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PLANT

ADVANCING CANADIAN MANUFACTURING

Volume 73, No. 08 November/December 2014

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TARGET LOCKED

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Manufacturers' Outlook 2015

Survey reveals how Canadian companies are driving growth

NEW TECHNOLOGY SECTION

CIEN

CANADIAN INDUSTRIAL EQUIPMENT NEWS

HIGHLIGHTS

Accelerating 3D technology adoption
Licensing: a key to new markets
How to leverage generational distinctions
Cozying up to cobots

BREAKING MANUFACTURING NEWS

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The Truth About Compressed Air!

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

Compare these Blowoffs

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

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

Facts about Blowers

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

Filters must be replaced every one to three months.

Belts must be replaced every three to six months.

Typical bearing replacement is at least once a year at a cost near \$1000.

- Blower bearings wear out quickly due to the high speeds (17-20,000 RPM) required to generate effective airflows.
- Poorly designed seals that allow dirt and moisture infiltration and environments above 125°F decrease the one year bearing life.
- Many bearings can not be replaced in the field, resulting in downtime to send the assembly back to the manufacturer.

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

To discuss an application, contact:

EXAIR Corporation
11510 Goldcoast Drive
Cincinnati, Ohio 45249-1621
(800) 903-9247

Fax: (513) 671-3363

email: techelp@exair.com

www.exair.com/18/423a.htm



See the Super Air Knife in action.
www.exair.com/18/akvideo.htm



Drilled Pipe

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



Blower Air Knife

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



Flat Air Nozzles

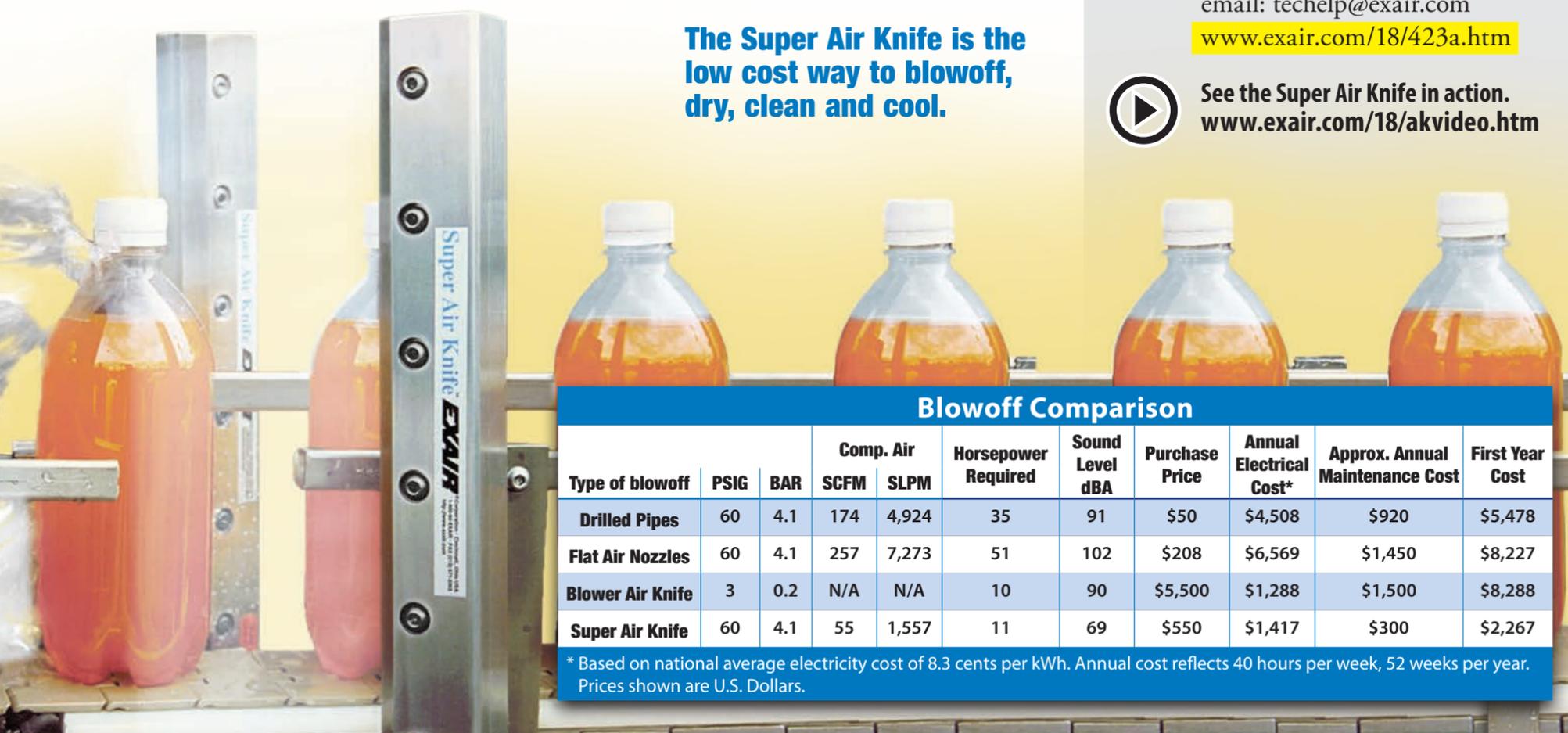
As shown below, this inexpensive air nozzle was the worst performer. It is available in plastic, aluminum and stainless steel from several manufacturers. The flat air nozzle provides some entrainment, but suffers from many of the same problems as the drilled pipe. Operating cost and noise level are both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



EXAIR Super Air Knife

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

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



Blowoff Comparison

Type of blowoff	Comp. Air		Horsepower Required	Sound Level dBA	Purchase Price	Annual Electrical Cost*	Approx. Annual Maintenance Cost	First Year Cost		
	PSIG	BAR							SCFM	SLPM
Drilled Pipes	60	4.1	174	4,924	35	91	\$50	\$4,508	\$920	\$5,478
Flat Air Nozzles	60	4.1	257	7,273	51	102	\$208	\$6,569	\$1,450	\$8,227
Blower Air Knife	3	0.2	N/A	N/A	10	90	\$5,500	\$1,288	\$1,500	\$8,288
Super Air Knife	60	4.1	55	1,557	11	69	\$550	\$1,417	\$300	\$2,267

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



Time to be bold

Canadian manufacturers have many great qualities. There are some truly innovative entrepreneurs carrying the flag for our brand, which is respected around the world. But ladies and gentlemen, they must be bolder.

PLANT's 2015 Manufacturers' Outlook survey of a mostly "cautiously optimistic" group of senior executives, found they continue to focus on domestic and US markets.

More than 90% of the 416 respondents derive most of their business from trade in North America (63.1% in Canada). Over the next three years, about 83% will seek new markets within the home continent, and from there the numbers take a mighty tumble. China is a huge opportunity, not without some risk, and so far just 2% of the respondents are doing business there.

The federal government is wrapping up trade deals with the European Union and South Korea, and negotiating the Trans-Pacific Partnership, all representing expansion into markets that should translate into growth and jobs. Yet only 11% of the Outlook respondents appear to be stoked by the opportunities.

The survey found 70% of companies intend to finance growth over the next three years from cash flow. This suggests investment will be conservative, yet Canadian businesses will need to spend on machinery, equipment and technology to address – among other things – the need for much improved productivity.

Most of the Outlook companies (65%) are small (fewer than 100 employees), and 33% of the total are really small. They are lacking the resources to which much larger manufacturers have access, there are challenges getting financing from outside sources, and they're still shaking off the effects of the 2008-09 economic turmoil, so it's understandable they're focusing on markets that are familiar and reliable.

But it's a mistake to believe North America – or Canada – represent safe havens. There are legions of competitors from all over the world that are looking for new territory to conquer and will be only too happy to relieve the home-team companies of their lunch money.

Some of the big Canadian players have thrived through the adversity, and their experience has been translated into practical advice in a project that looks at *The Future of Canadian Manufacturing*.

Researchers at the Lawrence National Centre for Policy Management (Ivey Business School, London, Ont.) have put together a comprehensive report that provides case studies from nine companies in automotive parts, food and diversified manufacturing. Common characteristics include: exposure to global competition; a decentralized management structure based on an entrepreneurial culture; investment in innovation as a critical strategy; greenfield investments and acquisitions to expand their geographic reach; and significant resources directed to developing skilled workers and managers.

The project also offers general recommendations. One is to help firms acquire expertise to break into global markets. Companies would bring in an experienced executive to be a "mentor" that advises and perhaps provides an in to its established networks.

Number two is to ensure companies have the skilled people they need, which would be helped along by partnering with local schools and colleges.

The third recommendation is for governments to unplug transportation bottlenecks. When it comes to attracting investment, Mexico is kicking our ass. A fourth recommendation calls for all levels of government to make Canadian manufacturing a shared priority and work together to attract more investment.

Manufacturers need to become bigger and bolder to create a more dynamic environment that will attract the entrepreneurs of the future.

Download the more detailed components of *The Future of Canadian Manufacturing* at www.ivey.uwo.ca/lawrencecentre/research.

Joe Terrett, Editor

Comments? E-mail jterrett@plant.ca.



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» Bulletins



Compressed and liquid gases for Southern Ontario. PHOTO: AIR LIQUIDE

Air Liquide Canada has inaugurated its \$2 million state-of-the-art centre of operations in Cambridge, Ont., which includes a filling plant, a distribution centre and an administrative office. The subsidiary of Air Liquide Group said the 50,000 square-foot facility will supply customers in Southwestern Ontario.

Bombardier has expanded its family of business jets with the new Challenger 650 aircraft in partnership with **NetJets**, the global launch customer. The **Berkshire Hathaway** company based in Columbus, Ohio, a supplier of private jets, placed a firm order for 25 jets, with options for 50 additional aircraft.

Orbite Aluminae Inc. has acquired patent applications through universal assignment from another company relating to a process for treating magnesium-bearing materials. The assignment in favor of **Orbite** by **Alliance Magnesium Inc.**, a Quebec-based private company, follows the public disclosure of regulatory filings for related intellectual property. **Orbite**, a Canadian cleantech company with a commercial high-purity alumina plant in Cap-Chat, Que., had advised Alliance the applications are based on its intellectual property.

Domtar Corp., a maker of paper products based in Montreal, has been recognized for its leadership in sustainability with the first FSC Leadership Award for the paper sector at the Greenbuild 2014 Conference in New Orleans. The award celebrates Domtar's pursuit of FSC certification in North America and its commitment to maintaining forests.

Enerkem Inc., a Montreal-based waste-to-biofuels and chemicals producer, has signed a MOU with **Shanghai Environmental Group Co. Ltd.**, a solid waste management company. Enerkem will license its technology for use in China and the partners will jointly build municipal solid waste-to-biofuels and chemicals facilities. Final business structure and sites are under discussion.

Magna opens Mich. exteriors facility

Will produce front- and-rear fascias for several GM brands

AURORA, Ont. — Magna International Inc. has opened its new Dexsys greenfield facility in Delta Township, Mich., where it will manufacture automotive exterior components.

The 290,000-square-foot injection moulding and robotic paint line facility will employ approximately 340 people at full production. They'll produce front and rear fascias for several General Motors vehicles, including the Cadillac ATS, GMC Acadia and Buick Enclave.

The Aurora, Ont.-based autoparts company now has 28 manufacturing operations and more than 10,000 employees in Michigan.



Michigan governor Rick Snyder, US Senator Debbie Stabenow and GM executives joined Magna International officials at the Dexsys plant opening. PHOTO: MAGNA INC

BoC to establish rembini currency hub

Canadian exports to China will grow 11% annually through 2017

VANCOUVER — The Bank of Canada and the People's Bank of China have signed a memorandum of understanding to establish Canada as the first rembini trading hub in the Americas.

Canada becomes the eighth global hub, along with Hong Kong, London, Singapore, Paris, Frankfurt, Seoul and Doha.

China is the largest trading economy in the world, and Canada's second-largest trading partner behind the US.

Global banking firm HSBC has established RMB trade capabilities in more than 50 markets globally, including



32% CANADIAN COMPANIES

... are non-users that expect to transact in RMB.

Canada, and was the first international bank to settle RMB trade on all six continents.

The rembini overtook the euro to become the second-most used currency in global trade finance after the US dollar

in December 2013. China was the world's second largest destination for foreign direct investments (FDI) in 2013. Overseas Direct Investments reached US\$115 billion in 2012.

In 2013, bilateral trade between Canada and China reached \$73.2 billion, or 7.7% of Canada's total merchandise exports. Trade between the two countries increased 57% between 2007 and 2012.

HSBC expects Canada to increase its exports to China by 11% annually over the next three years. Imports will grow by 8% over the same period.

CEIM innovation project gets \$6.2M

MONTREAL — A Quebec innovation project involving CEIM and McGill University that will provide student and faculty entrepreneurs with resources for start-ups is getting \$6.2 million over five years from the Government of Canada.

McGill innovators will have access to coaching and consulting services in various aspects of the commercialization process, including strategic planning, raising capital, identifying laboratory or production facilities, structuring legal and financial agreements, developing intellectual property and initiating domestic and international sales.

Financial support is provided by the Canada Accelerator and Incubator Program (CAIP) and delivered by the National Research Council of Canada Industrial Research Assistance Program (NRC-IRAP).

CEIM is a start-up incubator facility located in Montreal's Quartier de l'innovation.

NS launches tidal energy JV

HALIFAX — Tidal technology group OpenHydro and its Canadian partner Emera Inc. have launched a joint venture business to deploy a fully grid-connected 4 megawatt tidal array in the Bay of Fundy in 2015.

The company says the Cape Sharp Tidal project has the potential to be one of the world's first multi-megawatt arrays of interconnected tidal turbines, providing energy to over 1,000 customers in Nova Scotia. Cape Sharp Tidal employs a local team of 10 people based in Dart-

» Feedback

TOO MUCH CONTROL

"Corporations play a vital role in society" by Gwyn Morgan (**PLANT**, Oct. 2014) makes many good points about why large businesses are important to society, and they surely are. But the article fails to touch on why so many people see corporations as evil, to varying degrees.

Today, corporations (and unions) exert a great deal of control over government policy and the people at the top of those organizations are seen to be over-paid compared to the contributions they make to their companies and to society in general. The gap between executive salaries and labour salaries is about 100 times what it was in the 1960s. Instead of "telling their stories" as the author suggests, corporate leaders would do well to take a hard look at their public image and try to see why it's so poor.

If they did this, perhaps they'd realize it would do them some good to welcome laws that limit their influence over people's lives by curtailing the huge financial power they exert on elections and elected officials.

— Andrew Roudny
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Honda invests \$857M in Alliston plants

Ontario contributes 10% for “leading-edge technologies”

ALLISTON, Ont. — Honda of Canada Mfg. will invest \$857 million over three years to equip its Ontario manufacturing plants with new technologies and processes for the company’s next generation Civic passenger car.

The investment brings Honda’s total to over \$3.9 billion since 1986, when it became the first Japanese auto maker to build a manufacturing facility in Canada.

“This marks the first time a Honda plant outside Japan has been designated as a ‘global lead plant’, which reflects the knowledge and experience of our Canadian associates,” said Jerry Chenkin, president and CEO of Honda Canada Inc.

The Ontario government will contribute 10% as a conditional grant of up to \$85.7 million for “leading edge technologies” to upgrade vehicle assembly and engine manufacturing. It will be doled out over five years.

The two auto assembly plants and an engine plant will be the first in the world to launch the next generation Civic into mass production. Honda says it will become a teaching plant that



Honda Canada CEO Jerry Chenkin alongside Ontario premier Kathleen Wynne and Minister of economic development, employment and infrastructure, Brad Duguid on Nov. 6.

