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What lies ahead

We have come to the end of another year and despite the antics playing out in the US political arena, it was business as usual for most Canadian manufacturers. Now it's time to look ahead.

Every year **PLANT** surveys senior manufacturing executives and managers across Canada to get a sense of how they view the coming year. Responses to *Manufacturers' Outlook 2018* were similar to previous surveys. Many of the executives (44%) are feeling positive about 2018 but most (50%) are playing it safe and leaning on the side of caution. Their outright optimism diminishes the farther out they look and particularly so when they include the global view.

They're rightly concerned about Trump administration policies and how they might affect their businesses, but their responses also point to areas where there is work to do as they contend with technology disruption and other factors creating turbulence in the world today.

Let's start with the Gong Show in the US. All manufacturers must evaluate the risks resulting from the many uncertainties created by the Trump regime and plan to look beyond the North American market for growth.

Protectionist policies are worrying 92% of executives, followed by rising global protectionism (90%), US President Donald Trump's impact on nation-to-nation relationships (88%) and the NAFTA renegotiation (88%). As NAFTA talks broke off until the next round, the negotiations between the US, Mexico and Canada were bogged down by outrageous American demands that suggest the Trump administration aims to torpedo the three country agreement, then squeeze Canada and Mexico separately.

On the plus side, the world does not end with NAFTA's demise. Studies by BMO Economics and the C. D. Howe Institute contend it would cost us less than 1% of GDP, but the economists' macro view doesn't account for the effect it will have on individual companies. As many Outlook surveys have shown, most manufacturers are doing much of their business in the domestic and US markets rather than stepping out into the wider world. That business will take a hit, particularly those serving the automotive industry.

Outlook 2018 also shows companies continue to be less engaged with Industry 4.0 than they should be, lagging in the adoption of advanced measures and technologies that would improve productivity. Only 36% make use of automatic data access, analysis and review to measure and monitor productivity; 46% do it manually; 18% don't measure; and 59% do not plan on a digital production transformation involving Industry 4.0 and the Industrial Internet of Things (IIoT) over the next 12 months. Also in line with last year's survey, only 9% are applying IIoT capabilities, 33% are not familiar with these capabilities and 29% pronounced them not applicable.

It's encouraging that 79% intend to invest in machinery, equipment and technology over the next three years, but 54% will be spending less than \$500,000 and half of those under \$100,000. That kind of money won't go very far.

This brings us to a plan for manufacturing. It would be nice if the federal and provincial governments had one with unity of purpose that dealt with the bigger issues such as trade, technology, innovation, financing and the future. There are many groups and associations representing manufacturers with similar issues trying to influence government policy. It was suggested during the Outlook roundtable in October that collaboration with governments would be more effective if these groups could speak with one voice. Good idea. So many of Canada's manufacturers are small. They need a bigger presence at the table. A national vision would move the needle for Canadian companies of all sizes helping them to succeed in a world that presents so many uncertainties, but offers great opportunity.

Watch for the **PLANT Manufacturers' Outlook 2018** report at www.plant.ca

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BULLETINS

LGC Capital Ltd., a Montreal-based business group, has signed an option with **AAA Trichomes** to acquire a 49% interest (plus a 5% royalty) in a new medical cannabis processing facility to be built in Quebec. AAA Trichomes will manufacture and initially distribute medical cannabis products in Quebec. Operations are to begin in 2019 with an annual production rate of more than 2,500 kilograms. Production is to hit more than 20,000 kilograms by 2021.

Grande West Transportation Group Inc., a manufacturer of multi-purpose mid-sized transit vehicles in Vancouver, has a \$1.6 million order from Simcoe County in Ontario for four Vicinity buses. The order backlog for 2017-18 delivery is 354 buses worth \$131 million.

Tecvalco Ltd., a manufacturer and distributor serving the Canadian natural gas utilities industry, is bringing Cumberland Tools to its customers. The Monticello, Minn. manufacturer makes specialty products for field engineers.

NanoXplore Inc., a Montreal-based manufacturer of graphene powder, is acquiring **CEBO Injections SA**, a Swiss-based injection moulding company, from the BCR Plastic Group. CEBO makes high-precision injection-moulded products for the automotive, medical and industrial markets. Graphene powder is a carbon used in industrial markets.

ENPAR Technologies Inc., a developer of electrochemical water treatment technologies based in Guelph, Ont., is acquiring **Pumprtronics Inc.** in Oakville, Ont. for \$3 million. The oil field equipment supplier manufactures pump stations.

Olympus NDT Canada's new \$37 million office and manufacturing complex in Quebec City's Michelet Innovation Zone is open for business. The 15,794 square-metre facility is equipped with a vast hall for assembling large-scale industrial systems, and an air-conditioned workshop equipped with cutting-edge machining tools for mechanical production. Olympus NDT makes non-destructive testing instruments.

Small London manufacturers get Ontario development funding

Will expand facilities and add production equipment



TransForm Automotive's large metal forming press.

PHOTO: TRANSFORM

LONDON, Ont. — The Ontario government has made investments in several small London manufacturers worth more than \$1.2 million.

TransForm Automotive Canada Ltd., a manufacturer of round stamped and machined automotive transmission components for OEMs and suppliers, is getting \$500,000 in development funding to expand its facility by 9,000 square-foot and invest in new equipment. The \$15 million project will be completed by September 2020 and add 15 jobs.

Fluid Power House (FPH) Group Inc., a manufacturer of hydraulic, electrical and mechanical systems and components aimed primarily at defence industry, is getting \$175,650 for a project that will create 14 new jobs and be completed by May 2020.

Forest City Models and Patterns Ltd., a manufacturer of rotational moulded plastic products such as rain barrels and composters, is getting \$162,700 for a almost \$1.5 million, 55,000 square-foot plant, doubling its current production space.

Amino North America Corp., a producer of automotive body panels and other components, is getting \$400,500 to install a new sheet press to improve formability, cycle time and part quality. The \$5 million project will create 10 new jobs and is to be completed by September 2019.

Milette Doors invests \$2.4M to modernize

New line increases yield

ST-BONIFACE, Que. — Milette Doors has installed a new log breakdown line to meet growing demand for doors from the US market.

The St-Boniface, Que. door manufacturer said more than a \$2.4 million investment was funded by a \$1 million repayable loan from the federal CED program, a \$240,000 grant, \$280,000 investment tax credit from Investissement Québec and a commercial loan from the National Bank of Canada.

This project involves the combined expertise of System TM, a manufacturer of wood handling systems in Denmark, and Microtec, a scanning and information processing firm in Italy.



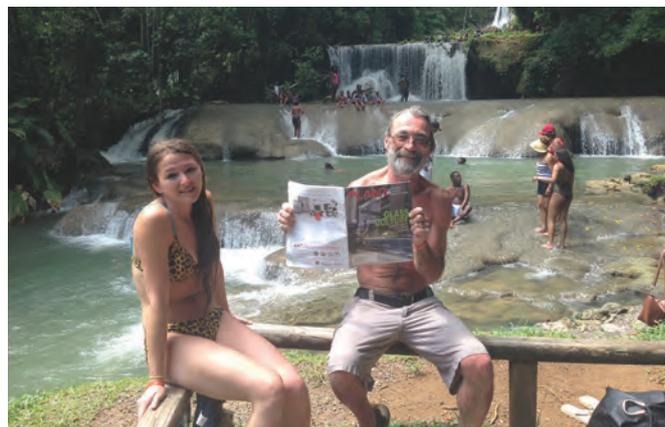
Hall and closet door set by Milette Doors.

PHOTO: MILETTE

The breakdown line has two key elements: a high-speed chop saw and a scanner that scrutinizes every wood plank before it's cut. The scanner analyzes the size, colour and position of knots on lumber at over 300 feet per minute to optimize cutting and reduce waste.

Once cut, the wood is classified and sorted using an algorithm based on pre-established selection criteria. Each piece is then ejected through a chute, which groups only identical pieces or those that meet the same sorting criteria.

PLANT OFF-SITE



Frank Butterwick, a maintenance manager at Bell & Mackenzie in Hamilton, and daughter Beverly, a self-employed entrepreneur, paused for a **PLANT** break while visiting the scenic YS falls in Jamaica. It was originally a cane farm, with a factory. Now it features seven waterfalls cascading into several natural pools.

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

OBITUARY



Bill test-driving a streetcar, Czech Republic, 2005. PHOTO: JOE TERRETT

Bill Roebuck

Former editor of **PLANT**

BURLINGTON, Ont. — Bill Roebuck, editor of **PLANT** from 1979 to 1984, passed away on Nov. 12 at the age of 70.

He was a gentleman, a professional and one of the most interesting people you could meet. This man of many interests held a variety of jobs during his working years that included such disparate pursuits as marine biology, forestry and cable TV interviewer.

But he shone brightest as a writer and editor. He was the heart and soul of MRO Magazine, where he was editor and associate publisher from 1985 to 2015. And he was very supportive of Canada's maintenance community.

Bill was a skilled, intuitive and creative editor, which is why he tallied an impressive number of awards for writing and graphic design. His journalism interests were diverse. He covered electrical engineering, foodservice and hospitality, personal computing technology, but he was also a car enthusiast so naturally he gravitated to automotive journalism, which, as the owner and editor of *cartest.ca*, allowed him to drive and write about hot new cars. And add domestic engineering to his interests as the editor of *Home Digest*.

Bill was a bright light in this world. He was supportive, helpful and always chuckling about something.

Condolences to Roslyn, his wife of 39 years, daughter Katie and her husband Stephen Hess, grandkids Ryan and Ashlynn, and son James. — *Joe Terrett*

Sonaca expands capacity with gantry mill

GRANBY, Que. — A manufacturer of large aluminum aerospace components, is expanding its capacity with a new high-speed, five-axis gantry mill.

Fives Line Machines in Granby, Que. is supplying the unnamed company with its Powermill V spindle and axes drive systems.

The milling head features a 125/156 kW, 30,000 rpm spindle with a HSK A63/F80 tool taper. The linear motors produce a 76 m/min. (3,000 ipm) traverse rate to reduce cycle time.

Powermill V's rails are installed on an elevated concrete foundation with an integrated vacuum table, workholding and programmable high-pressure coolant for removal of the high chip

load and collection of mist. The set-up includes a full-length machine roof system, thermal compensation, chip extraction, automated tool changing and tool/part probing systems.

The operator station area monitors remote gauges with real-time feedback for machine utilities and critical components. HD cameras oversee cutting operations from a safe distance, a machine health-check system examines machine geometry and the head check cycle assesses the geometry of the milling head to provide periodic quality verification and reporting.

Fives is a manufacturer of industrial machines, process equipment and production lines based in Paris, France.

Kruger's rebuilt PM10 machine up to speed

Plant to produce 360,000 tonnes of XTR linerboard



Dedicating the PM10 paper machine in October (L-R): Jean-Denis Girard, member for Trois-Rivieres; Luc Blanchette, minister of forests, wildlife and parks; Gene Kruger, vice-president, business development, Kruger Inc.; Julie Boulet, minister for the Mauricie region; and Michael Lafave, senior vice-president and COO, Kruger Packaging. PHOTO: KRUGER

TROIS-RIVIÈRES, Que.

— Kruger Packaging has rebuilt its No. 10 paper machine (PM10) to manufacture 100% recycled, lightweight and high-strength linerboard at its Trois-Rivieres, Que. mill.

