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Bell Helicopter's 505 aircraft
gives Mirabel plant global lift

Loop makes leftover paint new again
TransPod's fifth mode of transportation
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Tap funding for training initiatives
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12 AEROSPACE

Bell Helicopter leverages a skilled workforce to secure 505 Jet Ranger X production.



17 TRANSPORTATION TransPod's quest to develop Hyperloop – a fifth mode of transportation.



20 COMPUTING D-Wave's quantum computing upgrade advances the development of artificial intelligence.



22 TRADE Prepare your company for potential changes to the North American Free Trade Agreement.



23 TRAINING GRANTS Funding is available for proactive manufacturers serious about workforce training.

FEATURES

- 15 ELECTRICITY** Many manufacturers won't benefit from Ontario's hydro rate cuts.
- 16 CLEANTECH** BC is cleaning up in cleantech.
- 18 HEALTH** Kindred's sink innovation kills infectious bacteria.
- 21 EXPORTING** There are reasons to be optimistic despite uncertainty about the US.
- 24 TRAINING** Measure your workforce's skill levels.
- 25 SOFTWARE** Getting the most out of CMMS/EMAS software.
- 26 THINK LEAN** Embed operating principles into your business culture.
- 27 CCOHS SAFETY TIPS** Understand the difference between hazard and risk.
- 28 RECYCLING** Loop Recycled Products makes sustainable paint from leftovers.
- 30 AUTOMATION** Some industries will be disrupted by technology more than others.
- 31 GOVERNMENT** Budget 2017 lacks "wow" factor, but leaves room to manoeuvre.

DEPARTMENTS

- 4 Editorial
- 6 News
- 7 Feedback
- 8 Careers
- 11 PLANT Pulse
- 33 CIEN FEATURE: Develop an RBD.
- 34 Product Focus: Health & Safety
- 36 Products and Equipment
- 41 Plantware
Events
- 42 postscript

COVER IMAGE: BELL HELICOPTER

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No benefit to Wynne's hydro price bribe

Ontario is supposed to be Canada's manufacturing heartland. Someone should remind Premier Kathleen Wynne. Her Liberal government's hydro price cuts don't do much for most manufacturers, and it's questionable whether this attempt to bribe taxpayers is enough to buy an election win in 2018.

With Wynne's approval rating circling the bowl at around 12.7% and the top irritant among Ontarians being sky-high electricity rates, the government's answer is to add a 17% cut to the 8% rebate. This will be paid for by spreading the \$28 billion cost over a 30-year period, sticking future ratepayers with an extra \$25 billion in interest payments. And that's the Liberal estimate. The opposition parties suggest it could be more like \$42 billion.

The province's over-priced, tragically inept green energy plan with its guaranteed high rates for wind and solar is covered by a global adjustment fee that's crushing manufacturers.

There are plenty of anecdotal horror stories that illustrate the carnage, like the manufacturer that got a \$162,000-plus hydro bill in November, almost \$108,000 of which was for the global adjustment. This "adjustment" hobbles many manufacturers who would otherwise invest in their businesses. And it's not surprising companies with US parents are fearful Canadian operations will be shut down because of the crazy, escalating costs, while others are opting to leave on their own accord. Toronto-based fastener manufacturer Leland Industries is moving its operations to the US, while Plasticap Inc., a Richmond Hill, Ont. manufacturer of specialty caps and closures, intends to expand elsewhere (Ohio or Virginia).

The automotive industry accounts for 12% of the province's GDP and employs more than 124,000 people. It's struggling to succeed in North America where its share of the market and future investment is under siege. The Canadian Vehicle Manufacturers' Association says electricity rates have to be addressed. Costs are up to three times greater than competing jurisdictions.

But high electricity cost isn't the only reason Ontario will lose manufacturers. The province's cap and trade program adds to their expenses, and then there's the uncertainty of the Trump factor. It could lead to a scrapped or changed NAFTA agreement, a border tax and lower business taxes that will eliminate the Canadian corporate advantage. That adds up to a lot of disadvantages that won't attract investment or be compensated by the province's skilled and educated workforce.

The Wynne government should be very concerned about the competitive impediments manufacturers face. Yet economic development minister Brad Duguid doesn't appear to be too worried about companies leaving. He told the *Financial Post* for every company that hits the road there are three or four setting up in Ontario. His list of newcomers included IT, computer technology, life sciences and cleantech companies, but manufacturers were noticeably absent.

The new plan expands the Industrial Conservation Initiative (ICI) to include smaller users, but does nothing for companies with a peak power demand of less than 500 kilowatts.

Canadian Manufacturers & Exporters (Ontario) wants the ICI program to be more accessible to SMEs, and like the Coalition of Concerned Manufacturers, calls for a competitive industrial electricity rate that entices manufacturers to stay and invest in Ontario.

Manufacturing accounts for about 12.7% of the province's GDP and almost 753,000 jobs. Growth means jobs that pay higher wages. Ontario needs a government that's focused on eliminating rather than perpetuating barriers to manufacturing growth.

That might require an election colonic next year.

Joe Terrett, Editor
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BULLETINS

Magellan Aerospace Corp., a manufacturer of aerospace systems and components based in Mississauga, Ont., has won a multi-year contract extension with European plane maker **Airbus Group** to supply crown modules for the twin-engine A350 XWB jet program. The components will be built at Magellan's plants in the UK, Poland and India.

Premier Tech, an industrial equipment manufacturer, is investing \$7 million in one of its plants at its Rivière-du-Loup, Que. campus. The expansion includes final assembly and start-up areas for automated packaging systems, and an isolated area for stainless steel work. Over the next three years, 30 new workers will join the 60-person workforce at the 75,000 square-foot facility.

Metal 7 Inc. has acquired **Enduride**, a manufacturer of rollers and idlers for power-driven or gravity conveyors based in Quebec City. Metal 7, based in Sept-Îles, Que., makes equipment for the iron ore and aluminum industries.

Canada Bread Co. Ltd. has acquired Toronto's **Stonemill Bakehouse Ltd.**, a producer of slow fermented craft breads baked in stone ovens using natural, non-GMO certified and organic ingredients. Stonemill employs approximately 100 people and operates one production facility in Scarborough, plus a store at Toronto's St. Lawrence Market.

i55 Communications Inc., a manufacturer of industrial ethernet products, has received \$750,000 in funding from FedDev Ontario to develop faster, more secure ethernet switches and other network equipment. The investment will add 12 skilled positions to the Mississauga, Ont.-based company's workforce, bringing the total to 24.

BIOX Corp. is working with **Forge Hydrocarbons** on a potential co-location of a renewable diesel production facility using Forge technology. BIOX has acquired a 50-million litre plant with 25 acres in Sombra, Ont. Forge will lease up to four acres to build a new 25 million-litre renewable diesel production facility and will be responsible for obtaining funding for the \$25 million project.

Magna lowers subframe weight

Carbon fibre project with Ford yields 34% mass reduction compared to steel equivalent



Prototype reduces the number of required parts by 87%. PHOTO: MAGNA

SAILAUF, Germany — Magna International Inc. is using a carbon fibre composite to significantly reduce the weight of vehicle subframes.

The Aurora, Ont.-based global auto parts manufacturer, working with Ford Motor Co., has developed a prototype carbon fibre composite version that reduces mass by 34% compared to making a stamped

steel equivalent.

The subframe provides a place to attach the engine and wheels while contributing rigidity and crash management.

The prototype replaces 45 steel parts with two moulded and four metallic parts. Mouldings are joined by adhesive bonding and structural rivets.

The subframe is the result of a Magna and Ford research and development project that's investigating potential mass-reduction benefits and the technical challenges posed by using carbon fibre-reinforced composites in chassis applications.

Prototype subframes are being produced by Magna for component and vehicle-level testing at Ford to evaluate corrosion, stone chipping and bolt load retention.

Forest sector partners with FCM

WHISTLER, BC — The Forest Products Association of Canada (FPAC) is partnering with the Federation of Canadian Municipalities (FCM) to help advance economic growth, innovation and sustainable land-use management.

Canada's forest sector provides more than 230,000 jobs in more than 200 communities across the country, including many rural communities, said FCM president Clark Somerville, who noted tackling climate change and creating a green economy are priorities shared with the municipalities.

Under the new agreement, FPAC will share information and work directly with FCM's 2,000 member municipalities on policies and initiatives that address climate change and support local job creation. This includes participating in FCM's national conferences.

FPAC represents Canada's wood, pulp and paper producers nationally and internationally.

The \$65-billion-a-year forest products industry represents 2% of Canada's GDP and provides 230,000 direct jobs across the country.

Math research hub gets \$12.8M

CALGARY — Mathematics research gets a boost with \$12.8 million in funding for the Banff International Research Station (BIRS), which provides more than 2,000 researchers from 60-plus countries a place to network.

Their collaboration leads to research ventures in clean energy technology, advanced manufacturing, computer science, climate science, biology, and the prediction and mitigation of natural disasters.

Canada's Natural Sciences and Engineering Research Council (NSERC) has committed \$3.4 million, while Alberta is contributing another \$4 million. The US and Mexico are contributing \$5.3 million.

BRIS also received \$400,000 in support from the University of British Columbia, plus in-kind support from the University of Alberta and the University of Calgary.

\$10M for BC fuel cell joint venture

VANCOUVER — A Ford Motor Co. and Daimler AG joint venture aimed at bringing automotive fuel cells to the mass market is getting a boost from the federal government.

Sustainable Development Technology Canada has set aside \$10 million in fresh funding for Burnaby, BC's Automotive Fuel Cell Cooperation (AFCC).

The company has been working on fuel cell stacks in Metro Vancouver since 2008 and will use the funds to develop and test its next generation.

Though a number of challenges remain, including a lack of hydrogen infrastructure and the rising popularity of battery electrics, a recent study found most auto industry

insiders expect fuel cell vehicles to eventually replace gas-powered cars.

Major automakers are working on FCVs in some capacity and several, including Honda, Toyota and Hyundai, have introduced hydrogen-powered cars to the mass market.

Ford and Daimler picked Vancouver based on its track record with fuel cells, as well as the province's hydroelectric resources, which can produce hydrogen through electrolysis emissions-free.

The joint venture already works with the fuel cell stack manufacturing group at Mercedes-Benz.

SDTC pegs the annual production of FCVs at more than 70,000 vehicles by 2027.

G4 Insights gets \$2.15M to fuel RNG development

OTTAWA — Natural Resources Canada (NRC) is investing \$800,000 in G4 Insights to develop a technology that converts forestry waste into renewable natural gas (RNG) for distribution through natural gas pipelines.

The Burnaby, BC cleantech company is partnering with Canadian Gas Association members Enbridge Gas Distribution, FortisBC, Gaz Metro, Union Gas, utility host ATCO, the Natural Gas Innovation Fund, Alberta Innovates and FPInnovations. Together, they are contributing \$1.35 million towards the project.

Renewable natural gas produced from sustainably managed forest residue emits up to 85% less greenhouse

gas emissions than fossil fuels. Converting forest residue that includes all parts of the tree into solid, liquid or gaseous biofuels such as renewable natural gas creates fuel substitutes for transportation or industrial processes.

G4's PyroCatalytic Hydrogenation is a low temperature thermochemical process that can be produced on a distributed basis in forestry regions and delivered to end users through existing natural gas pipelines.

The main input is sawmill waste, slash, thinning and hog fuel.

G4 Insights will build a RNG demonstration plant in Edmonton and test it under operational conditions with a range of biomass types.

KATFISH completes first round of sea trials

Tests will increase the system's operational depth to 200 metres



KATFISH uses sonar to generate real-time, ultra-high resolution seabed images and 3D maps. PHOTO: KRAKEN

ST. JOHN'S, NL — Kraken Sonar Inc. has successfully completed phase one sea trials of its KATFISH towed synthetic aperture sonar system.

The tests were to validate KATFISH's towing performance at various speeds and in a variety of sea conditions; to validate hydrodynamic flight sensors; and to operate onboard sonars, including the AquaPix MINSAS 180 Synthetic Aperture Sonar.

The actively controlled, intelligent towfish generates real-time, ul-

tra-high resolution seabed images and 3D maps for a variety of military and commercial applications.

Other system sensors tested included a high accuracy Ultra Short Base Line positioning system with topside and underwater inertial navigation; and platform sensors for velocity, current, temperature and depth measurements.

The Conception Bay, NL-based marine technology company said its manually operated KATFISH launch and recovery system was also tested. It reached speeds to 8 knots in depths of 50 metres in sea state conditions meeting Beaufort 5 scale, and exceeded expectations.

Phase Two will increase operational depth to 200 metres to produce higher drag forces and a larger vertical manoeuvring envelope. Operators will also be evaluating the first version of Kraken's new SASView 3D visualization software.

Businesses not offering professional training

TORONTO — A business is only as strong as its employees, and a recent survey by ADP Canada finds Canadian companies aren't doing enough to help their employees improve and grow professionally.

ADP Canada Sentiment Survey, a research series put together by the human resources specialist, reveals 40% of working Canadians say that their

company rarely or never provides them with career development support, while 39% would take a pay cut from another employer that offered better professional development opportunities.

Skills development programs, technical training, career mapping and mentoring are the services many Canadians feel are missing from their workplace.

FEEDBACK

Carbon pricing's high cost

Re: Carbon pricing a triumph of ideology over reason, Postscript, PLANT March 2017.

I am in total agreement with Gwyn (Morgan) on this one. Not only will we get, say, a 2% tax added on to everything we buy, it will be doubled because all manufacturers will have to add their share of the tax onto their product to cover the cost.

That's a cost produced elsewhere will not have.

This government is killing our economy. The extreme desire to appear to be doing something about climate change is merely a cash grab, without any plan. It will turn into a redistribution of tax dollars to "green" criteria-meeting companies.

Our weak dollar is killing businesses. The Canadian plastics industry is in trouble. We are buying resin in US dollars and trying to compete on pricing that often means a penny a pound will raise a quote by \$3,000 or \$4,000.

Shipping costs, duty, brokerage fees, fees to convert into US dollars, and so on, are crushing our industry.

The federal government should focus on other things.

Terry Manick
International Pipe,
Selkirk, Man.

Send comments to jterrett@plant.ca with your name, address and phone number. Comments will be edited.



PHOTO: FOTOLIA

Irving invests \$4.5M in NS ocean innovation centre

HALIFAX — Irving Shipbuilding Inc. is investing \$4.52 million in the newly established Centre for Ocean Ventures and Entrepreneurship (COVE). The ocean innovation centre will be located on the waterfront in Dartmouth, right across the harbour from Irving's Halifax shipyard.

Ocean science researchers, start-ups, R&D-intensive companies, industry and Nova Scotia post-secondary institutions will work together at the centre on marine innovation projects.

COVE, operated by the Institute for Ocean Research Enterprise, is in the early stages of transforming a former Canadian Coast Guard base at the Halifax Harbour into extensive marine facilities with two deep-water piers, office space, a startup incubator and space for shops and labs.

In September, the Government of Canada committed \$7.17 million to COVE, and Nova Scotia has committed \$12.55 million.

Irving Shipbuilding's funding is part of its commitments under the National Shipbuilding Strategy – Canada's 30-year plan to renew the fleets of the Royal Canadian Navy and the Canadian Coast Guard.

CAREERS

Factora Solutions has appointed **Barry Lynch** vice-president of sales and marketing. Previously he was with GE Digital and has more than 25 years of experience helping manufacturers implement operational excellence on the plant floor. Factora Solutions is a global company with Canadian offices in Trois-Rivières, Que. that plans, designs and implements MES and MOM solutions.



Barry Lynch

Aurora Cannabis Inc. has promoted **Neil Belot** from chief brand officer to chief global business development officer. In his new role, he'll focus on developing business opportunities that drive the company's international growth. Aurora Cannabis Enterprises Inc. is a licensed producer of medical cannabis, with a production facility in Mountain View County, Alta.

BioAmber Inc.'s **Jean-Francois Huc** has resigned as president and CEO. **Fabrice Orecchioni**, the company's COO, has replaced him. Orecchioni oversaw the construction, start-up and operation of the company's Sarnia, Ont. manufacturing plant and management of the Mitsui joint venture. Huc stepped down for personal reasons, but will remain a member of the board of directors and assume an advisory role.

Hugo Lafontaine joins energy management company Schneider Electric Canada Inc. in Mississauga, Ont. as national sales manager for its building automation systems division in Canada. He'll be based in the company's Ottawa office. Lafontaine brings more than 15 years of experience in building control systems. He was previously a sales director at Regulvar Canada Inc.