PHOTO: HONDA CANADA.

will form the manufacturing base for all global Honda plants that build the Civic.

Honda can produce 390,000 Civic and CR-V models annually for the Canadian and North American and other export markets. It also makes 240,000 four-cylinder engines annually.

DBG secures \$8.8M in capital from GE

TORONTO — GE Capital Canada has provided an \$8.8 million senior secured credit facility to DBG Canada Ltd., a manufacturer of heavy-duty truck parts, which the company will use to refinance an existing term loan and for working capital.

Headquartered in Mississauga, Ont., DBG manufactures metal stampings, modular welded, structural welded and mechanical assemblies for truck OEMs including Navistar International Corp.

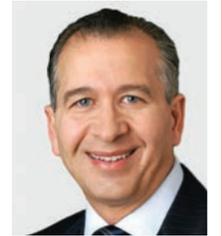
It also has customers in the automotive, military and agriculture industries.

The company has more than 900 employees at six facilities in Canada and Mexico.

» Careers



Phil Underwood



Michael Shorts

Magellan Aerospace Corp., a manufacturer of aircraft assemblies and components based in Toronto, has appointed **Phil Underwood** CEO. He replaces the retiring **Jim Butyniec**, who will become vice-chairman of the board. Underwood was appointed president in May.

The Fluid Sealing Association (FAS) has appointed **Michael Shorts**, vice-president and general manager for Triangle Fluid Controls Ltd. in Belleville, Ont., president of its board of directors. FSA members account for most of the manufacturing capacity for fluid sealing devices in the Americas market.

Louise Fecteau has been re-appointed to the Canada Industrial Relations Board (CIRB) for a three-year term. She began service on the board in 2003 as vice-chair. The CIRB is an independent tribunal responsible for the interpretation and administration of industrial relations and occupational health and safety provisions of the Canada Labour Code.

Craig Rix has been appointed to the board of the Windsor-Detroit Bridge Authority (WDBA) for a three-year term. Rix is a partner with the law firm Hicks Morley Hamilton Stewart Storie LL. Windsor Mayor **Eddie Francis** has also joined the board of the not-for-profit Crown corporation that will manage the procurement process for the new bridge.

EnerDynamic Hybrid Technologies Corp. (EHT) has appointed **James Kerr** CFO. The senior executive has held senior positions with publicly traded companies in alternative energy, exploration and construction. EHT, based in Toronto, is a provider of turnkey energy systems using solar photovoltaic, wind generation and batteries.

Anticosti, Gaz Metro reach deal

Agreement focuses on Anticosti Island resource

MONTREAL — Anticosti Hydrocarbons LP has signed a strategic agreement in principle with the Gaz Metro Limited Partnership to develop natural gas from Anticosti Island.

It gives Anticosti Hydrocarbons access to Gaz Metro’s expertise in natural gas distribution, and they’ll identify ways to transport the fuel to consumer markets if the resource is developed.

Anticosti Hydrocarbons, a limited partnership between Ressources Qué-

bec Inc., Pétria Inc., Saint-Aubin E&P (Québec) Inc. and Corridor Resources Inc., said there are a variety of technical issues to address, including storage, transportation and distribution of the natural gas.

It has agreed to an exclusive partnership for the next five years with Gaz Metro, which will have acquisition rights to any natural gas produced from wells on Anticosti Island and transport or distribute it to market.



Gaz Metro serves 300 municipalities in Quebec.

PHOTO: GAZ METRO.

Gaz Metro has a network of more than 10,000 kilometres of underground pipelines that serve 300 municipalities and more than 190,000 customers in Quebec.



New radar sensors in Canadian forces LAVs will keep soldiers safe.

PHOTO: GENERAL DYNAMICS CANADA.

General Dynamics awarded \$287M contract

LAV upgrades will maintain 60 jobs at its London facility

LONDON, Ont. — General Dynamics Land Systems Canada has been awarded a \$287 million contract by the Canadian government to equip 66 light armoured vehicles (LAVs) with a new reconnaissance and surveillance system for the Canadian

Armed Forces.

The upgrades will be completed at General Dynamics’ London, Ont. facility, and will include sensors in the LAVs so soldiers will no longer have to leave the vehicle to use radar equipment.

Infrared equipment will also

be installed to improve day and night vision, and the vehicle’s firepower and mobility will be upgraded.

The LAV manufacturer, part of General Dynamics Corp., expects the contract to maintain 60 full-time positions at its London facility.

EMC’S ENERGY BUYING GROUP: A BRIGHT IDEA!

Excellence in Manufacturing Consortium has a mandate to help manufacturers in Canada succeed. We established Ontario’s only non-profit energy buying group to help them save money.

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Contact us today to find out more.

1.866.323.4362
energy@emccanada.org



Siemens supplies two wind projects

OAKVILLE, Ont. — Siemens Canada Ltd. will be supplying the turbines for two Ontario wind-energy projects: one in Kincardine and the other in Sarnia, which will provide power for a combined 110,000 homes.

In Kincardine, the subsidiary of the German industrial products company will supply, install and commission the turbines for Samsung Renewable Energy Inc. and Pattern Energy Group LP at the 180-megawatt Armow Wind project.

Siemens says the project will generate power for about 70,000 homes, create 200 jobs during construction and 15 permanent jobs.

Commercial operation is to begin in the fourth quarter of 2015.

The 273 49-meter blades will be manufactured at Siemens' blade facility in Tillsonburg, Ont., and 91 towers for the project will be manufactured locally at CS Wind's facility in Windsor, Ont. using Ontario-made steel.

The deal includes a three-year service and maintenance agreement.

Siemens will also deliver and install 46 SWT-2.3-113 direct-drive wind turbines to the 100-megawatt Cedar Point project in Sarnia. The deal includes a two-year service and maintenance agreement.

The 138 55-metre blades will also be manufactured at Siemens' Tillsonburg plant.

OCE partners on aerospace R&D

Network will support industry-academic collaboration

TORONTO — Ontario Centres of Excellence (OCE) and the Ontario Aerospace Council (OAC) are teaming up with the newly formed Consortium for Aerospace Research and Innovation in Canada (CARIC) to support innovation.

The partnership will identify and develop opportunities for more industry-academic aerospace R&D collaborations.

A full-time OCE business development manager will be assigned to identify and facilitate the collaborations.

Formed in April, CARIC is a national research and technology network that brings together stakeholders from industry, universities, colleges and research institutions to identify strategic aerospace technology areas and facilitate R&D.



Brent Colver of the OAC; Tom Corr, CEO of Ontario Centres of Excellence; and Denis Faubert, CEO of CARIC, sign the agreement that will advance aerospace R&D in Ontario.

PHOTO: ONTARIO CENTRES OF EXCELLENCE

WANT TO TAKE A CLOSER LOOK AT YOUR INVENTORY MANAGEMENT?



We can help.

Bring your MRO spend into sharper focus. With services like KeepStock™ inventory management from Acklands-Grainger, you can create efficiencies and manage your budget with greater precision.

acklandsgrainger.com/FacilityIndustries

WHAT YOU NEED IS JUST THE BEGINNING.

We have Canada's largest MRO product offering. But we also have the know-how that comes with over 125 years of experience in managing procurement and inventory challenges. So while we supply products, we deliver practical solutions and positive results too.

**ACKLANDS
GRAINGER**
INDUSTRIAL • SAFETY • FASTENERS

» Events

LEAN Level 1 Certification - Yellowbelt CME

Jan. 14-March 12, Truro, NS.

This yellowbelt certification program is delivered by manufacturing industry leaders. Six modules. 8:30 a.m.-4:30 p.m., modules 1 & 2, Jan. 14 & 15; modules 3 & 4, Feb. 11-12; modules 5 & 6, March 11-12. Visit www.cme-mec.ca, click on Events

Cargo Logistics Canada

Expo+Conference

Informa

Jan. 28-29, Vancouver

Speakers will discuss issues relevant to the entire freight spectrum. CLC also includes exclusive distribution centre tours, networking events and a supply chain tradeshow. Visit www.CargoLogisticsCanada.com.

STLE 70th Annual Meeting & Exhibition STLE

May 17-21, Dallas

The Society of Tribologists and Lubrication Engineers (STLE) conference showcases more than 400 technical papers, application-based case studies and best practice reports, and discussion panels on technical or market trends. Visit www.stle.org.

Motor & Drive Systems 2015

ISA

Jan. 21-22, Orlando, Fla.

Sponsored by the International Society of Automation (ISA), the 12th annual conference focuses on technical advancements. Visit www.e-driveonline.com/conferences.

Asset Reliability

CI Energy Group

Feb. 4-5, Edmonton

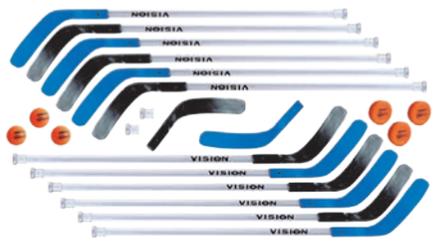
Processes and strategies needed to drive best reliability practices. Visit www.canadianinstitute.com/2015/268/asset-reliability.

Shutdowns Fort McMurray

CI Energy Group

March 3-4, Fort McMurray, Alta.

The 4th annual conference covers the delivering of shutdown projects that meet budget, stay within targeted timelines and put safety at the forefront. Visit www.shutdownsfortmcmurray.com.



DOM Sports & SYSPRO ERP

Established in 1968 by Dom Petrucci, DOM Sports has manufactured sports and PE equipment for over 40 years. From its office/manufacturing facility and warehouse in Toronto, DOM Sports supplies schools, parks and recreation centers, correctional facilities, government housing, community centers and seniors groups across Canada, the United States and Europe.



“We manufacture and distribute a diversified line of top-quality, durable, safety-first sports equipment for the institutional market,” says Mike Zanon, Manager of Business Systems and Administration. “Our big sellers are gym hockey and fitness-based activity equipment and programs for schools, but we also distribute giant games (such as chess and checkers) to camps, resorts, bible groups and corporate get-aways, as well as floor shuffleboard to senior centres and ice ringette sticks to retail sports stores. We have a number of websites that target each of the different markets we serve. Most of them provide information that directs the consumer to a local seller or distributor, but our floor shuffleboard site serves the target market directly with an entire line of equipment. We also deal directly with retail sports shops (such as Pro Hockey Life and Play It Again Sports) for ice ringette. These various product groups each serve a different customer base, and each comes with a different set of demands and requirements.”

In the past, says Zanon, DOM Sports manufactured 90% of its products, but over the years the business has moved increasingly towards distribution. “These days we do more distribution and less manufacturing, although we still assemble much of our gym hockey equipment. Over the past three years we’ve experienced a great deal of growth, and the scope of our business has increased considerably. With the addition and expansion of product lines we’ve seen our item codes grow by 40% and our customer base grow by 30%. The number of physical orders we receive has almost doubled.”

Since 2006, DOM Sports has run its business on SYSPRO Enterprise Resource Planning (ERP) software. “We’re very tied into SYSPRO,” says Zanon. “In fact, we use almost the entire suite of modules. One of the reasons we originally chose SYSPRO was because we saw the benefits of full integration. The system we were using before had some of the same features, but it didn’t have the breadth of functionality, or the customization capabilities. For example, it had an

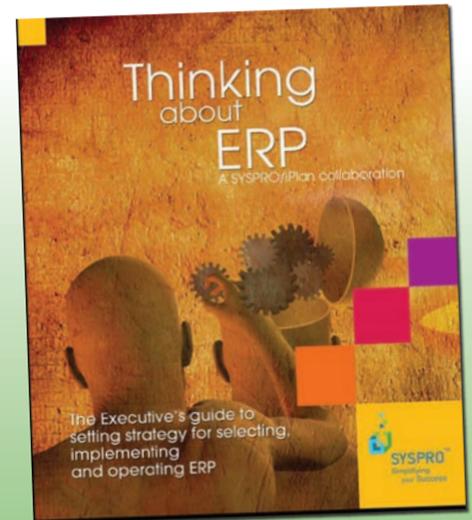
inventory system, but it didn’t tie in with work in progress (WIP) and receipts. We needed a system that could take us from raw materials to WIP to inventory, and accommodate full integration with labour tracking and accounts payable. On the distribution side, SYSPRO has given us enhanced capabilities within Order Entry with respect to pricing, custom notes, tracking and kitting. That allows us to better service our different customer bases, and to respond effectively and efficiently to each of their special requirements.”

In June, 2014, DOM Sports upgraded to SYSPRO’s most recent software release, SYSPRO 7. “The implementation went smoothly,” says Zanon. “The process started on a Friday and by Monday we were operational, with all the new functionalities available. Whenever there’s a new upgrade we take advantage of it, and we saw some key improvements in SYSPRO 7. We definitely appreciate Quick Entry, which creates efficiencies in terms of entering orders. For our ice ringette orders, for example, we have a long list of available models and colours of sticks. The new Quick Entry feature enables the creation of template orders, which saves a significant amount of time and improves accuracy. Quick Entry also gives us the ability to enter the order from an Excel sheet if desired.”

SYSPRO, says Zanon, has proved itself capable of handling everything DOM Sports requires of it. “It’s been a good investment with a rapid ROI. There are seven of us working in the office and five are active SYSPRO users — we have all seen the benefits of using SYSPRO. The software is very customizable, and SYSPRO has automated many of the business processes we were previously doing manually. In addition to automation, we need information to run the business at peak efficiency, and with SYSPRO we have all the real-time information we need right at our fingertips. Personally, I would recommend SYSPRO ERP without any hesitation.”

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“In addition to automation, we need information to run the business at peak efficiency, and with SYSPRO we have all the real-time information we need right at our fingertips. Personally, I would recommend SYSPRO ERP without any hesitation.”

Mike Zanon
Manager of
Business Systems
and Administration

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Good jobs for Canada's young are possible

BY JERRY DIAS

Today's tough economy has taught Canada's young people an appalling lesson – work harder, but expect less. They've followed the right advice and gone to school, trained and accepted unpaid internships to gain valuable work experience.

Yet good jobs elude them.

Instead, they end up with low-paying, precarious jobs that make it difficult, if not impossible, to build a secure future or raise a family.

“We can create good jobs by using Canada's abundant resources to actually make things...”

As Alastair Woods, chairperson of the Canadian Federation of Students, Ontario noted at the Good Jobs Summit in Toronto, many people work 40 hours a week or more in unpaid internships, afraid to say anything for fear they'll never work in that field again.

This is a heart-breaking situation we've created for our children and it just isn't good enough. We can and must do better.

The summit, put together by Unifor, Ryerson University, the Canadian Federation of Students and the Canadian Centre for Policy Alternatives, explored several issues, including:

- how to turn low income, precarious jobs into good jobs;
- where the jobs will come from; and
- how young workers and students can succeed in Canada's difficult labour market.

This national dialogue heard from a diverse group that included students and people from business, labour, community organizations, and some political leaders. All agreed good jobs are possible.

By working together, industry, government, labour and communities can develop sustainable plans and make strategic investments.

One good example is the New Brunswick forestry plan, which promises more Crown land and greater protection for wildlife zones. This merges the interests of industry, Aboriginal communities and environmental groups. Released in March, it was followed by an announcement of a \$513 million investment by JD Irving.

Unifor, working with industry and government, had long pushed for such a plan. Now, a similar plan for the forestry industry is needed across the country. We can create good jobs by using Canada's abundant resources to actually make things.

More than 1,000 delegates at the Good Jobs Summit talked about similar ideas for three days in public forums and smaller workshops. There were repeated calls for sector councils and an industrial strategy that could reinvigorate manufacturing.