The Montreal-based paper company invested \$250 million in the project that will help it meet demand for ultra-light packaging.

Kruger will be able to produce 360,000 tonnes of the XTR linerboard annually. The company's packaging plants in LaSalle, Que. and Brampton, Ont. will use a portion of the production with the remainder sold to packaging manufacturers in Canada and the US.

Kruger Packaging employs 800 people, including more than 600 in Québec, and operates four production sites in Trois-Rivieres, Montréal, LaSalle and Brampton.

Kruger Inc. is a producer of papers, tissue products, containerboard and packaging made from recycled fibres.

McCain Foods opens new spud line

Expansion to meet growing demand for specialty foods

FLORENCEVILLE-BRISTOL, NB — McCain Foods (Canada) has officially opened its new \$65 million potato specialty production line in New Brunswick.

The 35,000 square-foot line expands the company's flagship facility in Florenceville-Bristol to meet growing North American demand for frozen potato and specialty products.

The new line created more than 40 new jobs and additional demand of 4,000 acres of potatoes from New Brunswick farmers.

McCain Foods (Canada) is the Canadian division of McCain Foods Ltd.

The company has eight production facilities and approximately 2,600 employees in Canada.



Official opening marks 60th year in business.

PHOTO: MCCAIN

CAREERS



Chantal Theoret

Linamar Corp.'s Skyjack division in Guelph, Ont. has hired **Chantal Theoret** as its new global marketing communications manager. She comes from Just Energy, a Mississauga, Ont.-based natural gas and electricity retailer, where she served as brand manager for the solar and sustainability division. Skyjack makes telehandling equipment.

Susan Uthayakumar

is Schneider Electric's new Canadian president. Uthayakumar moves into the job from her previous position as vice-president, national sales. She'll oversee all strategic initiatives in Canada.



Susan Uthayakumar

Alex Pourbaix is Cenovus Energy Inc.'s new president and CEO, replacing **Brian Ferguson**, who is retiring after 33 years with the Calgary-based company and its predecessors. Pourbaix recently retired from TransCanada Corp. where he was COO.

Photon Control Inc., a Richmond, BC developer and manufacturer of optical measurement technologies for the global semiconductor industry, has appointed **Michele Klein** to its board. She served as senior director of Applied Ventures (the investment arm of Applied Materials) in addition to founding four technology start-ups and leading two semiconductor inspection companies from start-up to acquisition.

Econo-Rack Group (2015) Inc., a supplier of industrial racking in Oakville, Ont., has appointed **Randy Wronzberg** president and CEO. He was previously vice-president of operations for the group.

BC's D-Wave upgrades 2000Q

Increases quantum computing power

BURNABY, BC — D-Wave Systems Inc. has improved the performance of its 2000Q quantum computer with two powerful new capabilities.

The Burnaby, BC quantum computing systems and software innovator has upgraded the 2000Q with reverse annealing and virtual graphs. The company said these features give users greater control of the quantum processing unit.

"The combination of larger, more powerful quantum processors, enhanced user control over the quantum computation, and a growing list of software tools are all critical to advancing quantum computing. D-Wave is doing pioneering work in all of these areas," said Earl Joseph, CEO of Hyperion Research, a high-performance computing research firm in St. Paul, Minn.

Reverse annealing lets users program the system by harnessing powerful heuristic* search algorithms for optimization and machine learning, and applications such as cybersecurity, and drug discovery. Users specify a problem with a predicted solution to narrow the search. D-Wave researchers using reverse annealing observed speed was 150 times faster than the current D-Wave 2000Q system.

Many optimization and machine learning



The 2000Q system in the laboratory.

PHOTO: D-WAVE

algorithms are commonly described as graph problems, such as analyzing the flow of traffic between cities or the transmission of information between neurons in an artificial neural network.

Virtual graphs improve accuracy by allowing control over the interaction of groups of qubits, to model a node or link in a complex graph. D-Wave said this new feature handles more complex probability distributions and has improved success rates by five times for common hard optimization problems and machine learning models over earlier 2000Q systems

* **Translation:** proceeding to a solution by trial and error or by loosely defined rules.

BRP setting up Texas headquarters

Sea-Doo's new facility to service the US



A Sea-Doo recreational watercraft.

PHOTO: BRP

MONTREAL — The Quebec-based company that makes Sea-Doo personal watercraft is looking to accelerate US sales by opening a headquarters in the Dallas area to service American dealers and customers.

BRP Inc. says about 20 employees who service

the US from the company's facility in Sherbrooke, Que. will be affected, although most will likely be re-assigned to other Quebec facilities.

The office in Plano, Tex., will provide dealer and customer service, sales, human resources, parts, accessories and clothing.

The Dallas area was chosen because it is central, has a major airport and is in the southwest area of the country where the company sees growth potential.

Canadians will continue to be serviced by BRP employees in Canada.

BRP's main headquarters will remain in Valcourt, Que., where it conducts global functions such as human resources, sales, marketing, design and product development.

Eclipse is in Arizona

New plant its third in the US



Eclipse Automation building in Phoenix area.

PHOTO: ECLIPSE

CAMBRIDGE, Ont. — Eclipse Automation has added a new location in the Greater Phoenix Area of Arizona to support its rapidly growing international business.

Eclipse Arizona is the Cambridge, Ont. automation company's third US location, joining plants in Fremont, Calif. and Charlotte, NC. The company said it will eventually hire more than 50 automation engineers and technicians.

This expansion follows the announcement of a new \$6 million facility in Cambridge that will be used primarily for equipment staging and assembly.

The company currently employs about 320 people in Cambridge and 60 in the US.



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This project is funded by the Government of Canada Sectoral Initiatives Program

Ballard, Siemens partner on Mireo fuel cell

Commuter train will consume up to 25% less energy



Siemens' Miro light train.

PHOTO: SIEMENS

VANCOUVER — Ballard Power Systems has signed an agreement with Siemens AG for the development of a zero-emission fuel cell engine to power the German industrial technology company's Mireo light rail train.

The \$9 million

agreement involves the development of a 200-kilowatt fuel cell engine for integration into Siemens' Mireo modular commuter train, which is designed for speeds of up to 160 kilometres per hour.

Mireo's lightweight design, energy-efficient components and intelligent onboard network management will consume up to 25% less energy than trains with similar passenger capacity.

Initial deployments are planned for 2021.

EMC and NB partner to improve productivity

OWEN SOUND, Ont. — New Brunswick manufacturers are invited to update their skills through a partnership involving the Excellence in Manufacturing Consortium (EMC) and the province.

EMC, a national not-for-profit organization based in Owen Sound, Ont. that helps companies compete globally, is working with the Department of Post Secondary Education, Training and Labour to provide the fully funded skills programs for supervisors and production workers.

The Manufacturing Essentials Certification (MEC) initiative will address skills gaps and raise productivity levels and capabilities.

Participants will learn the essential skills necessary to become more effective in their roles, while improving productivity through workplace performance projects.

For information about MEC, e-mail Jean-Pierre Giroux, EMC's national director of skills and talent development, at jpgiroux@emccanada.org.



PLANT ONLINE

SOUNDING OFF

What readers have to say about breaking news

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

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

UOIT and GM partner to promote STEM education

www.plant.ca/BwCcc

This is a very good program that should be extended to all high schools. Kids today have a huge advantage [being able to] access knowledge via the internet. They'll learn and get training as

required at an early age. Keep up the good work GM and UOIT.

BC's Site C dam could exceed budget, cost more than \$10B: report

www.plant.ca/dp6ON

We might not need the Site C dam for hydro, but we definitely need it for water conservation. When the glaciers finish melting, there will be no water flow in our rivers after June, every year. How will the population down river survive without a natural river water flow?

Tories say Harper's letter doesn't change their approach to NAFTA

www.plant.ca/N8v1k

It's strange for Harper to criticize the combined efforts of NAFTA Team Canada. He should be supporting these efforts. Who knows how long Trump will survive, but most other US politicians support Canada's role.

The short-circuit in Ontario's manufacturing sector

www.plant.ca/RoDTG

When you add this stat to some of the highest industrial real-estate prices in the world, is there any wonder why we can't attract middle-class paying manufacturing jobs to Ontario? The only business sectors holding up the Ontario economy are financial services and construction. Once the over-built condo slowdown takes hold, watch out! This is what happens when inexperienced schoolteachers attempt to govern. Class dismissed.

Be prepared for an end to NAFTA, start contingency planning

www.plant.ca/9GXSB

The government has stated that small business is the backbone of Canada. With political "sabre rattling" occurring regarding the cancellation of NAFTA, what motivation do I have to keep my

small business in Ontario, when there are so many financial and operational benefits to moving the business out of Canada?

Another view...

Well, Trump has so far screwed up everything he has touched, so to blow up NAFTA will not come as a surprise to anyone. The clown has no idea how valuable NAFTA is to many states and frankly he doesn't care. He's the "master dealmaker" and has to be seen as such (at any cost).

Feds to guard jobs before approving Bombardier Airbus deal

www.plant.ca/BBeJf

What will happen to the hundreds of subcontracting firms in Canada that are part of the C-Series supply chain? They represent more employees than those actually working for Bombardier. No one is saying anything about whether Airbus will continue to purchase from them.

PLANT PULSE

ECONOMIC DEVELOPMENTS AND TRENDS

MMEs wield economic clout

Exporters employ more than 2.5 million

Attention Canadian exporters, your business efforts have a significant impact on the economy.

An export study of 1,400 mid-market enterprises (MMEs) in 14 countries by international banking firm HSBC found boosting export-based revenues globally by just 1% increases their economic impact by \$12.5 billion.

The study, in conjunction with Oxford Economics, covered firms ranging from 200 to 2,000 employees across most sectors, but driven mainly by mining, manufacturing and business services, and it provides some interesting insights into Canada's 6,800 MMEs.

Exports currently account for only 11% of revenues at Canadian enterprises, which is significantly less than their global peers (29% or \$200 billion).

But they employ more than 2.5 million people, which is high compared with other countries.

Canada's MMEs contribute \$350 billion of market sector gross value added (GVA). Combined with the impact of supply chains and consumption, they account for 40% of Canada's GVA.

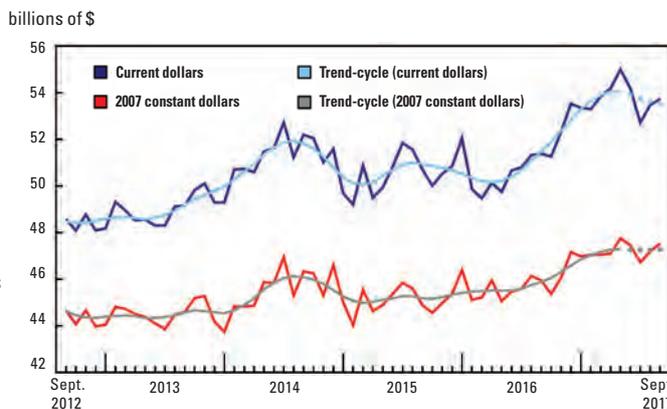
Compared to their global peers, MMEs have the same level of confidence in both their local and global economies, and they find it easier to export (47% versus the global average of 36%).