High-end bike manufacturer Argon 18 has appointed **Claude LeBlond** vice-president of global sales. A senior executive with more than 30 years of experience in international sales, LeBlond has in the past worked with Segway and Bauer. Argon 18, based in Montreal, sells its bikes in 70 countries.

Skills shortages prevents business growth: CME report

TORONTO — Not finding the right people with the right skills is preventing Canadian manufacturers from pursuing business opportunities, while driving up costs, and undermining productivity, according to a new report from Canadian Manufacturers & Exporters (CME).

The fourth of five reports from CME's Industrie 2030 initiative blames the shortages on an inability to attract youth into skilled trades relevant to manufacturing; a disconnect between the formal training system and industry needs; and an aging workforce.

"Today nearly 40% of companies are telling us that they are unable to find the right people with the right skills to help grow their companies. As a result, nearly 20% are forgoing business opportunities," said Mathew Wilson, CME's senior vice-president.

Nearly 60% of companies expect labour shortages to affect their operations within five years, he said.

Building a Strong and Skilled Workforce for Growth calls for coordinated national action on skills development, including improved engagement with youth, women and underrepresented workers in manufacturing.

The sector must also strengthen links between industry and postsecondary institutions to improve alignment of skills with the needs of industry. The report calls for expanded government support for business-led training, management leadership development and improved access to foreign trained workers.

Polycorp launches \$17M expansion of its Elora plant

Will purchase new equipment, establish a test lab



Polycorp makes engineered rubber products in Elora, Ont.

PHOTO: POLYCORP

ELORA, Ont. — Polycorp Ltd. has partnered with the Ontario government on a \$17 million expansion at the company's manufacturing facility in Elora, Ont., adding 26 jobs to its current 146 positions.

The \$17 million project includes \$2.5 million from the provincial government

to buy new equipment, create a new testing laboratory and expand the plant.

The company, a manufacturer of engineered rubber products for the transportation, mining and protective lining industries, has customers in 38 countries.

The project is to be completed in 2022.

Gaz Métro acquires US solar developer

Opens the door to combined energy sources



Deal extends Gaz Metro's reach into the US.

PHOTO: GETTY IMAGES

MONTREAL — Gaz Métro has acquired Standard Solar Inc., a US solar energy firm specializing in the development, installation and financing of commercial solar electric systems.

The deal, through Gaz Metro's Valener subsidiary, expands the Quebec natural gas distributor's reach in the rapidly growing US solar industry, and opens the door to combining solar with other energy sources.

Standard Solar, based in Rockville, Md., operates in California, Connecticut, Maryland, Massachusetts, New Mexico, New York, North Carolina and Washington DC.

Gaz Métro, through its Vermont-run subsidiary Green Mountain Power, manages approximately 30 megawatts of solar in the state, and has sponsored hundreds of solar air preheating system projects in Québec.

Rail cars delivered for potash miner

SASKATOON, Sask. — K+S Potash Canada has accepted delivery of 177 of 531 custom-built rail cars for its Legacy Project, a potash production facility near Bethune, Sask.

The cars, manufactured by National Steel Car, are enough to complete one of three trains to transport product to a handling and storage facility in Port Moody, BC.

The train will travel along 30 kilometres of Canadian Pacific's recently constructed Belle Plaine subdivision, which connects CP's main line at Belle Plaine, Sask. to 14 kilometres of newly constructed industrial rail line owned and to be operated by K+S.

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\$2M for UBC cyber, risk initiatives

Funding will also aid financial risk research



Focus is on cyber-attack impacts and risk management tools. PHOTO: GETTY IMAGES

VANCOUVER — Scotiabank is helping the University of British Columbia (UBC) accelerate cybersecurity and financial risk research in Canada with \$2-million in funding.

Over the next five years, the Scotiabank Cybersecurity and Risk Analytics Initiative will support research and educational initiatives, advance understanding of cyber-attacks and refine risk management tools.

The bank's donation is supporting work by UBC researchers Konstantin Beznosov and Hasan Cavusoglu, who specialize in cyber-attack research, privacy and security; and statistics professors John Braun, Natalia Nolde and Harry Joe, who are furthering financial risk modelling and probability theory.

The Creative Destruction Lab West (CDL West) at the UBC Sauder School of Business will also be supported.

CDL West, an extension of the Creative Destruction Lab at the University of Toronto's Rotman School of Management, helps entrepreneurs transition from science-based innovations to commercialization.

New production line for Fabspec

SOREL-TRACY, Que. — Fabspec, a manufacturer of machined metal parts and components is commissioning a new production line at one of its three plants.

New tooling equipment will be purchased and headcount will increase, including a number of new welding and specialized technical positions.

The company, based in Sorel-Tracy, Que., serves the energy, iron and steel mill, mining, and petrochemical sectors.

Shell sells oil sands assets

Reduces share in development projects

CALGARY — Shell Canada has signed a pair of agreements that will see the energy producer sell its in-situ and undeveloped oil sands interests in Canada and reduce its share in the Athabasca Oil Sands Project (AOSP) from 60% to 10%.

Shell will sell its 60% interest in AOSP to a subsidiary of Canadian Natural Resources Ltd. (CNRL) and its 100% interest in the Peace River Complex in-situ assets, including Carmon Creek, plus a number of undeveloped oil sands leases in Alberta.

The sale is valued at \$11.1 billion.

Under the second agreement, Shell and CNRL will jointly acquire and own equally Marathon Oil Canada Corp., which holds a 20% interest in AOSP, for \$1.25 billion each.

CNRL will operate the AOSP upstream mining assets, and Shell will continue to operate the Scotford upgrader and Quest carbon capture



Workers stand in front of the Quest carbon capture storage project in Alberta. PHOTO: SHELL

storage project.

Quest was designed to capture and store about one third of the emissions from Shell's Scotford Upgrader (near Fort Saskatchewan, Alta.).

Quest captured 1 million tonnes of CO₂ by September, its first year of operation, which is equivalent to the annual emissions from about 250,000 cars.

The transactions are to close mid-year.

\$28.8M challenge to drive innovation

TORONTO — The Ontario government has launched a \$28.8 million challenge to help innovative startups and SMEs address public sector business and service challenges.

The Small Business Innovation Challenge (SBIC) will be managed by Ontario Centres of Excellence (OCE) and support SMEs developing and demonstrating technologies that drive innovation.

Participating Ontario government ministries will issue innovation challenges and invite companies from the start-up level to SMEs with 500 employees or less to develop and test novel technology solutions.

Successful applicants will receive funding for feasibility and demonstration projects.

Infrastructure spending unlikely to grow economy: study

VANCOUVER — Only 11 cents of every dollar in new federal government infrastructure spending will be spent on highways, bridges, railways and ports, finds a Fraser Institute study.

The Canadian public policy think-tank's study notes most of the new spending will go to green and social infrastructure such as new parks, community centres and hockey arenas.

Of the nearly \$100 billion in announced spending within the last year, only 10.6% will be spent on projects relating to transportation and trade. These areas have the potential to strengthen the economy by moving people and goods across the country and to international markets.

Provincial governments are also spending just a small fraction of infrastructure dollars on projects that can improve the economy.

Of the Ontario government's \$138 billion spending over the next 10 years, only 18.8% will be spent on highways.

In Alberta, 20.6% of the \$34.8 billion capital plan is being spent on roads and bridges.

The study argues Canada's total infrastructure is currently at the highest level in 40 years, claiming it's a myth governments have neglected spending in this area.



First in North America to produce Maltesers. PHOTO: MARS CANADA

Mars expands Newmarket plant

\$70 million project adds 60,000 square-feet

NEWMARKET, Ont. — Mars Canada has completed a \$70 million expansion at its Newmarket, Ont. chocolate plant, where it will now produce Maltesers.

The project added 60,000 square-feet of floor place and added new manufacturing and packaging equipment.

The plant is North America's first site to produce the 80-year old chocolate-coated treats, previously made overseas exclusively. It also manufactures Mars, Milky Way and 3 Musketeers bars.

The company said the expansion is adding 30 jobs to the 150-employee workforce.

Auto sales strengthen

Canada exceeds 2 million units

Luxury vehicles drove Canadian automotive sales in February after global car sales moved higher in January, according to the Scotiabank Economics global auto report.

Global purchases advanced 3% higher than a year ago as volumes in developing markets began 2017 with the strongest gain in nearly four years, excluding China.

Most automakers reported lower sales there due to an increase in the sales tax applicable on vehicles with 1.6 L or smaller engines.

February data points to ongoing strength across North America. The report shows purchases in Canada exceeded the annualized 2 million units for the second consecutive month, climbing to a record high for February.

The improvement was led by a 16% year-over-year surge in luxury cars and trucks that posted double-digit advances.

In the US, car and light truck sales totalled an annualized 17.5 million units in February, in-line with the previous month's performance and the 2016 total.

The report says automakers will ramp up production to record highs in the second quarter.

Rising vehicle assemblies are to add an annualized 0.6 percentage points to economic growth in the April-June period, helping to lift overall US growth to 2.3% in 2017, up from 1.6% in 2016.

Momentum continues

Prospects have been improving for manufacturing. Canadian sales were up 0.6% in January and TD Economics sees this as continuing momentum from the later months of 2016.

It cited encouraging forward-looking indicators. New orders were up 4.6% and unfilled orders were up 0.3%.

Global growth is projected to pick-up to 3.3% through 2018.

TD Economics is calling for 2.3% Canadian growth this year, an upgrade of 0.5 points.

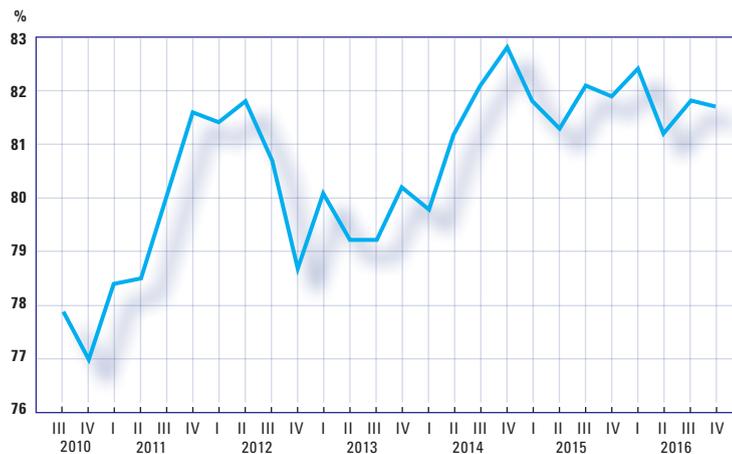
Oil and gas will rebound and lead the growth, but there are still risks posed by a renegotiation of NAFTA and tax policy reform that may impede investment in Canada.

PLANT PULSE

ECONOMIC DEVELOPMENTS AND TRENDS

Manufacturing capacity utilization takes a dip

The capacity utilization rate of all manufacturing industries declined 0.1% in Q4 to 81.7%, after rising 0.6 points in Q3. Statistics Canada attributes most of the decline to durable goods manufacturing. All industries operated at 82.2%, up from 81.6% in the previous quarter, the second consecutive gain. Mining, quarrying, oil and gas extraction, construction and non-durable goods manufacturing drove the increase, offsetting declines in durable goods, electric power generation, transmission and distribution, and forestry and logging.



Source(s): CANSIM



Canada's projected economic growth for the year. It equals the US and is ahead of the other Group of Seven countries, according to estimates released by the OECD. That's up from a previous estimate of 2%.

2.4%

1.5% to 2.5%

EBITDA growth for North American manufacturers (mostly thanks to US companies) over the next 12 to 18 months, based on Moody's forecast for G20 GDP growth of 3%. The investor services firm has changed its previous outlook from negative to stable.



Canada's merchandise trade balance with the world in January. It's up from \$447 million in December, the third consecutive monthly surplus, according to Statistics Canada. Exports were up 0.5% thanks to motor vehicles and canola. Imports were down 0.3%.

\$807M



65% HYDRO POWER

The amount of power generated from all renewable sources in Canada as of 2015 (and 60% of that is hydro), according to the National Energy Board. That's up from 60% in 2005.



\$34B

The amount of sales activity generated by off-highway equipment manufacturers in Canada (\$15.5 billion direct sales), according to a report by IHS Economics for the Association of Equipment Manufacturers. These manufacturers support 64,000 jobs directly and another 84,000 jobs associated with their supply chains. Overall, this segment of industrial activity contributes 4.1% of Canada's manufacturing GDP. The US-based AEM represents manufacturers serving the mining, agricultural, construction and utility industries.

CLEARED FOR LIFT OFF

BELL'S 505 JET RANGER X SECURES MIRABEL JOBS

New mandate leverages a skilled workforce to attract global product platforms.

BY MATT POWELL, ASSOCIATE EDITOR

The future of a Quebec helicopter manufacturing plant is brighter today than it was a little less than two years ago.

Trouble started in 2015 when persistent weakness in the oil and gas sector (and the growing use of drones) created a lot of turbulence for Bell Helicopter Textron Canada in Mirabel, Que. The company, which has been building helicopters in Quebec since 1983, was forced to cut 300 positions despite winning two Canadian Coast Guard contracts worth \$328 million. The cuts were part of a global downsizing that eliminated 1,100 jobs.

By 2016, global demand for rotorcraft had plunged by 16.1% in the first half of the year, with billings down more than 32.5% according to the General Aviation Manufacturers Association.

Bell Helicopter, owned by Fort Worth, Tex.-based Textron Inc. (a global network of aircraft, defense, industrial and finance businesses) describes 2015 and 2016 as challenging years. Global deliveries fell 35% last year to 114 aircraft, while revenues declined to \$3.2 billion from \$3.5 billion.

But there were signs of optimism that Bell's fortunes were about to (pardon the pun) take off. In November, Bell announced it would test, certify and manufacture its next two commercial aircraft at its Quebec manufacturing plant. Part of the plan included moving production of the new Bell 505 Jet Ranger X – a five-passenger commercial helicopter – from a facility in Louisiana to Mirabel, creating 100 highly-skilled jobs and securing 900 or so current positions. Transport Canada certification quickly followed in December, and there's a multi-year order backlog of more than 400 aircraft.

Bell's Canadian operations are led by Cynthia Garneau. She joined the company in



Bell's 505 Jet Ranger X production is in full flight at the aerospace company's Mirabel, Que. plant.

PHOTOS: BELL HELICOPTER

2004 as a contracts and compliance manager at the Mirabel site before holding other leadership roles in supply chain management and government relations. A lawyer and member of the Quebec Bar since 1994, she has more than 20 years of aerospace experience, and was named president of Bell Helicopter Textron Canada in January last year. She's also a member of the Aerospace Industry Association of Canada and Aero Montreal boards.

"The size of Quebec's aerospace cluster is an incredible help to companies like us, and I'd argue it's a big reason behind why the 505 is being produced in Mirabel. That mainly relates to the skilled workforce we have not only in Quebec, but across the country for aerospace manufacturing," says Garneau. "In our case, academia and industry, the tools we need for research and development and innovation are like a well-oiled machine."

Aerospace investment

Bell plays a significant role in Canada's massive aerospace sector, which employs 180,000 people and drives annual revenues of \$29 billion. Aerospace invests \$1.9 billion annually in research and development, which is five times the intensity of Canada's manufacturing sector.

Mirabel, an off-island Montreal suburb that's home to about 42,000 residents, accounts for 55% of Canada's aerospace jobs and sales, and about 70% of total R&D investments. Bombardier Aerospace has a significant presence there, where it's producing the CSeries jets at a facility close to the Montreal-Mirabel International Airport.

The 505, Bell's highest-tech commercial offering, was unveiled at the 2013 Paris Airshow as the Bell SLS (Short Light Single). It's a "clean sheet design," but will use some dynamic components such as the rotor systems from Bell's 206L-4 chopper. The airframe is made from a combination of metals and composites, with a 22 square-foot flat floor and an 18 cubic-foot luggage bay. The aircraft also accommodates extras such as a cargo hook. The cockpit is equipped with the Garmin G1000H glass avionics suite and the aircraft is powered by an Turbomeca Arrius 2R turboshaft engine capable of producing speeds up to 232 kilometres per hour across a maximum range of about 650 kilometres.

Main production was to start last year at



The 505 backlog has grown to 400 aircraft, which will keep the plant busy.



A 505 being prepped in the paint shop.