Come together

Certainly there are many issues. Labour, business, government and young people must find the solutions. Such a diverse group of stakeholders will not see eye-to-eye on every difficult issue, but they should not be afraid to disagree. What's most important is a shared understanding of the complexities that are involved and a willingness to work together.

Of course, it will take more than good intentions and impassioned speeches. Real success comes through the relationships forged and the potential they create. One project that emerged from the summit as a result of this potential is a “Roundtable on Good Jobs.”

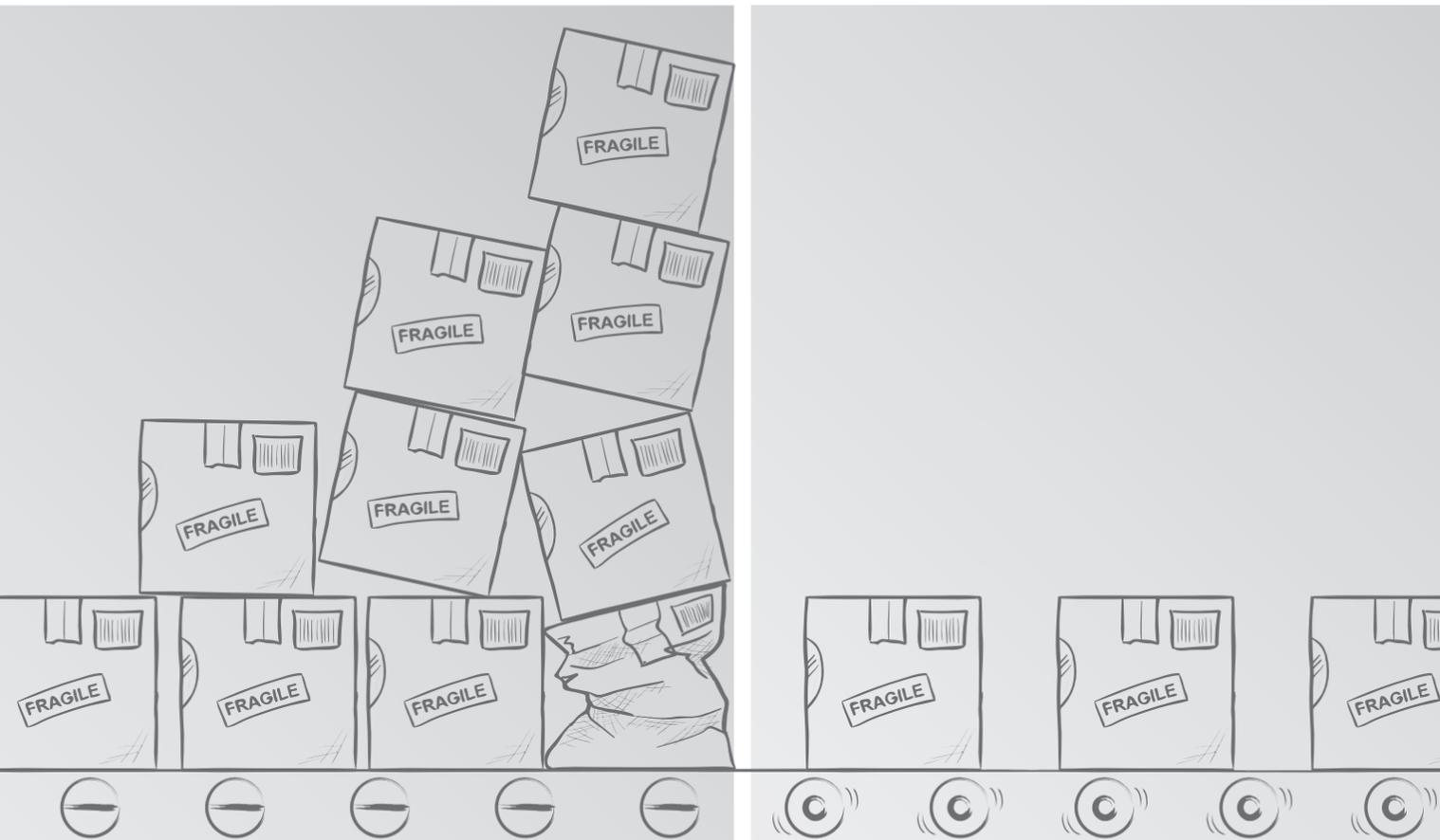
Joining me on the roundtable will be J.D. Irving co-CEO Jim Irving, Canadian Federation of Students national chairperson Jessica McCormick, former Toronto mayor and World Wildlife Fund Canada CEO David Miller and Metro Vancouver Alliance Organizer Deborah Littman.

Our job will be to develop strategies and policies that create the good jobs Canada needs.

There are some very talented people on the roundtable. Their best efforts are needed to get the job done.

Jerry Dias is the national president of Unifor, Canada's largest union in the private sector with more than 300,000 members.

Comments? E-mail jterrett@plant.ca.



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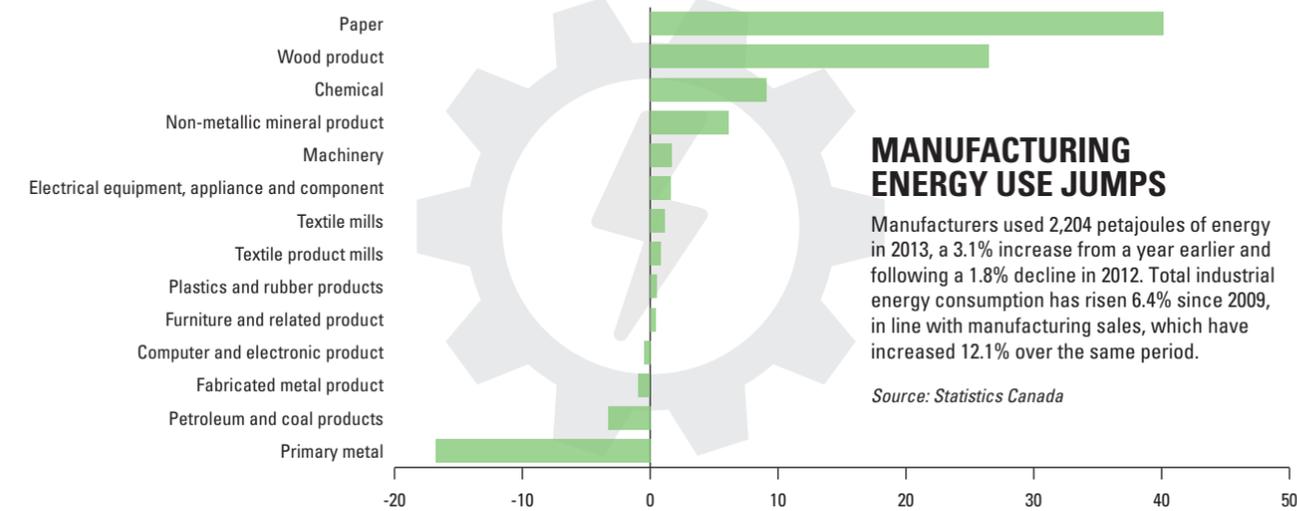
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ONTARIO'S EXPORTS TO SURGE

US demand will drive growth

Export Development Canada (EDC) says surging US growth will power Ontario export growth in 2015.

Key to that growth is the province's industrial machinery sector, which is being driven by strong demand south of the border. Exports are projected to grow by 10% this year, and jump to 17% in 2015, making it the biggest mover in Ontario's economic forecast.

EDC says Ontario exports will increase by 7% in 2014 and 5% in 2015.

"Tight industrial capacity stateside is igniting US business investment well ahead of the normal timetable," said Peter Hall, EDC's chief economist.

Ontario's manufacturing sector will be a major beneficiary of the recovery in the US, predicts Hall. The auto sector has seen surprisingly strong growth this year and is nearing pre-recession production levels with continued growth next year.

However, without considerable new investment Ontario will bump into capacity constraints that will limit automotive sector export growth next year. The sector, which accounted for 35% of the province's total exports in 2013, is to expand by 8% this year and another 3% in 2015.

"Considering the competitive factors and capacity constraints, the sector is continuing to perform well," said Hall. "A lower Canadian dollar and increasing US auto sales will help support the industry's growth, but competition from Mexico and southern US states persists."

Hall said assembly has recovered somewhat from the 2008-09 recession when vehicle production fell to 1.4 million units. This year it's expected to reach 2.3 million units.

Mining and metals, the province's second largest sector, is forecast to grow by 3% this year and 6% in 2015.



The percentage of employers concerned about the employability skills of graduates. Respondents to a survey observed gaps among job candidates and recent hires in critical thinking and problem-solving. Almost half said they are seeing deficits in literacy, communication and teamwork skills.

Source: The Conference Board of Canada.



40%

The percentage of Canadian businesses sitting on cash reserves. Owners are optimistic about future growth, but most are not thinking about tapping new markets. Barely a third have expansion plans.

Source: CIBC



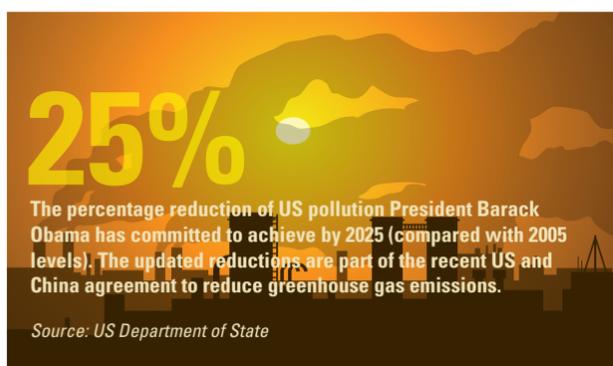
Global demand for material handling equipment with a projected annual increase of 5% through 2018. The market will be driven by improved investment conditions.

Source: The Freedonia Group



The increase in manufacturing's use of natural gas as fuel since 2012. Natural gas accounted for 32.5% of total energy consumption. Lower prices have fuelled this trend, though prices levelled off somewhat in the last year.

Source: Statistics Canada



The percentage reduction of US pollution President Barack Obama has committed to achieve by 2025 (compared with 2005 levels). The updated reductions are part of the recent US and China agreement to reduce greenhouse gas emissions.

Source: US Department of State



\$28.3 BILLION

The amount Quebec workers will pay in payroll taxes this year – the most in Canada and around 21% higher than in Ontario.

Source: The Montreal Economic Institute

SCRAP CAPITAL GAINS: REPORT

Scrapping or lowering Canada's capital gains tax would encourage investment and boost the economy, the Fraser Institute concludes in a report.

The right-leaning public policy think-tank said Canada is home to the 14th highest capital gains tax among the 34-member Organisation of Economic Cooperation and Development (OECD). With the federal government touting a budget surplus in 2015, the report said it's time to change the rate for the first time in 15 years.

The institute estimates revenues from capital gains taxes, imposed on gains from the sale of assets, was only \$2.8 billion in 2011. Combined top rate federal-provincial capital gains tax across Canada averages out at around 23%, with Nova Scotia having the highest rate at 25% and Alberta the lowest at 19.5%.

The US has a capital gains tax rate of 27.9%, making it the eight highest among OECD nations. Eleven OECD members impose no capital gains taxes.

The report contends that eliminating the capital gains tax would unlock capital for Canadian businesses looking to expand while strengthening entrepreneurship, and supporting investment and job creation.

How are your retirement plans?

Although many Canadians say they're putting money aside for retirement, most (60%) are concerned they haven't saved enough, according to a Conference Board of Canada report. The average planned age for retirement is 63.2 years of age, but more than one-third don't know when they'll be able to do so.



» Engineered Alloys

The Canadian company aspires to lead a “materials revolution,” and has the heft of an aerospace powerhouse behind it.

BY MATT POWELL, ASSISTANT EDITOR

Anthony Dutton is a big man, built more like an NFL linebacker than a Vancouver-based CEO and private investor. He’s got a personality that matches his commanding stature – no-nonsense, to the point – but he speaks about his company, IBC Advanced Alloys, with a humble confidence and pride in the firm’s successes despite its relative infancy.

He’s tucked into a booth at a noisy downtown Toronto restaurant, across from Chris Huskamp, the company’s executive vice-president of business and technical development from South Carolina, who has a distinct, yet charming southern twang. Both men talk passionately, but carefully about the fact that their company has become a major disruptive force in the advanced and engineered material industry – a sector that’s been dominated by a single player for the last 50 years.

“I believe there’s a quiet materials revolution going on,” says Dutton, giving the super-strong gorilla glass screen on a nearby iPhone a heavy tap for context. “[IBC] has done something to be impossible.”

The manufacturer of specialty and advanced alloys founded in 2007 is rewriting the book on how light-weight advanced materials are produced cost-effectively. Its success is driven by growing demand in the aerospace, automotive and nuclear industries.

The company has 80 employees and four production facilities in the US.

Although it’s headquartered in Vancouver, IBC doesn’t manufacture in Canada. There’s a sales office in Montreal, and it’s considering expansions to serve the oil and gas, automotive and precision manufacturing markets.

Dutton says the US plants were acquired in several M&A transactions, adding that he’s open to the idea of manufacturing in Canada, so long as the opportunities are “synergistic with our existing operations and corporate objectives.” The company is also traded on the Toronto Stock Exchange’s Venture Exchange – a good place to generate capital, according to Ian Toothill, IBC’s director of corporate communications

It’s latest addition, in 2011, is the 63,000 square-foot engineered materials facility in Wilmington, Mass. The vacuum casting facility, currently operating at 20% capacity with a single furnace, has AS9100C certification, essential for the manufacture of aerospace components.

Copper alloys account for about 85% of the company’s revenues, a business unit that’s operating across three facilities in Indiana (home to IBC’s operational headquarters), Pennsylvania and Mississippi.

Dutton wants that ratio to reverse in favour of the company’s patented beryllium-aluminum alloys, called Beralcast.

For one thing, there’s more money in engineered materials. IBC sells them as semi-finished products while its copper alloys are sold as raw materials.

High profile customers are chomping at the bit.

“That’s where the growth and excitement is, especially from aerospace companies that always want the latest and greatest,” says Dutton. “And nowadays they want it all to be light.”



Raw beryllium sells for up to \$500 per pound.



Pardon the DISR

IBC’S ADVANCED MATERIALS SHAKE

IBC’s Beralcast, which is typically produced from blends of give or take 65% beryllium with 35% aluminum, serves as a higher-performance and lower-cost replacement for cast aluminum, magnesium, titanium, metal matrix or non-metallic composites, and pure beryllium or powder metallurgy beryllium-aluminum. Beryllium is known for its excellent thermal conductivity and its extreme stiffness and lightness, with a modulus of elasticity that’s almost 50% great than steel with only 22.5% of the weight. But it has been prohibitively expensive for mass use, priced at up to \$500 per pound, usually in high tech applications where cost isn’t an object.

Technology disrupter

The key to IBC’s success, however, isn’t the alloy itself; it’s the proprietary investment casting process, the creation of which Dutton credits in part to Ray White, president of IBC’s Engineered Materials division, which produces near net-shape parts and components from rare earth beryllium-based alloys.

The main benefit is a major cost advantage, a factor that’s attracted some major industry heft from the likes of aerospace and defence powerhouse Lockheed Martin.

Innovation isn’t always about something new. Great innovation lies in the ability to renew an existing product or process that make customers’ lives easier. There are bonus points to those who introduce disruptive technologies that alter a market’s landscape, which Dutton says IBC has accomplished.

“There hasn’t been any competition in this market before, and now we’re making ripples,” says Dutton, comparing IBC to rental-car provider, Avis. “We try harder because we’re number two.”