Canadians are also:

- less concerned with domestic economic uncertainty and expanding into new domestic markets;
- more likely to believe entry into new international markets would be a main contributor to financial performance over the next three years;
- more likely to believe sustainable business practices will improve growth and profitability;
- more aware of customers demanding more customized products; and
- less concerned about a growing threat of competition from large or small companies.

QUEBEC LEADS SALES GAINS IN SEPTEMBER

Manufacturing sales rose 0.5% in seven of 21 industries to \$53.7 billion in September, reflecting growth across seven provinces. The leaders were Quebec (up 1.7% to \$13.3 billion) and New Brunswick (up 13.1% to \$1.7 billion). In the manufacturing heartland, Ontario sales fell 0.9% to \$24.4 billion. The decline was largely attributable to motor vehicles (-6.3%), motor vehicle parts (-2.7%) and primary metals (-3.6%). These decreases were partially offset by a 5% increase in sales in the machinery. Nationally, gains were greatest in petroleum and coal products (10.3%), machinery (1.9%) and paper (1%).



Source: Statistics Canada, CANSIM

125B

The number of connected IoT devices worldwide by 2030.



IHS Markit's The Internet of Things: a movement, not a market report projects a 12% annual increase from nearly 27 billion this year.

\$20 TRILLION



Size of the market Export Development Canada says Canadian

companies access now CETA is in effect.

A joint Canada-EU study equates the deal with almost 80,000 new jobs, increasing the average household's annual income by \$1,000.



2.9

Job vacancies in manufacturing per unemployed person during 2015 and 2016.

A Statistics Canada study says the overall ratio was 3.4 jobs. Since the beginning of 2017, job conditions have improved with an overall ratio of 2.8 jobs.



\$5.4B

Worldwide demand for 3D printers in 2021, a

24% annual pace of expansion, according to the Freedonia Group. Overall demand will be driven by wider adoption of production and desktop printers.



0.5

Percentage contributing to the 1.3% decline in overall manufacturing labour productivity growth following the exit of large and productive foreign-controlled enterprises during the post-2000 period. A Statistics Canada report examining the effect of multinational relocation on productivity identified offsetting factors as new, more productive, domestically-controlled enterprises and the reallocation of resources between firms in different industries.

A GREENER TRUCKING FUTURE

I-PHI REDUCES LONG-HAUL DIESEL EMISSIONS

IHS technology uses hydrogen for cleaner, more fuel-efficient combustion.

BY JEFF BROWNLEE

Joe Williams set out on a mission to chase a dream. Two decades later, that pursuit may end up changing the world.

It's been a long, winding road for the president of Ontario's Innovative Hydrogen Solutions (IHS) who has dedicated most of his life to developing and improving technology that reduces greenhouse gas emissions (GHG) produced by internal combustion engines that run on diesel fuel. After many lessons learned, a never-quit attitude that would make Thomas Edison proud and enlisting some of the brightest minds in the industry, the Aurora, Ont.-based company is now in the fast lane to becoming a global leader in the cleantech space.

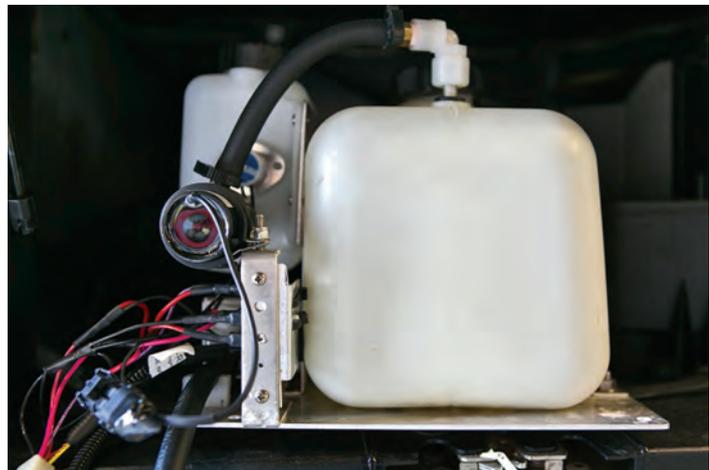
"It's been quite the journey and we've made mistakes along the way, no question," says Williams. "But we've learned from those mistakes; we never gave up; pushed forward and now I can honestly say, we've finally nailed it."

While hydrogen-on-demand

(HOD) technology has been around for more than 40 years, until now the main challenge has revolved around developing a reliable product that overcomes issues related to operating in both cold and warm climates, is corrosion resistant and most importantly, produces consistent results.

For IHS, nailing it takes the form of the latest generation of its i-phi (innovative partial hydrogen injection) product, geared predominantly to long-haul truck applications. The brains of the unit, the electrolyzer, is housed in a stainless-steel box mounted on the outside of the truck. It breaks down distilled water stored in a separate, external tank and produces hydrogen and oxygen gases through electrolysis. Those gases are then introduced into the combustion process through the engine's air intake.

Diesel engines burn approximately 70% of the fuel. The remaining 30% is exhausted as unburnt hydrocarbons, producing both pollution and smog. With hydrogen burning 14 times faster than diesel fuel, the result of installing the i-phi unit is an optimized, cleaner combustion process that decreases greenhouse gases and reduces



emissions as well as fuel consumption.

"We frequently hear that this is too good to be true – but it's not. It's definitely a win-win-win across the board," Williams says. "There are many benefits as a result of using this technology, both in terms of the

environment as well as financial. You basically add water and save."

Third-party verification data shows fuel savings in the 10% to 30% range with emissions reductions up to 80% in the long-haul truck industry. As a scalable technology, the i-phi unit has



Joe Williams, founder and president with the new POD operating system for large stationary gen sets and marine engine displacements.

PHOTOS: SILVANA METALLO

many applications, including marine, heavy equipment, rail, public transit and diesel-powered generators. It also works on smaller engines such as light-duty vehicles, but the cost benefit for that segment isn't feasible – yet. That's a major area of research and development for IHS.

“The technology has come a long way, especially in the last couple of years and it will continue to change at a rapid pace,” says Williams. “I compare it to the advances in smart phone technology. Look at how they have changed in such a short period of time.”

Investing in R&D

Pushing the technological envelope has been part of the IHS business plan from the start. Williams wanted to ensure the company was leading in the space and went to market with a good, reliable product that delivered on results before he started focusing on the sales cycle. And all of this has been done with private money, without government support.

“We have spent so much of our time and money on R&D, product development and third-party verification,” he adds. “I wanted to ensure we were selling a product that delivers on what we say it's going to do, which is incumbent on taking the position as a leader in this industry.”

IHS is working on several large new projects, including one with the US military that demonstrates how necessity spawns innovation as well as how product development advances so rapidly. This project has expanded the scope of the technology well beyond current applications and bodes well for an exciting future.



(Left) Water reservoir that feeds the electrolyzer and allows a truck to go 15,000 kilometres before refilling. Its heat exchange system allows continuous operation in freezing or hot temperatures.

(Middle) An analogue electrical box that's a series of relays and a solenoid that communicates with the electrolyzer for a number of operational functions.

(Right) An expansion tube that prevents any moisture from getting into the truck engine.



A large part of the 15,000-square-foot manufacturing facility is dedicated to innovation. It has a cryogenic chamber that mimics a cold Canadian winter. It also has a heat room that simulates sweltering temperatures found in the engine rooms of ships. Two new generations of the product are being tested in the lab – one specifically for large diesel generators, which has huge global growth potential in the immediate future.

“There’s increasing demand for our technology to be used on diesel generators, particularly in developing countries,” he says. “We’ve had inquiries from Africa, India, Guatemala, Mali, Chile and Brazil.”

One market the company is taking a serious look at both for sales and manufacturing is the US. That can be partly attributed to increasing protectionist sentiment south of the border.

IHS is also gaining market traction in Pakistan. One of the i-phi units installed on a diesel generator powering a hospital is recording impressive results, including a 30% reduction in fuel use.

“They’re really pleased that the diesel smell is gone, there’s no more black smoke and that people aren’t getting sick,” Williams says. “This technology eases the burden on health care systems around the world.”

Emissions are a major global health issue. According to the American Association for the Advancement of Science (AAAS), more than 5.5 million people die as a result of air pollution. In the US, that number is approximately 200,000 and around 7,700 in Canada.

One of the major hurdles developing the i-phi was translating the science into a finished product while finding innovative solutions to some of the design issues.

“One of the most important lessons we learned is the importance of marrying science with engineering,” Williams says. “It took us 10 years of trial and



Equipment designed by inhouse MacGyver and plant manager Stan Gernowicz. It expedites the building of the process relating to fittings.

error and flying by the seat of our pants while introducing new technology to the marketplace the wrong way. Then, after 10 years of doing it the wrong way, we looked for help from some outside agencies.”

The solution was to enlist the services of Wardrop Engineering – designers of the Canadarm on the space shuttle – the physics department of the University of Winnipeg and the combustion engineers at Queen’s University in Kingston, Ont.

Resolving issues

“There were major issues that the entire marketplace – not just IHS – was facing,” adds Williams. “Overcoming those was a result of having the physicists tell the engineers what works and what doesn’t work; and how do we resolve the issues of corrosion of the anode and cathode; the freezing issues and the overheating issues. Once the technical uncertainties were resolved, we knew that we had a product that was reliable.”

Then came the challenge of manufacturing the product efficiently. Williams turned to lean

guru George Trachillis to help streamline operations.

“He came in and turned our operations upside down and drove us crazy,” Williams admits. “But it was short-term pain, for long-term gain. He really helped us with ergonomics.”

Due to the intricate nature of the i-phi unit, the bulk of the manufacturing process is done manually, particularly for quality control. Another reason is that any automation machinery has to be highly customized, or as Williams describes it, “Macgyvered.”

IHS relies on approximately 11 different parts suppliers in its supply chain, with final assembly being conducted at six workstations for each manufacturing line at its Aurora facility.

Because the manufacturing processes are segmented into different zones, IHS has the capability to scale up full-capacity production by simply and quickly adding shifts to the manufacturing lines as needed. One manufacturing line of six or seven work stations can produce five units a day, which is a major improvement when compared to

the three days it took pre-lean journey. The Aurora facility produces up to 1,000 units or so per month through the ongoing application of continuous improvement.

With sound, proven technology, the company is now focusing on improving sales domestically and internationally.

“It’s been one heck of a journey to get to this stage, but we believe in our product and we want to make a difference,” says Williams. “If we’re going to be responsible corporate citizens, it’s incumbent upon us to get this technology out there, not just locally and not just in the United States, but globally.”

With a determined focus on innovation while marrying science and engineering and blending in lean manufacturing, IHS is off to a good start.

Jeff Brownlee is an Ottawa-based communications specialist, business writer and editor. E-mail jeff@rainmakermedias.ca.

Comments?
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LAW

Protect workers while successfully responding to MOL inquiries.

BY MICHAEL SHERRARD AND MATTHEW BADROV

Maintaining a safe workplace is a team effort. Under Ontario's Occupational Health and Safety Act (OHSA) workers, supervisors, constructors, management and site owners all have a role to play. Employers, in particular, have a duty to advise workers of potential or actual hazards and dangers in the workplace and take every reasonable precaution.

Yet despite best efforts, workplace accidents do happen. A charge under the OHSA exposes an employer to liability including a fine, and in extreme circumstances, imprisonment, not to mention negative publicity. But an employer can take steps that will put it in the best position to protect workers and successfully respond to a Ministry of Labour (MOL) investigation and/or charge.