Bell Helicopter's Mirabel plant now handles all of the company's commercial production.

an 82,300 square-foot \$26.3 million hangar facility at Lafayette Regional Airport in Louisiana. The state offered Bell \$8 million as a job creation incentive to bring 250 new jobs to the plant, and construction started in 2014. The facility opened in August 2015, but by May last year CEO Mitch Snyder announced a number of changes to the company's supply chain, which included moving production of the 505 to Mirabel. The Lafayette Assembly Center, which was specifically designed to manufacture and deliver the 505, will instead complete Bell 525 sub-assemblies and perform work on Northrop Grumman MQ-8C Fire Scout UAVs.

The Mirabel plant is now home to all of Bell's commercial helicopter manufacturing, where the six-passenger, single-engine 407, dual-engine composite 429, and 13-passenger dual-engine 412 models are manufactured.

"The team approached the 505 program from what it means to manufacture in a way that enforces our competitiveness as a company," says Garneau.

The Mirabel plant has deployed a "pulse" production line that isn't typically adopted in slow moving manufacturing systems like aerospace.

"We're working differently with suppliers – a kind of kanban system to minimize impacts to the production line. Kits and options are all developed to meet customer needs from the get-go."

The Mirabel team completed a tight timeline. Design to production took just over

two years. A production-quality aircraft was delivered in less than a year, which completed its first flight in January. Production roll-out commenced in February and deliveries began in March.

Future opportunities

Manufacturing at the Mirabel plant secures opportunities for future models of commercial helicopters to be tested, certified and assembled, and there's a commitment to relocate and manufacture some components for the 429, 505 and 525 models currently produced by subcontractors.

Innovation and R&D efforts will be increased for advanced vertical takeoff and landing designs, hybrid and clean propulsion, assisted and automated flight technologies, more flexible avionics systems and material technologies that would boost craft survivability.

Bell's 638,000 square-feet of hangar, assembly and office space has produced more than 4,900 commercial variant helicopters since 1983, and directs more than \$150 million to more than 500 suppliers across Canada. Mirabel's airport, spread over 152 acres, provides Bell with two runways and a control tower that offers complete flight test and delivery capability.

Although drones have eaten into market share because they're cheaper to operate in industrial applications (such as pipeline and power line inspection), Bell is turning that into an opportunity. It's partnering with US

defence manufacturer Northrop Grumman to develop unmanned aircraft using Bell's 407 airframe.

Despite the cyclical nature of the aerospace industry, Garneau is confident the 505 has established Bell's Mirabel plant as a grassroots manufacturing and innovation centre for the company globally. The skilled workforce available to Quebec's aerospace cluster is certainly key, but Garneau would like to see more done with training and skills development by the various levels of government.

"Our workforce has to evolve with the technology we're now using, and to do that we have to leverage available government programs, but those can be hard to navigate," she says. The company is working with a number of colleges to help students work through specific trades that may benefit aerospace.

"We've been here for 30 years. We've been able to develop a stable and loyal relationship with academia and the government. When you have your own government buying your product, that says a lot about the quality of what you're manufacturing."

Having a backlog to work through also says something about product's value. Bell Helicopter's Mirabel plant will be busy and in a good position to leverage its highly-skilled workforce and a commitment to R&D by bringing in more global platforms.

Comments? E-mail mpowell@plant.ca.

ELECTRICITY

The plan to cut hydro rates by 25% shifts costs of up to \$25 billion to future taxpayers.

BY MATT POWELL,
ASSOCIATE EDITOR

Ontario's Wynne government has unveiled a plan to reduce sky high electricity bills by 25%, but many manufacturers won't benefit.

The reduction announced March 2 includes an 8% rebate introduced in January and a further 17% reduction that will come into effect this summer if the Liberal's Fair Hydro Plan bill is approved by the legislature.

Premier Kathleen Wynne has likened the plan to re-amortizing a mortgage over 30 years instead of 20, and Energy Minister Glenn Thibeault expects it to cost about \$25 billion. Opposition parties suggest that figure is more like \$42 billion.

Critics have been quick to pan the plan that refinances up to \$28 billion costs destined to land in the laps of future taxpayers. The Wynne government hopes the move will improve its prospects ahead of next year's election, although the party currently trails the Progressive Conservatives by 14% according to a number of polls.

How do the people view it?

A Mainstreet Research poll commissioned by Postmedia shows 41% of respondents see the reduction as a political move, but 47% approve of the plan compared to 35% who disapprove.

The rate cut is a welcome development for residential customers already dealing with the highest energy costs in country, and it also delivers some benefits to business, but the scope depends on the size of the organization. This is of particular concern for manufacturers who blame skyrocketing and uncompetitive energy costs (plus a cap and trade program) for impairing their ability to



The Fair Hydro Plan is aimed at peak demand of 500 kilowatts.

PHOTO: FOTOLIA

Ontario cuts hydro COSTS BUT MOST MANUFACTURERS ARE LEFT OUT

make much-needed investments.

And the province's time-of-use pricing system has increased peak time energy use costs by 81% since 2010, according to Ontario Energy Board data.

Relief in sight?

Ontario's plan includes the expansion of the Industrial Conservation Initiative (ICI), open to manufacturers and large industrial consumers that can save up to 33% of the global adjustment. Instead of paying the wholesale global adjustment rate, eligible companies pay based on their share of the demand for power used during the highest five peak hours of the year.

Introduced in 2011, only Ontario's largest companies could join – those with a peak

power demand of more than 5 megawatts. The threshold has been lowered twice already, now sitting at a single megawatt, and the new Fair Hydro Plan proposes opening the program to businesses with peak power demands of just 500 kilowatts.

This could benefit manufacturers too small to take advantage of the program's original requirements. Yet it does nothing for smaller companies with a peak power demand lower than the 500-kilowatt requirement, and it's a miss for the largest manufacturers, while many medium-sized manufacturers aren't eligible for the original 8% rebate because they consume more than 250,000 kilowatt-hours of power annually.

Jocelyn Bamford, founder of the Coalition of Concerned

Manufacturers and vice-president of Automatic Coatings Ltd. in Scarborough, Ont., says the new plan and the expansion to the ICI doesn't do enough to address the needs of manufacturers, particularly smaller companies that feel the most pain from high power costs.

Automatic Coatings, which has 75 employees, feels the pain daily. Its hydro costs increased by more than \$8,000 in a single month last year – the extra costs not from using more power, but instead government add-ons, including the global adjustment.

"The problem with programs like ICI is that the majority of Ontario's manufacturers employ 50 people or fewer – a lot of them don't have the resources to have visibility in those programs," she says. "And if you choose to pursue one of the available programs, you're going to have to bring in consultants and external energy managers, resources that essentially eliminate any savings you'd see from participating in the program to begin with."

She says the Ontario government needs to develop a plan with a competitive per kilowatt-hour rate to keep companies from moving to lower cost jurisdictions in the US. That means rolling money available

to manufacturers from complicated and labourious green energy and energy efficiency programs into a competitive rate for industrial power users.

“The reality is that companies need to get their operational costs in order, and that starts with energy costs,” she says. “If not, Ontario is going to continue to lose manufacturing capacity to the US and companies will continue to go out of business.”

Ian Howcroft, vice-president of Canadian Manufacturers & Exporters – Ontario, was pleased with the expansion of the ICI program, but he shares Bamford’s concern about the ability of manufacturers to participate in the cost reduction programs, particularly the “enormous” numbers of SMEs that don’t qualify.

“To participate in these programs you have to have exper-

tise and knowledge that many manufacturers, particularly SMEs, don’t have in-house,” he says. “We have to find ways to simplify these processes and allow everyone to participate.”

Howcroft is also seeking a commitment from the government to develop an industrial energy rate that would cut costs to manufacturers and increase their competitiveness while encouraging investment in

Ontario.

“It’s a complicated system we have here, so everything won’t change at once. We want an industrial rate that provides manufacturers with the ability to remain competitive. [Manufacturing] is the largest [sector] we have – we need those jobs and investment – and right now the cost of energy is an incredible deterrent to both.”

Comments?

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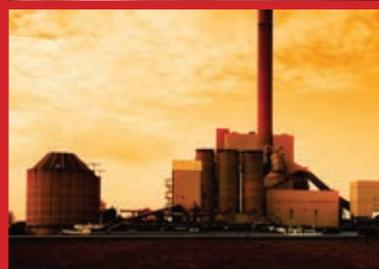
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CLEANTECH

Growing fast in BC: KPMG

Largest export market is the US

VANCOUVER — BC’s Cleantech entrepreneurs are expanding the province’s economy, according to a cleantech status report.

They’re launching dozens of new, high-growth companies, creating thousands of high-paying technology jobs, and attracting billions of dollars of investment to commercialize products and services for export around the world, says the report by KPMG and the BC Cleantech Alliance.

The sector’s employment growth remains high.

The number of cleantech companies is up 35% to 273 and employees are up 20% to 8,560. Total employment increased by 9% in 2014 and 18% last year. Average wages have increased 24% to \$84,000, up from \$68,000 in 2009.

BC’s cleantech companies sell a significant amount of their products and services to customers outside BC. The survey shows the largest export market is the US, and this is expected to remain the case for the next three to five years.

Combined sales to Europe, Asia and other countries are expected to grow to one-third of total revenue by 2021.

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TRANSPORTATION

Toronto startup will manufacture high-speed pods and establish a consortium to build tube infrastructure.

BY MATT POWELL,
ASSOCIATE EDITOR

Elon Musk's push to develop a fifth mode of transportation has acquired a distinctly Canadian flavour.

TransPod, a Toronto-based startup focused on creating a hyperloop, is leading a global charge to bring the ultra high-tech, ultra-fast transportation system to life. It has an academic collaboration agreement with the University of Toronto's Institute of for Multidisciplinary Design and Innovation, and a corporate partnership with REC Canada.

Hyperloop is an imagined high-speed transportation system, first floated by Tesla and SpaceX founder Musk in 2012, which would carry cargo or passengers in pods that travel through large tubes at speeds of up to 700 miles per hour. To put that into perspective, a Toronto-to-Montreal jaunt would take a mere 45 minutes, compared to a five-hour car ride along the 401.

In November, TransPod announced a \$20 million seed round to continue supporting efforts led by Angelo Investments, an Italian high-tech holding group specializing in advanced technologies for the railway, space and aviation industries. The funding will position TransPod for commercial viability and increased global growth.

And the timeline is ambitious. Founder and CEO Sebastien Gendron says TransPod plans to work for two years with industry partners before moving on to government, municipalities, and Transport Canada to get approval to build a line between 2020 and 2025.

TransPod was born in 2015 to meet Musk's challenge to create a half-scale model. The compe-



A rendering of TransPod's hyperloop system along the Gardiner Expressway in Toronto.

ILLUSTRATION: TRANSPOD

Travel by HYPERLOOP

TRANSPOD'S QUEST FOR A FIFTH MODE OF ULTRA-FAST TRANSPORTATION

tion quickly evolved to focus on student teams, but TransPod decided to skip ahead to develop the full-scale concept.

The company, now with 20 employees and plans to double that number by year's end, has secured IP patents for its designs and is expanding its network of global industry partners, including leaders in the railway, space, aviation, engineering and architectural spaces.

Designing the system

It's in the process of designing the entire hyperloop system, including the pod and infrastructure, with an emphasis on physics and safety. The plan is to manufacture the pods while establishing a consortium to build the infrastructure through

public-private partnerships with construction companies and financial partners.

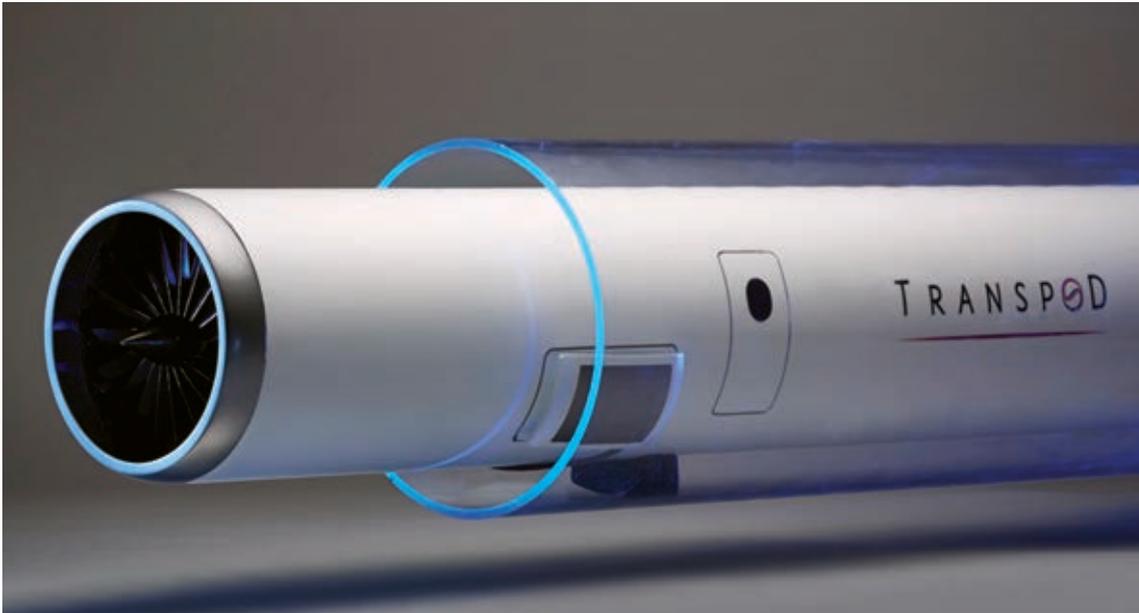
"In addition to developing new technologies, we're utilizing concepts and designs from the aerospace industry. Many subsystems, such as the vehicle structure, control systems and vehicle dynamics, are very similar to what we can find on an aircraft," says Gendron. "Railway technologies are also being adapted, including communication, signalling and energy management. Much of the work we are doing integrates these existing technologies with our own proprietary designs to create a new high-speed transportation system."

TransPod intends to design and manufacture the pod in

Canada, but Gendron concedes the company must be open to other options based on current and future investment scenarios.

The seed funding received in November helped finalize a conceptual design, so the next step is development of the full hyperloop system. Its pod's propulsion and levitation systems are magnetic-based components attached to a carbon fibre structure. The vehicle is 82 feet long and capable of carrying 10 tons, passengers or freight. A compressor at the front of the pod draws in any air that remains in the near-vacuum tube, and pumps it to the back to minimize drag.

"We're not using pre-existing concepts of hyperloop, and we're not crowdsourcing or



A closer look at the hyperloop pod, which is 82 feet long and can carry 10 tons of cargo, human or freight. PHOTO: HUGH READ

harvesting ideas and trying to make them fit with each other,” says Gendron. “We’re developing every aspect of the hyperloop system, from design to systems engineering, all in-house and with our partners, which means everything is designed to work together seamlessly.”

TransPod is focused on proving the technology and has secured IP patents for the pod’s design.

Gendron has more than 12 years of experience working on aircraft development programs, including stints with Airbus, Safran and Bombardier. Much of his career has focused on testing and executing complex industrial strategies, flight test activities and manufacturing strategies. He holds two Master’s degrees in mechanical aeronautical engineering at the Aix-Marseille II University and the French Aeronautical and Aerospace National School in France. His Master’s thesis focused on aerospace debris.

When he joined Airbus Group as an industrial engineer, he worked on the development and commercialization of new industrial products and applications, including the final assembly of the A320 passenger jet.

“The transportation industry is rapidly changing, influenced by disruptions such as ride-sharing services and trends

like population booms, all calling for a deeper investigation into how to most effectively meet demands for public transportation in major cities,” says Gendron. “There is an incredible need right now for a new means of transportation as an alternative to the relatively expensive, slow, and environmentally harmful conventional travel we currently have.”

There’s also an economic benefit associated with the hyperloop system: commuters will no longer be forced to choose where to live based on where they work.

“You could live six hours away from work, and still get home in 45 minutes,” Gendron says.

For businesses that need to ship goods, hyperloop adds a layer of choice related to

delivery and affordability. It will drastically change how commerce is conducted between cities and across countries, allowing businesses to transport products at high speeds at affordable rates, while being environmentally responsible.

TransPod is seeking support from the federal and provincial governments to prospect and build a test track in Ontario. It’s also in discussions with other governments to develop hyperloop lines around the world. Gendron believes they’ll be most interested in the innovation, and will find a way to plan hyperloop into transportation strategies – just the momentum needed to drive the fifth mode of transportation into the future.

Comments?
E-mail mpowell@plant.ca.