For 50 years, Materion Corp., based in Mayfield Heights, Ohio (with customers in 50 countries and more than 2,500 employees) has dominated the engineered materials market.

“Ultra lightweight, super stiff materials are going to have importance across multiple sectors and I think the opportunities are endless,” says Dutton, who is also a principal at Delu Corp., a strategic and financial advisory company.

Arguably, no industry is more innovative right now than aerospace and defence. It’s facing a paradigm shift; a call to develop new aircraft that are more environmentally responsible and cheaper to operate. That requires a new wave of innovative suppliers with the ability to produce lightweight, high-strength materials and components.

“This is about using only what you need, and that provides a major cost benefit from a materials standpoint,” says Huskamp, who points to sportswear giant Nike as an example of the importance of finding new uses for material as a cost advantage.

“Nike is so successful because they focus materials and push them to do new things.”

Lockheed Martin Missiles and Fire Control first approached IBC in 2011 when the plane’s well-documented production struggles peaked and it was under much pressure to reduce costs. After working with IBC for three years, Lockheed selected IBC Engineered Materials Corp. (a wholly-owned subsidiary) to produce critical cast components for the F-35’s state-of-the-art



IBC's azimuth gimbal housing will be fitted within the F-35's EOTS sapphire windowed diaphragm, which is the first targeting system to combine forward-looking and search infrared technology.

PHOTOS: LOCKHEED MARTIN

That's 3,000 planes.

Lockheed estimates the F-35 will produce industrial profits of more than \$10 billion over the length of the program. It's already contracted out 200 projects worth \$319 million for the stealth jet manufactured in Fort Worth, Tex. that's made up of 300,000 parts and 11,000 unique part numbers.

But the program hasn't been without controversy. Well-documented price overruns caused some global customers, including the Japanese and Canadian governments, to threaten to pull out of their purchase commitments.

Lockheed, however, says it has righted the ship, cutting production costs by 50%. It also cut production time in half. Efficiency and cost benefits are both in IBC's wheelhouse.

"Not a lot of people know how to implement these advanced materials in a cost-effective way, and in most cases they won't be implemented unless the cost trade justifies it. That's what we've been able to do," says Huskamp.

The F-35's EOTS is the world's first sensor that combines forward-looking infrared and infrared search and track functionality to provide pilots with situational awareness with air-to-air and air-to-surface targeting from a safe distance.

The low drag, stealthy targeting system is integrated into the plane's fuselage with a durable sapphire window and is linked to the aircraft's integrated central computer through a high-speed fibre optic interface.

The ability of beryllium-aluminum to self-dampen vibration are a clear benefit to the targeting system, which are much more accurate if they aren't vibrating.

The process of finalizing a contract with Lockheed was a three-year journey, and required a significant undertaking by IBC to ensure it met qualification protocols, which Dutton says were quite strict.

"[Lockheed] has a whole bunch of boxes they have to tick through our entire operation – engineering, our facility, safety and HR practices," he says, adding that the process, including the commissioning of the Wilmington facility, required an investment "in the ballpark" of \$5 million.

Historically, the only way to manufacture beryllium-aluminum components was by using HIP, a process that involves a powdered raw material being hot isostatically pressed to create blocks of alloys that are worked on by CNC and finishing machines.

"Up to 90% of the material ends up on the shop floor," says Ray White, an industry veteran who's been in the business since 1978.

The president of IBC's engineered materials unit was previously the vice-president of operations with Beralcast Corp. and a division manager in the integrated optical systems division of L-3 Communications Corp., the sixth largest defence firm in the US.

"Materion has been trying to get into the casting business since I can remember, and they're still trying to do it," says White. "We're a small company of 80 people and we're taking business away – it's like David and Goliath."

Process development

The key factor behind IBC's casting process is its ability to make single components from less material, which cuts costs significantly. Some industry experts have estimated the process would produce a 50% cost savings over traditional machined parts, but that's not confirmed as most defence contractors keep their cost base under wraps.

Investment casting is one of the oldest known metal forming technologies, allowing the production of components with accuracy, repeatability, versatility and integrity for a variety of metals and high performance alloys. The process produces complicated shapes that would otherwise be difficult or impossible with die casting, and they require little surface finishing, with only minor machining.

IBC, White explains, takes a final part design, adds small amounts of material to critical surfaces that require machining, then create a hard tool by injecting wax to create an exact replica of the final component. An investment shell is made from the wax pattern, which requires nothing more than dipping the wax repeatedly into a ceramic slurry until the coating is strong enough to withstand metals.

It's fired in a furnace, which melts the wax out of the casting and the part solidifies. IBC can produce up to 32 components at a time, depending on size.

"That saves a tremendous amount of money with respect to production schedules," says White. "Especially with aerospace customers who are used to waiting on parts for months or years. We're doing castings in a matter of weeks."

That won't be the case with the F-35's EOTS azimuth gimbal housing. Because they're large, White says it's likely they'll manufacture one part at a time.

"But it's not unreasonable for us to make up to five housings a day."

Continued on page 12

UPTION

THINGS UP

electro-optical targeting system (EOTS). The first component is an EOTS azimuth gimbal housing using IBC's Beralcast beryllium-aluminum casting alloy.

The first contract, which is valued at \$2 million, is for low-rate initial production (LRIP) lots 7 and 8, with initial deliveries to begin by the end of this year and into 2015.

There's growth potential for IBC's involvement in the F-35 program, as all variants of the jet fighter and planned production quantities with deliveries through 2035 will be equipped with the flashy targeting system.

MISSION CRITICAL

IBC is currently working with the US Department of Defense's Reliability Information Analysis Centre (RIAC) to develop Beralcast subsystem components for the US Navy's MQ-8B Fire Scout vertical takeoff drone.

In September, the company shipped several key components to RIAC resulting from a program the company joined in 2011 with the US military's Army Research Laboratory (ARL) and the Naval Air Systems Command (NAVAIR).

The joint initiative is focused on the development of beryllium aluminum components that reduce the drone's overall weight and enhance component stiffness and sensor effectiveness.

UAS (unmanned aerial systems), more commonly referred to as drones, are performance-rated according to the time they stay in the air. In that case, the lighter, the better – something IBC knows a thing or two about. It says the cost-effective Beralcast materials would give the systems advantages in image accuracy, extended range and increased payload due to their reduced weight and high stiffness.

A 2013 Teal Group market study predicts UAS spending to top \$11.3 billion annually in the next decade. That's up from \$5.9 billion. The report says the US will account for 77% of the R&D and 69% of the procurement spend. That's major growth potential.

The Fire Scout provides aerial targeting support for air, ground and sea forces. PHOTO: NORTHROP GRUMMAN





Lockheed Martin expects to ship more than 3,000 F-35's through 2035.

Game changer

Continued from page 11

He won't give up details of the science behind IBC's process, but he does disclose that it has evolved over the past 15 years.

"Beryllium-aluminum was considered to be a non-castable alloy. When we started this, anyone who knew anything about it thought we were nuts."

White says the added benefit of the investment casting is the minimal finishing because the process holds tolerances to plus or minus 0.003 of an inch.

Dutton is confident the Lockheed Martin contract will provide IBC with a clear take off for its engineered materials business.

"[Magna International founder] Frank Stronach made his fortune understanding how to transition the automotive industry from machined parts into cast parts to make the manufacture of cars more affordable," says Dutton. "What we're trying to do is very similar."

And if the Lockheed contract is any indication, essentially a defence stand-in for the US government, the market has confidence in IBC's ability to deliver.

Huskamp says the lightweight components are particularly attractive to the aerospace sector because they help increase fuel efficiency.

"Cutting one pound from a jetliner amounts to \$200,000 in savings over the lifetime of the plane," he says. "In aerospace the drive towards these materials is solely a fuel efficiency thing, and in today's market fuel efficiency becomes a major competitive advantage."

Huskamp's resume speaks volumes about his passion for the science. He previously worked as an associate technical fellow at Boeing, collaborating with other scientists on advanced materials development and implementation aerospace projects. He also spends his free time consulting with NASCAR teams on how to incorporate advanced materials into their race cars.

R&D commitment

Uncovering IBC's benefits comes down to a dedication to ongoing research and development, says Dutton.

"This initiative wouldn't have happened without a clear commitment to R&D," he says. "If you're not pushing the envelope and trying new things, you're yesterday's news."

IBC, he adds, treats R&D as an ongoing process, constantly refining existing processes and making tweaks to material geometries.

"Our whole company starts with engineering. This is not just a heat and beat metal shop," says White. "Almost everything we do has a technical aspect to it."

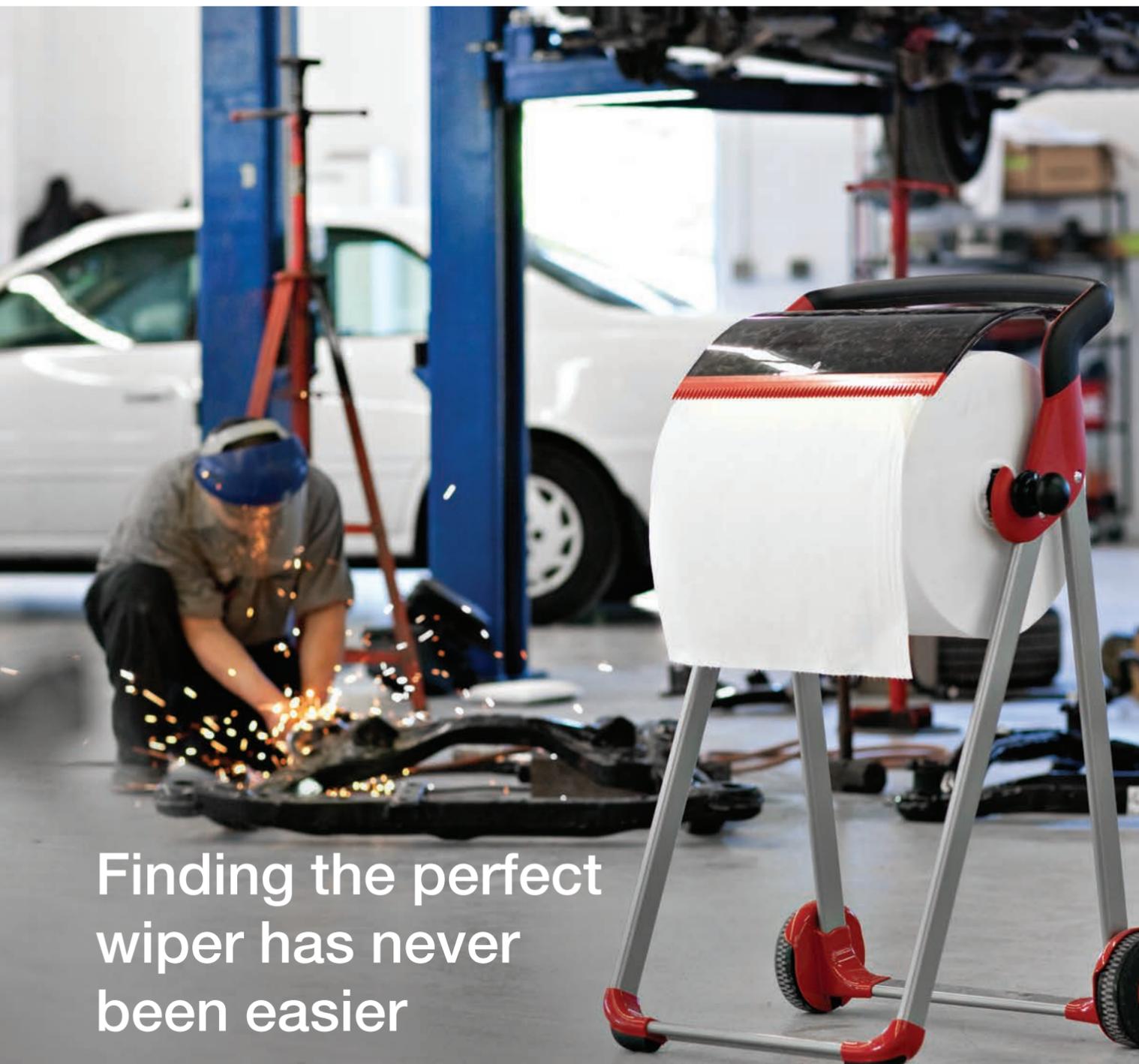
Continuous R&D will only help IBC break into new markets, particularly automotive, where Huskamp believes there is great opportunity thanks to new US fuel efficiency requirements.

"The corporate average fuel economy (CAFE) requirements are causing a stir – this is the first time Detroit has truly had a drive to change the way it does things," he says, pointing to Ford's aluminum-bodied F150 pick-up truck as an example of where the industry is headed from a materials standpoint.

"These times are unique," Huskamp adds.

For Dutton, the company's growth lies in continuing what it does best: making advanced materials better, faster, and cheaper.

Comments? Email mpowell@plant.ca.



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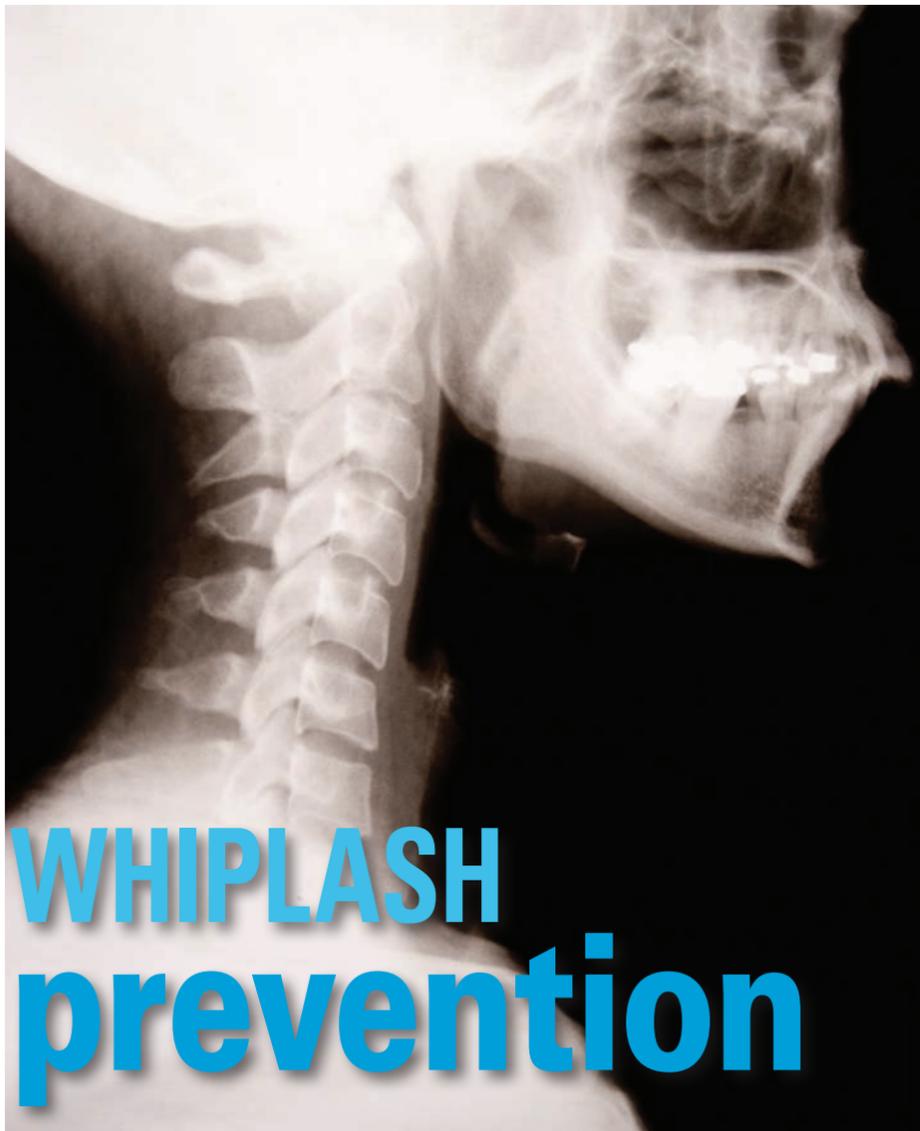
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» Automotive R&D



WHIPLASH prevention

MACHINE VISION SYSTEM TO REDUCE RISK OF INJURY

NZ Technologies is developing an automatic technology that would eliminate manually positioning headrests.

