFIB acknowledged the small business premium rebate for

businesses that pays \$20,000 or less per year in EI premiums. Starting in 2020, a rebate will aim to reduce premiums, but details are pending.

The business association that represents small enterprises has been pushing for a reduction in red tape, and some progress is evident in the budget. It notes investment in improving government services to help businesses comply with and understand their tax requirements; a permanent dedicated line for tax service providers; and wait time improvements for business inquiries to the Immigration Refugees Citizenship Canada phone line.

But the CFIB noted some missed opportunities:

- Measures to offset the costs of the Canada Pension Plan increases nationally and the new federal carbon tax affecting small businesses in several provinces.
- Exempting previous passive investments from the small business tax changes to maintain access to the small business tax rate.
- Expanding the red tape reduction one-for-one rule to include policies, guidelines and legislation.
- Keeping today’s debts from becoming tomorrow’s taxes by creating a plan to balance the budget within the next three to five years.

The CFIB intends to keep these issues top of mind as the election time approaches.

Comments?

E-mail jterrett@plant.ca.

LOGISTICS

Ten tips for managing its impact on your supply chain.

BY MARCO ROMANO

Extreme weather is becoming increasingly common. Floods, hurricanes and wildfires have devastated vast regions around the world with increased frequency. This winter, much of Canada and the Midwestern United States experienced unprecedented extreme cold.

These events put severe stress on local authorities and infrastructures. Government offices, schools and airports often close as roads and railways become impassable.

In the manufacturing world with its expansive supply chains, a weather crisis in the Midwest can affect a small business owner in rural Ontario. Manufacturing has become more integrated than ever before, and while weather crises are difficult to predict and manage, it is possible to prepare in advance to mitigate the impact.

Here are 10 tips to help maximize capacity, procure reasonable rates, and ship securely when bad weather strikes:

- 1. Don't try to time the market.** Conduct a regular procurement exercise every year at the same time to review rates and service providers. Doing it on a consistent schedule permits better alignment between shipper and provider networks, helping to develop long-term, sustained pricing levels regardless of major weather events.
- 2. Maintain a stable set of service providers.** Measure how much freight your carriers are actually hauling, compared to what they promised. If you give too much freight to non-incumbents, higher rates will result in both emergency and non-emergency situations.
- 3. Investigate what drives ongoing fluctuations in the market.** Truckload capacity, like the economy, is cyclical:



Extreme WEATHER

AVOID ITS EFFECT ON TRANSPORTATION

market changes affect available capacity. Watch certain economic indicators to understand what's happening in the market and anticipate potential impacts on transportation rates. That can leave you better prepared to respond to rate changes during extreme weather, such as hurricanes.

- 4. Understand how relationships between shippers and receivers can significantly influence carrier engagement.** Don't leave carriers to deal with problems that fall outside their regular duties: shippers are ultimately responsible for resolving any issues carriers encounter with receivers, including those that are weather-related. Negative carrier treatment can reflect poorly on your business.
- 5. Ensure your transportation providers are adaptable.** Can they step in and move additional freight volumes in a pinch? Do they have the size and scale to help you easily find solutions to unexpected problems that may arise during floods

and fires? Consider business processes and the attributes of freight (lead time, dwell time) to see if you can optimize with appropriate capacity communities. This will help mitigate volatility and make the market more predictable.

- 6. Look for any missing links between inbound and outbound strategies.** You may have access to providers who can deliver inbound raw materials to supplement your outbound transportation needs, especially useful during times of limited resources.
- 7. Be flexible.** Rigid appointments prevent efficient transit times and good use of drivers' hours of service. Sometimes, driver delays can last a day or more because a receiver has a small dock and too small a timeframe for unloading. Stay flexible whenever possible to minimize frustration in crisis scenarios.
- 8. Communicate within your organization.** Avoid service failures and unmet expectations by educating your company

Weather crises can disrupt a manufacturer's supply chain. PHOTO: ADOBE STOCK

(especially salespeople) about how weather affects capacity. Explain your plan for situations that could significantly curtail capacity, such as blizzards: will you ship early to avoid the rush? Will you leave inventory in strategic locations, balancing maintenance costs against potentially higher transportation rates?

- 9. Connect with your carriers' local offices.** No one can better inform you about specific local situations than people on the ground. When choosing a carrier, ask questions about procedures during harsh weather: Will it be possible (and easy) to reach a local representative during an emergency? Will they quickly understand your situation and resolve it in real time?

- 10. Use the technology at your disposal.** When you choose a carrier, pay specific attention to the technological tools it has to offer. Real time visibility helps you manage client expectations and maintain good business relationships. Moreover, technological tools also help you redesign your logistics strategy in real time to respond to severe weather, which will promote efficiency and result in lower costs.

No one is insulated from the market pressures and cycles that drive supply and demand. But you can manage those factors to create the best possible experience in any marketplace. Better preparation and clear communication will reduce the risk to your logistics supply chain.

Marco Romano is director of transportation sales at C.H. Robinson, a provider of multimodal transportation services and third-party logistics in Vaughan, Ont. Visit www.chrobinson.ca/en-ca.

Comment?
E-mail jterrett@plant.ca.

CCOHS SAFETY TIPS

Create a written policy that provides a protocol for reporting incidents.

Maia is dreading Monday morning and a supervisor who makes a habit of intimidating and humiliating her in front of co-workers. This and other types of harassment play out for many workers and is an issue that often goes unreported. The harm this causes affects employees, clients, customers and visitors.

Everyone is entitled to protection while on the job. When workplace harassment and violence are not defined they can go unnoticed and unreported.

There's a tendency to think of violence as physical – hitting, shoving, kicking and other threatening behaviours. But it can also be arguments, property damage, vandalism, theft, psychological trauma and anger-related incidents. There are also less obvious, but equally destructive, behaviours such as verbal or written threats, rumours, pranks and abuse such as swearing, insults or condescending language.

According to the Canadian Initiative on Workplace Violence, one in five violent incidents (including physical assault, sexual assault and robbery) occur in the workplace. But violence is not limited to traditional workplaces. It can happen offsite at work functions such as conferences, training, tradeshow, social events, in clients' homes or away from work (such as a threatening phone call at home).

A 2014 Queen's University poll found 23% of Canadians have experienced workplace harassment. It's a form of discrimination that involves any unwanted physical or verbal behaviour that offends or humiliates. Generally, it persists over time but includes serious one-time incidents.