HEALTH

Kindred’s sanitary sink

Ozonator kills infectious bacteria

Frankie Kindred Canada has been manufacturing sinks for 55 years. In fact, it’s likely the stainless steel sink in your kitchen was made at the company’s Midland, Ont. plant where more than 100 employees work.

While the company’s processes have changed little over time, the manufacturer is aiming to increase sales in the US, and it hopes to make inroads with a new sink.

Created specifically for hospitals, it doesn’t have a faucet, knobs or levers, it reduces splashing and has a built-in ozonator that kills bacteria.

The Medi-Flo hand hygiene sink limits patient, staff and visitor exposure to potential infection and exceeds CSA Z8000 safety standards. The disinfecting technology combats poor hand hygiene methods and biofilms on the sink and in traps, and its laminar flow chamber is a first in the industry.

Water is infused with ozone and other mixed oxidants generated on demand to keep hands and the sink waste-free of bacteria and pathogens. Ozone is among the world’s most powerful disinfectants – twice as effective



Kindred’s Medi-Flo hand hygiene sink. PHOTO: KINDRED

as bleach – and it kills bacteria 3,000 times faster.

The sinks are already proving to be popular. Four were installed at Collingwood General and Marine Hospital, which is undergoing an emergency room modernization.

Frankie Kindred is leveraging the current focus on infectious disease control to get its sinks installed in healthcare facilities across the US. By entering new markets it hopes to maintain jobs in Midland, and eventually create new ones.

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COMPUTING

The Quantum Artificial Intelligence Lab in California will upgrade its computing power with the new 2000Q System.

BY PLANT STAFF

D-Wave Systems Inc. has been making quantum leaps and bounds recently as it furthers the development and application of its unique, advanced superconducting computing technology.

Indeed, this Canadian rising star based in Burnaby, BC (with offices in Pal Alto, Calif.), and grown from roots established at the University of British Columbia, is the first company in the world to sell quantum computers. And it has just provided an upgrade to a triumvirate of tech heavy-weights that are gauging the potential of artificial intelligence.

Google, NASA and the Universities Space Research Association (USRA) are getting D-Wave's new 2000Q computer as an upgrade for the Quantum Artificial Intelligence Lab (QuAIL) at NASA's Ames Research Centre in Moffett Field, Calif.

The multi-year agreement supports research on how quantum computing could be applied to artificial intelligence, machine learning and difficult optimization problems.

"The new system will be the third generation of D-Wave technology installed at Ames," says D-Wave CEO Vern Brownell.

It replaces D-Wave's 2X system, a 1000+ qubit quantum computer installed at QuAIL in September 2015. The 2000Q doubles up the qubits to 2,000 to handle bigger problems.

Qubits separate the quantum from conventional computing. A computer encodes data in binary digits (1 and 0). Qubits exist in two states – on and off, simultaneously – to speed up calculations of complex problems.

Earl Joseph, vice-president for high-performance computing, an IT market research firm at



The 2000Q system in the laboratory.

PHOTOS: D-WAVE

Quantum UPGRADE

D-WAVE TECH ADVANCES ARTIFICIAL INTELLIGENCE

IDC, described the leap from 1,000 to 2,000 qubits as a "major technical achievement and an important advance in the field of quantum computing."

The first D-Wave system was installed at Ames in 2013. Scientists have been using it for a range of complex problems such as web search, speech recognition, planning and scheduling, air-traffic management, robotic missions to other planets, and support operations in mission control centres.

"The new processor offers more controls for each qubit, which enables us to experiment with new quantum-enhanced optimization and sampling algorithms," says Hartmut Neven, director of engineering for Google and head of QuAIL.

D-Wave's 2000Q system will be installed at Ames later this year. In January, D-Wave released Qbsolv, open-source software

for solving QUBO problems on quantum processors and classic hardware architectures.

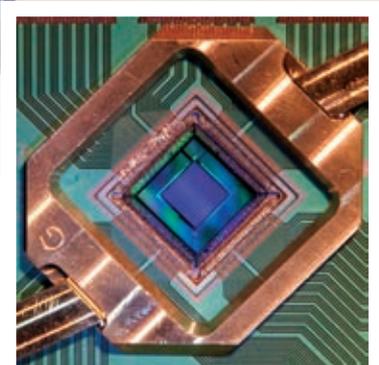
And Volkswagen has been working with D-Wave on a research project involving traffic flow optimization that has used data from 10,000 taxis in Beijing.

Solving complex issues

The two companies were to announce their strategic cooperation at CeBit 2017 in Hanover, Germany and demonstrate the advanced mobility software.

D-Wave is also working with Virginia Tech, and its research institution to set up a joint effort that will provide researchers from the Intelligence Community and Department of Defense with greater access to quantum computers.

The plan is to create a permanent quantum computing centre to house a D-Wave system at the Hume Center for National Secu-



D-Wave quantum processor.

urity and Technology. Hume leads Virginia Tech's research, education and outreach programs, which focus on the challenges of cybersecurity and autonomy in the context of national and homeland security.

D-Wave will work with Virginia Tech to enable staff, faculty and affiliates to build new applications and software tools for D-Wave quantum computers. Participants will be selected by Virginia Tech and include experts in artificial intelligence, machine learning, optimization, and sampling.

What's ahead for D-Wave?

Jeremy Hilton, SVP Systems, says the 2000Q represents an important step toward more general purpose quantum computing.

"We will continue to increase performance of our quantum computers by adding more qubits, richer connections between qubits and more features by lowering noise and by providing more efficient, easy-to-use software."

Comments?

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Reasons to be OPTIMISTIC

OPPORTUNITIES DESPITE THE UNCERTAINTIES

The US economy is performing well, the loonie is fairly low and emerging markets appear to be strong.

BY JIM MENZIES

Canadian manufacturers are fairly optimistic these days. **PLANT's** *Manufacturers' Outlook 2017* survey, co-sponsored by Grant Thornton LLP and SYSPRO Canada, suggests that, while they're by no means overconfident, manufacturers by and large see the potential for good things in this year, with increased exports driving opportunity.

How optimistic are they? When specifically asked to assess their business prospects in the coming year, over 90% of survey participants are either optimistic or cautiously optimistic while less than 10% are pessimistic. Within this positive picture, almost 90% expect their orders, revenue and pricing to increase or at least stay the same, while about 80% expect a similar outcome for profits.

Some may be surprised by this outlook, given that Canada's economic performance last year underwhelmed despite seemingly positive conditions. However, looking at the big picture, there's good reason for their confidence.

For one thing, Canada continues to enjoy a relatively stable economy and banking system, along with fairly low interest rates to encourage industrial and consumer spending. Additionally, with last year's rapid appreciation of the US dollar slowing – making US exports



A stable economy and promising export opportunities are driving business confidence.

PHOTO: FOTOLIA

(often made with Canadian-manufactured components) more appealing to global consumers – and the oil and gas sector rebounding, Canadian GDP growth should increase and have a positive impact on Canadian manufacturing.

Emerging market forecasts appear strong as well, with both China's and India's middle class continuing to become more consumer-oriented – a boon for Canadian export prospects. And while oil prices are showing signs of rebounding, which may increase energy costs for some manufacturers, it will also benefit those supplying the industry.

From an exchange rate perspective, since the loonie remains fairly low in relation to the US dollar, the price of goods manufactured in Canada and exported to the US is relatively favourable.

Of course, optimism should always be tempered by caution, and there are some red flags to be aware of – US political uncertainty, for example. Interestingly though, despite pre-election anxiety, the US economy has performed very well of late, and many economic pundits believe that will continue, at least in the near term.

However, with prevailing

US protectionist sentiment, it remains to be seen how the economic picture will unfold with respect to Canada.

Political reaction was similar last year regarding the Brexit vote, but following an initial economic slowdown, there was a quick, strong recovery and many believe Brexit will not take a significant toll on our UK and Europe trade relations.

Nonetheless, the Canadian dollar has appreciated against a number of other foreign currencies, adversely impacting the price of our exported goods in those countries.

Executives responding to the *Manufacturers' Outlook 2017* survey certainly expect to face a number of challenges. Many foresee their top pressures over the next three years to revolve around pricing (50%), controlling/reducing costs (50%) and increasing sales/orders (48%). Addressing the skilled labour shortage is also high on the list.

Export opportunity

Clearly, these concerns are significant. Yet even tempered by today's economic realities, optimism remains – driven by the potential for increased manufacturing exports. In fact, we're likely to see more export activity, with 32% of respondents planning to enter the US market and a significant number planning to enter other global markets in the next three years.

Still, exports remain a largely untapped opportunity for many companies. Many feel they lack the necessary cultural knowledge around consumer tastes and business practices to sell effectively into foreign countries – a valid concern.

By accepting that what works at home may not work elsewhere and by diligently researching business culture in potential markets, manufacturers should be able to effectively address those fears.

Some may also be hesitant due to the potential impact of "Buy American" and other potential

Changes to NAFTA

HOW WILL RENEGOTIATION AFFECT YOUR BUSINESS?



The US is Canada's top trading partner.

PHOTO: GETTY IMAGES

Be proactive and prepare by focusing on your trade profile and engaging with other stakeholders.

BY IMRAN AHMAD

If your company exports to the US, you're likely concerned about the impact US president Donald Trump and Company will have on your business, especially his commitment to renegotiate the North American Free Trade Agreement (NAFTA).

Much of the Trump coverage has created confusion about what a renegotiation of this important trade deal would mean, but some Canadian companies are preparing themselves by engaging with industry associations, government agencies and ministries.

Your goal should be nothing less than protecting your position or, ideally, improving it. Companies that don't prepare may find themselves reacting to less or decidedly unfavourable circumstances.

How can you prepare? Proactive companies are implementing these measures:

Appoint a trade lead. It should be someone within the organization who will be responsible for the trade file. That person must build a team of internal and external experts, collect and digest trade news that may impact the business, and develop practical recommendations for protecting and improving the company's trade position.

Understand your supply chain and its vulnerabilities. Most businesses rely on an inte-

grated North American supply chain. Have a clear understanding of your supply chain and its vulnerabilities, which includes identifying alternative sources for manufacturing inputs. Get advice from legal and customs experts on what a potential change to the rules of origin may mean as it would pertain to the preferential treatment of Canadian goods.

Push your industry to be proactive. There is strength in numbers. Reach out to industry associations and let them know how your position relates to the upcoming NAFTA renegotiations. Consider reaching out to US and Mexican partners. If there is common ground, ask them to lobby local associations and governments. Businesses should also be engaging with provincial and federal members of parliament.

Communicate your trade position to negotiators. As the Canadian government gears up for NAFTA renegotiations, it's identifying offensive and defensive interests. Provincial and municipal governments are doing the same on a regional and local basis. Convey your interests and objectives to Canada's negotiators. They will be aware of the big issues but are likely unaware of a particular irritant affecting your business or industry, or an interest you'd like to see protected. Now is the time to communicate your position. Don't miss this opportunity to be heard – trade agreements aren't renegotiated often.

Take immediate action to deploy resources and tap trade experts who will assist your business and minimize any shocks that may result from changes to NAFTA.

Imran Ahmad is a partner specializing in cybersecurity law at Miller Thomson LLP in Toronto. E-mail iahmad@millerthomson.com.

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protectionist policies. Such measures may come to pass, but it would be premature to suggest that economies will significantly backtrack on the idea of globalization.

While significant challenges may arise, companies shouldn't abandon export strategies or ambitions just because of the threat, or even the implementation, of foreign protectionist policies.

Between Brexit, the Trump presidency and a fluctuating loonie, 2017 is still something of a conundrum, but there are enough positive signs that many Canadian manufacturers believe they'll achieve export gains in a healthy US economy.

And why not? We have certain natural advantages when exporting to the US, such as proximity, similar consumer tastes and an advantageous exchange rate. When you factor in the sheer size of the US economy, the extent and potential of the opportunity seems clear.

We must also not undersell our reputation. "Made in Canada" on any product can have strong and distinctive international cachet.

We have repeated experiences with foreign business people and consumers making a conscious choice to purchase Canadian products because of the perceived quality and trust that comes with the product.

It's an advantage many Canadian manufacturers undervalue, but one that – combined with key positive economic trends – could help realize their export potential in 2017.

Jim Menzies is National Leader, Manufacturing Industry, at Grant Thornton LLP, a tax, accounting and advisory firm with offices across Canada. To learn more about the manufacturing landscape for 2017 or the Manufacturers' Outlook study call (416) 360-5008, e-mail jim.menzies@ca.gt.com.

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TRAINING GRANTS

Getting serious about workforce training? Here are some programs to get your company started.

BY JEFF SHEPHERD

A strong, diverse, and skilled workforce opens the door to new opportunities for Canadian manufacturers. Being proactive in your approach to hiring and training ensures skills gaps are closed and productivity is strengthened.

As technology and innovation become even more important to manufacturing, ensure your company has the talent to serve market demand is essential.

Skills gaps are a challenge faced by many manufacturers. **PLANT's** *Manufacturers' Outlook 2017* report shows 35% of surveyed businesses believe they're limited by skills shortages.

Over the next three years, 60% of manufacturers plan to invest in training, delivered internally or led by third-party trainers. This is a wise strategy but cost a common barrier to implementing training. As a result, many companies perform infrequent and internal training that meets minimum requirements.

But there is funding for training initiatives by leveraging a mix of government grants, loans, and tax incentives.

The following training incentives offset the costs of building a skilled workforce:

The Canada Job Grant (CJG). This federal grant is available in provincial variants, except Québec, which opted to manage its training support services separately. Initiatives can be one-time or multiple professional development sessions, but they must deliver benefits to the employee and company in the home province.

Manufacturers receive up to 66% of expenses to a maximum \$10,000 per trainee. In some provinces, such as Ontario, small businesses with fewer than 50 employees can access compensation for trainees' sala-



Training will help narrow your skills gap.

PHOTO: GETTY IMAGES

Build your SKILLS

GOVERNMENT FUNDING IS AVAILABLE – BE PROACTIVE

ries. Some provinces place a cap on the total.

The program is open to Canadian-based businesses with \$2 million in liability insurance. Trainees must be permanent Canadian citizens or be granted refugee status, and projects must be completed within the year.

Project themes include lean manufacturing, software and technology, sales and marketing project management, food safety, strategic planning and leadership. Outcomes include wage increases, new job titles, avoidance of job loss and new employee training.

FedDev Ontario Productivity Training Incentive. Funding is for internal and third party training aimed at improving productivity and export sales. Two types of training projects are supported: improving productivity and capabilities; and developing more innovative, efficient, export-oriented pro-

duction processes.

Applicants are eligible for up to \$50,000. Manufacturers who haven't received program funding in the past can get up to 50% of their training costs covered. Those who have received funding may be eligible for up to 25% of their expenses, based on when they last applied.

Eligible Ontario companies must have three years of solid financial performance, between 10 to 1,000 employees and export or be willing to export when the program is completed.

Training focuses on new technology adoption and developing a more skilled, innovative and export-focused workforce.

Employee onboarding grants. Federal government grants are used strategically to reduce payroll costs for new employees while they develop required skills to effectively carry out their roles.

Grants are available to

support the hiring of recent post-secondary graduates who are either unemployed or underemployed. In most cases, successful applicants receive up to 50% of the employee's wages up to \$14,000 to \$20,000. These programs typically provide funding to support the first few months of employment.

Apprenticeship funding.

The Apprenticeship Job Creation Tax Credit is specific to Red Seal Trades and provides a tax credit of up to 10% of eligible wages, to an annual maximum of \$2,000 per apprentice for the first two years of apprenticeship.

The Apprenticeship Training Tax Credit (Ontario) covers up to 25% of eligible expenses (or 30% for small businesses) to an annual maximum of \$5,000 per apprentice, and a maximum \$15,000 over a 36-month period.

Manufacturers expect industrial innovation and more sophisticated production methods to widen the skills gap. Accessing funding programs for training initiatives will help narrow it.

Jeff Shepherd is a marketing coordinator at Kitchener, Ont.-based Mentorworks, a business support organization that specializes in Canadian government funding.

Comments?

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Measuring MATTERS

CHECK YOUR TEAM'S SKILLS

BY HUGH ALLEY

I was recently in a plant where the ratio of ingredients used in a process was critical. The managers knew that being off just a percent or two had a significantly impact on yield – much bigger than the measurement error itself. But as I watched employees measuring additives, I saw huge variation.

It got me thinking about Mr. Gilbert, my Grade 7 science teacher, who taught us how to

read volume in a beaker. He knew measuring was a learned skill, and he knew it was critical for our lab experiments to succeed.