BY NIMA ZIRAKNEJAD

Whiplash is the most common vehicle injury. It occurs during rear-end or side impacts when the dynamic backwards motion of the head is not sufficiently limited by properly adjusted head restraint devices.

AUTO21 Network of Centres of

Excellence researchers have spent the past five years researching and developing a new position estimation system that would help spare vehicle occupants the pain – and the costs to society – incurred from whiplash and associated neck injuries. Integrated in an automatic restraint system, it would eliminate whiplash or lessen its severity by adapting the restraint to the proper position prior to a collision.

Capacitive proximity sensing and vision techniques are applied to estimate details of the occupant's head. Machine vision and image processing algorithms allow automatic inspection and analysis of digital images acquired in real time

Whiplash costs in British Columbia are more than \$850 million a year. PHOTO: THINKSTOCK

from sensory devices such as cameras and optical transducers. The optical sensors are accompanied by other electronic components such as capacitive sensors and infrared lighting modules, making them more robust and accurate in, for example, automotive applications where temperature, humidity and lighting conditions are variable.

If the technology is proven to be effective, vehicle occupants won't have to worry about properly positioning their headrests.

Field-testing the technology

NZ Technologies Inc., a Vancouver-based advanced technology start-up launched in 2009, is developing these solutions for various industries within the automotive, residential, and clinical sectors. It intends to commercialize the technology, but first it will collaborate with seat and head restraint manufacturers to field-test the performance and the accuracy of the final system in advanced automotive facilities.

The company has also joined the People and Planet Friendly Home Initiative (PPFH) headed by TELUS and the University of British Columbia (UBC) Institute for Computing, Information, and Cognitive Systems, which enables collaboration with UBC researchers to develop innovative, sustainable technologies. It's adapting the vision and sensing technology for other uses, one being as an aid for seniors prone to falls. If successful, real-time machine vision would automatically detect the fall and make the necessary emergency call to obtain medical care.

Nima Ziraknejad is a former AUTO21 student researcher and founder and CEO of NZ Technologies Inc. AUTO 21 is a national research initiative supported by the Government of Canada through the Networks of Centres of Excellence Secretariat. Visit www.auto21.ca.

Comments? E-mail jterrett@plant.ca.

» Additive Manufacturing CME launches Canada Makes Network to accelerate adoption of 3D technologies

Canadian Manufacturers & Exporters (CME) has launched a national network of excellence dedicated to the adoption and development of additive manufacturing in Canada.

Canada Makes, a collaboration with Sheridan College's Centre for Advanced Manufacturing and Design Technologies (CAMDT) in Brampton, Ont., will cover a range of additive manufacturing technologies including 3D printing, reverse engineering 3D imaging, medical implants and replacement human tissue, metallic 3D printing and 3D printing with embedded electronics.

"Additive manufacturing is one of those advanced manufacturing technologies that is likely to disrupt the way we are making things," said CME president and CEO Jayson Myers. "CAMDT is one of the most advanced applied research labs in Canada and it has the latest technologies and software in the field of fused deposition modeling (FDM)."

This state-of-the-art laboratory will be available to small and medium-sized manufacturers across Canada.



The network will cover a range of 3D technologies.

PHOTO: THINKSTOCK

The network will gradually expand into other areas of additive manufacturing, including metal 3D printing and printable electronics.

Members will tap into technology demonstrations and training workshops, a customized service aimed at identifying potential partners and sources of funding for projects ranging from prototyping to applied and fundamental research.

Sheridan is also helping regional SMEs build capacity around emerging manufacturing technologies. With support from the National Research Council of Canada Industrial Research Assistance Program (NRC-IRAP), CAMDT will work with companies on a variety of research projects, workshops and training opportunities to help them adopt additive manufacturing and robotics technologies into their workflows.

The college will host a series of community outreach events profiling the benefits of additive manufacturing and robotics services and highlighting CAMDT's technology development services. Twenty companies will then be selected to participate.

IRAP funding will support a portion of the project costs and SMEs may have to contribute through an in-kind or cash contribution

Visit www.canadamakes.com for more information.

» Spending

Bombardier tops R&D dollars

57 companies increased their investment in 2013

Canada's leading firms raised their combined research spending to \$12.5 billion in fiscal 2013, an increase of 4.1% over the previous year, according to the annual Canada's Top 100 Corporate R&D Spenders list.

Research Infosource Inc., a Toronto firm that specializes in R&D intelligence, says 57 companies increased their spending, two companies spent the same as the previous year and 41 spent less.

The top spender was Bombardier Inc., an aerospace and rail transportation manufacturer based in Montreal. It invested \$2.2 billion – an increase of 15.4% from 2012.

Mobile communications specialist BlackBerry Ltd. in Waterloo, Ont. held on to second place even though its R&D spending dropped

by 12.2% to \$1.3 billion.

Auto parts maker Magna International in Aurora, Ont. jumped three places in the ranking to third with a 12% increase to \$576.8 million.

Several firms displayed especially strong growth in their R&D spending with triple-digit year-on-year increases. They include Redknee Solutions Inc. (278%), TransCanada Corp. (203.9%), CGI Group Inc. (164.1%) and Valeant Pharmaceuticals International Inc. (104.3%).

Ontario was home to 43.7% of all Top 100 research spending, compared with 39.9% in Quebec, 11.3% on the Prairies, and 5.1% in BC. Spending declined in Ontario by 2.7%, but increased in Quebec (12.4%), BC (11.2%), and the Prairies (2.7%).



Licensing the manufacture of your products represents a quick entry into a foreign market but success hinges on the details of the deal.

BY MARK DRAKE

“Give and take, compromise, trusting partners” – essential elements of a long and happy marriage. Same with business partnerships, and nowhere more so than with an agreement to license the manufacture of products in a foreign jurisdiction.

Most experienced international traders know the value of partnerships for speedy and successful market entry. The more challenging the environment (different culture, language and business practice), the more interesting the partnership option becomes. It takes many forms: agency or distribution arrangement, franchise, joint venture or licence. The choice depends on many factors such as size of company, depth of technology involved, barriers to competitive entry, or import restrictions in the target market.

In the late 1950s the British company Pilkington Glass invented the “float” process, which revolutionized the manufacture of flat glass. They made a fortune licensing other glass manufacturers around the world, with carefully crafted agreements transferring the patented technology and ensuring – at least for a specific time – that licensees would not compete, and royalties would flow.

There is no reason why small and medium-sized companies with niche products and unique (and protected) technology should not also consider licensing as an appropriate route to move quickly into a new market. This should always involve a written contract under which the owner of technology, know-how, or intellectual property (patents, copyrights or trademarks) allows a licensee to use, make or sell copies of the original.

So what are the advantages? For the licensor: reliance on local (and possibly better) manufacturing capacity while retaining ownership of the intellectual



A path to new markets

IT'S THE ULTIMATE BUSINESS MARRIAGE CONTRACT

property; speed of market entry; access to new and distant markets; even stopping an actual or potential infringer by bringing him on board; and above all, income that goes straight to the bottom line. For the licensee: access to established and protected technology, and the potential development of new and superior products.

Formal agreement

Once initial trust has been built up, and both parties are on the same cultural wavelength and are a good fit, a formal agreement can be drawn up. This must be clear on all the minutiae, and it then should become a protective document in case of divorce. Here are some of the critical elements:

- **Term.** This needs to be reasonable and make sense for both parties, allowing for proper transfer of technology and training, and time for the licensee to get up to speed in the market – maybe three to five years, (longer if the investment is significant) with options to renew.

- **Territory.** It should be clearly specified to avoid disputes with other partners, and if exclusive, note it as such. Specify how enquiries/orders from adjacent markets are to be covered.

- **Products/technology.** Outline the details of what you're transferring, including the intellectual property (patents, trademarks and copyrights), as well as the arrangements for dealing with infringements by third parties, the training of licensee's employees, and any manufacturing set-up required. Similarly cover the designs and other specifications that will be provided and the requirements for the licensee in terms of brand image, labelling, packaging, manufacturing standards and quality control.

- **Communication.** It can make or break an agreement. Mutual trust should be built up throughout both organizations. The parties need to be clear about routine and regular interchange of information, and also have a “hot line” between senior management on both sides in case of an emergency. A “champion”

Partnerships speed up entry into new global markets.

PHOTO:THINKSTOCK

of licensing operations might be useful.

- **Sales targets.** Sales expectations should be realistic. Make allowance for a start up period, and if possible include a three- to five-year sales plan as an appendix, based on research. Given the investment, include minimum targets and also some element of “stretch” looking forward.

- **Royalties.** Agree to the numbers up front, be realistic and ensure they're acceptable to both parties. If one party “screws down” the other, the arrangement will fall apart. Whatever level is agreed, the actual numbers should be verifiable by an independent audit in case of dispute.

- **Termination.** This covers termination on the amicable conclusion of the agreement at term (what happens to IP, inventory, proprietary equipment), as well as on “irretrievable breakdown” with an appropriate notice period, and non-compete guarantee.

- **The small print.** We all like to avoid lawyers, but in an agreement, which involves major commitments by both parties involving time and funds, it's vital that everything be covered. In foreign jurisdictions it's also important to ensure local regulations are respected. There are many templates available to guide the process: www.onecle.com gives a range of different agreements that might be drawn up. For something more detailed try www.stemcellnetwork.ca and get to the long license agreement template. For a detailed training manual try the World Intellectual Property Organization at www.wipo.int. As a last resort, google license (or licence) agreements for a wealth of other relevant information.

Hard work? Sure, but the deal should be as successful as a long term marriage, provided it's “win-win” for both parties.

Mark Drake is former president of Electrovert Ltd. and the Canadian Exporters' Association. E-mail corsley@videotron.ca.

Comments? E-mail jterrett@plant.ca.

» Training

Five gifts for your employees

...and a more prosperous new year

BY HUGH ALLEY

This is the season. Here are five gifts you can give your employees to make their next year better, and improve your company's bottom line.

1. **Present clear objectives.** A study reported in the Gallup Business Journal showed that what may start as five or six objectives for the CEO can become as many as 40 by the time it reaches the front line. With 40 objectives, you have nothing. Clear objectives give your team members the ability to test whether changes they make are having a useful impact. And it lets you train for skills that matter.

2. **Let people know how they're doing.** Great sports performers rely on factual feedback about every aspect of their



Employees will learn better if you show them a new task several times.

PHOTO:THINKSTOCK

performance, otherwise they cannot train to overcome their weaknesses. Your team members are the same.

3. **Prevent surprises.** Aside from presents, most people don't like surprises. If it is a surprise, it usually means things are out of their control. So much as it is in your power, tell people about changes that will affect them, then give them the training they'll

need to deal with the situation.

4. **Help them succeed at new tasks.** Too many people get trained by having their supervisor show them the task once. Show learners a new task several times (four to five is a good number) and then let them try it out under supervision four to five times more. Your employees will learn better and faster, and you'll have fewer errors.

5. **Make a plan for training.** When you are scrambling to deal with training needs, everyone feels on edge. Learners are less comfortable, and as a result, they don't learn as well. When you set out a plan for training, people know what's coming, they prepare and they'll learn faster. The result is a more competent workforce with more capabilities. That gives you the flexibility to respond faster to your customer's needs and earn sales that would otherwise be passed up.

Hugh Alley is president of First Line Training Inc. in Burnaby, BC, which focuses on increasing productivity by improving the skills of front line managers and supervisors. E-mail halley@firstlinetraining.ca. Visit <http://firstlinetraining.ca>.

Mind the (age) gap

Gen X and Millennials: understand generational differences to gain a competitive edge

BY PLANT STAFF

Not all workers are the same. Sure, your employees may possess similar skills, but their career goals and workstyle preferences are being defined by generational differences that a Conference Board of Canada report recommends you understand.

Workplace Preferences of Millennials and Gen X: Attracting and Retaining the 2020 Workforce, surveyed 506 Millennials (1978-1990) and 514 Gen X (1965-1977) employees and reveals similarities and differences between them.

“While fundamental values across generations are more alike than different, stereotypical perceptions of differences persist,” says Ruth Wright, director of human resources research at the Conference Board.

Gen X is only about two-thirds the size of the Boomer generation (1946-1966), and by 2020, Millennials will represent the largest cohort of working Canadians.

the employee prefers a social environment. But that’s not their preferred way to work.

The report concludes workplace cultures shaped by exiting Baby Boomers may not be satisfying the needs of the Millennials or Gen Xers. A company that adjusts its traditional practices will gain a competitive edge by attracting a more vibrant future workforce.

Need for feedback

Here are key findings:

- Millennials are more confident than Gen Xers they’ll achieve career goals, but they’ll also expect faster promotions and will switch jobs more often. Managers must become more transparent about career paths, provide more development opportunities, increase organizational mobility, recognize achievement and provide greater access to leaders.

- Both generations desire ongoing, frequent feedback. How managers approach feedback is as important as the frequency.



Meet the Millennials: ambitious and social.

PHOTO: THINKSTOCK

The Conference Board suggests reasons for generational differences are created by:

Socio-cultural events. This theory explains Gen X’s reputation for cynicism and apathy sprung from the economic recession of the early 1990s and other global crises, including 9/11. Millennials are the social generation thanks to the proliferation of the internet and other social technologies in the early 2000s.

Changing social environments. Slow changes in the social environment have an influence on generational attitudes. For Gen X, the importance of work-life balance stems from an increasing distrust of organizations over time, while Millennials are influenced by society’s increasing focus on individual rather than organizational goals.

Life stages. Differences are related to activities that commonly occur at certain ages. For example, 20- to 30-year-olds entering the workforce are concerned with advancement and acquiring new skills. As a result, Millennials are often perceived as naïve and over-ambitious. This also suggests when they reach their 30s and 40s, they’ll demonstrate the same characteristics as Gen Xers (pragmatic, underachieving).

Social construction. Labelling employees Millennial of Gen X shapes their behaviour. A manager might give a digital native responsibility for managing technologies, but assign a perceived Millennial a great deal of collaborative work, assuming

- Managers should plan staff interactions into their daily routines. They may need coaching on how to deliver constructive feedback.

- Neither generation is willing to sacrifice their lives for work. They want flexible schedules and work arrangements, and a clear separation between the job and their lives. To attract and retain employees, offer and publicize work-life balance policies, including input into decisions that affect work and life.

- Perceptions of justice and fairness are a very important aspect of culture. Organizations should leverage opportunities, such as corporate social causes, so Millennials can showcase their skills and demonstrate leadership.

- Offering competitive pay and benefits is imperative to retain both generations. Millennials will switch employers if they are offered more money. Benefits preferences appear to be driven by life stage, but differences are minor. Millennials show a slightly greater preference for vision care and parental leave supplement pay. Gen Xers have slightly greater preference for pension plans and prescription drug coverage.