Harassment occurs when someone makes unwelcome remarks or jokes based on race, national or ethnic origin,



Protect EMPLOYEES ...FROM WORKPLACE VIOLENCE AND HARASSMENT

colour, religion, age, sex, sexual orientation, marital status, family status or disability. Repeated and persistent actions aimed at an individual can torment, undermine, frustrate or provoke a reaction. With persistence, this behaviour pressures, frightens, intimidates or incapacitates the victim.

Decreased productivity

Sexual harassment is any conduct, comment, gesture or contact of a sexual nature likely to cause offence or humiliation, or that might, on reasonable grounds, be perceived as placing a condition of a sexual nature on employment, or any opportunity for training or promotion.

A 2014 survey on sexual harassment in Canada by Angus Reid revealed three in 10 Canadians said they had been sexually harassed at work, but very few of them reported this to employers. The top reason for not reporting was a preference to deal with the incident themselves. Other reasons included embarrassment, not sure it was harassment, fear it would hurt their career, and the feeling

that the issue was too minor. Three-quarters of respondents described the issue as important and that it should get more attention. The same number also believed it's widespread or at least a common occurrence.

The human and financial costs of workplace harassment and violence are great. Victims can be affected physically and psychologically. Common responses range from low morale and productivity, changes in eating and sleeping patterns, denial, panic

Heated arguments can be classified as violence.

PHOTO: ADOBE STOCK

and anxiety, depression, fear, post-traumatic stress disorder, and thoughts of suicide.

Companies also experience increased absenteeism and healthcare costs, as well as legal expenses when steps aren't taken to prevent harassment and violence.

Managers must not tolerate any violent behaviour including aggression, harassment or threats of violence. Such behaviours create a psychologically unsafe work environment where employees are fearful and anxious.

Commitment from management is best communicated in a written policy that includes a protocol for employees to report incidents.

Learning to recognize workplace violence and harassment is an important first step toward prevention.

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

Comments?
E-mail jterrett@plant.ca.

Employee protection

Most Canadian jurisdictions have a "general duty provision" in their OH&S legislation that requires employers to take all reasonable precautions to protect the health and safety of employees. More information on this topic is available in the OSH Answers (www.ccohs.ca/oshanswers) fact sheet OH&S Legislation – Due Diligence.

Canadian jurisdictions that have specific workplace violence prevention regulations include Alberta, BC, Saskatchewan, Manitoba, Ontario, Nova Scotia, Newfoundland and Labrador and PEI. Canadian federally regulated workplaces (that fall under the Canada Labour Code, Part II) also have specific regulations. Quebec has legislation regarding "psychological harassment," which may include forms of workplace violence.

Many jurisdictions have working alone regulations, which may have some implications for workplace violence prevention. Ontario also has specific harassment legislation.

SHOW TIME

Discover how millennials, cannabis, diversity and demographics are changing the workplace.

Safety is a priority for manufacturers. Management is facing a number of evolving conditions that impact the workplace, including the legalization of cannabis, mental health, diversity and changing demographics of the workforce. These issues and others will be addressed at Partners in Prevention 2019, running April 30 to May 1 in Mississauga, Ont.

The health and safety conference and trade show presented by Workplace Safety & Prevention Services (WSPS) will focus on safety superheroes who advocate for health and safety practices in the workplace. The two-day event includes three keynote speakers, 60 sessions, workshops and professional development courses, and more than 400 exhibitors booths on the trade show floor showcasing the latest innovations, market trends, products and services.

This year's keynote speakers include Canadian comedian, TV personality, political satirist and author Rick Mercer; Scott Stratton, a social media influencer on Forbes.com, who will discuss how today's business climate is changing at an unprecedented rate; and Mark Henick, whose TEDx talk, "Why We Choose Suicide," had more than 5 million views, will look at mental health.

Sessions cover a range of issues including: cannabis, mental health, inclusivity and diversity, and the rise of the millennial worker in the workplace. Here are some highlights:

- **Canadian cannabis 101.** Jay Rosenthal, co-founder and president of Business of Cannabis, will explain how Canada and the US are regulating cannabis; the promise of medicinal cannabis; and what the future has in store for Canada as a world leader in the cannabis industry. He'll also



More than 400 exhibitors booths at PIP 2019 (last year's trade show floor pictured).

PHOTO: WSPS

Celebrate safety SUPERHEROS

PIP 2019 COVERS PRESSING SAFETY ISSUES

touch on the impact cannabis may have on workplaces.

- **Cannabis – six months in.** A panel will review the progression leading up to legalization and early information on the development of the impairment standard by CSA.
- **Millennial management – maximizing tenure and leveraging their potential.** Generation workplace expert Jeff Butler will expose the mindset of one of the largest demographics and show how to turn a career hopping millennial into a devoted employee by tapping his/her potential and creating a strong management structure.
- **Up the ante on workplace mental health/wellness.** Adam Palmer, safety and prevention supervisor, Niagara Casinos, and Amanda Silliker, editor, Canadian Occupational

Safety, will discuss how managing employee mental health and overall wellness reduces costs, improves safety and sustains happier employees.

- **Fatigue management: Cheaper than therapy.** Mike Harnett, president of Solaris Fatigue Management, delivers the most recent scientific research on the best way to optimize personal health, safety and performance while minimizing the consequences of fatigue.
- **Smartphones and the pursuit of workplace wellness.** Human resources consultant Jim Lees examines the impact smartphone technology has had on the workforce and considers the challenges balancing the increasing demands for productivity and efficiency with the mental health and wellness of employees.

- **Harassment in the workplace: How to identify, prevent and take action against it in the #Me-Too era.** Lauren Bernardi, Bernardi Human Resources Law LLP, will lay out the legal definitions of harassment, the importance of bystander interventions and other preventative measures, and raise awareness of sexual harassment and how to address it.

Partners in Prevention will be held at the International Centre in Mississauga, Ont. Register at PartnersinPreventionConference.com.

WSPS, based in Mississauga, Ont., represents more than 167,000 member firms across the agricultural, industrial/manufacturing and service sectors.

Comments?
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THINK LEAN

How the sport parallels manufacturing and leadership.

BY RICHARD KUNST

I was introduced to white water kayaking at an early age. As I became involved in the competitive side of the sport a couple of different types of challenge emerged: the downriver race where you had to accomplish the shortest time from the start to the finish; or the slalom event, where you had to navigate the course through a series of (typically) 20 gates.