Same goes in a plant.

Measurement matters in so many tasks. In one plant, a test was instituted to ensure all employees could read a tape measure. Some couldn't. At another plant, people were tested to determine if they could correctly use a vernier (a high-precision device that measures length)



Poor measuring skills can lead to significant errors.

PHOTO: GETTY IMAGES

and a dial gauge. The result – there was some training to do.

Indeed, in almost every situation where ability to measure is tested, I've been surprised by the lack of skill. It hasn't been universal, but enough to account for significant errors and costs. When addressed, plant performance improved.

Customers are increasingly asking for precision and repeatability, which helps reduce costs and improve delivery.

If you're running into product

variation or rework that isn't accounted for, look into your team's measuring skills.

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

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SOFTWARE

Develop strategies for a successful implementation and continuous improvement of maintenance operations.

Plants need maintenance software to help maintain the health of their physical assets – repairing, modifying, improving or replacing them as necessary to support availability and reliability of production. Maintenance is also the largest controllable operating cost in a capital-intensive industry. Implementing the right software for Computerized Maintenance Management Systems (CMMS) and for Enterprise Asset Management (EAM) systems is critical.

Any CMMS/EAM software has the potential to be a maintenance pro's most powerful tool when strategies guide successful implementations followed by continuous improvement. Plants need to make sure policies, procedures and practices are in place for improved assets reliability.

Raymond Kelly, senior ICS consultant at Infor Canada Ltd., an enterprise software company with offices in Toronto, addressed these issues during a MainTrain conference, convened by the Plant Engineering and Maintenance Association of Canada (PEMAC).

He prefaced his remarks by emphasizing that all CMMS/EAM programs are simply software tools designed to support business processes related to maintaining plant assets. They're modelled on current best practices for maintenance operations and regardless of the software that's selected, there must be a culture of change and continuous improvement to reap any of the benefits.

One of the most common issues to arise is the expectation that the implementation will miraculously transform



Get the most out of software by developing guidelines and tools to support maintenance activities.

PHOTO: GETTY IMAGES

Optimizing CMMS/EAMS

HOW TO GET THE BEST RESULTS FROM YOUR SOFTWARE

maintenance operations. This inevitably leads to frustration and additional costs.

Kelly listed conditions that inevitably lead to disappointment:

- Lack of strategy.
- Lack of defined business processes.
- Lack of change management strategy.
- Lack of a project champion.
- Poor communications.
- Poor data quality.
- Focus on software training rather than on learning the process.
- Failure to include the EAM as part of the corporate reporting systems.
- A desire for a quick fix.

Empower users

Indeed, there are no quick fixes. It takes time to develop the right culture, to empower users with training and understanding, and to develop accurate and consistent data sets. Ask what a properly implemented EAM system is costing you, and remember: more than half of the maintenance is likely reactive and unplanned. And he warned against short cuts. They can seriously impact the quality and

integrity of an EAM system.

Reports and results are directly related to the accuracy, quality and consistency of the data.

Seven points cover how to get the most out of the software:

- Develop guidelines and tools to support maintenance practices.
- Document processes, roles and responsibilities and make the documentation accessible to everyone.
- Set data requirements.
- Involve everyone in changes.
- Develop meaningful KPIs and benchmarks.
- Apply role-based training on needs, not on software.
- Make sure that the “right” person “owns” the system.

So how do you start? Develop a vision or mission statement defining the “why” and the benefits, and communicate this to the entire organization. Begin with a comprehensive maintenance review, then decide on the level of complexity required. Define key positions, activities and responsibilities, set milestones and end date, then determine how you will measure success.

EAM software supports huge stores of data, but it has to be

meaningful and you have to decide who selects, collects and feeds data into the system, Kelly warns. “Watch out for incomplete data sets and for possible inconsistencies if several people are assigned to the data collection and input process.”

There will be challenges. Implementing any CMMS or EAM software has an impact on individuals and on day-to-day maintenance activities. Have a strategy for managing these impacts. Change management must start at the beginning of the implementation. It requires the involvement of all those affected.

There's often a disconnect between operations and maintenance.

An EAM system can help, but it needs a project champion, adequate training, proper empowerment and, above all, meticulous implementation. EAM may include materials management but not procurement and labour resources. Most EAMs are not financial or payroll systems, so consider the integrations as part of the overall strategy.

Improved business processes, availability and reliability, reduced production and maintenance costs, and the ability to make use of advanced EAM functions hinge on planning and understanding the commitment that has to be made to succeed, even before the maintenance department begins a CMMS or EAM implementation.

Comments?

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Establish a learning culture to foster teamwork. PHOTO: FOTOLIA

Operating PRINCIPLES

WHAT TO EMBED IN YOUR BUSINESS CULTURE

Focus strategy by defining how the organization must operate to achieve success.

BY RICHARD KUNST

Successful manufacturers embed a suite of operating principles within their organizations. These principals are documented and communicated to all employees.

How do you define an organization? It's a company, but also a natural work group, department, facility or division. Here are some useful operating principles and the expected behaviours:

Ensure health and safety is the top priority. Safety programs save lives and prevent injuries, but only if they're prop-

erly implemented and applied.

Create a learning, supportive and cooperative culture dedicated to continuous improvement. Learning must be in place at all levels to develop the knowledge necessary to transform the organization. The transfer of knowledge, sharing of lessons learned and recognizing mistakes/errors as an opportunity to improve are the foundation of a learning culture.

Aggressively improve customer response time. Responding to the changing global market conditions requires a transition from traditional time-based process principles to those that involve quality outputs, shorter lead times at a reduced cost, and increased value-add content.

Produce competitively at

any volume and be flexible to any request. Replace paradigms regarding mass production with time-based, mixed model, flexible systems. Equipment and people must support changes in volume as well as features within a product family and across families of products.

Have process measurements that contribute to business goals. Meaningful process measurements drive overall performance improvement. Establish a feedback system that reinforces decisions people make based on a set of standard measures that cascade down from the business at all levels of the organization.

Drive transformation process through knowledge and involved leadership. Leadership must champion the creation of an environment for change that will gain the co-operative support of the entire organization. Put in place a clear vision, appropriate skills, proper incentives, necessary resources and a realistic master plan.

Define and understand roles and responsibilities. Identify the structure, roles and responsibilities required to implement process changes. Clearly define boundaries. Understanding the scope of

their control empowers people to make decisions that are consistent with overall business objectives, beliefs and values. This improves teamwork, communication and an engaged workforce.

Optimize processes through balanced implementation of interdependent elements. Each element of your operating system supports and complements the other elements to form an interdependent system. Balanced implementation successfully impacts business goals and sustains gains. Demonstrate capability in each element. Like a chain, the system will only be as strong as the element that's "weakest."

Relentlessly pursue the elimination of waste. Continuously identifying and eliminating it from processes reduces cost and lead-times while improving your company's competitive position. Drive out correction, over-production, material movement, motion, waiting, inventory, and processing. The key to "relentless pursuit" is to go back a second, third and fourth time, and so on. It's impossible to eliminate all waste, so prioritize issues and address them as resources become available. Consider issues from a flow perspective to establish priorities.

Establish principles and engage team members to focus their efforts on achieving goals that support the business.

Richard Kunst is president and CEO of Cambridge, Ont.-based Kunst Solutions Corp., which helps companies become more agile, develop evolutionary management and implement lean solutions. Visit www.kunst-solutions.com. E-mail rkunst@kunststartofsolutions.com.

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Hazard and RISK

UNDERSTANDING THE DIFFERENCE



A wet floor is a hazard that poses a risk of injury.

PHOTO: FOTOLIA

A hazard has the potential to cause damage or harm; risk is the chance or probability of damage or harm.

Two words that appear frequently in your health and safety manual are “hazard” and “risk”. They’re often used interchangeably yet each means something very different. Is a wet floor in a workplace a hazard or a risk?

There are many definitions for hazard but the most common is any source of potential damage, harm or adverse health effects. Examples include wet floors, direct exposure to the sun or to toxic chemicals.

The CSA Z1002 Standard “Occupational health and safety – Hazard identification and elimination and risk assessment

and control” defines harm as physical injury or damage to health, and hazard as a potential source of harm to a worker.

There’s a wide range of workplace hazards that could involve a substance, product, process or practice that cause harm to property or result in an adverse health effect.

Knives cut, welding fumes can cause metal fume fever, and bullying affects the victim by creating anxiety, fear and depression.

Practices or conditions that release uncontrolled energy are also hazards. As an object falls, it gains momentum and it could seriously harm anyone or anything it lands on. Or consider the danger posed by rotating machinery that could entangle loose hair or clothing.

Think of hazards in groups. Categories include:

- Biological – bacteria, viruses, insects, plants, birds, animals, and humans.
- Chemical – physical, chemical and toxic properties.
- Ergonomic – repetitive movements, improper set up of workstation.
- Physical – radiation, magnetic fields, pressure extremes, noise.
- Psychosocial – stress, violence.
- Safety – slipping/tripping, inappropriate machine guarding, equipment malfunctions or breakdowns.

Risk factors

How does risk differ from a hazard? It’s the chance or probability a person exposed to a hazard will be harmed, or experience an adverse health effect. For example there is a risk of slipping on the wet floor and breaking a bone, or developing skin cancer from long-term exposure to the sun. Risk also applies to property or equipment loss, or harmful effects on the environment.

Many factors influence the degree of risk. They include the nature of the hazard and level of exposure. For example, a product with a low hazard level poses a high risk if exposure is high. A product with a high hazard level poses less risk if exposure is low.

The goal is to minimize exposure to hazards to minimize risks.

When a hazard is identified,

work towards eliminating it or controlling the associated risks.

A risk assessment involves:

- Identifying hazards and risk factors that have the potential to cause harm.
- Analyzing and evaluating the risks associated with a hazard.
- Determining appropriate ways to eliminate a hazard, or if that’s not possible, controlling the risk.

The health and safety committee’s responsibilities include determining possible causes of health conditions reported by employees, informing employees about potential and actual hazards, recommending control measures to management, and participating in evaluating the effectiveness of the control measures.

Every workplace has hazards. Ensuring a plant is safe begins with a clear understanding of how to identify hazards and the risks they pose.

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

Comments?

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Portal to gender diversity

How it impacts the workplace

A new web portal will help bridge the gap between gender diversity, sex and health, and their impact on the Canadian workplace.

The Canadian Centre for Occupational Health and Safety (CCOHS), a federal government organization based in Hamilton, launched the portal to further understand of how sex and socio-cultural (gender) differences between women, men and gender-diverse people influence work and health.

The Gender, Work and Health web portal (www.ccohs.ca/genderhealth) provides links to information, tools, research, and resources on topics such as sex and gender differences in workplace injury and illness, gaps in knowledge and improving risk prevention.

CCOHS created the portal in partnership with the Institute of Gender and Health and its Gender, Work and Health Chair Program.



Leftover paint is given new life by Loop.

PHOTO: LOOP

Loop Recycled Products impresses CBC's Dragons, securing a \$500,000 investment.

BY MATT POWELL,
ASSOCIATE EDITOR

An Ontario paint manufacturer has hit it big, attracting customers with a taste for sustainable products and gaining support from three of Canada's top business personalities who star on CBC's popular Dragon's Den TV show. They made a \$500,000 investment in the company.

So, what to do with perfectly good leftover paint? It's mostly incinerated or sent to landfill, where it releases toxic chemicals into the environment. Recycling keeps those toxins out of the air and groundwater, while delivering a high-quality product that's easier on the wallet and closes the sustainability loop.

That's what Loop Recycled Paint is about. It's a brand of waste collector and recycler Photech Environmental Solutions. The St. Catharines, Ont. company, launched in 2012, is the result of a request from Stewardship Ontario for Photech to increase its recycled paint processing capacity. Donated and unwanted paint

Closing the LOOP

MAKING A SUSTAINABLE PAINT FROM LEFTOVERS

is revitalized into a fresh, middle-grade product that the company claims is better quality than new. And a \$30 per can price is enticing to customers.

Photech, founded in 1997, specializes in environmental solutions for underserved businesses such as dentists and veterinarians across Ontario that produce photo-chemicals and hazardous waste materials.

Loop Recycled Products and Photech recently combined their three facilities into one location in St. Catharines to improve productivity, and have more space and capacity to make production more efficient. Loop now employs 60 workers.

When the paint enters the facility, it's assessed for quality and sorted, then made into a feedstock and undergoes about 30 specifications during

a quality control process. Each colour and batch is personally approved by president Josh Wiwcharky before it moves to packaging, labelling and distribution.

Green supply chain

Everything in the Loop supply chain is environmentally sustainable. Boxes and labelling are produced from recycled products, and even used paint cans are crushed and sent to other recycling facilities where they are repurposed.

The paint is sold under three brand names – Loop, Port Weller Paint Co. and Blue Moose Paint – and found in Wal Mart, Lowe's and Giant Tiger stores across Canada. They're also available online through Amazon.ca. A fourth brand, Paint, is sold in unconventional retail outlets

such as grocery stores.

Loop is also developing a recyclable plastic pouch to replace the cans, making its paint completely sustainable.

Because the paints are ready to use right out of the can without mixing, Loop has won clients such as Giant Tiger, which hasn't sold paint because of the need to invest in specialized equipment such as mixers, or staff a paint department.

The Loop brand is the company's signature product, available in 11 nature-inspired colours and sells for about \$18 per gallon at Walmart. A five-gallon tub for contractors retails for \$63, which compares to competitors whose prices range from \$80 to \$92.

The company has one challenge: the choice of colours depends on what's donated at production time.

Loop Recycled works with local municipalities to collect the paint. The Regional Municipality of Niagara is helping to close the sustainability loop by keeping and managing its waste within its borders. Niagara has also taken steps to ease hazardous waste disposal and make it more convenient for residents to drop off materials such as paint.

And the company is giving back to the community. It's donating paint to groups and non-profits such as Red Roof Retreat, the David Suzuki Foundation and the City of St. Catharines.

Loop's recycled paints caught the attention of three Dragons when the company appeared on the show in April last year. Loop secured the \$500,000 investment from tech investor Michael Wekerele, Joe Fresh founder Joe Mimran and Boston Pizza czar Jim Treliving, who took a 20% stake. The company is hopeful this relationship with the Dragons will help it make inroads in the US market.

Comments?

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A C.D. Howe Institute report finds some industries' occupations will be disrupted more than others.

BY PLANT STAFF

Artificial intelligence, driverless cars and automated production lines are raising red flags in North America where some technology prognosticators are warning that automation will displace millions of workers.

Global consulting firm McKinsey and Co. concludes 60 million in the US will face some form of automation and warns of job losses coming in the white-collar world. We're seeing it in retail (automated checkouts), but McKinsey offers a broad list that includes transportation, agriculture, arts, medicine, stock trading and even prostitution (something about robotic companions that are decent conversationalists and good listeners).

Closer to home, a report by the Mowat Centre, part of the University of Toronto's School of Public Policy & Governance, warns 1.7 million to 7.5 million Canadian jobs could be at risk over the next 10 to 15 years.

And federal government officials have been warned machines are going to replace people in the workforce over the coming years. That will require a rethink of how government helps the unemployed.

But the C.D. Howe Institute

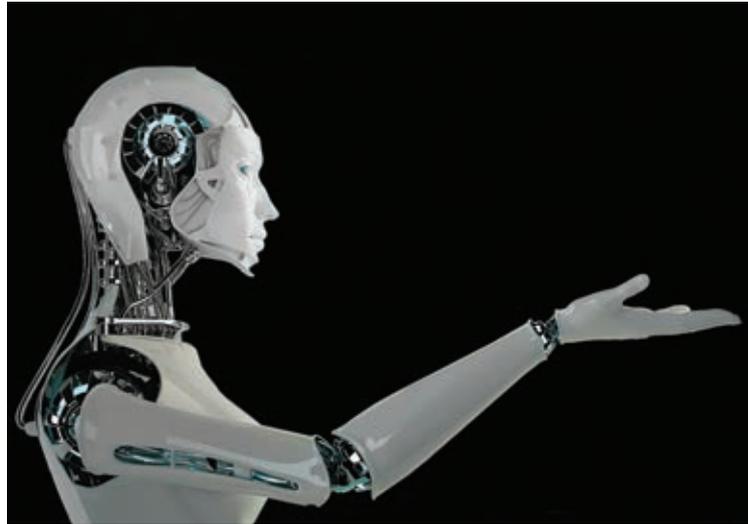
Robotics in Canada

69,000 – Automotive manufacturing
 36,200 – Electrical/electronics
 16,500 – Metal and machinery
 12,200 – Rubber and plastics
 6,200 – Food manufacturing
 2,000 – Pharmaceuticals and cosmetics

Source: International Federation of Robotics 2015

Is technology KILLING JOBS?