Generational differences are increasingly evident. Don’t ignore them. Understanding employees’ wants and needs will help you attract and retain a vibrant workforce.

Comments? E-mail mpowell@plant.ca.

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HOW A LITTLE **RED** CAN HELP MAKE YOU GREEN.

“THESE DAYS, YOU HAVE TO BE PICKY.”

Second-generation cucumber farmer Ron Voorberg chats with the SEW United team about the importance of choosing like-minded partners that can fully appreciate his vision of managing and growing an environmentally sustainable business that is both viable and profitable.



The **SEW**
United Team
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Read why Foothill Greenhouses made it SEW at sewcan.ca/foothill

SEW
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» Think Lean

Standing and observing allows you to see processes, operations, tasks and subtasks really work.

BY RICHARD KUNST

The “waste walk” is a common method touted within lean communities to identify waste and ultimately improve processes, but there’s another method: the simple yet not so simple art of “standing to observe.”

We become immune to our surroundings after 21 days (according to research) and miss seeing opportunities that would be quickly evident to an outsider.

We’re programmed to tackle challenges head on but often do so without taking the time to observe.

Standing to observe is not a new concept. Tiachi Ono, father of the Toyota Production System, would force his engineers to stand in a circle outlined in chalk on the floor and interrogate them about their observations, helping them to sharpen that skill.

So pick a spot within the operation and observe: people walking; their motions; their emotions and engagement; the process; material conveyance; the environment and working condition; and the complexity of process, operations, tasks and sub tasks.

As you observe, define and document the common lean wastes: defects; overproduction; waiting; not fully utilizing people; travel; inventory; motion; excessive processing; and unactionable information systems.

After you identify opportunities to improve processes and the work conditions of employees, your next challenge will be to implement sustainable change.

Metrics that matter will depend on



Tie lean methodologies and opportunities to metrics. PHOTO: THINKSTOCK

to unload a truck over a period of days, then review the data together to establish a target that reduces the unloading time by 10 minutes per truck.

Muscle memory is another challenge to making change sustainable. It’s a condition that comes from programming the body to perform certain tasks in a prescribed manner, which becomes automatic. However, it may not be the best way to do it.

An employee asked to perform a task in a different way will likely revert back to the old method when not under observation or measured against a controllable metric.

Changing muscle memory takes time, so stand to observe, link an opportunity to an employee controllable metric, monitor performance and remember muscle memory.

It takes 21 days to change behaviour. Come back for some additional observing to ensure your suggestions are routine.

Stand to OBSERVE

IDENTIFY OPPORTUNITIES TO IMPROVE PROCESSES

who’s monitoring them. The person handling the process should easily understand aggressive but realistic and controllable metrics. The CFO will be interested

in EBITDA but a receiver asked to help improve it by 10% likely won’t have a clue what you’re talking about. Instead, ask the receiver to monitor how long it takes

Richard Kunst is president and CEO of Cambridge, Ont.-based Kunst Solutions Corp., which publishes the “Lean Thoughts” e-newsletter and helps companies implement lean solutions. Visit www.kunstsolutions.com. E-mail rkunst@kunstartofsolutions.com.

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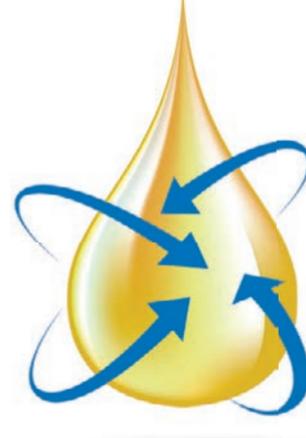
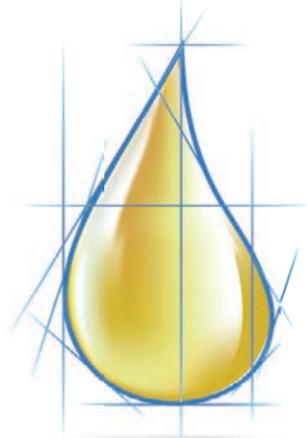


LEAN ALERT

Watch out for excessive processing, one of the lean deadly wastes. Adding more value to a product than the customer actually requires (such as painting areas that will never be seen or exposed to corrosion) costs staff time, materials and equipment wear.

Source: *Lean Manufacturing Tools* at <http://leanmanufacturingtools.org>.

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The Power of Knowledge Engineering

» Inside Maintenance

Implementing ISO 50001

LESSONS LEARNED FROM THE NEW ENERGY MANAGEMENT STANDARD

NRCan offers tools that will help validate improvement initiatives and verify ongoing performance.

BY STEVE GAHBAUER

Current thinking is smart energy management will save you money. Turns out it does more than that. During the Energy Summit 2014 conference in Niagara Falls, Ont. last May, presenters talked about the journey towards ISO 50001 Energy Management Systems standard certification, and they shared lessons learned.

Natural Resources Canada, which presented the conference with the Excellence in Manufacturing Consortium, stated that “project-based energy management is neither self-sustaining nor continuous improvement of energy performance; there has to be something more than just projects. Energy management must become part of the fabric and of the [organization’s] systems.”

That’s why the ISO 50001 standard, with a focus on continuous improvement and energy management integration, is so appealing.

Companies that have implemented the new standard learned that:

- Good energy data is necessary and extremely useful.
- Much about energy management and use can be learned from the planning process.
- An employee suggestion program engages staff and collects good ideas.
- Most energy efficiency projects also have operational, environmental and safety benefits. Undertaking viable energy efficiency mea-



Having someone dedicated to energy management is key to ISO 50001 certification.

PHOTO: THINKSTOCK

asures and assessing ongoing energy performance are key steps in implementing an energy management system. To assist, Natural Resources Canada provides RETScreen Clean Energy Management Software.

It helps to determine the technical and financial viability of energy efficiency improvements and verify a facility’s ongoing energy performance. There are free online training resources available to help you with the software that include: extensive webcasts, presentation slides, and instructor notes; numerous case studies; a detailed user manual; an e-textbook that provides a detailed description of the algorithms used in the models; and clean Energy Legal & Policy Toolkits, including sample legal and policy documents.

RETScreen Marketplace lists companies and organizations around the world that use RETScreen or provide RETScreen services.

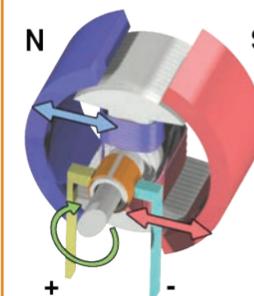
RETScreen Plus monitors analyzes and reports key energy performance data to facility operators, managers and senior decision-makers. It will measure and verify energy consumption or energy production and generation. The tool also supports the “check” phase of a Plan-Do-Check-Act energy management system. It works according to any timeframe and the software allows users to model baseline energy performance, target improvements and compare new data to the baseline or targets.

Soon RETScreen Plus and RetScreen4 will be merged into RETScreen Expert, the next generation of the software. Watch for it.

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

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» Tech Tip



Motor magnetics: the “N” and “S” designate polarities on the magnets’ inside faces; the outside faces have opposite polarities. The + and - signs show where the DC current is applied to the commutator, which supplies current to the armature coils.

ILLUSTRATION: Wapcaplet in Blender

DC motors

Points to consider when reversing direction

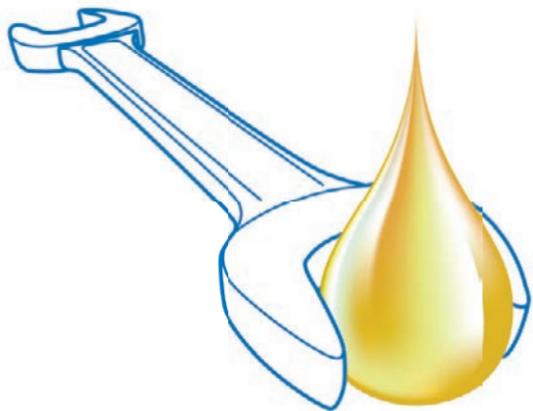
When there is a reduced field due to a loss of, or low voltage, the magnetic fields are reduced and the motor will attempt to ‘run away,’ or operate at a higher speed than it’s supposed to.

A series field wraps around a shunt field and requires it to have the same polarity.

That’s true for most conditions.

Source: Motor Diagnostics and Motor Health News, Success by Design, with permission.

reliability



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» Strategies

Maintenance experts weigh in on the inevitability of change and how to manage it to advantage.

BY STEVE GAHBAUER

Many manufacturers are discovering that in order to up their game and secure an edge over their competitors, they need to change the way they do things. Doing so not only requires new thinking, company culture must also adapt. Yet change is seldom easy because it makes people uncomfortable.

At the last MainTrain maintenance conference in Calgary by the Plant Engineering and Maintenance Association of Canada, a number of speakers focused on how to implement change in maintenance and the management of assets.

Company culture is about shared ideas and values, customs, and group norms of behaviour, said Jean-Robert Cleveau, director of reliability at Rio Tinto Alcan. He has more than three decades of plant experience on four continents and his job as reliability program leader is to implement best practices and improve asset reliability across all of the aluminum company's sites.

To change a culture, Cleveau said you have to create a sense of belonging, identity and meaning. To change behaviour, watch for non-verbal communication, which reveals attitudes and reactions. Most important, you also have to change systems.

Changing the system represents a long journey from routine maintenance to effective asset management, culminating in what John Hardwick calls "asset management maturity."

Hardwick is the group executive for network strategy at Networks NSW, an



Meticulous information gathering is key to asset management maturity. PHOTO: THINKSTOCK

with investment justification.

Hardwick said asset data is extremely valuable for predicting the future. It's information that can be used for both technical and economic decision-making. With accomplished asset management maturity, he said you can influence the rest of the business.

Change also affects turnover and operational risk. This was addressed by sustainability expert David Drerup in a workshop presentation about sustainable solutions events in a number of companies.

Drerup is an engineer with 20 years of experience in the mineral, chemical and nuclear processing industries, and is currently the chief production engineer and focus team leader at Cameco's uranium conversion facility in Port Hope, Ont. He plays a pivotal role in spearheading continuous improvements in safety, performance and reliability of plant operations.

He reminded his workshop audience that, given the recent technological and demographic trends affecting manufacturing and processing industries, employee turnover has increased, leading to crucial knowledge gaps. A lack of knowledge or familiarity within environments that include complex, hazardous processes greatly augments the risk of injury or work incidents; hence, the necessity for plants to have a robust change management system.

Developing such a system, however, is quite challenging, because it touches almost every process and function within a company. Paper-based processes are no longer acceptable, and poor close-outs of change management, as well as the lack of administrative control during start-ups and shutdowns, lead to additional operating risks.

Most of a plant's process safety incidents occur during operational phases. Change management is tied to work

Managing CHANGE

HOW TO HANDLE CULTURE, SYSTEMS AND TURNOVER

Australian electrical utility. To achieve asset management maturity it's necessary to meticulously gather meaningful information about asset function, failure modes and causes, then practise corrective and preventive maintenance, which leads to routine maintenance planning and informed repair or replacement decisions.

Asset management maturity

But what you do with the information gathered and analyzed is key. Use it for an improved spares strategy – what to keep, how much to keep, and how long to keep it. Ask yourself how you can make the system more reliable, buy bet-

ter assets and improve the configuration of existing systems.

Hardwick emphasized the importance of expressing this information in terms senior management cares about – risk, expenditure and bottom line profit. Plot a course for achieving asset management maturity that starts with basic asset data, including information about failure, costs, age and performance; progress to system power integration and possibilities for higher-level use; lead to the benefits of RCM analysis that enables informed and data-based decisions about spares, repair and/or replacements; moves on to prioritizations; and ends up

» CCOHS Safety Tips

Bad vibes in the workplace

How to lower exposure and avoid vibration hazards

Vibration is harmless in small doses, but the effects of regular and frequent exposure from mechanization are potentially disabling and permanent.

Whole-body vibration affects people who operate mobile machines or who work near stationary machines that vibrate. Among those affected are workers in foundries, shipyards and those who sit or stand on a vibrating floor or seat, such as operators of off-road vehicles.

Whole-body vibration produces effects similar to motion sickness such as fatigue, insomnia, stomach problems, headaches and shakiness.

To help reduce the risk of injury, vehicles and mobile equipment should be well maintained. Properly inflate tires or replace solid tires on lift trucks, sweepers and other mobile equipment. Have proper seats with armrests and lumbar support, and air-ride suspension or suspended cabs.

Hand-arm vibration from certain powered tools such as grinders, sanders, drills and impact wrenches, cause a range of conditions such as carpal tunnel syndrome and vibration-induced white finger (VWF).

It can also damage blood vessels in the hands and fingers by reducing blood flow and harming skin, nerves and muscles. A worker may experience a tingling sensation or numbness in the fingers, a weakened grip and general clumsiness. When the fingers are cold and wet, the tips might turn white or blue, then red and sore. With continued use of high-vibration tools, symptoms will likely progress to permanent numbness in the hands, inability to pick up small objects and more frequent episodes of white finger.

Workers exposed to vibration should wear sufficient clothing to keep them warm and dry, which encourages good blood circulation.

The best way to avoid injury and lasting damage is to minimize exposure to vibration. Workers should have long rest breaks or shake-free tasks between exposures. Employees who are older, have back problems or are pregnant should avoid long periods of exposure.

Use non-vibrating tools whenever possible, or tools that have built-in features that reduce vibration. Limit use to a few hours per day and days per week with breaks at least 10 minutes per



Power tools generate hand-arm vibration. PHOTO: THINKSTOCK

hour and alternate vibrating and non-vibrating work.

Refer to exposure limits or threshold limit values, as recommended by the American Conference of Governmental Industrial Hygienists or as outlined in other standards and regulations. In many work applications manual tasks can be mechanized, removing workers from harmful exposures to vibration.

Teach employees about the health risks of vibration, how to identify early signs and symptoms of injury, select and use appropriate tools, and find alternative safe work practices.

At the first sign of vibration disease, workers should consult with their healthcare professionals, and talk to their supervisors and/or health and safety committees to find ways to reduce or eliminate exposure.

orders and spare parts inventory. So the lack of interoperability with plant information systems, vetting out of business processes in isolation, and departmental separation, all inhabit the ability of maintenance departments – and management – to make timely, risk-informed decisions.

While the overall goal is one company culture, companies continue to struggle with holistically addressing operational risk management to bring this all together. Plants can profit by reducing risks and by minimizing the effects of turnover.

There is one more important aspect to managing change: before you can develop and implement a robust system, you need to perform an assessment of the challenges your organization, plant and maintenance department face to properly identify what needs to be changed.

Indeed, assessment is a precursor to change management, says Brad Maheu, the president of Calgary-based Clearpass Inc., a professional services company that specializes in providing asset management expertise to the energy industry. Maheu's specialty is the assessment and delivery of enterprise-wide asset management solutions.

Corporate response

His presentation outlined steps to follow from the start, through execution and to conclusion.

He said an assessment provides a corporate response to a problem, raises its profile, identifies its true source and obtains stakeholder buy-in.

Start by planning with the manager, confirm assessors, complete a list of stakeholders, establish a method of assessing, and set a timeline. Execution involves interviewing and notifying sponsors, conducting interviews about scheduling and execution, following up questions and providing an assessment conclusion. The conclusion should comprise a report to the sponsors and the manager documenting the initial problem, stakeholder interviews, major and minor findings, and suggestions for the next steps. Follow up with a summary presentation and make it available to all stakeholders.

There are risks: some stakeholders may not want to participate; the scope could become unmanageable; some findings may be "sensitive" and there may be disagreements with the findings. These are issues that must be clarified and eliminated to make an assessment meaningful.