Be proactive. The OHSA requires an employer to take every reasonable precaution to ensure the protection of workers. This includes ensuring equipment is well maintained and workers are provided proper instruction and supervision. Special care should be taken to ensure new or younger workers, who may be unfamiliar with the workplace and industry, are provided with safety information, instruction and supervision before starting a job.

Every employer should:

- Become familiar with its obligations under the OHSA, notably sections 25 and 27, which set out responsibilities for employers and supervisors.
- Conduct an honest and thorough workplace self-audit to identify areas of risk.
- Document all efforts to comply with health and safety requirements.
- Enforce a "zero tolerance"



The OHSA requires an employer to ensure employees are protected.

POTO: FOTOLIA

Managing the OHSA

BEST PRACTICES FOR MANUFACTURERS

policy for health and safety violations.

A proactive approach to health and safety is the first step, but it doesn't end there. A robust health and safety program requires ongoing training and diligent supervision of workers.

Strong supervision

The proper use of a supervisor is a cornerstone of a strong health and safety program. Reasonable supervision is about consistency, deliberate observation, detection and correction. Supervisors should be present at a workplace or job site often and consistently enough to detect hazards or unsafe behaviours in both routine and non-routine activities. Where hazards or unsafe behaviour are detected, a supervisor should take steps to rectify them and develop preventive measures.

Supervision should not be ad hoc or sporadic, and supervisors should meet frequently with staff to discuss health and safety matters.

Just as important as being safe is having the documentation to prove it. Maintain good record keeping that includes:

- Safety checks at the beginning of each shift.
- Regular maintenance and safety inspections of tools and equipment.
- Regular workplace and site inspections.
- Records from the joint health and safety committee's monthly inspections.
- Records of supervisor safety meetings.
- Reports of "near miss" incidents and investigations.
- Written documentation of progressive discipline for

breaches of safety rules.

In the event of a workplace accident, an MOL inspector is likely to visit the workplace/job site and conduct an inspection and/or investigation into the circumstances of the incident. An employer can be charged under the OHSA within a year of the accident and face a penalty. If an accident occurs, consider following the Sherrard Kuzz 12-Step Accident Checklist:

- 1. Provide medical assistance.** Immediately call for, or assist the injured worker with, appropriate medical aid.
- 2. Preserve the scene.** Other than to preserve life or prevent unnecessary damage to equipment or other property, do not touch anything until the provincial labour regulator arrives or releases the scene.
- 3. Contact your lawyer.** This is to help protect your organization.
- 4. Consider the seriousness of the injury.** Determine whether the injury meets the province's criteria for a critical injury and if so, there may be notification, reporting and investigation requirements.
- 5. Notify.** If the injury triggers an obligation to notify,

promptly contact the provincial labour regulator, workplace joint health and safety committee, and trade union (if applicable).

6. Report. If the injury triggers an obligation to report, submit the report within the timeframe specified (48 hours for Ontario), and provide a copy to the workplace joint health and safety committee.

7. Investigate. If the injury triggers an obligation to investigate, or if an internal investigation is appropriate, do so without delay.

8. Collect information. Begin to gather factual information including the circumstances of the incident. This includes recording the full name, telephone number, e-mail ad-

dress and home address of each witness and individual providing first aid. It may be important to reach these people in the future. In addition, consider taking photographs, measurements and records of site conditions at the time of incident.

9. Protect the investigation from disclosure. Take steps to protect the results of

an internal investigation from disclosure to a provincial labour regulator. A lawyer can assist with the investigation, which helps to ensure the results of the investigation remain confidential and "privileged".

10. Co-operate. Co-operation with a provincial labour inspector is required by law. However, employers have rights too. To the extent possible, ensure a representative of the employer accompanies the inspector to record questions asked, answers given and documents produced. Do not hesitate to correct misinformation where necessary.

11. Obtain independent expert advice. Depending on the nature of the incident, it may benefit an employer to retain an expert (such as an engineer or health and safety consultant) to comment on the conditions at the time of the accident.

12. Take preventative steps. Consider undertaking a workplace health and safety audit to review policies, practices, training and inspection schedules. An audit may enhance worker protection and reduce whatever penalty (if any) is ordered against the workplace and/or management.

Manufacturers have a duty to ensure workplaces are safe and workers are protected but if an accident does occur, be prepared for what follows when the MOL investigates.

Michael Sherrard and Matthew Badrov are lawyers with Sherrard Kuzz LLP in Toronto, an employment and labour law firm representing management. Call (416) 603-0700 (main) or (416) 420-0738 (24 hour). Visit www.sherrard-kuzz.com.

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Recognize mistakes as an opportunity to learn.

PHOTO: FOTOLIA

Help employees remove the causes of failure and do a better job.

BY HUGH ALLEY

A business owner, deciding he was going to hold employees accountable, rewrote their job responsibilities. He expected some of them would stick around, and others would not.

When he informed his staff, one of them asked, "What do you want me to do? I'm already working really hard." His response: "How about do what I've asked?" With such an attitude it's unlikely his initiative ended well.

Holding people accountable too often means berating them for not doing the tasks they were directed to do. This is not a useful strategy. W. Edwards Deming said, "the aim of leadership is not merely to find and record failures of men, but to remove the causes of failure: help people to do a better job with less effort." Many bosses ignore the second part of Deming's statement. This leads to workers who do only what they're told, and who don't think or innovate.

Insisting on accountability misses two key issues: rarely are poor outcomes the fault of just one person; and directing someone to do something doesn't

mean that they have agreed to it. But we can't have them doing anything they choose. As James Lawther said in his Squawk Point blog, "If you operate a totally blameless culture, people can (and sooner or later will) get away with murder."

Dealing with mistakes

So we need some way to recognize mistakes rather than ignore them, and deal with them fairly. Getting participants to commit to the terms is key. Sometimes the commitment is to learn something, such as getting training to change a behaviour or learn a new skill. Or it could be to set priorities differently.

When there's no commitment, the employee is not answerable for failing to achieve an outcome. With a commitment, a manager can come back to the employee and ask for a reckoning if something didn't get done. In such a case, it's likely everyone will learn something.

But people need to be able to say "no" without fear. They need time to come up with appropriate solutions (that might be the basis for another commitment), and they need the resources to address the issue.

Those resources may include specific skills, information or authority. If they need skills, that entails a commitment from the

manager and the business owner.

Before applying "training" as a solution to a situation, consider what might be necessary to win that commitment. In some cases that may be enough to resolve an issue.

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

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ELECTRICITY

Ontario's high cost of power

1.8 jobs lost for every one gained from green energy

Ontario's rising electricity costs have likely contributed to significant job losses in manufacturing, according to a Fraser Institute study.

The public policy think tank concludes the province has experienced the most substantial decline in manufacturing and employment over the past decade based on comparisons with several US and Canadian jurisdictions.

Since Ontario companies have endured the same factors as other jurisdictions (such as technology change,

exchange rates and world demand), the report suggests electricity has placed too much of a financial burden on manufacturers.

From 2008 to 2015, jobs declined from 805,170 to 688,735, and the study contends about 64% of that – 74,881 jobs – are attributable to the province's higher electricity prices.

Even accepting and factoring in the province's estimates of job creation in renewable energy, there is an



Ontario's higher electricity prices have cost 74,881 manufacturing jobs.

PHOTO: FOTOLIA

implied loss of about 1.8 jobs for every new job created in the green energy sector, many of which are temporary positions.

See *Rising Electricity Costs and Declining Employment in Ontario's Manufacturing Sector* at www.fraserinstitute.org.

CYBERSECURITY

Protect your assets and plan for what happens when a breach occurs.

BY IMRAN AHMAD AND
ASHLEY-ROSE GILLESPIE

With almost daily reports of cyber attacks resulting in the theft of data, operational disruption and financial loss, more businesses are implementing risk strategies.

Success hinges on how well manufacturers engage their people.

Most cyber attacks are caused by mistakes made by employees as a result of ignorance or negligence.

You can't prevent cyber attacks from ever occurring, but you can mitigate the impact following an incident by engaging everyone in the organization and taking these basic steps:

1. Engage senior management and the board. Risk managers ensure senior management and the board have all of the relevant facts to allocate resources for cybersecurity. Awareness will prepare them to respond quickly and accurately in the event of an attack and mitigate the potential for lawsuits alleging a breach of duty of care.

2. Invest in regular employee training. According to a study conducted by Wombat Security Technologies and the Aberdeen Group, increased investment in employee training reduces risks by 45% to 70%. Education and training should be frequent – at least twice a year. Test them on their ability to detect risks and follow the security protocol. Those who fail should undergo more training and their access limited.

3. Have clear cyber reporting protocols. Know when to report an incident and to whom, including when senior management and the board should be notified, as well as a regulator or law enforcement.



Protect your network but plan for a breach.

PHOTO: FOTOLIA

Employees pose the **GREATEST RISK**

FIVE TIPS FOR ENGAGING EVERYONE TO MANAGE CYBER THREATS

Include a vendor of record list of cyber incident experts, including forensic, law, public relations, credit monitoring and insurance firms, and law enforcement. Companies covered by cybersecurity insurance may need to report the risk to the insurer as soon as possible to avoid being denied coverage for waiting until the breach is official. If a risk is “material” in accordance with the Canadian Securities Administrators’ guidance, organizations you’ll also need to report the risk to the public and decide who will make the public statement.

4. Supply chain management. Third parties including contractors, suppliers and distributors get access to information systems. Ensure their supply chains are secure. In the 2013 Target case, hackers stole network information from one

of Target’s vendors and gained access to the retailer’s network where they stole customer data.

Stipulate security requirements in their third-party contracts to co-ordinate effort internally and externally. Monitor and test third parties regularly to ensure they’re following requirements, such as having their own cybersecurity insurance. When a third-party relationship ends, so too does its access to the network.

5. Risks in the cloud. Many companies are investing in cloud computing to store data because it lowers costs and increases productivity. That doesn’t mean the data is secure. Cloud service providers offer their own security tools, but security of the data remains the responsibility of the organization.

Carefully negotiate cloud agreements and assess security

architecture, including the need to employ additional tools such as encryption, strong passwords and multifactor authentication to verify identity.

The standard for addressing cyber risks isn’t perfection, it’s diligence. Investing time and resources to prevent or mitigate a breach demonstrates diligence to the courts.

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Hire more WOMEN

A SOLUTION TO THE SKILLS SHORTAGES CHALLENGE

A CME report discusses the under-representation of women in manufacturing and what to do about it.

Manufacturers continue to identify shortages in key skills areas. This is an ongoing problem and a major headache for companies that are finding it's affecting their ability to grow.

PLANT's 2018 Manufacturers' Outlook survey identifies the greatest skills deficiencies are in general labour, production and engineering. And Canadian Manufacturers & Exporters (CME) research shows that problem is affecting 40% of companies, while 60% anticipate shortages within five years and 20% blame shortages for curbing business growth. Within five years, CME says 75% of companies will struggle to find workers in production fields.

But there is an under-utilized demographic that offers a solution that will help alleviate the skills deficit. Hire more women.

That's the thrust of a CME report (*Untapped Potential: Attracting and engaging women in Canadian Manufacturing*) that provides a comprehensive examination of women in manufacturing and offers some suggestions on how to improve their representation. The report is based on the efforts of a CME working group, partners and a survey that provides some tell-

ing numbers.