RELAX, NO DOOMSDAY SCENARIO HERE



We're not about to be replaced by robots but expect some disruption.

PHOTO: FOTOLIA

has conducted an analysis of global trends and contends automation poses no doomsday scenario for jobs in Canada.

The Toronto-based research firm finds a drastic shift in employment is unlikely in the near future, although particular industries and types of occupations will be disrupted more than others.

Future Shock? The Impact of Automation on Canada's Labour Market finds trends show a gradual shift to jobs that require higher skill levels.

"New technology does not simply make people redundant; rather, it reduces the labour required for a given level of production," says report co-author Matthias Oschinski. "This means that more of the same goods can be produced or people can be redeployed in areas that otherwise might not have been developed."

Canadian manufacturers, especially smaller ones, have been slow to adopt advanced technologies.

The **PLANT Manufacturers' Outlook 2017** report shows only 16% of respondents use automated materials handling technologies and 10% make use of robotics.

The pace of automation adoption in manufacturing has room to pick up, but as it does so, will it lead directly to job losses?

Robotic use

Based on density (the number of robots in service per 1,000 workers), the C.D. Howe research shows Korea is at the highest level followed by Japan and Germany. Canada, incidentally, is well above the world average. So you'd think the highest density countries would experience the greatest job losses. But the data says otherwise.

Looking at robotics use in manufacturing among a variety of industrialized countries (1993 to 2007), there was no significant effect on overall employment, but increased robotics density led to GDP growth and labour productivity gains.

What does that mean for Canada? The report notes several important factors:

- Canadian employment is concentrated in industries that have a low risk of automation. Industries with less than a quarter of the jobs susceptible to automation account for 27.5% of total employment (4.9 million jobs).
- Industries where more than three-quarters of the jobs are at high risk of automation account for only 1.7% of employment (310,000 jobs). This implies that Canada's diversified economy and labour force are well positioned to adapt to rapid technological change.
- Occupations high in abstract, complex-decision-making skills with a strong focus on creativity, critical thinking and interpersonal social skills are relatively low risk.
- It's very unlikely jobs highly susceptible to automation (35%) will be completely replaced by smart machines over the next few years.

But the report observes as the rate of technological progress increases, technical job-specific skills might become obsolete relatively quickly. This indicates a need to increase opportunities for continuous education and lifelong learning.

Oschinski recommended policies that encourage collaboration between public and private institutions to ensure workers have the necessary skills for new employment. That's sound advice as technology continues its rapid advance.

Comments?

E-mail jterrett@plant.ca.

GOVERNMENT

The Trudeau government's second budget offers few policy changes but provides lots of room to manoeuvre.

BY MICHAEL OUELLETTE

The term Filibudget doesn't exist. At least, it didn't until yesterday.

In the minutes before Finance Minister Bill Morneau was set to stand and announce the budget, Rona Ambrose's Conservative Party of Canada launched an honest-to-goodness filibuster. The move delayed the budget announcement by 30 minutes and added a much-needed sense of drama and a wee bit of irony to the afternoon.

The drama was needed because the actual budget offered none. The irony comes in the sense that the budget, bereft of the builder-style initiatives provided in last year's policy document, was essentially a filibuster in paper form.

Gone are the "sunny ways" and sweeping optimism of the year prior. What we got was a pause. A delay – and a "let's wait and see how this plays out."

And just maybe, that's exactly what Canada needs right now.



Parliament Hill where Finance Minister Bill Morneau delivered his "wait and see what the Americans do" budget.

PHOTO: FOTOLIA

Nothing much to see here BUDGET 2017

HERE'S A LOOK AT WHAT'S IN IT FOR BUSINESS

"Unfortunately, this is the position we are in," says Jim Menzies, Canadian Manufacturing Industry Leader and Partner at Grant Thornton LLP, a tax services and advisory firm.

"Certainly, this is the most significant impact the US has had on Canada's policy in some time," he adds.

With a very large cloud of uncertainty hovering just south of our border, Prime Minister

Justin Trudeau and his cabinet likely decided now was not the best time to lay all their cards on the table. It's better to sit quietly, with a steely gaze and steady demeanour, and wait for the Americans to get their House in order.

Important negotiations are coming – NAFTA, immigration, security, dairy, softwood lumber, border taxes and Buy American provisions – everything will be on the table, and none of it is going to be easy.

"The impact of the US on Canadian manufacturers is obvious, and this is the first time I've seen Canada act so cautiously on policy," said Menzies.

From a business perspective, there are no immediate boosts in Budget 2017, but there's nothing that stings either.

Tax rates weren't tinkered with, the capital gains tax was left as-is and there were no changes to the accelerated capital cost allowance for writing off a portion of investments in new technology.

"In relation to tax rates, [the government] is purposefully holding back on that right now. Canada currently has a tax advantage over the US and

the government doesn't want to tinker with that. Come the fall, there will be a lot more we understand about the actions of the US," says Menzies.

Business perspective

Here are some highlights:

Infrastructure. The infrastructure bank was mentioned, but not with anywhere near the kind of pomp that came with its initial introduction and \$35-billion promise.

Menzies doesn't think the infrastructure bank is going to be up-and-running before the end of the year.

"Given that, it's going to be a couple of years before the infrastructure bank will have any meaningful impact," he says.

Deficit. It's going up, and not everyone seems to care.

"Most were not expecting the deficit to be reduced in the near term," Menzies says. "This budget was never going to focus on deficit, and its impact in the near term won't be significant."

Forecast to hit \$28.5 billion for this fiscal year, Morneau still believes the key is growth, and he's not inclined to jeopardize the growth rate to get closer to balance.

PRIORITIES

Budget pleases CME

It supports manufacturing priorities

Federal Budget 2017 may be lacking in "wow" factor but the parts pertaining to manufacturing have the support of Canadian Manufacturers & Exporters (CME).

The Ottawa-based association is happy with the emphasis on innovation and pleased the government is following through with the group's recommendation for an industry-led supercluster strategy, particularly its focus on digital technology and advanced manufacturing.

"We expect government will work with manufacturers to get this cluster off the ground quickly. The need is urgent: 36% of our members identify the cost and risk of seeking new opportunities as the leading domestic barrier to achieving export success," said Dennis Darby, CME's president and CEO.

He's also encouraged by the budget's commitments to invest in a comprehensive skills training strategy. One quarter of CME's members are restricting production due to a shortage of skilled labour, with 40% currently experiencing labour shortages.

Superclusters. While Budget 2017 is in most aspects a pause document, it includes some forward-looking initiatives to advance the economy and one of those is the Innovation Canada platform. Managed by Innovation, Science and Economic Development Canada (we used to call this Industry Canada), the goal is to place the country firmly in the centre of the pending innovation economy.

The plan identifies six sectors that will be the engines of job creation in the coming decades and earmarks \$950 million over five years to accelerate growth in these areas. None of it is new money: \$800 million will be drawn from the Budget 2016 provision for innovation networks and clusters, and \$150 million will be drawn from the public transit and green infrastructure allocations.

The program's superclusters include: Advanced Manufacturing; Agri-food; Clean Technology; Digital Technology; Health, Bio-sciences and Clean Resources; and Infrastructure and Transportation.

How it will work

There aren't a lot of details on how these will work, but the budget outlines a few ideas:

- Risk sharing to develop plat-

form and disruptive technologies that will boost Canada's competitiveness in areas of economic strength.

- Strong connections between businesses, from large anchor firms to start-ups, post-secondary institutions and research institutions that support private sector-led research and development that's linked to commercial outcomes with application in the real economy.
- Create opportunities to grow through globally integrated supply chains.
- Diverse and skilled talent pools enhanced by advisory services and business mentoring for start-ups and small and medium-sized enterprises that lead to opportunities for Canadians to access high-value, well-paying jobs.
- Focus on innovative solutions that will improve the quality of life of Canadians and allow businesses to better perform in a competitive environment.

Strategic Innovation Fund.

This \$1.26 billion, five-year funding initiative combines four previous funds: the Strategic Aerospace and Defence Initiative, Technology Demonstration Program, Automotive Innovation Fund and Automotive Supplier Innovation Program.

The budget sets aside a further \$200 million over three years, starting in 2017-18, on top of existing money. However, \$100 million will be new funding and \$100 million will be pulled from the \$1 billion announced in Budget 2016 that was meant to support clean technology.

With this budget, the Trudeau government is in a holding pattern. Now we wait to see which cards the Trump administration intends to play...

Michael Ouellette is the editor of Canadianmanufacturing, part of Annex Business Media. E-mail mouellette@canadian-manufacturing.com.

Comments?

E-mail jterrett@plant.ca.

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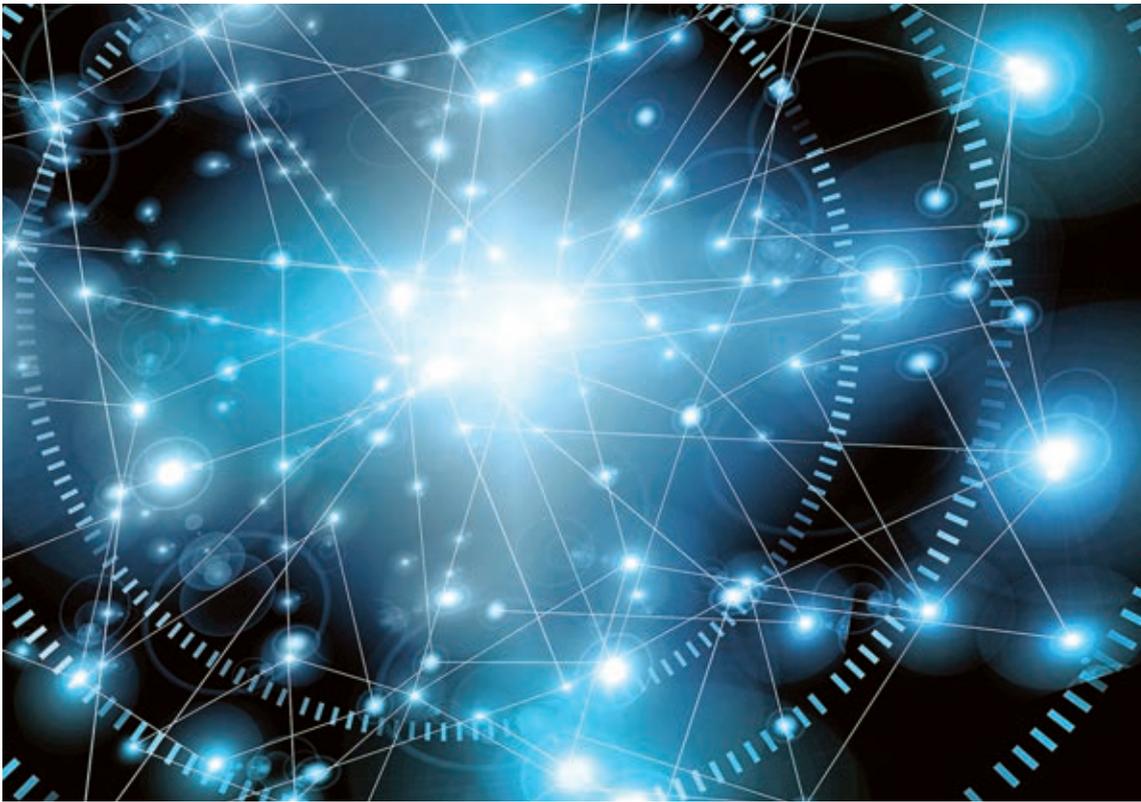


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RELIABILITY



Challenges in the digital age.

PHOTO: FOTOLIA

Develop an RBD

A TOOL FOR STAYING ON TOP OF TECHNOLOGY

Dealing with changing technology in the digital age requires a lot of preparation.

BY STEVE GAHBAUER

Technologies are advancing so fast it seems what's new this morning is obsolete by the afternoon. However, manufacturers must find ways to adapt to the rapid evolution of digital tech and other innova-

tions impacting their markets or risk being overcome by the disrupters or falling behind competitors and perishing.

History is littered with companies and even industries blindsided by innovation (think Eastman Kodak, which decided to stick with film production and photo processing, while missing the window digital photography opened) because it was dismissive of a seemingly distant threat.

This explains, at least partially, why 88% of firms on the

Fortune 500 list in 1995 don't exist today.

Changes and challenges in the digital age that impact asset management and maintenance were addressed during a MainTrain conference convened by the Plant Engineering and Maintenance Association of Canada (PEMAC).

Nicolas Castaneda, a reliability engineer at ARMS Reliability, a global consulting firm in Calgary, suggested developing a reliability block diagram (RBD) as a useful tool in technically challenging times.

An RBD evaluates plant/system performance in terms of reliability, availability, maintenance and cost. Castaneda said RBDs help identify improvement opportunities and achieve new goals. Once an improvement plan is defined, an RBD will derive tangible benefits. This applies in a variety of scenarios and provides feedback to the design, project or process team about cost, asset and plant performance.

SUPPLY LINES



(L-R) Armstrong CEO Lex van der Weerd; Nefertiti Saleh, corporate partnership manager, WaterAid Canada; Nicole Hurtubise, president of WaterAid Canada; and Armstrong chairman Charles Armstrong.

PHOTO: ARMSTRONG

\$40,000 FOR WORLD AID

Employees at Armstrong Fluid Technology's global locations have raised \$10,000 for WorldAid, an international charity dedicated to providing access to safe water, hygiene and sanitation worldwide.

The money, to which the Canadian government added \$30,000, was raised as part of an innovative employee recognition program called Rising Stars.

Armstrong's international talent show involved videos submitted by employees who sang, played musical instruments, danced, acted, performed magic tricks and demonstrated arts and crafts.

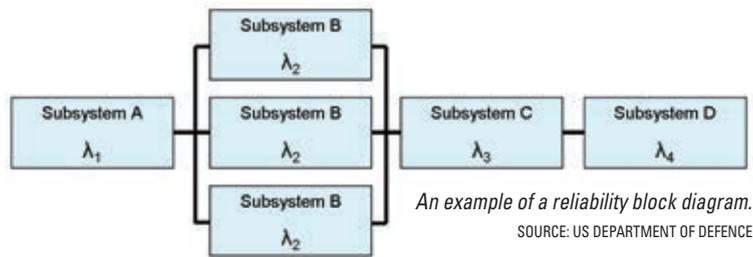
CHANNEL PARTNER

Gerrie Electric, a provider of electrical, automation, lighting and IP Network products with 24 locations in Ontario, is now an Endress+Hauser Canada authorized channel partner.

This partnership combined with Rockwell Automation extends Endress+Hauser's ability to help modernize Canadian plants.

Gerrie, based in Burlington, Ont., now has access to Rockwell Automation's PlantPAx distributed control system.

Endress+Hauser Canada provides tools for integration, plant-wide advanced diagnostics, and managing process system lifecycles.



So how do you develop an RBD? It starts with a base model, followed by a result evaluation, leading and an improvement plan. Various software packages will help you create an alternate scenario model and select the best one.

Equipment failure

The RBD illustrates plant systems, subsystems and assets arranged in a way that reflects the impact of equipment failure on system performance, and shows how a failure or scheduled equipment outage affects process throughput. RBDs simulate equipment in series and parallel arrangements, including redundancy and intermediate surge capacity, or bypass facilities that offer partial or total redundancy. They're used in system analysis to simplify and understand availability/capacity in complex systems, provide a means to display system performance, show interdependences between equipment items and describe the consequences of equipment failure at a system or plant level.

Blocks are divided by system and components. System blocks group a set of one or more. Component blocks are used either to represent equipment or a failure mode and can be assigned failure models using statistical distributions. Failure rates are attached to maintenance times through corrective, planned or inspection tasks. The model must have review simulation parameters, including lifetime, consequence of plant downtime, maximum system capacity and the number of simulation and data collection intervals.

Results for initial simulations may be used as either a trigger

for analysis or as a baseline for alternate scenarios already defined, and identify improvement opportunities. For this purpose the ranking and cost profile quickly highlight issues in the plant, whether it's a block having long or repetitive failures, lack of redundancy or bottlenecks in the model. The cost profile acts as a guide to identify what will drive cost under performance, whether it's maintenance, operations, labour, spares (including downtime) or plant downtime.