Downriver racing is like doing mass production where skill is minimal but you rely heavily on strength and the state of your equipment – the lightest boat and a strong paddle. In slalom, you need skill and the ability to read water currents to accomplish the best overall lapsed time – like doing a mixed-model or small lot production.

Both types of race require a lot of practice to create the muscle memory needed to negotiate the course. But practice is not enough. You need a coach who looks at your style and offers tips to improve technique, eliminate time wasters and to mentally challenge you to dig down and excel. These coaches are our team leads, supervisors and managers.

As I approached my first competitive race, I asked the coach what I should do at the starting gate. His answer was simple: as the starter holds the back of your kayak and begins the countdown, reach inside to produce the strongest paddle stroke followed by an even stronger paddle stroke. As the count ends and your race begins with your ultimately strongest paddle stroke, you keep that pace until the race is completed.

In today's manufacturing environment, we give our best and sustain this energy during our daily engagements. We're aware of the environment but rely on muscle memory to accomplish



Downriver racing is like mass production.

PHOTO: SUPASTE

Riding the white WATER

KAYAKING AND LEADERSHIP LESSONS LEARNED

tasks that we learned during practice.

What else did I learn during those formative years?

Start strong or you'll be discouraged right from the start, which will only amplify during the race.

Slalom events consist of several mini races. While navigating through a series of gates you gain penalties for missing or touching one. If you view the race one gate at a time, blowing one sequence will not discourage you for the entire race. This makes me a believer in hourly run boards (that tracks targets and compares them to production over a shift).

In slalom, you concentrate on the orientation of the kayak and ensure you never touch a pole. Weight to boat volume is

a huge KPI if you intend to win and as you approach a gate, you focus on submerging your boat to sneak under it. This is like single minute exchange of dies (SMED), which is converting as many changeover steps to external (while the machine is running), and to simplify and streamline the remaining steps.

New edge

One of the most important lessons learned stems from the coach who was not big on giving compliments or acknowledging our capabilities. I was not the strongest or most capable paddler on our team, but I did have a need to be acknowledged and perhaps complimented, but it never happened.

Because I was so frustrated with my coach, I took a week

away from work to concentrate on my paddling. I focused on improving my elapsed time, worked hard on skill and technique, and over several days I improved significantly. How could he not be impressed with this accomplishment?

During our team practice day, I paddled my sequence knowing it was a personal best. I glided up next to the coach looking for that compliment or acknowledgement of a sequence well done. His response, "You didn't fall in."

"What?" I exclaimed. "The purpose is not to fall into the water."

The coach said he could see that I had improved but since I didn't fall into the water, I didn't have a new edge.

So I learned the real purpose of practice: it's okay to fail.

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.kunstsolutions.com. E-mail rkunst@kunstartofsolutions.com.

Comments?

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CASE HISTORY

Successful performance improvement initiatives drive cost savings.

BY STEVE GAHBAUER

For any progressive plant, the goal is always to perform maintenance more efficiently and aim for world-class reliability. It takes effort, but it's achievable, as illustrated by a global medical and pharmaceutical device company.

The case study was presented by Jason Ballentine, the general manager of engineering operations at ARMS Reliability, a global consulting firm based in Austin, Tex. It specializes in helping industry derive more benefits from their assets, avoid unplanned downtime, and reduce operating costs. Ballentine presented the study at the MainTrain maintenance, reliability and asset management conference, convened in Ottawa by the Plant Engineering and Maintenance Association of Canada (PEMAC).

He said the successive improvement initiative at one of the unidentified manufacturer's facilities, was based on choosing a machine or line performing below desired levels and using reliability-centred maintenance (RCM) to improve maintenance strategies. This approach involving a single machine at a single facility saved \$150 million over 10 years as operations and maintenance personnel united to



Get more from your ASSETS

HOW RCM HELPED A MEDICAL DEVICE COMPANY

improve efficiency and reliability. They reduced downtime, idle time and labour reallocations.

There were challenges, of course. An important, intricate machine was frequently down, causing decreased production, increasing emergency and corrective labour costs. ARMS Reliability was charged with completing a study to risk-optimize the maintenance strategies for 40 asset types. The company gathered a cross-functional

team of more than 20 experts consisting of maintenance, reliability and operations members, plus personnel from other sites.

Bonus benefits

ARMS Reliability began by gathering failure and maintenance information for the machine from a variety of sources, including key site personnel, machine operations and maintenance documentation, site drawings and the SAP ERP system. It also held a series of in-person, onsite facilitation sessions to collect remaining data. Once all gathered information was validated, ARMS modelled various maintenance scenarios comparing different strategies, spares and holding options, and generated budget predictions over a 10-year period.

The models, completed using the RCMCost module of Iso-graph's Availability WorkBench, simulated three scenarios: run to failure (RTF); current maintenance practices, showing the effectiveness of the company's existing planned maintenance

RCM improves maintenance strategies.

PHOTO: ADOBE STOCK

strategy for the machine; and optimized maintenance, demonstrating what would happen with optimal tasks performed at optimal frequencies.

A "bonus" benefit of the study was how the team-based approach brought together maintenance and reliability personnel, plus site operations, directors and management, to discuss issues. With the involvement of operations professionals, the process became a platform for communication, new awareness and understanding between these groups. It helped propel the company toward a world-class reliability program via plant-wide buy-in.

The cost comparison showed optimized maintenance has potential for huge cost savings by redirecting the workforce toward tasks that are valuable to the company, and away from wasted efforts; by stocking low-cost, long-lead-time spares to dramatically decrease machine downtime; and by training operators wherever recurring incidents delay start-ups and produce machine trips.

Ballentine said the recommended solution consisted of two simple steps: catch belt failures just before they happen by turning monthly inspections into a daily task; and eliminate the wait time for spares by always stocking extra belts.

ARMS Reliability's RCM study provided the medical device company with a quantified new maintenance strategy expected to save 91% in costs over the current strategy in the next 10 years in a single facility. It showed performance initiatives work.

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

Comments?