Manufacturing accounts for 10.4% of Canada's GDP, generates sales of more than \$600 billion annually and employs 1.7 million Canadians. There are 8.6 million women representing 48% of the Canadian workforce, but they account for just 28% of manufacturing jobs. That's only 6% of employed women compared to 13% of men; and they make up less than 10% of skilled production workers.

Resource extraction, utilities and transportation/warehousing are also under-represented, as is the tech sector, so critical to business and industry. A study by PwC, the MaRS Discovery district and non-profit MoveTheDial, found women comprise just 13% of the average Canadian tech company's executive team while 53% of firms do not have any female executives.

Participation to drop

Over the past 30 years there has been no improvement in women's participation level, which in manufacturing has fluctuated between 27% and 29%, a trend that is similar in the US and the EU. But reading the trends, the CME warns the percentage of women in manufacturing will drop more.

The trends are driven largely by the adoption of advanced technology and specialized machinery as more general labour work shifts to low-wage jurisdictions. Most women are



Women make up less than 10% of skilled production workers.

PHOTO: FOTOLIA

employed in general positions, and less than 25% have STEM-related (science, technology, engineering and mathematics) jobs.

Women who were surveyed for the report provided some insight into the challenges they

face. Many identified a culture that is male-centric and needs to be more welcoming to women, as well as a male bias when promotions are made. Many respondents think women avoid manufacturing because of the current gender balance, 36% quit

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their last job because of the lack of opportunities for advancement and 20% quit because of sexism and discrimination.

“Attracting more women into manufacturing professions is critical to helping manufacturers grow and to replace the existing and aging workforce,”

said CME national chair Rhonda Barnet, president and COO of Steelworks Design Inc.

CME has formed an action plan that aims to address these challenges:

- More high-profile role models are needed to inspire young women to pursue a career in

manufacturing.

- Young women need greater exposure to modern manufacturing facilities for a more accurate perspective on career opportunities. Focus efforts on occupations within manufacturing rather than on the sector itself.

- Improve efforts to encourage young girls to pursue an education in STEM fields and skilled trades.
- Businesses need to listen to the concerns of women and take steps to make their workplace culture more inclusive.
- Find creative ways to improve work-life balance for employees and to accommodate both women and men who have unavoidable family obligations.

The shortage of skilled workers is a pressing issue. The CME report notes that the growth of the working age population will slow to almost zero by 2020. Bringing more women into the workforce is one very obvious solution.

Download the report at www.cme-mec.ca, click on Women in Manufacturing.

Comments?

E-mail jterrett@plant.ca.

TURNOVER

Cheap employers invite churn

Hays survey warns employees are ready to walk

Manufacturers that are having trouble finding and retaining people they need may be making the problem worse, according to the annual Hays Canada Salary Guide survey.

The Toronto-based recruitment specialist warns they are overlooking growing discontent among staff. It found 90% of employees would consider leaving their current role for one that met their expectations – a sentiment Hays believes may trigger

considerable departures next year.

The fall survey revealed employer confidence is back to pre-recession levels but temporary staffing levels were double the rate employers anticipated in 2017 and 26% said they plan to boost their reliance on contingent workers again next year. Hays says this contributes to eroded morale. And more than half of respondents said raises for staff will be less than 3% even though they're aware of

growing competition from companies that pay more. Nearly a third of employers admitted they lacked a network of candidates and 40% have increased salary offers in an effort to secure specific candidates.

“Employers would be wise to think about the message they’re sending to staff,” said Rowan O’Grady, president of Hays Canada. “When overworked teams get little in the way of raises but see their employer inflate salary offers to incoming candidates, they tend to look for the exit sign. We expect this is already happening and ‘churn’ will be the big word in 2018.”



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New rate structure will be more reflective of a company's claims experience.
PHOTO: FOTOLIA

WSIB rates are **CHANGING**

HOW THE NEW MODEL AFFECTS ONTARIO MANUFACTURERS

Understand calculations, rates and where they're heading.

Ontario's Workplace Safety and Insurance Board (WSIB) is changing how its premium rates are calculated for almost 300,000 registered businesses across Ontario.

The Ministry of Labour agency is introducing a simpler rate setting model that better reflects individual claims experience.

The change (to be implemented Jan. 1, 2020) will also make it easier to understand how businesses are classified, how premium rates are calculated and the direction premium rates are headed in the future.

What's changing? The Standard Industrial Classification (SIC) coding system will be replaced with the North American Industrial Classification System, or NAICS, the same system Statistics Canada and

the Canada Revenue Agency use to classify businesses. Manufacturers will be assigned one or more NAICS codes that fall under Class D.

You'll pay a rate based on actual workplace injury history, and projected rates will show you where insurance premiums are heading, allowing time to make adjustments. Rate changes will also be capped and spread over time.

The new model will not affect the amount collected by the WSIB, which will continue its risk sharing arrangement among all employers who pay premiums to maintain the insurance fund.

Visit www.wsibratereform.com for news, updates and information about the rate framework, the new NAICS system and how businesses will be classified.

Comments?
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LUBRICATION

INVISTA rebuilds its Victoria plant's system and improves efficiency while lowering costs.

Lubrication is the cornerstone of all reliability programs. A case study presented at a MainTrain conference convened by the Plant Engineering and Maintenance Association of Canada (PEMAC) about a turn-around for an INVISTA plant in Victoria, Tex. illustrates how an enlightened and proactive lubrication plan leads to success and profit.

INVISTA is an integrated fibre, resin and intermediates company headquartered in Wichita, Kan. with plants in various countries around the world.

Its Victoria plant, built on a 4,500-acre site by DuPont in the late 1940s, was purchased by Koch Industries Inc. in 2004. It called for a new vision and work processes, with a focus on reliability-centred maintenance (RCM).

The Victoria facility had a reputation for a proficient approach to maintenance that was an early proponent and adopter of predictive technologies. It was an extensive applier of preventive maintenance practices, and it involved machine operators in basic lubrication. After the Koch acquisition, a reliability group was formed, which spawned focused programs for fixed and rotating mechanical equipment.

When the results were slow to materialize, the reliability team reached some tough conclusions: sheer manpower had been driving reliability; a sizeable percentage of predictive maintenance tasks added little or no value; "we fix it fast" was not a motto to promote; and the mechanical reliability programs assumed the correct lubricant was used and it was clean, but that wasn't always the case.

The reliability manager wiped the slate clean and created a new lubrication program, based on two elementary principles: the right oil for the right equip-



An effective lube program should focus on reliability-centred maintenance.

PHOTO: FOTOLIA

Your new LUBE PLAN

BE PROACTIVE WITH A FOCUS ON RELIABILITY

ment; and keeping lubrication oil clean.

Success required a culture change and support across the board. It was found that an hour's work up front saved a month's worth of redo later.

Lube partner

Getting started involved partnering with the lubricant supplier, visits to the oil distribution warehouse, a lubrication survey and a database interface.

Key ingredients to the program rollout were training, a new appropriate lubrication storage facility, an oil distribution plan, equipment labelling

and ensuring adequate resources were available. Training was seen as critical because operators and mechanics with some 30 years of experience were not aware their current practices could have such a negative impact on equipment reliability.

The new program focused on RCM, vibration measurement and infrared thermography, oil analysis, and an emphasis on preventive and predictive maintenance. But there was also an emphasis on taking a proactive approach to spare parts management, redesign and spare equipment storage.

The benefits were manifold:

- fewer vendors
- fewer purchase orders
- less waste oil
- a national purchasing agreement with the oil supplier

The take home lessons from the effort were to: separate truth from assumptions; focus on the right things; set the stage for success; select an "owner" of the program; determine best practices and correct actions; and measure, then document performance.

Thanks to the rebuilt lubrication program, the Victoria plant became Koch Industries' standard for operation and maintenance managers at its facilities around the world.

Presented by Suzy Hitchcock, executive director for global strategy and advocacy at the International Council for Machinery Lubrication, and Paul Bonordon, rotating machinery capability manager at the INVISTA plant in Victoria, Tex.

Comments?

E-mail jterrett@plant.ca.

THINK LEAN

Identifying waste is easy, the challenge lies in engaging everyone to apply the tools.

BY RICHARD KUNST

You don't have to look too far to identify streams of waste that include: excess motion of employees or equipment; defective material; employees or equipment waiting; excess inventory; over-production; over-processing; and transportation of material from one location to another.

How do we eliminate such waste? Implementing lean principles and training will help you get to the root causes of problems.

Training should involve the senior executive team; sales force; and finance, purchasing, production, maintenance, engineering and logistics teams, who will look at the underlying structure of the business systems and processes. Note every item produced and its specific routing or sequence of process steps. There are likely hundreds of iterations or sequences that need to be organized into a more ordered group of part families.

The value stream engineer develops a map, both current- and future-state, and kaizen events or areas of opportunity are identified to help accomplish goals.

Most of them will likely centre around meeting promise dates, improving quality, increasing capacity, improving productivity, reducing cost and occupying less floor space.

The goals for each area are displayed and prioritized. A good way to start is a kaizen event leading to a trophy area that stands as an example of what lean can achieve. Set dates and identify individuals who should be invited to attend the events.

Once value streams are identified, defined, set up and the first group of kaizen events are carried out, you'll realize how to use other lean tools that facilitate a variety of other large and



Implement kanban (inventory control) systems.

PHOTO: FOTOLIA

War on WASTE

OBSERVATIONS FROM THE SHOP FLOOR TO TOP FLOOR

small lean improvements, across the business.

Implement 5S, point-of-use storage, kaizen, standardized work, kanbans and cellular/flow improvements.

Let teams develop shadow boards for housekeeping supplies; label and organize racking stations; and move operating supplies and inspection tools to the point of use.

Lean tools

Add visual controls and kanbans so replenishment of racks, clamps, rags, personal protective equipment and chemicals is completed automatically through a timed delivery route. Work is staged on carts and identified with flags. A cone on each cart shows the conclusion of that order. Mix is scheduled to optimize the process capacity and the work is delivered with everything the operator needs.

Auditing and driving continuous improvement is probably the most difficult part of the process, but it helps maintain the momentum to develop a culture and sustain lean. These tools will aid in this effort:

- **Employee engagement.** Each team member has a goal to submit 12 waste stoppers per year (one per month). This is the basis for small or larger kaizen improvements. It's easy to measure and great incentives are tied to meeting goals.
- **Standardized work.** A standardized checklist for leaders, managers and engineers helps audit improvements and processes, and requires data and/or numbers to be logged rather than just checked off as complete.
- **Incentives.** Make them creative and used for performance, ideas and participation.
- **New hires.** The foundation

of any culture is people. Can temporary or staffing agencies select new employees better than you? Doubtful!

- **Culture of change.** Employees must embrace change, because the status quo is the opposite of continuous improvement. That requires open communication. If team members are afraid to voice their opinions and concerns, growth is stifled, making it difficult to improve.
- **Measuring.** Change and improvement is very difficult without measurement.
- **Keep the surgeon at the table.** Anything that takes the operator away from his or her workstation should be analyzed and, if possible, delivered at the time it's needed. Implementing lean takes time, energy and money. It's a challenging process but the improvements that follow are worth the investment.

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@kunstofsolutions.com.

Comments?
E-mail jterrett@plant.ca.

Technology reduces vehicle weight and joint venture in China expands electric vehicle development.