The next step is creating an improvement plan. Scenarios to be evaluated may include:

- root cause analysis;
- redesign for repetitive or costly failure modes with maintenance being performed;
- removal or inclusion of redundancy;
- updating or changing the maintenance strategy on equipment and changing inspection technology; and/or
- reducing the size of equipment.

Scenarios evaluated in the model expose mid- and long-term savings that will lead to the creation of an alternative model. Compare results and choose the best one.

New thinking will help you deal with and manage change. Once everyone accepts the reason and need for change, the learning process begins, leading to the integration of new habits that will help your plant stay on top of advancing technology.

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

Comments?
E-mail jterrett@plant.ca.

PRODUCT FOCUS HEALTH & SAFETY

ROLLER SAFELY MOVES HEAVY LOADS

Appleton Mfg.'s battery-powered RollMover safely moves loads ranging from 100 to more than 100,000 lb.

The material handler has a durable steel frame, but is lightweight and compact, easy to use and simple to store. It also eliminates the need for air hoses, which have length limitations and pose a trip hazard on the work floor.

Four models include: Standard Duty (6,500 lb.); Heavy Duty (50,000 lb. plus); Extra Heavy Duty (100,000 lb. plus); and the HD Large Roller for damage-free moving of soft material rolls.

Appleton Mfg. Division is man-

ufacturer of materials handling products based in Neenah, Wis.
www.appletonmfg.com



COVER VERTICAL MILL MATERIAL REMOVAL



Prevents grabbing of hair, clothing.

Vertical mills remove material from the surface of metal work pieces, but they present a danger to operators who come into contact with their high-speed rotating draw bars.

The Milling Machine Draw Bar Cover from Rockford Systems LLC protects vertical mill workers from rotating shafts 2 m or less from the floor or working platform. Simple to install, it prevents clothing, hair or hands from being grabbed by the moving shaft.

The non-rotating, smooth, welded-steel enclosure is secured firmly to the mill with a powerful ring magnet and safety anchor chain.

It's used on any vertical mill that has up to a 18-cm (7-in.) extrusion.

Rockford Systems is a manufacturer of machine safeguarding systems based in Rockford, Ill.

www.rockfordsystems.com

TETHER PROTECTS AGAINST FALLING TOOLS

KNIPEX Tools has an answer for hazards created by falling tools. It provides 24 pliers with tether attachment mounts as part of its Tethered Tool program.

The attachment point is a plastic bracket with a closed wire clamp that's securely welded to the multi-component handle of the tool. The tether doesn't interfere with functionality and the user's comfort, but secures tools to a lanyard to prevent falling during use with cherry pickers, scaffolding and ladders. Industrial climbers with wire ropes also use the tools.



Secures tools to a lanyard.

KNIPEX Tools LP, based in Arlington Heights, Ill., is the North American sales and marketing organization of KNIPEX-Werk, a German manufacturer of professional quality pliers.
<http://knipex-tools.com>

MEASURE NOISE IN EXPLOSIVE ENVIRONMENTS

Real-time exposure data.



The world's first wireless noise dosimeter, developed by Casella, has Intrinsic Safety certification for use in industries that operate in highly explosive environments, such as oil and gas, chemical and other sectors.

Equipped with Bluetooth 4.0 and Casella's Airwave mobile app, the device is incapable of igniting an explosion even under fault conditions.

It's certified for hazardous locations where high concentrations of flammable gases, vapours or dusts are always present or for long periods under normal operating conditions.

Users wirelessly control multiple units from distances of up to 30.5 or more metres away – including starting, pausing or stopping noise sampling – even without a clear line of sight between devices. They then transmit real-time noise exposure data via IS approved mobile devices from the most hazardous zones to off-site managers.

The reinforced, rugged case is sealed against the elements and covers an ambient temperature range of -20 to 45 degrees C.

Casella CEL Inc., based in Buffalo, NY, is a supplier of Casella import and distribute noise, dust and vibration monitoring instruments. www.casellasolutions.com

HIGH-SPEED PALLETIZER WITH NEXT LEVEL PROTECTION



Fully integrated guarding.

Columbia Machine's FL6200 high-speed palletizer combines robotic-like precision with the simplicity and load build quality of a conventional palletizer with "next level" protection.

It handles up to 120 cases per minute, depending on layer pattern and manages standard as well as challenging products such as shallow unwrapped trays, shrink pads and film-only bundles.

It incorporates fully integrated guarding, full height light curtains, automatic four-point

hoist pins, case infeed tunnel and interlocked load building area access doors.

Product Manager HMI, servo-actuated layer transfer and load building area hoists, servo actuated bi-parting

apron plates and modular construction accommodates multiple layouts to fit site constraints.

Users create and modify layer patterns, view and export production reports, adjust component speeds and timer settings, and access manuals and schematics, all through the HMI. Graphic pattern screens created at the HMI aid recovery and provide graphic representation of diagnostics.

Columbia is a manufacturer of palletizers based in Vancouver, Wash.

www.palletizing.com

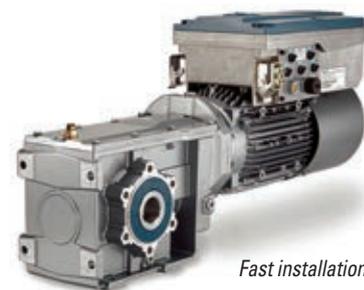
DRIVE HAS ONBOARD SAFETY FEATURES

The Sinamics G110M drive for Siemens' Simogear gear motors used in materials handling applications provides onboard safety features and communications.

Plug connections for onboard I/O ensure fast installation, while optional power connectors deliver more time savings.

For uses requiring safety technology, integrated functions include Safe Torque Off (STO), which activates via a fail-safe input or Profisafe, without additional monitoring components.

The pre-configured system has simple, comprehensive onboard diagnostic features. Options such as internal braking resistors and motor brakes —



Fast installation.

simultaneous operation — and integrated features such as Quick Stop and the limit switch make this system suitable for conveyor applications.

Siemens is a global manufacturer of industrial technology based in Germany with Canadian headquarters in Oakville, Ont. www.siemens.com

ANTI-FOG COATING FOR SAFETY GLASSES



Resists scratching.

Honeywell has expanded the number of eye protection products with Uvex HydroShield anti-fog lens coating.

Uvex HydroShield eliminates fog 60 times longer and resists scratching two times longer than any other Uvex coated products (based on the comparative lens life test using a Bayer Abrasion Test method).

Honeywell says HydroShield's performance exceeds the EN166 anti-fog standard and its dual-action coating is permanently bonded to the lens to withstand extended wear and repeated washings.

All HydroShield anti-fog coated products meet ANSI Z87.1-2015 and are certified to CSA Z94.3 standards, except Hypershock. It's available on the Uvex Flex Seal Goggle in Clear lens; Uvex Stealth OTG in Clear, Gray and Amber lenses; and in three more lens tints on Uvex Livewire.

HydroShield is also available on Hypershock, Genesis, Genesis XC, Protégé and Stealth.

Honeywell is an industrial solutions conglomerate based in Morris Plains, NJ.

www.honeywell.com

GAS DETECTOR PROVIDES REAL-TIME NOTIFICATION

The MSA ALTAIR 4XR Multigas Detector delivers real-time event notification using Bluetooth connectivity.

This four-gas (LEL, CO, O, H2S and O2) monitor with MSA XCell sensors is fast and when paired with the MSA ALTAIR

Connect app, it texts alarm notifications to supervisors, team members or other users. A virtual control room platform



Monitors four gases.

allows integration of third-party engineered systems or subscription safety services.

Its rugged housing will survive a 7.6-m drop and the large, glove-friendly buttons with high-contrast display makes the device easy to operate in any work environment.

MSA is a manufacturer of safety equipment based in Cranberry Township, Pa. MSAsafety.com

PRODUCTS AND EQUIPMENT

MOTORS

IRONHORSE DELIVERS HIGH EFFICIENCIES



4:1 constant torque.

AutomationDirect's IronHorse general purpose three-phase motors include MTRP 56HC-frame premium efficiency units from 1 to 3 hp that deliver 1,800 and 3,600 rpm.

The motors with 4:1 constant torque and 10:1 variable torque speed ranges, have TEFC frames, cast aluminum end bells and removable mounting bases.

They meet RoHS and low voltage directives, and are CSA- and EU-approved. Accessories include bases, junction boxes, fans and fan shrouds.

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

MOTORS ARE FREQUENCY SYNCHRONIZED



High torque, smooth motion.

Nippon Pulse' PF/PFC series tin-can stepping motors with a permanent magnet in their rotor core are used for printing and packaging applications.

They rotate in proportion to the number of pulses sent to the motor, and are frequency synchronized, changing speed depending on the frequency of the pulse signal.

Optional gearheads that increase torque (up to a 2,500 mNm) are also available.

The geared motors are also used in fluid dispensing, pumps, valves and other applications that require higher torque and smoother motion.

Nippon Pulse is a manufacturer of motion control products based in Radford, Va.

www.nipponpulse.com

INSPECTION

MICROSCOPE IDENTIFIES INTERNAL DEFECTS



Reduces vibration.

Sonoscan's J610 acoustic microscope is a semi-automated tool for production environments. Its large scan area finds internal structural defects by screening trays of loose components, wafers and board-mounted components.

A 610- x 610-mm scan area accommodates six JEDEC-style trays or one or more printed circuit boards. The system's inertial balanced linear scanner is counterweighted to reduce vibrations and maximize image quality.

The unit learns the x, y and z extent of specific user-defined areas of interest within a component. By comparing anomalies to the user's standards, it automatically accepts or rejects components.

Sonoscan's PolyGate software creates a separate image for each of the multiple depths of interest in a component, without increasing scan time.

The Q-BAM module creates non-destructive cross sections through a component.

When scanning printed circuit boards, the system accurately finds and scans a component even if it's slightly out of place on the board. If defects repeatedly appear in the same component on multiple boards, steps are taken to find and eliminate the cause.

Sonoscan is a manufacturer of industrial imaging and inspection technologies based in Elk Grove Village, Ill.

www.sonoscan.com

X-RAY PLATFORM DETECTS DENSE CONTAMINANTS

Thermo Scientific's NextGuard Pro X-ray inspection platform handles heavy products that weigh up to



Easy maintenance and repair.

50 kilograms. The long, rugged washdown conveyor is completely removable for easy maintenance and repair.

Additional shielding options are available to accommodate more stringent X-ray radiation regulations.

The product verification software option executes a range of size, position and count inspections. Additional algorithms target the detection of less dense contaminants such as glass or rocks in complex, textured products.

Optional mass estimation software uses the density information in the X-ray image to estimate weight and detect under- or over-filled products.

A 0.4 mm-pixel detector delivers 3.2 times better resolution to improve metal detection in lightweight, homogeneous products.

The Thermo Scientific Versa Flex (fixed height) and Versa Flex GP (height-adjustable cantilever) checkweighers suit dry applications. They control accuracy and reliability to decrease product giveaway, maintenance and total cost of ownership.

Thermo Fisher Scientific is a manufacturer of inspection equipment based in Minneapolis. www.thermofisher.com

SURFACE TREATMENT

SYSTEM DELIVERS UNIFORM FILM COATING



Reduces processes.

Nordson MARCH PD series

plasma deposition systems use polymerization to uniformly deposit thin films in precision manufacturing and assembly processes to change the surface characteristics of a substrate.

Plasma deposition is used in medical, industrial, semiconductor, plastics and electronics applications.

The PD system uses gas vapour or heated liquid monomer vapour to deposit coatings that reduce (and in certain cases eliminate tackiness). This provides a tie layer and makes surfaces more slippery or corrosion-resistant.

Polymers are attached directly while the chains are growing, reducing necessary steps for other coating processes such as grafting. This is useful for pinhole-free coatings of 100 pm to 1 µm thickness with solvent-insoluble polymers.

Nordson MARCH is a manufacturer of plasma processing technology based in Concord, Calif.

www.nordsonmarch.com

FILTRATION

FILTER ELEMENTS BOOST PROCESSING EFFICIENCY



Safer changeouts.

Clark-Reliance Corp's Vertex-Core coalescing filter elements eliminate unsafe changeout techniques while increasing filtration efficiencies for critical use applications in power generation, oil and gas and gas processing applications.

The elements have a fixed extension welded to the end cap, which allows maintenance staff to remove and replace elements without exposing their head, shoulders, torso or legs to a confined space.

VertexCore extensions and hold-down rods provide a barrier

er to prevent operator entry and positive reinforcement to confined space safety regulations.

Multi-layer construction maximizes efficiency and is rated to ANSI/CAGI 400 test standards. Removal efficiencies are down to 0.3 µm at 99.98% with maximum carryover of 0.1 ppm/w.

Because they are more efficient, the elements retrofit to existing pressure vessels to eliminate carryover created by inadequate spacing.

Clark-Reliance is a manufacturer of filtration, separation and coalescing equipment for the oil and gas industry based in Strongsville, Ohio.

www.clark-reliance.com

TOOLING

TOOLING SYSTEM CUSTOMIZES ASSEMBLY LINES



Multiple mounting options.

Piab's PMAT modular automation tooling system delivers secure, flexible and adjustable gripper and fixture tools for assembly lines.

The system is machined from lightweight anodized aluminum alloy, and is easy to assemble without welding or special tools. There are multiple mounting options.

It's used to design robot end-effector, ergonomic or fixture tools for automation equipment.

PMAT is used in automotive body-in-white (BIW) and stamping assembly areas, but is also applicable to general assembly. Attachments include vacuum ejector units based on Piab's COAX technology, which provides both grip and release mechanisms.

PMAT comes with an optional inline filter and an external check-valve to metre air flow to the unit, protecting it from over pressurization while saving air. The included vacuum check valve is an alternative to clamps

to save weight and traps the vacuum if there is any air interruption to tooling.

Piab is a manufacturer of industrial vacuum technologies based in Hingham, Mass.

www.piab.com

COMPUTING

PCI EXPRESS CARDS HANDLE SHOCK, VIBRATION



Small form factor.

Abaco Systems' R15-MPCIE MIL-STD-1553 and RAR-MPCIE ARINC 429 mini PCI Express cards handle harsh environments where shock and vibration cause reliability challenges such as data logging applications.

Both units are small, measuring 30 x 50.95 x 4.7 mm, and lightweight for deployment in highly-constrained platforms where size, weight and power need to be minimized.

The R15-MPCIE supports two dual redundant channels for better functional density. The RAR-MPCIE has eight receive and four transmit channels, and is configured to include one receive and one transmit ARINC 717 channel.

They fit portable devices, such as tablets and hand-held test and measurement systems or mission critical systems for I/O density, flexibility and modularity.

The API is consistent with existing Abaco avionics products and allows re-use of existing code for faster development, qualification and deployment.

An IRIG-B signal receiver/generator with GPS synchronization and 100% monitoring of fully loaded buses are standard. A PCIe carrier card hosts four Mini PCI Express modules. Support is provided for Windows 7, 8, 8.1, 10, XP, Vista (32- and 64-bit), Server 2012 R1/R2, Vx-

Works, Linux and other operating systems.

Abaco is a manufacturer of industrial computing systems based in Huntsville, Ala.

www.abaco.com

TEST AND MEASUREMENT

MEASURE PROCESS TEMPERATURE

SOR Controls Group Ltd.'s

Bimetal Thermometer delivers



Easy viewing.

local process temperature indications without wiring or electricity with an accuracy of ± 1%.

The stainless steel thermometers, which come in multiple dial sizes, lens materials and mounting connections, are corrosion-resistant and adjustable



Pushing Performance

Relax, tomorrow has already been tested.

Say goodbye to hardwiring with HARTING connectors.



Reduce the number of wiring errors, save time and headache.

HARTING, first established in 1945, delivers unrivaled reliability, efficiency, innovation and performance in connectors.

With HARTING you have a partner who ensures you dependable connections that stand the test of time.

HARTING.ca

People | Power | Partnership

PRODUCTS AND EQUIPMENT

for easy viewing from any angle. A calibration screw on the back of the dial eases recalibration and the gauge is hermetically sealed from the process. It's silicone fillable to protect against vibration.

The case is IP67 and NEMA 6 rated to protect against fluid ingress. Stem lengths range from 2 to 80 in. and a thermowell to protect the stem from process flow is also available.

SOR Controls Group Ltd. is a manufacturer of measurement and control devices based in Lenexa, Kan.

www.sorinc.com

CLAMPS RECORDS DATA AT PRE-SET INTERVALS

Fluke Corp.'s 1630-2 FC stakeless earth ground clamp measures loop resistances for multi-grounded systems using only a dual-clamp jaw safely



Compatible with Fluke Connect.

without exposing conductors.