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RCM in seven steps

Reliability-centred maintenance (RCM) is a process used to ensure systems continue to do what's required under the present operating context. It's defined by the technical standard SAE JA1011, Evaluation Criteria for RCM Processes that sets out the minimum criteria a process should meet in this order:

1. What is the item supposed to do and its associated performance standards?
2. In what ways can it fail to provide the required functions?
3. What are the events that cause each failure?
4. What happens when each failure occurs?
5. In what way does each failure matter?
6. What systematic task can be performed proactively to prevent, or to diminish to a satisfactory degree, the consequences of the failure?
7. What must be done if a suitable preventive task can't be found?

Source: Wikipedia

INSIDE MAINTENANCE

Increasing inspection frequency has a huge impact on the bottom line.

BY STEVE GAHBAUER

Electrical systems play a critical role in a manufacturer's ability to be competitive and profitable. They have to be properly maintained. Unplanned outages cost millions of dollars and have a direct negative impact on the performance of plant engineers, operators and managers. Although often poorly understood by stakeholders, electrical system reliability is directly tied to productivity and operating costs. Quantifying the statistical probability of an electrical system failure opens the door to prioritizing critical system components and minimizing maintenance costs.

It's not surprising then that how we look at the maintenance of electrical power systems and equipment is evolving. This is being driven by several influences – cost, technology and an enhanced human resource base. Efforts are directed to exploring new approaches to monitoring, diagnosis, life assessment and condition evaluation of critical plant infrastructure.

Power interruptions and electrical equipment failures are one of the major symptoms of ageing electrical distribution



Electrical outages interrupt production and drive up costs.

PHOTO: ADOBE STOCK

Protect your electrical SYSTEM

MAKE THE MOVE TO CONDITION MONITORING

components. Consequently, many manufacturers are migrating from traditional time-based maintenance to condition-based reliability maintenance.

One of the monitoring technologies is electrical maintenance surveillance. Surveillance and inspection systems determine the condition of individual

assets and include – but are not limited to – infrared thermography, airborne ultrasound, motor current analysis, partial discharge testing, corona cameras and visual inspections.

Arc flash danger

Making the transition from reactive maintenance to a

totally proactive structure is not an overnight project. It takes time, effort and planning, with commitment from all levels of an organization. The key is to have a reliable means to evaluate the condition of equipment components and the system as a whole.

These aspects of electrical systems maintenance have been specifically addressed in Main-Train maintenance conferences, convened by the Plant Engineering and Maintenance Association of Canada (PEMAC).

Here are highlights from presentations by Rudy Wodrich and Doug Marshall (*see Meet the presenters, page 26*):

Wodrich says the challenge of an electrical maintenance surveillance system is the inspection and equipment used yield their most valuable results when inspecting equipment operating under full load conditions. But this is also the time when equipment is most dangerous to maintenance technicians. The surveillance equipment normally requires direct access, or direct line of sight, to the energized components inside the electrical system. This means panels have to be open, which is an extremely dangerous condition. In many cases the posted arc fault currents are too high, and access is prohibited.

Every year, thousands of electrical workers in the US and Canada are injured or even killed while performing their duties. Ontario's Ministry of Labour

TECH TIPS

Grounding VFDs How to avoid problems

Maintenance crews frequently run into troubles with variable frequency drives (VFDs), including windings and bearings. There are two common issues: the drives were never tuned, or were not tuned following motor or drive repairs or replacement; and ground leads are in the same conduit as standard leads from the drive to the motor.

Follow manufacturers' installation instructions. They contain directions

on how to tune the drive and recommendations for cabling and grounding. Improper grounding will cause problems with how the drive operates.

One trouble spot is loose ground leads in the conduit combined with motor cables from the drive. This causes electrical unbalance between the phases and ground leading to a transformer effect (EMI) that generates voltage and current in the



A small VFD.

PHOTO: CJ COWIE

cables from control and ground cables.

Source: MotorDoc LLC newsletter, Howard Penrose. Visit www.motordoc.org.

ground lead. Heating, potential fire or shock hazards occur, depending on the size of the ground lead and amount of current.

Use special inverter cables that either balance the phases to grounding circuit, shield cables grounded at both ends, or distance the output

reports over a 10-year period 28 workers were killed and 255 seriously burned from arc flash incidents. According to the Bureau of Labor Statistics in the US, there are more than 300 fatalities each year from electrocution with an arc flash component, making this the fourth leading cause of occupational fatality. These numbers are nearly half of what they were 20 years ago, which is a marked improvement, for several reasons. First, personnel have a better understanding of risks due to training. Second, arc flash labelling requirements on equipment provide information to front-line personnel regarding the kind of personal protective equipment (PPE) they should use. Finally, there have been significant improvements in the types and quality of PPE.

Unfortunately, the average number of annual arc flash occurrences has not fallen at the same rate over that period. In

fact, there are still 4,000 non-disabling electrical contact injuries each year and 3,600 disabling electrical contact injuries, and non-age-related or random failures account for nearly 90% of equipment failures.

The value of condition-based maintenance (CBM) is avoiding costs related to material and labour to perform repairs, as well as downtime and lost productivity. Material lead-time may be substantial, depending on what has failed and the severity of the failure. A 2 MVA liquid-filled pad-mount transformer, for instance, could easily have 12 to 16 weeks lead-time. If that transformer was the linkage to a renewable power generation asset, such as a solar inverter or wind turbine, the downtime in lost energy harvest would be between \$40,000 and \$55,000, which is more than the cost of the transformer itself.

Harmonics risk

Several technologies are used to measure the condition of electrical equipment. They include ultrasonic testing, motor current analysis and power quality spot monitoring.

Harmonics pose the greatest risk of potential premature equipment failure. Non-linear loads that draw current for only a portion of the voltage waveform cause harmonic current. This includes variable-speed drives, DC rectifiers, UPS systems and lighting ballasts. In addition, harmonic currents can be magnified by poorly designed power factor corrections through a phenomenon called resonance. The issue with harmonic currents is a significantly higher heating in current-carrying components of the distribution network, proportional to the square of their harmonic order.

Imaging devices, a non-contact method, also measure condition. They keep the user away from danger and don't intrude upon, or affect, the target's operation.

Corona cameras work in the UV spectrum and detect coronal

FRAMEWORK

Managing your assets

It's about more than reliability



Maintenance on a metal lathe.

PHOTO: ADOBE STOCK

GMAM document takes maintenance performance to a higher level.

There will always be a need for the maintenance and repair of infrastructure. Now plants are under pressure to get things done, deliver value and meet goals.