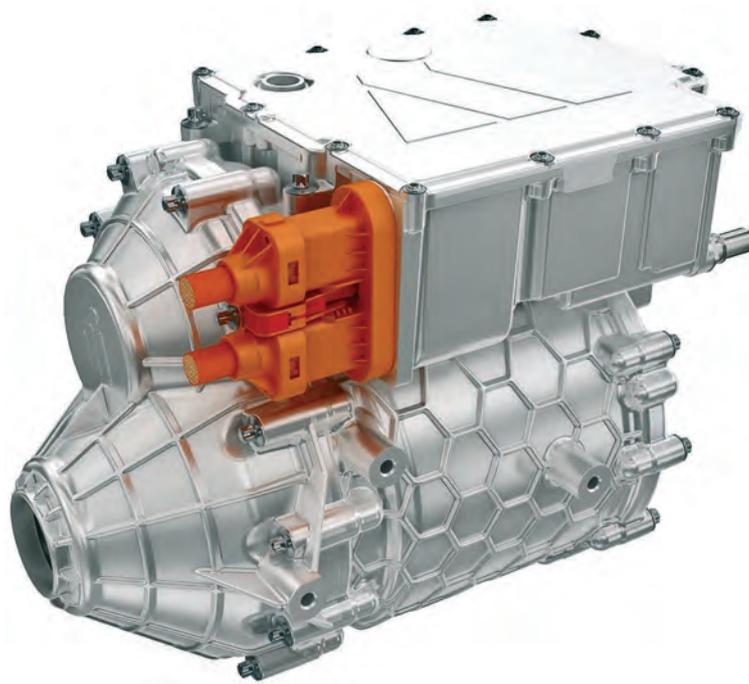
Global automotive components and systems manufacturer Magna International has been busy on the technology and business fronts this past quarter.

On the assembly side, it's helping automakers cut weight and costs with a new twist on joining thermoplastic materials; it has extended its reach in China; and it relocated a mirror plant in Slovakia.

Magna, based in Aurora, Ont., developed an innovative torsional welding process at its exteriors plant in Liberec in the Czech Republic.

This new way to join plastics employs a high-speed twisting motion that creates enough friction-based heat to join a plastic bracket to a thermoplastic fascia. But it also achieves about a 10% weight reduction because it allows thinner materials to be joined, which also reduces material costs.

Torsional welding is currently used to make the front fascia of the 2017 Skoda Octavia, and Magna said it has potential for other applications where materials of similar composition need to be joined.



Magna brings its integrated powertrain technology to a joint venture in China.

PHOTO: MAGNA

Magna innovates & EXPANDS

ADDS TORSIONAL WELDING TO ITS TOOLBOX AND PARTNERS IN CHINA

One area of interest is advanced driver assistance systems and self-driving cars.

Automotive fascias will become heavier when autonomous features such as sensors are added. Torsional welding will reduce weight on the outer skin

and brackets so more sensors can be added without affecting the weight of the vehicle.

BEV China deal

In China, Magna has established a joint-venture involving its electrified powertrain products. The agreement with Huayu Automotive Systems Co. Ltd. (HASCO), a subsidiary of SAIC Motor, will initially produce an electric-drive powertrain for an unnamed German automaker.

Magna production will be mostly aimed at the Chinese market. The partners will focus on local core competencies in market development, R&D, advanced manufacturing and key parts supply such as gearboxes, inverter components and e-motors.

"China is the number-one growth market in the world, and they have been clear about their intended leadership in bringing hybrid and electric vehicles to

market," said Magna CEO Don Walker in a statement. "Combining strengths with HASCO helps position Magna and the joint venture for future growth and success."

Magna has been supporting customers in the US and Europe from concept to production with products for battery electric and plug-in hybrid vehicles. In 2009, it partnered with the Ford Motor Co. to introduce the Focus BEV in 2011, a zero-emission lithium-ion battery electric vehicle. Magna provided the electric motor and control module, and was involved in the engineering to integrate the propulsion and other new systems into the vehicle architecture.

Since 2012 the parts and systems manufacturer has supplied Volvo with the electrified rear axle drive system for the Volvo V60 and S60 plug-in hybrids. The system complements a traditional gas- or diesel-engine front-wheel-drive powertrain with an independent electric powertrain for the rear wheels.

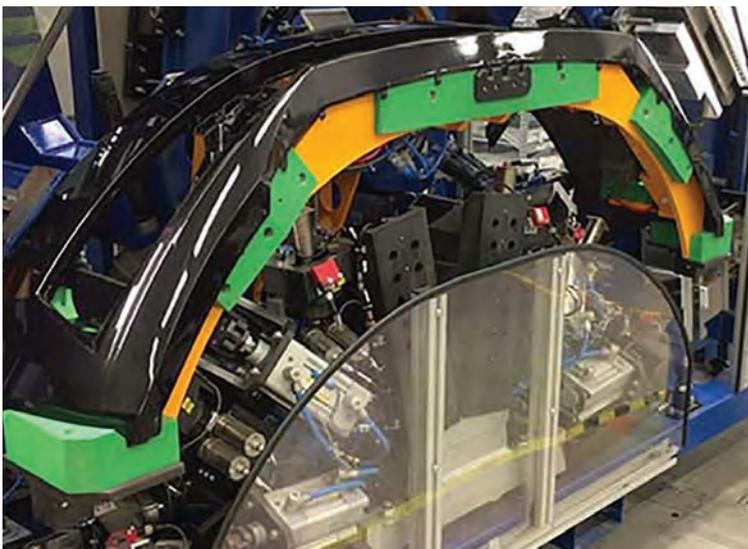
Mirror plant

In Slovakia, business growth at its Slovteca mirror manufacturing facility in Nove mesto nad Vahom led to a US\$30 million expansion.

The new location added 27,820 square-metres of space. The building was refurbished and a new automated paint line was installed (to be operational in 2019), all of which added 150 jobs to the 630-person payroll.

Slovteca supplies approximately 20 different customers and ships to more than 80 locations worldwide.

Magna has 327 manufacturing operations and 100 product development, engineering and sales centres in 29 countries.



Magna's torsional welding process is used to make the front fascia of the 2017 Skoda Octavia.

PHOTO: MAGNA

Comments?

E-mail jterrett@plant.ca.

ERGONOMICS

Overhead RELIEF

FORD EKSOVEST RELIEVES FATIGUE



The EksoVest in action at a Ford assembly plant.

PHOTO: FORD

Exoskeletal tool assists with repetitive overhead tasks in auto assembly.

Manufacturers whose workers perform a lot of overhead tasks will be interested in a contraption developed by the Ford Motor Co. and Ekso Bionics, a developer of exoskeleton devices based in Richmond, Calif.

Ford assembly line workers lift their arms during overhead tasks as many as 4,600 times per day or one million times a year. To relieve the fatigue and prevent injury, Ford and Ekso have developed a new upper body exoskeletal tool.

The EksoVest elevates and supports a worker's arms while performing overhead tasks. It fits workers ranging from 1.5 metres (5 feet) to almost 2 metres (6 feet 4 inches), and provides adjustable lift assistance of 2.3 to 6.8 kilograms per arm. It's lightweight, not bulky, and it allows workers to move their arms freely and perform tasks with tools that weigh up to 3.6 kilograms.

"My job entails working over my head, so when I get home my back, neck and shoulders usually hurt," said Paul Collins, an assembly line worker at Ford's Michigan Assembly Plant. "Since I started using the vest, I'm not as sore, and I have more energy."

The device is suitable for environments other than factories, such as construction sites and distribution centres where there's a need to reduce strain on a worker's body.

With support from the United Automobile Workers and Ford, the vest is being piloted in two US plants, and there are plans to test it in other regions, including Europe and South America.

Investing in the latest ergonomics research, assembly

improvements and lift-assist technologies is paying off. Since 2005, the Dearborn, Mich.-based automaker has recorded an 83% decrease in the number of incidents that resulted in days away,

work restrictions or job transfers – to an all-time low of 1.55 incidents per 100 full-time North American employees. There is also a 90% decrease in ergonomic issues such as overextended

movements, difficult hand clearance and tasks involving hard-to-install parts.

Comments?

E-mail jterrett@plant.ca.



Digitalized Pneumatics

FESTO

World's first in digitalized pneumatics: Festo Motion Terminal VTEM
The Festo Motion Terminal VTEM is opening up radical new dimensions in the world of automation. It's the world's first valve to be controlled by apps. It combines the advantages of electric and pneumatic technology for numerous functions that currently require more than 50 positions.

www.festo.com/motionterminal

FATIGUE

in the workplace

HOW TO FIGHT THIS WORKPLACE HAZARD

Be concerned, it impacts work performance in several ways.

Old, dark mornings, darker afternoons and early evenings characterize late autumn and winter. Feeling tired or rundown is often attributed to the time of year, but any number of other factors may be the cause.

Fatigue is the state of feeling very tired, weary, or sleepy as a result of too little sleep, prolonged mental and physical work, extended periods of stress or anxiety. Boring and repetitive tasks also intensify fatigue. It impacts work performance, something that should concern employers and supervisors.

Factors that may influence fatigue are shift rotation patterns,



An impairment that affects people differently.

PHOTO: FOTOLIA

balanced workloads, timing of tasks and activities, availability of resources and the workplace environment (lighting, ventilation, temperature).

It's a form of impairment that affects people differently, but an Alberta labour department report notes fatigue increases exposure to hazards by:

- reducing mental and physical functioning;
- impairing judgement and concentration;
- lowering motivation;
- slowing reaction time; and
- increasing risk-taking behaviour.

Lack of sleep

Some studies have shown that when workers have slept for less than five hours before work or have been awake for more than 16 hours, their chance of making a mistake is significantly increased.

Here are some tips for fighting fatigue:

- Ensure the work environment does not promote fatigue. Avoid dim lighting, toasty warm temperatures and excessive noise.
- Vary job tasks to eliminate repetition or long periods of boring, monotonous work.
- Incorporate and encourage taking breaks.
- Train workers on the importance of getting enough rest (7.5 to 8.5 hours) and how to

achieve work-life balance.

- Introduce shorter shifts and rotate shifts in the direction of the sun.

Workers can fight fatigue by maintaining a healthy diet that promotes longer-lasting energy. Complex carbohydrates (green vegetables, beans, grains) are preferable to simple carbohydrates (sugars) and they should avoid fatty and junky food.

A steady exercise routine should include cardiovascular, muscle strengthening and flexibility workouts while staying positive and avoiding being overwhelmed by negative circumstances.

Fatigue is not easily measured or qualified, so it's difficult to isolate its impact on accident and injury rates. Being aware of its effects and observing changes in behaviour will help identify and deal with fatigue in the workplace.

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 and the prevention of injury and illness in the workplace. Visit www.ccohs.ca.

Comments?
E-mail jterrett@plant.ca.

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TECHNOLOGY



Sensata's 53TP solid-state relay with thermal protection.

PHOTO: SENSATA

A case for solid state RELAYS

NEW DESIGN PROVIDES INTEGRATED THERMAL PROTECTION

An integrated thermostat ensures relay always operates in a safe or protected mode.

What do large conveyor belts, assembly lines, and other complex manufacturing systems have in common? Big and expensive electrical motors that, if they overheat, can be damaged or even destroyed.

Most large motor driven machinery requires an attached power supply monitoring and safety device attached to the motor that will sense overheating and then return power off.