The clamp automatically records data at pre-set intervals and saves up to 32,760 measurements at the set logging intervals. The heavy-duty clamp jaw stays aligned and calibrated even in harsh environments.

The 1630-2 FC is part of Fluke Connect. It allows technicians to view, record, and share measurements from the clamp in real time via their smartphones or tablets and automatically uploads them to the cloud along with tags and the asset's GPS location.

There's also a non-Fluke Connect model.

Fluke is a manufacturer of test, measurement and vision tools based in Everett, Wash.

www.fluke.com

TILTIX MEASURES MOVING EQUIPMENT



Full range of motions.

Posital's TILTIX inclinometers deliver tilt measurements for moving equipment using a combination of electro-mechanical gyroscopes and accelerometers.

The inclinometers rely on monitoring the effect of gravity on a tiny mass suspended in an elastic support structure. When the device tilts, the mass moves slightly, causing a change of capacitance between the mass and the supporting structure. Tilt angle is calculated from the measured capacitances.

Accelerations also cause the mass to shift relative to its support structure and introduce errors in the tilt measurements. The inclinometers have a set of electromechanical gyroscopes to eliminate this issue. A signal from the gyroscopes compensates for the effects of acceleration, allowing the units to be used in applications where sudden movements, shocks and vibrations are likely.

The inclinometers, in either plastic or aluminum housings, have a measurement range of +180 degrees around their X-axis (pitch) and +90 degrees around their Y-axis (roll) to cover a full range of motions. The CANopen communications interface is supported with analogue, SAE J-1939 and Modbus interfaces.

Posital is a manufacturer of position sensors and motion control products based in Hamilton, NJ.

www.posital.com

LIGHTING

LEDS CUT ENERGY COSTS



Explosion-proof.

Appleton Electric's FELED Luminaires deliver high efficiency, reliability and longer lifespan in harsh and hazardous industrial environments.

The non-metallic, explosion-proof linear LEDs are certified for Zone 1, 2, 21 and 22 hazardous locations. These include petrochemical and chemical plants, plus industries where flammable gases, vapours and dusts are present.

The light output range is 2,000 to 8,000 lumens, with a high T-code rating and efficacy. Uniform bright light and superior colour rendering ensure safer working conditions in areas such as walkways, bridges, tunnels, operation floors and roadways where sub-optimal lighting conditions may cause serious accidents.

Power Meets Profitability Guaranteed.

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

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They're fitted with a corrosion-resistant, fibreglass reinforced polyester body and hinged polycarbonate lens. An elastomer gasket protects internal components against dirt, water and moisture. Advanced LED thermal management meets a range of ambient temperature requirements from -30 to 55 degrees C.

The LEDs are maintenance-free with a life rating of over 60,000 hours of operation. When maintenance is required, the lens is removed quickly to access the internal components.

Appleton is a lighting manufacturer based in Rosemont, Ill. www.appletonelec.com

MATERIAL HANDLING

MATERIAL LIFT TRAVELS BETWEEN LEVELS



C or Z loading patterns.

Wildeck Inc.'s RML RiderLift Type B rideable material lift boosts efficiency and saves time by allowing workers to travel between levels.

The RiderLift increases the utilization of facility capacity gained from mezzanines, rack systems and pick modules. Standard car size is 6 x 6 ft. x 80 in. high, with a lifting capacity of 2,500 lb. Standard top lifting height is 14 ft. and lifting speed is 20 fpm.

The lift comes in either C or Z loading patterns and has a keyed enable switch inside the car to ensure use only by authorized personnel. It meets ASME A17.1 / CSA B44 code requirements.

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

HOPPER DELIVERS HIGH-ACCURACY

Flexicon's weigh hopper with fill/pass valve for dilute-phase



Stainless steel construction.

pneumatic conveying systems delivers higher accuracy than loss-of-weight systems that require higher-capacity load cells.

The hoppers are suspended from three small-scale load cells and the gain-in-weight single or multiple hoppers are positioned along a common vacuum or positive pressure pneumatic conveying line. This discharges dry bulk solids into single or multiple process equipment, storage vessels or downstream use points by weight.

The system's controller weighs a batch by changing the position of the valve to divert conveyed material into the hopper. As it fills, load cells transmit weight gain information to a PLC. Once the batch weight is reached, the valve redirects material away from the hopper. The controller then actuates a slide gate valve to open, discharging the weighed batch.

Rated for the pressure differentials associated with pneumatic conveying, the conical hopper is eccentric with a vertical sidewall for complete discharge and batching accuracy.

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

MACHINING

TAPS TACKLE HARD-TO-MACHINE MATERIALS

Cuts inventory costs.



Walter's Titex Perform TC115 and TC216 taps come in a variety of sizes to tackle materials

such as steel and aluminum (ISO material groups P, M, K and N) and cut inventory costs by reducing the number needed for complex machining applications.

Both taps have HSS-E bodies and come in either TiN or vapourized coating, which increases process reliability with tough ISO-M materials. The TiN coating extends tool life and increases cutting speeds.

Dimensions for the line include metric fine (MF) M8 x 1 to M18 x 1.5; and UNC #6, 8, 10, plus 1/4, 5/16, 3/8, 1/2 and 3/4.

The TC115 blind-hole tap has a 45-degree helix angle (for thread depth of 3xD) and a C-form chamfer. The TC216 through-hole tap has a spiral point for forward chip evacuation and a thread depth capability of 3.5xD.

Walter is a manufacturer of metalworking tools based in Waukesha, Wis. www.walter-tools.com

WELDING

WELD MONITOR ELIMINATES GUESSWORK

Huntingdon Fusion Techniques' PurgEye 100 weld purge monitor doesn't have to fill entire tubes and pipes with inert gas and eliminates guessing related to oxygen levels in welding applications.

The IP65-rated system comes with leak-tight push buttons, auto calibration, vacuum-sealed leak-tight probe assembly, a wrist and neck strap and a tripod mount for easy mobility.

An extra long life sensor lasts up to 18 months. A 24-mm high-quality LCD display is easy to read and when the monitor



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Huntingdon is a manufacturer of weld purging technologies based in Carms, UK.

www.huntingdonfusion.com

ADJUST WELD SETTINGS AT THE ARC

Increases productivity.



Lincoln Electric's CrossLinc Remote adjusts welding settings at the arc, including current for stick and TIG welding or voltage on select wire feeders. This streamlines welding setup.

The remote boosts productivity and makes operations safer by eliminating additional control cables and reducing time by removing trips back and forth to

the welding power source.

Operators dial in the exact settings required for each weld and the remote auto-detects the mode setting at the power source to control CC or CV processes. It also displays actual voltage or current.

When in SMAW mode and DC output, the remote uses polarity sensing to automatically optimize power source settings for scratch-start TIG operations. This speeds up process changes between stick and TIG welding.

Users choose to display current or voltage during welding, reset the machine to factory default setting and use an arc timer.

A digital metre indicates polarity and an LED display indicates if the voltage or amperage is preset or actual values. A memory function recalls where it was set if the unit is disconnected to power.

Lincoln is a manufacturer

of welding products based in Cleveland.

www.lincolnelectric.com

PUMPS

REDUCE ENERGY USE BY 30%

Armstrong Fluid Technology's Tango pumps deliver energy savings of up to 30% thanks to built-in parallel sensorless pump controls, redundancy and efficient staging.

The pumps that range from 1 to 10 hp are completely integrated.

They're hydraulic to optimize intelligent variable speed operations and permanent motors with integrated drive and control deliver IE4 energy efficiency levels.

Efficiencies improve by up to 6% on hydraulics and 2% to 7% on motors, which assists with the reduction of a facility's carbon footprint.

Armstrong is a pump manufacturer based in Toronto.

www.armstrongfluidtechnology.com

ACTUATORS

ACTUATORS MEET HIGH-PURITY STANDARDS



Optimize operating efficiencies.

BEI Kimco's VCA actuators meet high-purity and low out-gassing requirements for semiconductor, military and space manufacturing, microelectronics, and test and measurement applications.

The 1/2 to 2 in. LA05-05 and LA15-16 actuators minimize the use of adhesives and inks,

incorporating only approved materials, while measuring just 1/2 to 2 in.

Mechanical assembly methods within a clean manufacturing process eliminate substances that could cause outgassing and contamination.

High energy Neodymium Iron Boron (NeFeB) magnets optimize operating efficiencies.

BEI Kimco is a manufacturer of rotary and linear motion components based in Vista, Calif.

www.beikimco.com

WORKHOLDING

FLEXIBLE CHUCK JAW MONITORING



Clamping forces of up to 55 kN.

Schunk's TANDEM KSP plus clamping force block delivers flexible monitoring along the whole jaw stroke in automated manufacturing applications, such as demanding milling operations that require a high metal removal rate, high-cycle times and minimum tolerances.

Opened or clamped positions for base jaw positions are adjustable. Monitoring is performed via two inductive proximity switches integrated in two recesses in the base jaws.

The system is sealed against dirt-ingress. The signal is directly processed in the machine control unit to ensure the clamping force blocks are easily integrated into existing machines.

The blocks deliver concentrated clamping forces of up to 55 kN. Repeat accuracy is up to 0.01 mm. An optimized outside contour and minimum gaps prevent dust pocket built up, chips or dust penetration.

Schunk is a manufacturer of workholding and clamping technologies with offices in Mississauga, Ont.

www.us.schunk.com

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PLANTWARE

Motor health check



Advanced maintenance planning.

Smart sensing technology from ABB provides a timely health check for low-voltage motors.

ABB's Ability Smart Sensor uses compact sensors to pick up data and provides information about motor health and performance via a smartphone or a dedicated web portal.

Converting regular low-voltage motors into intelligent, connected machines allows you to plan ahead for maintenance, which cuts costs and boosts productivity. ABB says the predictive analytics can reduce downtime by up to 70%, extend motor life by as much as 30% and cut energy consumption by up to 10%.

Sensor modules are factory fitted on new ABB motors or retrofitted within minutes on installed motors made by ABB or other manufacturers.

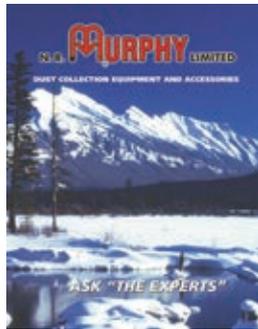
They'll be released in North America with UL/CSA certifications.

ABB, a global manufacturer of industrial products based in Zurich, Switzerland, says the Smart Sensors will be available later this year.

www.abb.com

Industrial Literature Reviews

DUST COLLECTORS FULL LINE LITERATURE GUIDE



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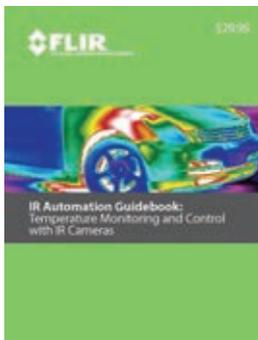
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For more information contact: Craig Moffatt, sales manager, Cambridge, Ont.

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EVENTS

Partners in Prevention 2017 Health & Safety Conference, WSPS

May 2-3, Mississauga, Ont.

The workplace health and safety conference and trade show is presented by Workplace Safety & Prevention Services (WSPS). Features sessions, workshops and trade show exhibitors. Keynotes include Steven Paige, formerly of Barenaked Ladies and an advocate of mental health awareness, Neil Pasricha, award-winning blogger and Curt Steinhorst, digital distraction expert. Visit www.PartnersinPreventionConference.com.

ADM Expo

May 16-18, Toronto

The Advanced Design and Manufacturing show brings together ATX Canada, Design & Manufacturing Canada, PACKEX Toronto, PLAST-EX, and Powder & Bulk Solids Toronto. Visit <http://admtoronto.com>.

CPES 2017

CPEIA

May 24-26, Toronto

Presented by the Canadian Printable Electronics Industry Association. Presentations will focus on intelligent packaging, intelligent buildings, aerospace and defence, automotive

and industrial applications, health and wellness, intelligent documents, consumer electronics and wearables. Visit www.CPES2017.ca.

WMTS 2017

SME

June 6-8, Edmonton

Keynotes, panel discussions and interactive technology exchanges on the event floor of this Western Canada manufacturing event. Visit www.wmts.ca.

PTDA 2017 Canadian Conference,

PTDA

June 7-9, Toronto

Convened by the Power Transmission

Distributors Association (PTDA).

Networking and education sessions, plus CEO/Senior Executive Roundtable, leadership enhancement seminar and Distributor-Manufacturer Idea Exchange. Visit www.ptda.org/CanadianConference.

EMO Hannover

VDM

Sept. 18-23, Hannover, Germany

This global machine tool trade fair presented by the German Machine Tool Builders' Association will feature the latest metalworking solutions and services. The theme is "Connecting systems to intelligent production." Visit www.emo-hannover.de.



Stop trying to grow the economy on a hunch

BY NOBINA ROBINSON

Canada can't expect to improve its economic growth without a better understanding of who is responsible for it.

At a conference in Ottawa last fall, where speakers included federal finance minister Bill Morneau, innovation minister Navdeep Bains and growth council chair Dominic Barton, a challenge was laid on the table. We live in a low-growth world and Canada is not immune. We've experienced sluggish growth for much of the past decade and gross domestic product is not predicted to breach the coveted 3% mark without bold action now.

So what do we do?

Big ideas such as an infrastructure bank, increasing the labour supply through immigration, and ramping up investments in R&D were tossed around. But if we really want to retool Canada's economy and become the innovation nation the Liberal government wants us to be, a key piece to the puzzle remains elusive: data.

While we fixate on the numbers of startups or unicorns (upstarts with growth), do we really have adequate data with which to build a resilient labour force or a cadre of innovative firms that will help Canadian productivity and competitiveness?

In an exchange with former Liberal MP and current Business Council of Canada president John Manley, Bains highlighted the leading role talent plays in the innovation process.

If innovation is going to be the means through which we achieve growth, and talent is the driving force behind innovation, let's start by measuring this key input to growth correctly.

Where do Canada's current talent gaps exist and, more pressing, where do these gaps exist for the firms that perform the innovation that leads to economic growth?

On talent, the data challenge rests almost entirely in the lack of evidence on demand: we don't know in measurable terms what the market demand is for particular skill sets or credentials. For example, we don't know for certain if we're producing too many PhDs, engineers or lawyers, or enough mechatronic technologists, coders, marketing specialists or project managers.

The result is an overproduction of individuals in possession of credentials or skill sets the market can't absorb, even as we clamour for international talent to spur innovation.

Using credentials as a signal for productivity has serious implications – it leaves individuals with high levels of academic achievement working jobs

far below their skills sets. Statistics Canada data on over-qualification reveals 40% of university graduates outside of management occupations are considered to be overqualified for their positions.

Further, innovation is a people-driven activity, so shouldn't we know what type of talent is in demand by the companies performing innovation?

Our approach so far seems to indicate science, technology, engineering and math discipline (STEM) PhDs hold a monopoly on research and development and innovation, yet innovation is a team sport needing a full complement of technical and creative talent. We need the contributions of undergraduates and technologists, just as much as we need the doctoral student or researcher.

As the government sets about designing a new innovation agenda, the case for evidence-based decision-making in innovation policy is urgent.

In Canada, we decry our underproduction of PhDs relative to global counterparts. Implicit is the assumption that this inhibits our ability to innovate – but what do the data suggest?

Data from the *2011 Review of Federal Support for R&D* show that Canadian firms use individuals holding technologist designations, bachelor's and master's degrees more than they use PhDs for research and development. This is the type of demand-side data we need to collect year over year.

Such evidence adds nuance to discussions around credentials. Depending on who you talk to, there's an alphabet soup of credentials in demand: STEM+B (business), or STEAM+D (arts and design). Before we say we need more STEM, business, design or engineering talent, we should first collect data about demand for this talent.

Productivity and growth don't occur when our workers can't effectively put to use the full extent of their publicly-subsidized education or training. Responsive higher education systems need these demand indicators to improve the quantity and quality in the supply of innovation talent.

As we seek to move Canada beyond 2% growth, let's remember public policy can't be built on hunch or anecdote. To attack Canada's growth challenge, more data are needed to unlock barriers to the commercialization of research and labour productivity.

Nobina Robinson is CEO of Polytechnics Canada, a national alliance of Canada's research-intensive and degree-granting public colleges and polytechnics. Distributed by Troy Media © 2017.

Comments?

E-mail jterrett@plant.ca.

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