To help make this happen, the Global Forum on Maintenance and Asset Management (GFMAM) – of which Plant Engineering and Maintenance Association of Canada (PEMAC) is a supporting and contributing partner – has issued a document titled, *The Maintenance Framework*.

The details of this release are outlined in an Asset Management Solutions newsletter, published by Len Middleton (www.asset-management-solutions.com). Here's a quick outline:

- The five principles are value, efficiency and effectiveness, integrity, execution, and leadership,

providing decision criteria to drive behaviours, decisions, and actions that support excellence in maintenance. The subject groups are business requirements, maintenance strategy management, maintenance management, maintenance execution, deliverables, continual improvement, and allocation of resources.

- Three of the asset management landscape subjects are: operations and maintenance decision-making; maintenance delivery; and reliability engineering. These subjects are part of what would be considered part of maintenance management and reliability, therefore a subset of asset management.

Both business requirements and maintenance strategy management will get inputs from the asset management landscape of the Strategy and Planning subject group.

Looked at it this way, asset management is more broadly business-focused at the organizational level, and maintenance management is more tactically focused on maintaining the function of the assets.

The Maintenance Framework helps explain the various symbiotic relationships that take maintenance performance to a higher level. Get a copy at <http://gfmam.org>.

MEET THE PRESENTERS



Rudy Wodrich is the leader of product development at IRISS

Inc. in Bradenton, Fla., a company that provides asset tracking for the electrical industry. He's an electrical engineer whose career has revolved around designing electrical distribution systems for industrial, commercial and power generation applications. He holds an MBA from the University of Toronto and works on critical asset surveillance technologies.



Doug Marshall is a senior project engineer at Magna IV Engineering-

with locations in Western Canada and offices in the US, a company in the field of high voltage power, automation and controls, and that commissions electrical power systems for industry. Marshall has 35 years of experience in electronics and electrical power distribution. He currently conducts feasibility and power system studies and holds degrees from Concordia and McGill universities in Montreal.

ionization around a conductor or insulator.

Thermal imaging cameras provide extremely accurate quantitative results. Accurate temperature readings are impacted by various factors, such as the distance to the target, reflectivity of the surface, geometry, humidity of the air and transmission rate of an infrared viewing window. Modern IR cameras adjust for most of these factors and an experienced technician can secure very accurate results. NETA publishes guidelines for maximum tem-

peratures in different types of electrical equipment compared to actual measurements.

Safety concerns for electricians and other maintenance personnel are front and centre. Appropriate controls eliminate hazards, reduce risk by design, and apply safeguards. The final type of electrical maintenance safety devices is online monitoring. It includes permanently installed versions of power quality and partial discharge (PD) monitoring. PQ monitoring, with permanently installed hardware and sensitive software, detects



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transients that often come down from the utility and have an impact on sensitive equipment. Without PQ monitoring in place, it's often impossible to prove the utility was the cause of damage or production outage. PD monitoring is permanently installed monitoring of the ultrasound signature of equipment and is primarily used in HV utility substation applications.

Keep personnel safe

Wodrich emphasized the need for electrical maintenance safety device technologies to be part of a CBM program to ensure personnel are kept as safe as possible. The hierarchy of control concept encourages employing a "safety by design" approach as the next best protocol in instances where it's not possible to perform the necessary work with the equipment de-energized. Permanently installed online monitoring technologies provide significant additional value to de-

termine when it may be prudent to conduct in-depth inspection and proactive maintenance.

"They can be even more valuable when they tell us nothing is wrong and allow us to use our limited maintenance man-hours on more productive tasks than pure calendar-based maintenance activities," Wodrich said.

In his presentation about evaluating the reliability of electrical distribution systems in a plant, Doug Marshall stated a study could be conducted. This reduces unplanned outages (production loss), as well as maintenance costs and spare parts inventory, while increasing equipment performance, extending equipment life, reducing safety risks and providing financial benefits.

There is a specific process to this. It's called value stream mapping, which is a lean management method for analyzing the current and future state of a manufacturing process that

details the series of events. It takes a product or service from beginning to the customer. For an electrical system that's running a complex manufacturing process, it's a way to identify the critical processes (motors/pumps, boilers, crushers, filters, process machinery) in the value chain and a means to prioritize where reliability improvements are to be made.

There are several RCA techniques that can be employed, depending on the complexity of the electrical distribution system. The best-suited are fault tree diagram and failure mode and effects analysis.

Marshall said that an electrical reliability study identifies improvements to reduce single points of failure, identifies aged components that require replacement, reduces loading in electrical equipment, reduces insulation stresses in electrical equipment, improves preventive maintenance planning, installs

predictive maintenance technologies, and reduces MTTR with critical spares inventory and contingency planning.

He concluded his presentation by emphasizing it's of paramount importance that reliability be one of the cornerstones of electrical distribution design at the outset, along with meeting code and safety requirements. However, once an optimal design is implemented, factors such as ageing components, changing operating conditions and maintenance procedures can affect the system's reliability. So it's recommended an electrical reliability analysis be conducted at regular intervals.

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

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INDUSTRY 4.0



Pick-and-place robots will handle 25% of manufacturing goods by 2000.

PHOTO: IFS

AI's 2019 FORECAST

THREE PREDICTIONS FOR MANUFACTURING

Voice-driven solutions, pick-and-place robots will lead.

BY ANTONY BOURNE

A new generation of artificial intelligence (AI) solutions will prove themselves in 2019. They'll build trust, urgency and understanding of what AI actually is, and just how much it can deliver. Voice-driven solutions will lead the charge while pick-and-place robots in smart warehouses will deliver a competitive edge as companies advance their use of robotic process automation. Here are three

predictions for manufacturing:

Prediction 1. Fifty per cent of all manufacturers will be using AI in some form by the end of 2021. The implementation of AI will change industry, business, processes and companies, but for many businesses, targeted solutions are already here! This year will be all about AI spreading with targeted, project-based solutions hitting the ground running.

The term 'AI' misleads many manufacturers, suggesting a large end-to-end system. In reality, it's a collection of technologies, including natural language processing, vision identification, chatbots, analytics and automa-

tion, each with its own strengths and applications. What they all share is intelligence: a high degree of accuracy and the ability to learn from mistakes – fast.

You can't implement AI any more than you can implement the internet. Before you initiate any project, figure out what the business goal and target will be. What do you want to improve and enhance? The more targeted your objectives, the more competitive and transformative the results.