In many cases, this device is an electrical relay and the two most common types of these devices are electro-mechanical and solid-state relays.

For more than 50 years, electro mechanical relays (EMRs)

were the “go-to” solution for managing load circuits used to power assembly lines, conveyor belts and other large electrical and mechanical systems. However, in the last decade or so, solid-state relays (SSRs) have taken a great deal of the market share.

There are significant differences between the two, especially in terms of life span.

EMRs are mechanical, mak-

SUPPLY LINES



Rittal president Tim Rourke, Michael Almeida, Franklin Empire's general manager. PHOTO: RITTAL

NEW RITTAL PARTNER

Rittal Systems Ltd. has added Franklin Empire Inc. to its distribution/partner network in Canada.

Franklin Empire is an independent electrical distributor with an extensive network in Ontario and Quebec.

Rittal is a German manufacturer of enclosures for industry. It's Canadian subsidiary is based in Mississauga, Ont.

ITC EXTENDS ITS REACH

Emphatec in Markham, Ont., and ITC Electrical Components in Concord, Ont. are partnering.

This extends ITC's DIN rail-mounted AC power distribution and relay modules offerings, and introduces Emphatec's SigNext analogue signal conditioners, and DePro hazardous location modules.

ITC supplies electrical products for automation, machine building, control panels and wiring.

HARNESS TEAM

Turck Chartwell Canada Inc. has assembled a harness and cable assembly solutions engineering team to design custom solutions for challenging applications.

The harness team draws on the company's industry automation expertise to solve difficult connectivity applications, from ordering standard cable and wire assemblies to developing custom overmoulded harnessing.

Turck's Canadian office is in Markham, Ont.

PRODUCT FOCUS

DUST & FUME EXTRACTION

ing them highly susceptible to magnetic noise, vibration, shock and other outside influences that affect wear and life cycle. In contrast, SSRs are solid state with no moving parts to affect wear or accuracy and offer predictable operation plus longer life.

The average lifespan of electro-mechanical relays is 100,000 to 500,000 cycles compared to 2 million cycles for solid-state relays.

Switching is also faster than EMRs, making them adaptable to a wider range of high power load applications. They operate silently with low input power consumption and produce little electrical interference. Both shock and vibration resistant, they withstand harsh environments and continue to operate accurately and reliably. EMRs need frequent replacement, making them unsuitable for harsh conditions.

Thermal management

Because power continually flows through SSRs, whether they're open or closed, there's an ongoing thermal management component to their operation, just like the motors that they control. Should overheating occur, diagnosing and replacing a damaged SSR takes time, requiring the assembly line or manufacturing system to go offline.

To address the overheating challenge, Sensata has developed a technology that integrates a thermostat into the SSR to ensure the relay always operates in a safe or protected mode.

The new SSR cuts off input circuit power when the temperature goes beyond the specified maximum. Power is automatically turned on again when the temperature has cooled down to within the normal operating range.

This usually occurs within minutes of the initial shutdown

and is automatic, while a built-in thermal protection provides a trip before equipment damage occurs.

Thermal protection also troubleshoots design issues in the system by identifying incorrect heat sinking capacity, poor installation resulting in insufficient heat sinking contact, and heat dissipation efficiency.

These SSR designs adapt to a variety of manufacturing applications, such as a conveyor belt where a motor could get stuck or jam, causing an electrical overload.

In this case, the SSR would shut down the conveyor belt as soon as a pre-determined heat threshold was met.

In injection moulding applications where limited space can cause the temperature in the cabinet to rise, the thermostat prevents the SSR from overheating if the heatsinking is not adequate.

For heating systems, the thermally protected SSR helps shut down the elements if there's a problem with the temperature controller that causes a temperature runaway.

SSRs are compatible with control systems, immune to magnetic noise, completely encapsulated and position insensitive, so they're mountable anywhere within an application – whether sideways or upside down. An SSR with thermal protection is a valuable tool for engineers responsible for manufacturing systems.

This is an edited version of an article submitted by Rogelio Castaneda, engineering director, and Oscar Rivera, design engineer, at Sensata Technologies, a supplier of sensing, electrical protection, control and power management based in Attleboro, Ma.

Comments?
E-mail jterrett@plant.ca.



Updated finish.

REDUCE SMOKE AT THE SOURCE

Bernard's has added a new model to the Clean Air fume extraction family with a 300-A MIG gun featuring a finish updated from chrome to black that reduces smoke at the source.

It's available in 400-, 500- and 600-A models that are used with solid and flux-cored wire.

The guns use Bernard's Centerfire, Quik Tip and Tough Lock consumables, as well as the Universal Conventional or Quick Load Liner.

A small vacuum chamber provides joint access and visibility, along with a 360-degree vacuum hose swivel on the rear of the handle that improves flexibility and reduces operator wrist fatigue.

Use the guns for large weldment and confined space welding applications.

Bernard, based in Beecher, Ill., manufactures welding guns, consumables, accessories and manual arc products.

www.bernardwelds.com

REDUCE FIRE RISK

SparkShield, a straight-through cyclone spark arrester from Plymovent Inc., reduces the risk of fire from welding fume extraction systems.

It prevents sparks, spatters and cigarette butts from entering the ductwork and reaching the combustible filter cartridge. SparkShield also works as a pre-separator for high-dust applications.

Its internal design ensures high separation efficiency against a low-pressure drop. Combined with a limestone dosing unit, it helps to prevent fire.

Plymovent Inc. makes air quality products for industry. Canadian offices are in Mississauga, Ont.

www.plymovent.com



High separation efficiency.



Parallel arms.

EXTRACTION ARMS MOUNT ANYWHERE

Mini-Flex extraction arms from LEV-CO extract smoke, gas and light dust from soldering, grinding, gluing and laboratory environments.

The unit features a 360-degree turning flange with parallel arms in 3-, 4- and 5-ft. lengths with 3- and 4-in outlet diameters.

LEV-CO is a Port Perry, Ont. supplier of air pollution control products.

www.lev-co.com

WET MIX PURIFIES AIR

Eurovac's Wet Scrubbers purify air by combing centrifugal forces with the violent mixing of water and contaminated air.

The wet mix dust collectors safely collect potentially explosive and volatile materials and capture fine metal particles during processing and finishing of aluminum.

As the air stream passes the fixed baffles, a heavy, turbulent curtain of water created by the high-velocity air separates the particulates.

Eurovac/Clean Air Technologies Inc., based in Toronto, makes dust and fume extraction products.

www.eurovac.com



Collects volatile materials.

PROTECT AGAINST INDUSTRIAL DUST HAZARDS

Donaldson Co. Inc.'s Packaged Downflo Evolution (DFEP) dust collection system protects fabrication operations from industrial dust hazards.

The complete turnkey system includes a preassembled dust collector with integrated electrical controls, motors and fans for easy installation and operation.

There are currently four- and six-cartridge models with additional models to come.

Horizontal cartridge filter elements placed above the airstream harness gravity to assist in removing dust-laden air. Along with pulse-jet cleaning, the downflow action increases filtration capacity and reduces maintenance to maximize uptime.

Donaldson, based in Minneapolis, manufactures filtration systems for industry.

www.donaldson.com



Reduces maintenance.

EXTRACT WELDING FUMES

The Nederman FilterBox is a flexible, modular mobile filter for welding that extracts fumes and non-combustible dust.

It features 120-V plug and play ease of use, a backflow damper for safe filter cleaning, easy manoeuvrability and an advanced automatic cleaning system with filter load indicator.

The unit combines for mobile or fixed use with accessories that improve individual applications.

Nederman LLC makes dust and fume extraction equipment. Its Canadian office is in Mississauga, Ont.

www.nederman.com



Safe filter cleaning.

POWER TRANSMISSION

RE-ENGINEERED BEARINGS

SKF's re-engineered mounted ball bearing units are tasked for a wide range of light- and medium-duty industrial applications, including conveyor systems, fans and air-handling equipment, and similar machinery across industries.

They come in four cast iron housing types: pillow block units (P2B, P2BL and P2BM), 4-bolt square flange units (F4B and F4BM), 2-bolt oval flange units (F2B), and tapped base units (P2BT).

Housings in an assortment of bore sizes are pre-lubricated and with grease fittings. The bearings easily slip fit onto a shaft. Specify setscrew, eccentric, or concentric shaft-locking mechanisms.

Mounted units integrate with SKF insert ball bearings (inch



Reinforced polyamide cage.

or metric). Raceways have been ground and honed to provide precision, quiet running and higher speed capability. A moulded, glass fibre reinforced polyamide cage adds durability. The outside diameter of the bearing and the inside diameter of the housing are sphered for swivel to compensate for initial alignment errors.

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

www.skfusa.com

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PRODUCTS AND EQUIPMENT

SAFETY

GLASSES DELIVER 9- AND 10-BASE COVERAGE



Three new UVEX series.

Honeywell has expanded its value safety eyewear line with the new Uvex SVP 200, 300 and 400 series.

Each is lightweight and deliver 9- or 10-base coverage.

The low profile, frameless 200 Series in five colours features a moulded nose piece and flexible temple tips for a comfortable, secure fit.

A polycarbonate lens is available in five tints with optional Uvextra anti-fog hardcoat.

The 300 Series has full-frame look with wraparound polycarbonate unilens. It's flexible

at the bone and tendon with dual-material temples.

The 400 Series delivers ample 9-base, wraparound coverage in a stylized, frameless design. Dual-material rubber temples and cushioned nose bridge ensure a non-slip fit. Four lens tints handle indoor and outdoor applications.

Honeywell Safety Products is a supplier of industrial safety products based in Smithfield, RI. www.honeywellsafety.com

FACE MASK IS A COMFORTABLE FIT



Anti-fog lens.

Special compression silicone raises the comfort factor in Comfort Air full-face masks from

Dentec Safety Specialists.

The universal fit works for most people. Its five-point harness ensures an even, comfortable fit with no slippage. The hard-coated lens is anti-fog and a prescription lens insert is optional.

The inner mask prevents CO2 build up and the quick release shielded buckles make removal easier.

Extra large inhalation valves decrease breathing resistance when inhaling and a metal speech diaphragm makes communication clear. And cartridges last longer thanks to the built-in space plenum.

Dentec Safety Specialists in Newmarket, Ont. is a supplier of safety equipment.

www.dentecsafety.com

GUARD AGAINST FLYING CHIPS



Made of polycarbonate.

SLIDEWAYS polycarbonate clear guards provide protection from flying chips or potentially dangerous areas, and along conveyors with clear site lines.

The line includes necessary clamps, handles and hinges for assembling doors and panels.

Flat and cold bent guards are provided to meet most requirements.

SLIDEWAYS is a Worcester, Ma. manufacturer of custom and standard machined plastic extrusions and wear components. www.slideways.com

CONNECTORS

RFID READER FOCUSES PERFORMANCE

HARTING's Ha-VIS RFID Reader RF-R400 concentrates RFID performance with M8 and



Easy data processing.

M12 connectors.

Network, power supply, RS232, two digital trigger signal inputs and four digital signal outlets are available via circular connectors. Each of the four antenna connections with a maximum power output of 2 W remain in the usual SMA format.

It's compatible with the GS1 ALE 1.1-based HARTING middleware.