You can obtain more information on this important subject by visiting www.clearpass.com.

So what can we learn from all this? Managing change ensures the benefits accrue and help your company meet its competitive targets.

Steve Gahbauer, an engineer and Toronto-based freelance writer, is the former engineering editor of PLANT and a regular contributing editor. E-mail gahbauer@rogers.com.

Comments? E-mail jterrett@plant.ca.

» Electrical Systems Safety and CSA Z463

Changes will impact maintenance

Many industries use complex electrical equipment that requires regular maintenance for peak performance and safety. Several speakers at last year's MainTrain maintenance conference (presented by the Plant Engineering and Maintenance Association of Canada) discussed electrical systems maintenance and managing change.

In September 2013 the CSA published the CSA Z463 "Guideline for the Maintenance of Electrical Systems." It focuses on electrical equipment maintenance requirements, reliability, equipment damage and safety, all of which lead to a change in electrical equipment maintenance practices.

Terry Becker, owner and president of Electrical Safety Program Solutions Inc. (ESPS) and a past vice-chair of the CSA Z462 technical committee, explored how change management systems achieve the electrical safety trifecta: safe installations; safe work practices; and safe electrical equipment.

The 2012 Canadian Electrical Code is the 22nd edition and contains

more than 180 updates and revisions from the original 1927 Code.

C 22.1, CEC Part I of the Canadian Electrical Code is now law across Canada. It focuses primarily on fire and shock hazards.

Industries are using CSA Z463 and accepting it as best practice. But there will be changes in its third edition to be published in 2015. The major changes centre on shock and arc flashes, the establishment of boundaries and a special focus on tool and equipment issues.

Casey Baker of Cenovus Energy Inc., an integrated oil company with headquarters in Calgary, volunteered a half dozen lessons learned from a recent maintenance management project with IBM Maximo Solution, which streamlines and integrates with existing applications.

To achieve success, he says it's important to:

- have operations involved in maintenance change management;
- get resources on board as soon as a selection about change management is made;
- decide early on verticals and bolt-ons;
- get the configuration migration process developed early;
- avoid big bang solutions; and
- plan for retraining.

For more information visit www.csagroup.org, Click on SHOP CSA.



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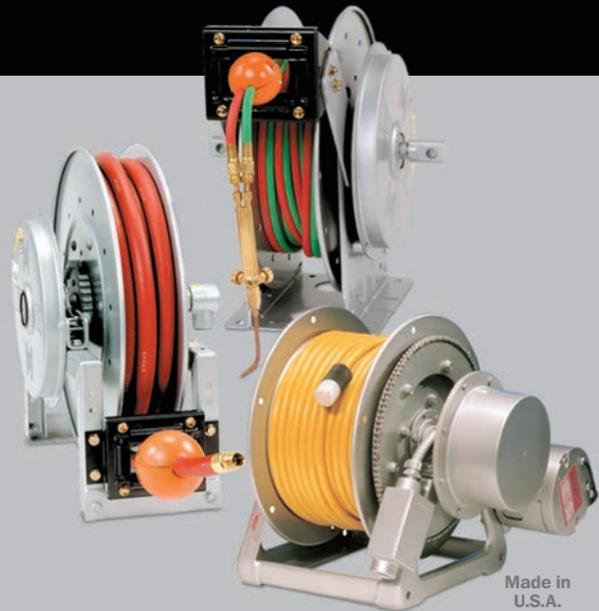
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Trends



**Promising
PROSPECTS**

**CAUTIOUS MANUFACTURERS
LOOK CLOSE TO HOME FOR GROWTH**

» **Manufacturers' Outlook 2015**

Executives from across Canada reveal their business plans, investments and operations in **PLANT's** annual outlook study.

BY JOE TERRETT, EDITOR

Market conditions in 2015 are looking good for Canadian manufacturers. American plants are busy and the US economy is surging, the Bank of Canada is forecasting growth of 2.5% in 2015, then 2% in 2016 and the loonie is floating below the US dollar.

All the same, 60% of respondents to **PLANT's** 2015 Manufacturers' Outlook survey view the year ahead with some uncertainty and describe themselves as "cautiously optimistic" about their prospects, compared to 29% who see market conditions as "very favourable" (and 10% who do not).

The survey, conducted by Bramm Research for **PLANT** in partnership with sponsor Grant Thornton LLP, is based on 416 replies from senior manufacturing executives, and has a margin of error of +/- 4.6%, 19 times out of 20.

Most companies (65%) fall into the small business category (under 100 employees), 25% are medium-sized (100 to under 500) and 9% are large firms (500 employees or more). As cautiously optimistic as many of them may be, they will be investing in their businesses, tackling productivity issues and pursuing growth.

Average sales are expected to be \$83 million in 2015 compared to \$75.9 million this year and \$72 million in 2013.

Just over half (57%) of the senior executives are expecting orders and their value to increase next year, while 50% expect pricing to remain the same (34% anticipate an increase), and 44% are predicting higher profits.

More than 90% derive most of their business from trade in North America (63.1% in Canada) and 50% intend to focus on North America as a key growth strategy. Thirty-one per cent of companies will seek new markets in the next one to three years within Canada, 37% in the US, 15% in Mexico, 15% in other Central America, South America, and 12% in Brazil. Currently 2% are doing business in China but 10% plan to enter that market.

The respondents' preference for North America surprised Jim Menzies, national leader of manufacturing for Grant Thornton LLP, an accounting, tax and advisory firm and sponsor of Manufacturers' Outlook 2015.

"I work with companies that are going into Eastern

Europe, China and India. Admittedly there are all sorts of risks that come with entering those markets... However, to fall back on the US because there's a surge in economic growth is just returning to old habits: easier to do, but at the cost of potentially missing some greater opportunities," he said during the Outlook 2015 Roundtable held in Toronto to discuss the survey's results.

Pent-up demand may fuel Canadian exports next year, but Bank of Canada governor Stephen Poloz warns that Canada is missing out on about \$40 billion in export sales as uncompetitive producers continue to lose market share. There are several factors to blame, including the loss of about 9,000 exporting firms since the recession, but high on the list is poor productivity.

Ninety-five per cent of respondents say it's key to business growth and 45% are pursuing a formal productivity improvement strategy while 20% are in the process of developing one. Managing productivity is most challenging on the shop floor for 61%, followed by marketing and sales (42%) and purchasing (29%).

Technology connection

Most companies are not making use of the latest technology to monitor and measure shop floor manufacturing equipment and operations shift by shift. Fifty-one per cent are still using manual methods to collect, analyze and review data compared to 31% who use automated means. Seventeen per cent aren't doing any monitoring or measuring.

Fifty-two per cent of companies are very or somewhat likely to connect the shop floor with the top floor's enterprise management systems in the next 12 months, but 45% are not.

Over the next three years 79% of companies intend to invest in machinery and equipment, and 44% say they'll invest up to \$1 million next year, although the overall average spend is \$2.16 million. Average investment in expansions, upgrades or new facilities is \$1.2 million.

The doors are open to the European and South Korean markets, and the federal government is working on the Trans-Pacific Partnership, a trade pact that offers a potential market of 800 million people who account for close to 40% of the global economy. However, less than half (44%) of senior executives believe these deals benefit them, but only 11% strongly agree.

Walking through those doors offers smaller enterprises the potential to add heft and become stronger global competitors. It comes down to embracing the challenge.

Watch for the Manufacturers' Outlook 2015 survey and roundtable report at www.plant.ca.

Comments? E-mail jterrett@plant.ca.

CIEN

CANADIAN INDUSTRIAL EQUIPMENT NEWS

» Robotics



A LBR iiwa, a robotic assistant, working collaboratively with humans to increase productivity in manufacturing and materials handling.

PHOTO: KUKA SYSTEMS

Collaborating with a COBOT

A LOWER COST ROBOTIC MULTI-TASKER

Program them to do multiple tasks and deploy them throughout the plant when they're needed.

LBR *iiwa* wants to get up close and personal. Its name, a pairing of German and English abbreviations, stands for "lightweight robot, intelligent industrial work assistant." One of a new class of small collaborative robots – called cobots – it's designed primarily to serve as a robotic assistant for a human worker and has the potential to change how work is structured.

In the past two years, many robot makers have increased their stake in human-robot collaboration (HRC),

unveiling next generation single-arm and twin-arm cobots with improved software that makes them ready for prime time. They're easier to program than conventional robots and easier on the budget, which is why their use in manufacturing and service sectors is accelerating.

These collaborative robots cover a large spectrum of tasks, products and production runs of all sizes. A conventional robot will perform a single task indefinitely, while cobots can be pro-

grammed for multiple tasks and deployed on an as-needed basis throughout a plant in close proximity to humans, without fences, separation barriers or other forms of safety equipment.

HRC's objective is to make workers more productive, not unemployed. Collaborative robots like KUKA's seven-axis LBR *iiwa*, will be used in certain full automation scenarios where they will take over tedious, low value or non-ergonomic functions, allowing the humans to focus on higher value tasks. Benchmarking HRC against some production processes has shown throughput increasing by 30% or more.

Continued on page 22

» Supply Lines



Data logger in action.

PHOTO: KSB

SES YOUR PUMP SYSTEMS

KSB, the Canadian arm of the German pump manufacturer, is offering a new onsite performance monitoring and analysis service.

System Efficiency Services (SES) will collect system parameters (such as power consumption, pressures, flow rates, pump and motor vibration, and pump speeds) at a number of locations on the system and over a range of operating conditions, then compare measurements to performance curves provided by the pumps' manufacturers.

Instrumentation is installed without drilling into existing equipment. Once the analysis is complete, KSB's engineers provide a comprehensive report that outlines areas for improvement and potential cost savings. The analysis will also recommend an optimized preventative maintenance program.

SKF EXPEDITES CUSTOM JOBS

Need a small quantity of customized, super-precision bearings? SKF will oblige.

Its new service delivers bearings with outside diameters ranging from 40 to 300 mm in just days throughout North America.

Orders will be delivered from SKF's North Charleston, SC production facility.

The Swedish bearing manufacturer and global supplier will customize pre-loading of precision spindle bearings, modify angular contact and ball screw support bearings, convert rolling elements from standard bearing steel to ceramic balls for higher load capacity with low friction and heat characteristics, optimize greasing, grind notches and substitute or redesign bearing cages.

A GREEN, SAFETY WINNER

Canadian Linen and Uniform Service received the SafeTRSA Innovation Award and the Clean Green Innovation Award for its efforts to improve plant safety and the environmental impact of its operations.

The Textile Rental Services Association (TRSA) recognized Toronto-based Canadian Linen for reducing spontaneous combustion fires at its production facilities and identifying prevention measures that could be applied to laundry practices.

It received the Clean Green Innovation Award earlier this year for gaining efficiencies in water and energy conservation, and adopting best management practices for reusing, reclaiming and recycling resources.

Applying HRC

Continued from page 21

The automotive sector, an early adopter of major industrial robotic technologies, has a strong interest in HRC. While large, conventional robots dominate the body and paint shops, cobots are likely to go where robots have never had much of a role – in final assembly. They reach into tight or awkward spaces – work that is physically taxing for a human – to plug, join, glue or fill body structures and interiors.

Cobots are programmable or set in motion by the worker on the shop floor using a touchpad-like device, not unlike an operator using the touchscreen of a PLC. They empower managers and workforces to identify opportunities to restructure jobs for maximum effect rather than take a top down approach with a turnkey robotic solution. This concept allows the manufacturer to find just the right mix – 40%, 50% or 60% automation – in a human-robot collaboration.



Collaborative robots can perform assembly tasks, like inserting plugs in a car body that are ergonomically taxing on humans.

PHOTO: KUKA SYSTEMS

Simple tasks are programmed without a lot of programming knowledge. Collaborative robots generally don't need the precise positioning of parts. With their internal sensors, they adjust to find the right positioning or are nudged into a corrected pathway. They don't require external sensors and cameras to guide them. They're mobile and thus shared, a roving multi-tasker during workload peaks and resource bottlenecks.

Most have built-in safety technology and design features that enable cage-free operations. For starters, they work at a similar speed as humans. The LBR *iiwa* features integrated force and torque sensors – part of its power and force limiting technology. Its collision detection is so sensitive it interrupts a rapid descent at the outer edge of a raw egg placed in its path without cracking the shell. Put a glass of water in its path, it will stop without spilling a drop. Its curved design means no corners, and hence no points to cause injury even if the worker bumps into an inactive unit.

That said, a full risk assessment with proper staff training should be done. That's no different than understanding and minimizing potential safety hazards in a manual work environment.

The robotics industry is creating or upgrading standards to reflect the HRC environment and work practices. Canada will have an updated CAN/CSA Z434 standard that mirrors international efforts in this area.

KUKA Systems North America LLC, a manufacturer of flexible automatic production systems based in Sterling Heights, Mich., provided this application feature.

Comments? E-mail jterrett@plant.ca.

Power Transmission

DOUBLE THRUST CAPACITY TO RG4

Installing an extra roller bearing on Amacoil-Uhing's Model RG3 linear drive doubles the thrust capacity to RG4 without significantly increasing the size of the unit.

The centre bearing on the RG3 makes point contact with the drive shaft on two points generating maximum side thrust. However, the two outside bearings contact the shaft on just one point, which produces half the thrust capacity for each bearing. The addition of the fourth bearing adds two more bearing-to-shaft contact points.

The RG drives are available in a range of sizes with



Four-ring, high thrust option.

side thrust ranging from 7 to 800 lb. They're used in equipment requiring a reciprocating linear motion component. The drives are

also used in material handling systems, spraying assemblies, converting equipment and metrology/inspection machines.

Travel speed and direction are mechanically controlled, which reduces or eliminates electronic controls and programming in linear motion systems.

Eight RG3 sizes are available with the four-ring high thrust option.

Amacoil is the Aston, Pa.-based North American distributor for Uhing Co.

www.amacoil.com

GET YOUR BEARINGS WITH DRY-TECH KIT

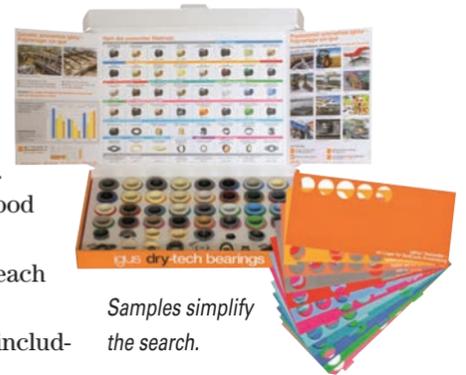
Engineers will find the right dry running bearing for their applications with the dry-tech box from plastics specialist *igus*.

The sample kit contains a set of card overlays that filter the bearing choices by criteria – similar to the *igus* online configurator and includes *iglide* bearings. They range from *iglide* H (for corrosive environments) to *iglide* A350 (for the food industry) that withstand temperatures up to 191 degrees C (356 degrees F).

The bearing guide simplifies the search by highlighting key properties of each bearing.

igus is a East Providence, RI-based manufacturer of plastic components including chains and bearings.

www.igus.com/iglide

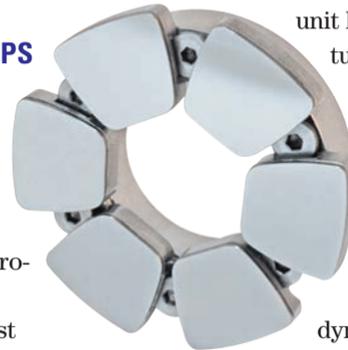


Samples simplify the search.

HIDRAX RELIEVES DEMAND ON ESPS

Technological advances in steam-assisted gravity drainage (SAGD) are increasing the operating temperature of electric submersible pumps (ESPs) and placing increased demands on the thrust bearings in the motor seal/protector section of the ESP string.