Smart solutions

Prediction 2. Twenty-five per cent of manufacturing planners will be talking to their systems by the end of 2020.

AI solutions are smarter and more eloquent than most of us realize. A customer survey found two thirds of those who said they had never used AI actually had, through chatbots. Quality was so high, the chatbots were indistinguishable from human speech. The same survey found 84% of respondents were comfortable using voice-activated AI at home, in the form of Alexa, Siri or Home. If simplicity, speed

SUPPLY LINES

ELECTRIFYING 25 YEARS

ITC Electrical Components is celebrating 25 years of supplying the industrial market with electrical and automation components.

The distributor, based in Concord, Ont., offers more than 10,000 parts from its Toronto warehouse. It plans special deals for customers through 2019.

PARTNERSHIP EXPANDED

Endress+Hauser Canada Ltd. and Westburne have extended the scope of their partnership agreement to include Manitoba.

Last year Westburne, an electrical distributor in Burlington, Ont., became an Endress+Hauser channel partner for Ontario and Saskatchewan. Endress+Hauser provides measurement instrumentation, services and solutions for industrial process engineering.

The three-province sales channel leverages the strategic alliance between Rockwell Automation and Burlington, Ont.-based Endress+Hauser, which was established to address today's process manufacturing challenges and develop next-generation control systems.

A RELIABLE ACQUISITION

Ficodis Group is acquiring Reliable Bearing, a company specializing in power transmission products based in Mississauga, Ont.

That's 14 acquisitions for Ficodis, a Montreal-based industrial distribution group.

It's expanding by establishing partnerships with major distributors throughout Quebec and Ontario.

Reliable Bearing, a Canadian-owned company founded 35 years ago, has 25 employees.

Combined with its acquisition of Transbearco last September, Ficodis is continuing to expand its network, with power transmission points of sale in Levis, Que., Ottawa, Montreal and Toronto.

LEADING EDGE

Innovative ideas for plants

and accuracy are crucial consumer benefits, imagine what they could do on a manufacturing line.

BMW's smart integration of Alexa into its models in March 2018 was widely applauded. The integrated voice activation went way beyond skin deep, adding layers of service and performance capability to the driving experience. Voice-activated solutions are also being used in automotive production.

In Japan, NEC is using voice-activated solutions for order picking, where line personnel simply give spoken instructions and orders are created instantly.

Prediction 3. Pick-and-place robots will put away 25% of manufactured goods by the end of 2020.

Amazon's smart warehouses have raised the performance and savings bar. Robots don't need lighting or heating, so energy costs plummet. There are no time or weight limits on breaks, shifts or loads. And the flexibility, fluency, reach and economy of picking and placing mean no wasted time or effort. Utilization of space is also better. A 24-hour, black box warehouse will store and do more, without having to get bigger.

As it is with AI so it is with robots: small, targeted use cases that will continue to grow. For example, a North American company extended its use of robotics from loading boxes to complete material handling. Full lights-out warehouses may be some years away, but this advance has begun with some companies beginning work with automated facilities.

This year will see these predicted technologies gain traction as they become more targeted and project-driven. Achieving small, concrete improvements will lead to bigger change, reaching new heights.

Antony Bourne is the UK-based global industry director for manufacturing for IFS, a global enterprise software vendor with Ontario offices in Waterloo, Toronto and Ottawa. E-mail www.linkedin.com/in/antonybourne/. Visit www.ifsworld.com/ca.

Comments?

E-mail jterrett@plant.ca.



Detect and respond threats.

PREPARE FOR CYBERSECURITY

Free tools from Dragos identify ICS assets

Manufacturers of all sizes should take cybersecurity risk seriously.

PLANT Magazine's Manufacturers' Outlook 2019 study shows 74% of companies rate their level of concern over risks to security as medium to high; and 42% have experienced breaches.

Industrial threat and response specialist Dragos Inc. has introduced free assessment tools to help qualified companies secure their industrial controls systems (ICS).

The company, based in Hanover, Md., recently acquired NexDefense, a provider of ICS visibility technology. As part of this deal, Dragos has introduced Dragos Community Tools to help manufacturers identify assets with interconnected communications that are potentially unknown to these companies.

The tools include NexDefense's Integrity (continuous, passive ICS network monitoring with basic DPI and asset fingerprinting capabilities); and Cyberlens, an assessment tool developed by Dragos that helps the community quickly process packet captures and visualize ICS environments.

Dragos contends visibility is the prerequisite for the development and deployment of cybersecurity architectures to detect and respond to threats. That leads to the Dragos Platform, a continuous passive monitoring software that identifies and visualizes assets, detects threats and provides playbooks for quick responses to attacks.

dragos.com



IoT, Cloud and SaaS technology applied.

PHOTO: ADOBE STOCK

MORE EFFICIENT ENERGY MANAGEMENT

Real-time tech covers asset and facilities

Traditionally, building automation and facility management have been independent of each other resulting in significant operational inefficiencies. But there's a growing need to meet environmental and regulatory compliance.

Kontrol Energy Corp. is extending its IoT technology solutions into the global asset and facilities management space to turn those inefficiencies around.

The Vaughan, Ont.-based energy efficiency specialist employs IoT, Cloud and SaaS technology to deliver end-to-end facilities management with real-time building data management, centralized asset performance, fault detection, predictive analytics and corrective workflow.

Benefits include streamlined manufacturing processes, workforce efficiency, longer asset life, enhanced energy savings, operating cost reductions and labour optimization.

www.kontrolenergy.com



PRODUCTS AND EQUIPMENT

PUMPS

NEXT STEP IN LIQUID RING TECH

Wet, humid and dirty pump applications? Atlas Copco's LRP 700-1000 VSD+ intelligent liquid



Low noise operation.

ring vacuum pumps will handle them.

The compact, high performance and energy

efficient variable speed drive pumps with HMI control are enclosed in a strong, noise-containing canopy that protects against dust and water. Operating noise is in the 65 dB(a) range.

Inlet, outlet and mains cable points are positioned on the top of the pump for plug-and-play installation.

The twin VSD system operates in harmony within the pump. The primary VSD accurately maintains required vacuum levels by controlling the operating speed, matching performance to process demand while saving energy. The second VSD regulates water circulation in response to the operating conditions.

Intelligence features include

automatic seizure prevention, ASP, automatic cavitation prevention and ACP.