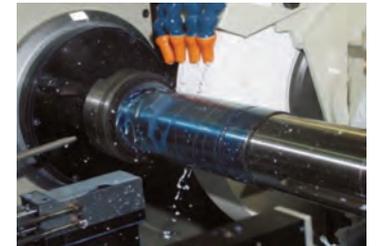
The reader is supported by both the server version, Ha-VIS Middleware and the RF-R350 embedded version, for easy raw data processing.

The HARTING Technology Group makes the HIS product line in Elgin, Ill. The company has a Canadian office in Montreal.

www.harting.ca

MACHINING

CNC SOFTWARE SIMPLIFIES PROGRAMMING



Intuitive HMI.

NUM's NUMgrind package added to the Flexium CAM CNC software suite simplifies machine tool programming for an extensive range of tasks, including external and internal cylindrical grinding, surface grinding, wheel shaping and dressing.

It simplifies the creation of G code programs for CNC machine tools through the use of a highly intuitive graphical HMI, conversational-style 'fill in the blanks' dialogues or a combination of the two.

NUMgrind works in conjunction with embedded CNC grinding and dressing cycles and direct hyperlinks to several production files such as wheel/part data sheets, CAD files and other pertinent grinding production data. This facilitates efficient manufacturing of a diverse

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CBRE

range of work pieces, covering various wheel forms and part types.

It handles a variety of machine configurations such as OD/ID, surface and centreless grinders.

NUM is a manufacturer of tool grinding machines and systems with US offices in Naperville, Ill. <https://num.com>

INCREASE YOUR DRILLING PRODUCTIVITY



Enhanced chip management.

Seco's solid-carbide Feedmax -P drills boost hole making beyond current drilling technology for ISO P (steel), as well as cast iron work piece materials.

They increase drilling productivity by up to 35% and ensure longer tool life thanks to a combination of new geometry and an advanced dark-coloured TiAlN coating that also enhances chip management.

The drill's coolant holes are close to the cutting edges for more efficient cooling with narrow land margins that minimize heat.

An enhanced flute protects drill point corners and maximizes the control and evacuation of chips.

Cutting speeds of 623 ft./min. are possible

Diameters range from 0.078 to 0.787 in. (2 to 20 mm) with length-to-diameter ratios of 3xD, 5xD and 7xD.

Seco Tools in Troy, Mich. supplies metal cutting solutions for milling, turning, hole making and tool holding.

www.secotools.com

EDM IMPROVES MACHINING PRODUCTIVITY

GF Machining Solutions' new FORM P 350 die sinking EDM machine drives productivity.

Its compact C-axis construc-



tion, fixed table and cast iron frame offer high stability and force reduction to maintain a precise spark gap between the part and the electrode. Regardless of part weight or dielectric volume, it delivers consistent accuracy and a best surface finish of Ra 0.1 µm.

Integrated glass scales preserve long-term repeatability so there's no need for recalibration and it eliminates errors due to backlash and wear found in traditional screw systems.

Its TECFORM module ensures the EDM process is continuously optimized with each pulse to reduce electrode wear and obtain the finest finishes.

The FORM P 350 comes standard with a four-position linear tool changer for System 3R macro tooling. A rotary changer can be added to replace the four-position linear changer on the left side of the machine, which increases the number of electrodes up to 160 in a very small space. The machine also pairs with the System 3R Work-Partner 1+ robot for unattended night and weekend operation.

GF Machining Solutions, based in Lincolnshire, Ill., makes machinery and tools for the tool and mould making industry, and for precision components manufacturers.

www.gfms.com

LASER

LASER FOR LIGHT ASSEMBLY

BEA Lasers' GPL line of lasers targets general purpose, medium-duty industrial applications.

Intended for light assembly, simple alignment, positioning and levelling jobs, the system includes a ½-in. OD NPT



Plug-in USB power.

threaded housing with mounting hardware and plug-in USB type power supply.

Its cable is 36 in. and available

patterns include green or red dot, or green or red line, with a nominal focal length of 17 in.

Its housing is CRS and plated with a clear zinc oxide.

The laser module can be powered from the USB port on any computer.

BEA Lasers is a manufacturer of rugged laser modules and assemblies in Elk Grove Village, Ill.

www.bealasers.com



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and minimize downtime.

Mencom Corp. is a manufacturer of industrial connectors based in Oakwood, Ga.

www.mencom.com

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ROBOTS COLLABORATE SAFELY WITH CO-WORKERS

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A 10-kg payload.

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eliminates operator pinch points while through-arm utilities hide cabling to reduce the risk of snagging or interference with other equipment.

It has a 10-kg payload with 1,200 mm reach to perform a broad range of material handling, machine tending, packaging or light assembly tasks.

It's compact (598 x 490 x 427 mm) and controlled by Yaskawa's YRC1000 controller.

The Motoman Robotics Division of Yaskawa America Inc. in Dayton, Ohio makes robotics systems.

www.motoman.com

RUN YOUR ROBOT'S MACHINE TOOLS

Siemens' SINUMERIK Integrate RunMyRobot technology seamlessly integrates robots into the production landscape for the loading and unloading of machine tools.

Sinamics G120 drives support



Supports Profibus DP.

Profibus DP and Profinet for seamless communications between every component involved in a typical automation solution including HMI and I/O.

Access operation, retraction, teach-in and diagnostics from the SINUMERIK 840D sl operator panel the robot operated from the Operate graphical user interface.

The solution is scalable from the automation of individual production islands up to a completely networked system.

Siemens is a global manufacturer of industrial technology with its Canadian head office in Oakville, Ont.

www.usa.siemens.com/sinumerik

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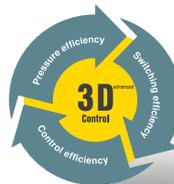


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GET STARTED WITH IIOT



Ready-to-go platform.

There's help available for integrators and engineers developing applications for the Industrial Internet of Things (IIoT).

Moxa Inc.'s IIoT Gateway Starter Kit provides a ready-to-use platform that has all the essentials needed to get data from edge devices to cloud services, but with little to no programming. It includes built-in support for Amazon Web Services (AWS).

ThingsPro Gateway ready-to-run data acquisition software platform provides a Modbus framework to easily connect with Modbus RTU/TCP devices and SCADA systems.

It also includes extensive network support for 4G connectivity, wireless failover, firewalls, and VPN to ensure data is securely retrieved from remote field sites.

A built-in client support for services such as AWS IoT and Cirrus Link Sparkplug gets the data to the cloud. Field data is then transferred to various AWS cloud services – such as Amazon Kinesis, AWS Lambda and Amazon S3 – to collect, process and store data.

Moxa is a provider of IIoT technology based in Brea, Calif.

www.moxa.com

Industrial Literature Reviews

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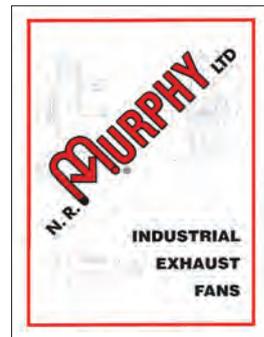
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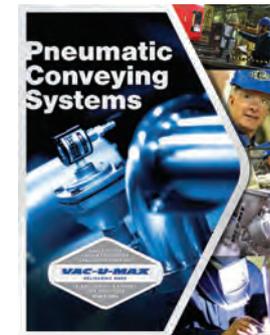
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April 9-12, Atlanta

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STLE 73rd Annual Meeting & Exhibition

STLE

May 20-28, Minneapolis

The annual meeting of the Society of Tribologists and Lubrication Engineers includes technical

presentations, education courses, plus an exhibitor trade show showcasing the latest products, services and technologies. Visit www.stle.org.

PTDA 2018 Canadian Conference

PTDA

June 6-8, Toronto

The Power Transmission Distributors Association (PTDA) presents its annual Canadian Conference featuring education sessions, keynotes and networking. Visit www.ptda.org.

Pack-EX Toronto

UBM Canon

June 4-6, 2019, Toronto

Showcases all that is associated with packaging, including equipment, accessories, technologies and automation. Visit <https://10times.com/pack-ex-toronto>.



Federal tax fight – it's far from over

BY DAN KELLY

You can't blame business owners for feeling like government is bombarding them. Increased EI premiums, new environmental levies, minimum wage hikes and announcements about new taxes and regulations were common this year. But perhaps the most significant tax announcement came in the summer, when federal finance minister Bill Morneau introduced a series of proposals that would dramatically change the way small businesses in Canada are taxed.

The Canadian Federation of Independent Business (CFIB) immediately began consulting tax professionals and surveying business owners to get an understanding of how these tax changes would affect small business owners and their families.

What we learned was alarming.

The proposals would restrict small business owners from sharing income with family members, hike taxes on some investments, and make it more difficult for entrepreneurial families to transfer their businesses to sons and daughters.

And, contrary to the government messaging (which seemed to characterize small business owners as fat-cat tax cheats), we learned these changes would have hurt the majority of middle-income business owners, including those who earn as little as \$50,000 in annual income.

On behalf of our 109,000 members, CFIB sprang into action. We fielded hundreds of calls, surveyed our members, launched alerts and petitions and helped share information through web posts, social media campaigns, webinars and hundreds of media interviews. Advocacy teams met one-on-one with MPs, cabinet ministers and premiers from across the country ensuring they all knew about the ramifications of these proposals. And we presented our findings to both the House and Senate committees.

We also helped form a coalition of more than 75 groups representing hundreds of thousands of small businesses with a unified message: take these proposals off the table and work with the business community to address any shortcomings in tax policy affecting private corporations.

Business owners also took direct action, including reaching out to their MPs, setting up special websites, expressing their outrage on social media and packing local meeting halls.

In my 23 years of working on behalf of small businesses, I have not seen this degree of spontaneous outrage toward any other government policy.

Following a hurried 75-day consultation period, the government retreated – at least partially.

A 2015 election promise to reduce the small business corporate tax rate to 9% (abandoned in 2016) was reinstated. It will help return hundreds of millions of dollars to small business owners.

The government also made some important changes to the original proposals. Most notably, it dropped provisions to limit the use of capital gains in business succession, it will allow up to \$50,000 in annual income from passive investments (equivalent to a 5% return on a \$1-million investment) and some of the rules around sharing income with family members were clarified.

Are the changes enough? The short answer is no.

While the government has backed away from its original bluster, these are still new tax measures that will likely make it more difficult for owners to grow their businesses, innovate and create jobs.

Specifically, the \$50,000 threshold for passive investment is still very low: barring any further concessions, larger passive investments will be largely taxed away, denying a growing business the resources it needs to expand or to buy that new piece of equipment needed to improve productivity.

Also, the current provisions around sharing business income among family members involved in the firm are still worrisome. If the provision is passed as is, it will be up to the Canada Revenue Agency to determine if the spouse or adult children made a “meaningful” contribution to the business. We are still fighting for the government to release an impact assessment on all remaining tax changes and allow for an additional period of consultation with small business owners before making any changes.

This tax fight has demonstrated to decision-makers there is a growing sense among entrepreneurs that governments don't understand them or appreciate their contributions to the economy.

This is significant.

The tax fight was also evidence there's strength in numbers — through CFIB and the coalition of business groups, small firms united together to send the government a clear message about unfair tax proposals.

What would the tax proposals look like today had we not pushed back?

Dan Kelly is the president and CEO of the Canadian Federation of Independent Business. Visit www.cfib-fcei.ca.

Comments? E-mail jterrett@plant.ca.

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