Atlas Copco in Canada, based in Mississauga, Ont., provides compressed air and vacuum equipment, industrial power tools, construction equipment, service and maintenance.

www.atlascopco.com/en-ca

MONITORING

AC TRANSFORMERS CHECK STATUS



Two mounting styles.

Measure primary current with AcuAMP Solid Core current transformers from AutomationDirect.

Two different window openings and two mounting styles along with numerous secondary ratios meet most applications.

The compact AC transformers in primary current ranges up to 1,000 A check motor run status, indicate pump dry run and monitor conveyors, heaters and power.

Secondary current is 5 A with multiple connection options for input devices that are compatible with standard power monitors, data loggers and panel meters.

Apertures of 1.56- and 2.5-in. diameter are available.

AutomationDirect is a distributor of industrial automation products based in Cumming, Ga. www.automationdirect.com

SYSTEM DETECTS FAULTS, PART AND TOOL VARIATIONS

The artificial intelligence capability of the Brankamp X7 in-process monitoring system from Marposs optimizes machine efficiency, improves part quality and limits unplanned downtime and tooling costs.

The system for cold and hot forming, thread rolling and stamping operations detects manufacturing faults as well as part or tool variations.

Setup is streamlined and rework reduced to increased capacity for additional orders without having to invest in additional presses.

The X7 system is operated from a 15-in. touchscreen with 30 channels capable of monitoring maximum forces, envelope curves and trend progressions, as well as run times, setup times and downtime; or sensitive process

areas such as distorted parts or a missed feed.

Depending upon the application, sensors are placed either on the machine, in the tooling or in the dies, connecting the press to an X7 unit. Users see at a glance if their machines are running, if their OEE is where it needs to be and what is happening at the machine.

FactoryNet 4.0 capability passes machine information directly to other stakeholders by means of intelligent online

communication. The operator filters the information, presetting it individually as desired so that each employee receives only relevant data. Displayed onscreen, the operator gets a real-time overview of production status.

Marposs is a provider of measurement and process monitoring technologies based in Auburn Hills, Mich.

www.marposs.com

SYSTEM GUARDS CLEANROOM

The Sentinel system from Sensaphone ensures temperature, airflow, humidity and airborne particulates



Provides real-time data.

do not compromise products in facilities that require a controlled environment or designated cleanroom.

The system uses cloud technology to provide supervised 24/7 remote monitoring of up to 12 different environmental and equipment status conditions. When the system detects a sensor reading has moved out of the preset range, it sends notification via phone call, text or e-mail to designated personnel for action.

Operators access real-time data from anywhere using any mobile device to check status information, change settings, disable alarms and readjust temperature limits right from the Sensaphone app.

If the communication link is interrupted, the system generates an alert indicating the internet connection is lost or there is a cellular communications problem.

Enhanced data logging functionality allows users to print, graph or export accurate historical records.

Sensaphone is an Aston, Pa. provider of remote monitoring products.

www.sensaphone.com

COMPRESSED AIR

SAFELY CLEAR SMALL DIAMETERS

EXAIR's Soft Grip Back Blow Safety Air Gun uses the smallest nozzle available to blow debris and liquids from inside small pipe or hose diameters, channels, bores, holes, internal threads and other internal part features.

An array of holes on the Model 1004SS M4 provides a forceful back-facing 360-degree airflow to clear out coolant, chips and light oils from machining processes. The type 316 stainless steel nozzle prevents blowing chips farther into a part, tube or pipe and eliminates any safety hazard created by blowing



Smallest nozzle.

debris out the far end of a pipe or tube.

Air consumption is only 4.5 scfm at 80 psig with a low sound level of 75 dBA. The nozzle is manufactured to clean inside openings as small as 1/4 in. (6 mm) and up to 1 in. (25 mm).

EXAIR Corp. is a manufacturer of compressed air-operated products based in Cincinnati.

www.exair.com



Eliminates unplanned downtime.

MOTION CONTROL

SYSTEM BUNDLES MOTION TASKS



Fast commissioning.

Bosch Rexroth's MLC motion control system handles up to 192 synchronized axes. Adding the new XM42 embedded control tops off the motion kit.

The system software includes numerous pre-defined technology functions that only need to be parameterized. The wizard-supported generic application template (GAT) speeds up commissioning of simple applications and coordinated hardware. Users create synchronized axis motions within a matter of

minutes that GAT automatically converts into PLC code.

For more complex applications, numerous pre-defined functions, such as winding and register control, belt synchronization and various different robotic kinematics, simplify fast engineering. Users select the corresponding software package to synchronize up to 64, 128 or 192 axes.

Bosch Rexroth, a global supplier of drive and control technologies, has Canadian headquarters in Burlington, Ont. www.boschrexroth.ca

ELECTRONICS

SIC DIODES UP PERFORMANCE

Littelfuse Inc. added to its line of 650 V, AEC-Q101-qualified silicon carbide (SiC) Schottky Diodes.

The two diodes offer advantages over traditional silicon-based devices, including negligible reverse recovery current, high surge capability and

a maximum operating junction temperature of 175 degrees C.

The LSIC2SD065DxxA diode has current ratings of 6, 10, or 16 A in a TO-263-2L package. Current ratings for the LSIC2SD065ExxCCA are 12, 16, 20, or 40 A in a TO-247-3L package.



The diodes dissipate less energy and operate at higher junction temperatures than alternative solutions. They also require smaller heat sinks and support a smaller system footprint.

Littelfuse is a global manufacturer of circuit protection, power control and sensing products based in Chicago.

Littelfuse.com

Smaller system footprint.

EVENTS

Partners in Prevention 2019

Health & Safety Conference & Trade Show WSPS

April 30 – May 1, Mississauga, Ont.

Focus is on the 'safety super heroes' who advocate for health and safety in their workplaces. More than 60 educational sessions examining legislative and legal issues, leadership, human resources, hazards, mental health and workplace culture.

Visit www.partnersinpreventionconference.com.

PLANT Expo 2019

Annex Business Media, FMA Inc.

May 15, Abbotsford, BC

June 19, Sherbrooke, Que.

Products and solutions for manufacturing, processing machinery and MRO markets. Co-located with Design Engineering's DEX Expo and Canadian Metalworking's MMP Expo. Visit www.plantexpo.ca.

CNAM 13th Annual Conference

Canadian Network of Asset Managers

May 6-9, Kelowna, BC

Explore asset management challenges through leading edge professional development, idea sharing, workshops and networking with peers and new players in government, academia and industry.

Visit <http://cnam.ca/upcoming-/2019-conference>.

Operational Excellence in Energy, Chemicals and Resources Summit

IQPC/PEMAC

June 4-6, Calgary

For oil and gas, chemicals and resources companies to help them eliminate sources of risk, cost and complexity in their operations. Focus is on optimizing safety, efficiency, sustainability and reliability. Presented by IQPC and the Plant Engineering and Maintenance Association of Canada (PEMAC). Visit <https://opexsummit.iqpc.com>.

Plast-Ex UBM

June 4-6, Toronto

For Canada's plastics processing marketplace. Showcases products and innovative business solutions covering marketing, packaging services, material handling and logistics. Visit <http://admtoronto.com/plastex>.

Pack Expo Las Vegas PMMI

Sept. 23-25, Las Vegas

Presented by the Association for Packaging and Processing Technologies. Co-located with Healthcare Packaging EXPO. Visit www.packexpolasvegas.com.

PLANTWARE



Advanced encryption.

PHOTO: ADOBE STOCK

PARTNERSHIP ENHANCES INDUSTRIAL CYBERSECURITY

Schneider Electric has entered into a global partnership with Vericlave, a cybersecurity technology firm in Dallas.

The provider of energy management and automation technology (with Canadian offices in Mississauga, Ont.) will provide Vericlave's advanced encryption technology to secure and protect customers' critical IT and OT systems from cyberattack.

Vericlave will help companies bolster their networks from within. Its technology combines with Schneider Electric's Eco-Structure, its open, interoperable, IoT-enabled system architecture and platform.

The Dallas company's intrusion-prevention system overlays a zero-trust stealth model at the network perimeter and within existing infrastructure. This provides a secure communication tunnel between sites and to extend layers of defence across an enterprise.

The solution shrinks the attack surface by more than 90% (when compared to traditional internet protocol virtual private network solutions) to eliminate the risk of incidents that lead to plant shutdowns.

And Schneider Electric says its plug-and-play capability reduces installation, maintenance and other ownership and operating costs by 50% or more.

The technology also allows industrial enterprises to extend their current infrastructure so disparate sites become extensions of the operations centre.

www.vericlave.com



Bridge the technology divide

BY JAYSON MYERS

Rob Wildeboer will tell you there's no shortage of companies with great technologies looking to partner with manufacturers. The executive chairman of Martinrea, one of Canada's leading auto parts companies, often meets entrepreneurs with a prototype or working model who tell him they've done 95% of the work in developing a technology and are wondering whether it might be of interest to his company. His response? He now has at least 95% of the work yet to do to ensure it can be used in manufacturing.

Clearly technological capabilities are changing rapidly. Digital and other advanced technologies are revolutionizing manufacturing, whether it's products, production processes, operating systems, customer and supplier interactions or business models. Canada has leading research capabilities and a wealth of start-ups developing new technology applications. We also have strong manufacturing capabilities and companies that will need to adopt new technologies to remain competitive and grow. So, what's the issue?

New technologies are capable of doing some amazing things, but manufacturers need solutions for their customers and their own operations that are effective from a technical point of view. They must also be cost competitive, manageable and improve quality and performance. It's difficult to develop a technology to a stage where it can be produced or applied in full-scale production.

Because production problems are complex, it's not good enough to plug in a new device or piece of software and expect it to do the trick without thinking about a whole range of requirements necessary for the effective deployment of that technology. Digital technologies are disrupting production, materials handling, supply chains and business processes because they need a systems-based approach to be managed effectively.

In any case, manufacturers are looking for integrated solutions, not one-offs. When it comes to advanced manufacturing, technology companies rarely have all the pieces of the puzzle.

There's another side to the problem. Manufacturers often find it difficult to identify the opportunities for improvement that advanced technologies offer, and what the optimal solution might be. It's even more difficult to work out what the business requirements are for successful technology deployment. The capabilities of Canada's research, technology and skills training community are not widely known. Integrating solutions is a big job, especially for smaller companies that make up more than 90% of the manufacturing sector. And there's the money. Any return on investment calculation

assumes that companies have sufficient working capital to make the investment in the first place. That's no small hill to climb.

Statistics Canada reports close to 40% of manufacturers who invested in advanced technologies over the past three years failed to achieve their business objectives. We've all seen robots sitting idle at the end of an assembly line, 3D printers that aren't being used much, or other pieces of equipment that aren't running at full capacity. It's seldom a problem with the technology, but more likely not fully understanding what processes need to be improved, not implementing the right technologies for the desired business objectives, not having the right skill sets to run the technology effectively, or simply the belief that throwing money at a problem is going to fix it. It's not. In any case, this is a management issue.

Canada's Advanced Manufacturing Supercluster aims to accelerate the adoption and scale-up of new technologies in manufacturing. So bridging the divide between technology and manufacturing is a burning issue for the team at NGen Canada, and we've learned a few things.

First, the challenges manufacturers face when successfully managing digital technologies are to a large extent the same, regardless of sector, size or location. Second, it's about business strategy, management capabilities and skills, which is really about people.

A third thing is the amount of translation needed to communicate customer requirements to tech providers and technology capabilities to manufacturers. De-mystifying technology and starting from best practices in manufacturing management go a long way.

We've also learned how important it is to build connections and collaboration, and how difficult that is to achieve. Partnerships are important, but they demand a level of openness and trust many Canadian companies are not used to.

Collaboration makes a huge difference for business success in advanced manufacturing. NGen is funding collaborative projects with real potential to transform manufacturing capabilities across Canada. We're looking for technology and manufacturing companies that want to partner. Membership is free – just tell us how you can make a difference for manufacturing in Canada at www.ngen.ca.

Jayson Myers, the CEO of Next Generation Manufacturing Canada, is an award-winning business economist and advisor to private and public sector leaders. E-mail jayson.myers@ngmcanada.com. Visit www.ngmcanada.com.

Comments? E-mail jterrett@plant.ca.

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- Expandable; up to 140 devices (124 in / 16 out)
- Supports 12 different types of safety devices
- Agency approvals cULus, CE, TUV



Watch a quick overview of the MOSAIC Safety Controller at:
www.go2adc.com/mosaic



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www.automationdirect.com/safety-controller



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