Waukesha Bearings' Hidrax HT thrust bearing for high-temperature ESPs sustains



A drop in replacement.

unit loads of 8 MPa (1,160 psi) at oil bath temperatures up to 300 degrees C (572 degrees F).

The bearing – in sizes up to 200 mm with centre or offset pivot designs – is a drop-in replacement option for equipment requiring increased load capacity at high temperatures.

Waukesha Bearings, based in Pewaukee, Wis., is a manufacturer of engineered hydrodynamic bearings and brush seals.

www.waukeshabearings.com

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Backlash-free connections.

COUPLINGS PROVIDE HEAVY-DUTY PROTECTION

Ringfeder Power Transmission's GWS safety couplings from the GERWAH product segment are custom-built for heavy-duty needs.

Up to 12 standardized switching units are located on the outer ring of the coupling, ensuring a backlash-free connection and reliable torque transmission between input and output side. This allows a high level of flexibility in disengagement torque.

When the coupling is engaged, steel balls located within the switching units are forced into a conical detent by spring pressure. If the disengagement torque preset on the switching units is exceeded, the steel balls move out of their detent in axial direction, causing a stable separation of input and output side, which interrupts the torque transmission.

With a few steps, the overload coupling is returned to operating mode.

In addition to a coupling model with flange-hub and keyway-hub (GWS 5420), the product line includes a flexible coupling (GWS 5421) and a rigid disc coupling (GWS 5422), both with keyway-hubs on the input and the output side.

Ringfeder is a German manufacturer of power transmission products. www.ringfeder.com

IRONHORSE ADDS ALUMINIUM WORM GEARBOXES

AutomationDirect has expanded its mechanical power transmission product line to include aluminum worm gearboxes in five frame sizes, with gear ratios from 10:1 to 100:1.

They feature a C-flange input and hardened hollow-bore output shafts and come in 30- to 75-mm box sizes with double-lipped embedded oil seals to prevent leakage.

Epoxy paint inside and outside the reducer prevents corrosion, and double bearing sets are on both shaft ends.

They change drive direction by 90 degrees; they're mountable in any direction, except motor pointing up; and they do not



Gear ratios to 100:1.

have vent plugs or breathers. These IronHorse worm gearboxes are used with electric motors for reducing output speed, increasing torque, changing drive direction, or running two loads from one motor in applications such as conveyors, packaging machines and rotary

tables. Options include single and double output shafts, output flanges, torque arms and output covers.

AutomationDirect is a distributor of automation products based in Cumming, Ga.

www.automationdirect.com

READY FOR WASHDOWNS

ReliaMark has added two products to its line for washdown applications: corrosion-resistant mounted units and stainless steel chain. The mounted units come with stainless steel and thermoplastic housings with set screw or eccentric collar stainless steel inserts in pillow block, 2- and 4-bolt flange, 3-bolt flanged bracket, tapped base and take-up unit styles.

Shaft sizes for standard stainless steel bearing inserts range from 3/4 to 2 in. Most housing styles come with both set-screw and eccentric locking collar mounts.

The corrosion-resistant rollers are come in single- and double-strand ANSI sizes # 25 - 80; extended pitch conveyor standard- and large-roller ANSI sizes #2040 - 2082; and British Standard single-strand sizes 06-12. ANSI sizes come in packaged lengths of 10, 50 and 100 ft., and British Standard chains are packaged in 10-ft. lengths.

Reliamark products are distributed by Kaman Industrial Technologies Corp., which is based in Bloomfield, Conn.

www.reliamark.com



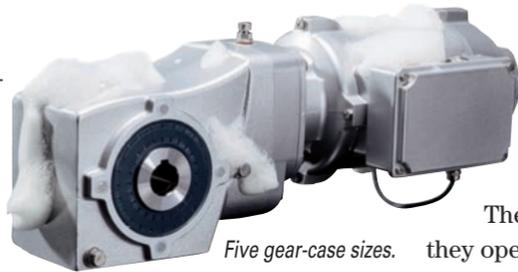
Corrosion-resistant rollers.

TORQUE INCREASED 60%

NORD Drivesystems' next generation of two-stage helical-bevel gears deliver up to 97% efficiency and a 60% increase in torque to weight ratio over the previous series.

The 92.1 and 93.1 come in five gear-case sizes characterized by an open, smooth, self-draining outer surface.

The high-strength aluminum alloy housing is one-piece with bores and mounting faces machined in one step, producing precise tolerances that ensure accurate positioning of gear teeth,



Five gear-case sizes.

bearings and seals. And reinforcements inside the gear case increase strength and rigidity. This, in turn, provides for larger, high-capacity output bearings, increased overhung load capacity and increased hollow bore capacity.

They're leak-free with longer gear and bearing life, they operate quietly and have high output torque capabilities.

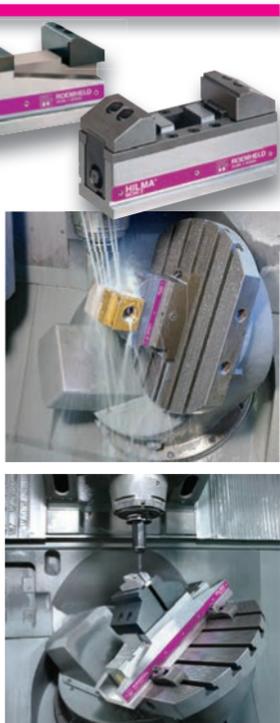
Applications include conveyors, material handling, food and beverage, and washdown environments.

NORD Gear Corp. is a manufacturer of drive systems based in Waunakee, Wis. Nord Gear Ltd. has offices in Brampton, Ont. www.nord.com

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POWER TRANSMISSION

COMPACT MOTORS SAVE SPACE

The ACOPOSmotor from B&R Automation combines a servo motor and drive in one compact module that provides developers with more freedom in machine design and saves space in control cabinets.



It's connected to the drive network using a hybrid cable, which includes all necessary power and signal lines and connects to the POWERLINK network.

Available

Three sizes. in three sizes, the modules handle torques from 1.8 to 12 Nm. An optional fan assembly boosts performance up to 100%.

They're fully compatible with the ACOPOS-multi drive system, allowing users to select the best-suited servo drive for each machine without any additional engineering work.

B&R is a manufacturer of industrial automation equipment based in Atlanta.

www.br-automation.com

BEARINGS DON'T NEED GREASE



EDT Corp.'s Poly-Round Plus bearing insert has a stainless pin on the outer diameter to facilitate drop-in installation into housings without using a set-screw as an anti-rotation device.

Low maintenance.

The self-aligning polymer inserts are made for a variety of operating conditions.

When the environment contributes to premature bearing failure, Poly-Round bearings operate without grease, seals or shields, are unaffected by washdown and don't rust. They run 12 months without maintenance on modular plastic- and wire-belt conveyors.

There's no need for drilling and tapping a hole through the housing so the bearing insert aligns but doesn't rotate. Housings are fitted with the appropriate hole.

EDT is a bearing manufacturer based in Vancouver, Wash.

www.edtcorp.com

WORKSPACES



Easily assembled.

LAB WORKSPACE PRE-ENGINEERED

HEMCO Modular CleanLabs pre-engineer the lab workspace, including the structure and the lab furniture/fume hoods to outfit the interior.

Wall panels made with a fiberglass surface provide chemical resistance and excellent light reflectivity.

The structure is easily assembled, modified, or disassembled and moved.

Ceiling HEPA filtration meets the needs of a cleaned-up area from the surrounding environment to class 1,000 (ISO 6).

HEMCO is a manufacturer of lab equipment based in Independence, Mo.

www.hemcocorp.com

SENSORS

TRANSDUCERS HANDLE HIGH PRESSURES

American Sensor Technologies, Inc.'s AST5400 explosion proof and non-incendive differential pressure transducer measures line pressures up to 5,000 psi (350 bar), providing an output signal of analogue voltage or 4-20 mA for monitoring filters or dryers, ensuring flow, or calculating torque.

The transducers have been CSA certified to Class I Division 1 and Class I



Measures line pressures up to 5,000 psi.

Division 2.

Bi-directional calibration is available, and material options include 316L stainless steel, Inconel 718, and Hastelloy C276.

It's also available with an additional temperature output signal or line pressure output signal to reduce the total number of devices and saving money and installation time.

American Sensor Technologies is a manufacturer of sensors and transducers based in Mount Olive, NJ.

www.astensors.com

MULTIPLEXER TRANSMITS UNLIMITED OUTPUTS



Supports daisy chain.

Ultra Electronics' EOTec 2000 multi-node MX multiplexer transmits up to 16 1024 input channels and unlimited output channels of bi-directional electrical information over a pair of fibre optic cables. Use it for remote data acquisition, emissions

monitoring, data and signal transmission in hazardous areas, tank gauging, and conveyors.

The multiplexer's base module provides input/output selections including 4-20 mA, 0-10 VDC and contact closure. It connects directly to the cable via Small Form-factor Pluggable (SFP) transceivers and provides visual indicators for power, global alarm, and module status as well as the fibre link status.

Each base unit has two transceiver ports that support 1,300 and 1,550 nm wavelengths for multimode or single-mode optical fibre. I/O modules are available in 2-and 4-channel versions, and all modules mount on 35 mm Din Rail.

An integrated backplane communicates from the base unit to the input/output modules without external inter-modular connections. Programming isn't required as input/output configuration is derived via a one-time dip-switch configuration.

Power is supplied through redundant external 24 VDC power supply terminals.

Ultra Electronics is a sensor manufacturer based in Round Rock, Tex.

www.ultra-nspi.com

MOTORS



250 to 1,500 hp available.

INDUCTION MOTORS CUT ENERGY USE

Baldor Electric Co.'s energy efficient AC-GPM induction motors are available in 250 to 1,500 hp, 2,300 to 4,000 V sizes with totally enclosed fan-cooled, foot-mounted designs for industrial applications such as pumps, fans, conveyors and compressors that require high torque.

The motors are used on variable frequency drives and feature all cast iron construction, drive end slinger, insulated opposite drive end bearing, 100 ohm platinum winding RTDs, space heaters, provisions for bearing RTDs, and a ground lug in the conduit box.

Baldor Electric Co. is manufacturer of electric motors, drives and power transmission products headquartered in Fort Smith, Ark.

www.baldor.com

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Exair Corp.'s Internal Mix Atomizing Spray Nozzles mix liquid and air to produce a fine atomization of liquids up to 300 centipoise.

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ing or mating surfaces. Drips also ruin the appearance of painted or coated finishes. In addition, excess liquid flow wastes coatings, chemicals or water. The nozzles stop the flow of liquid when compressed air is shut off.

They're available in five patterns: narrow angle round pattern, wide angle round pattern, flat fan pattern, deflected flat fan pattern and 360-degree hollow circular pattern for pressure fed applications that don't require independent air and liquid control.

Applications include painting, coating, rinsing, cooling, quenching, wetting (moistening), humidification and dust control.

The nozzles are fully adjustable to minimize air and liquid consumption and have interchangeable liquid and air caps.

Exair is a manufacturer of compressed air-operated products based in Cincinnati. www.exair.com

STORAGE



Handles multiple loads.

RAPIDSTORE RETRIEVAL SYSTEM SIMPLIFIES STORAGE

Use Dematic's RapidStore ML storage and retrieval system to handle totes and cartons for reserve storage, goods-to-person order fulfillment, automatic pick face replenishment and palletizing applications.

An all aluminum, lightweight mast construction, advanced horizontal and vertical belt drives and optional wheel drive allow high acceleration and deceleration, and high-velocity transport.

It's equipped with a telescopic extractor or table load handling device that stores single, double, or triple deep in a rack structure. Configure it in side-by-side or stacked arrangements for multiple loads weighing up to 110 lb. each.

Move up to six loads simultaneously. Each device is configured to handle one or two loads. The single or double mast miniload comes in 32-, 45- and -65 ft. heights.

Dematic is a provider of warehouse logistics and materials handling products based in Luxembourg.

www.dematic.com

GEARS

HYGIENIC GEARBOX SERVES FOOD AND PHARMACUETICALS

Neugart's HLAE gearbox is designed for use in food processing, pharmaceutical and other industries with stringent manufacturing hygiene standards.

The hygienic gearbox has electro-polished 316L stainless steel surfaces and IP69K washdown performance. It uses food-safe lubricants and includes a smooth PTFE shaft seal that has no particulate-trapping.

Full-load efficiency is above 97% and



No particulate trapping.

it has minimal backlash, high torsional stiffness and a range of output torques.

It handles food and pharmaceutical applications, including filling equipment, slicers, hygienic belt drives, agitating machines, cone mixers, capsule filling systems and centrifuges.

Neugart is a German manufacturer of gear technology with US offices in Virginia Beach, Va. and Bethel, Pa.

www.hygienic-design-gearbox.com/en

HOSES

FITTINGS RESIST BACTERIA

Parker Hannifin Corp.'s Parflex high temperature processing hoses for the food and beverage industry are FDA compliant, resist the collection of bacteria, and are easy to clean.

For added strength and durability, the seamless fluoropolymer hose has added reinforcement that withstands internal pressures and full vacuum capabilities within temperature parameters. Stainless steel braid reinforcement is available with a silicone jacket for handling protection and coated fittings with an FEP liner to eliminate flow reduction at the fitting connection.

Flare-seal hose assemblies feature a PTFE liner that passes through the inside of the fitting and is flared over the face to provide 100% full PTFE coverage on all wetted surfaces. FEP smoothbore EPDM rubber covered hose is flexible and increases personal handling safety. Sizes range from 1/2 to 4 in. in diameter.

Parflex is a manufacturer of thermoplastic hoses and tubes based in Ravenna, Ohio.

www.parker.com



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CLAMPS



LIGHTWEIGHT GRIPPERS HANDLE UP TO 12.8 KG

Schunk's CGH long-stroke, light-weight gripper has an E-value that's four times higher and a tensile force twice as high as aluminum, but weighs 40% less to handle workpieces up to 12.8 kg.

At 11.7 kg, the CGH has a gripping force of 2,500 N, and a variable stroke per gripper finger of up to 160 mm. Decoupled re-circulating ball carriages ensure the acting moments are evenly distributed so 90% of the used energy is on the finger of the grip. This provides a light, but sturdy gripper that has a corresponding torsional stiffness.

By varying the quantity and distance of the guide carriages, the module is adjustable to individual loads. To increase the gripper's efficiency, the stroke is scaled by adjusting the damped end positions.

"Open" and "closed" positions are adjusted according to specific job requirements, and the complete cylinder doesn't have to be aerated and de-aerated at

every cycle, which minimizes cycle times and reduces the consumption of compressed air.

The toothed belt-drive synchronizes the fingers and ensures that the gripper works precisely in case of varying strokes, where small and big components can be alternately handled. Various robots can be directly adapted using an ISO flange.

SCHUNK is German developer of clamping and gripping systems with Canadian sales operations in Mississauga, Ont. www.schunk.com

CLAMPS

PNEUMATIC CLAMP FITS TIGHT SPACES

DE-STA-CO's 8700 pneumatic lever clamp is a lightweight, space-saving alternative to traditional pneumatic toggle and swing clamps, giving fixture builders a reliable option for tight spaces that delivers up to 25% more force than comparably sized alternatives.

An arm arcs up and out of the way on a single plane. It doesn't rotate like a swing clamp and remains in the open position within the clamp's footprint, which eliminates interference with



25% higher clamping force.

adjacent components or crowded fixtures.

It handles materials with differing thicknesses up to 3.8 mm. The clamping mechanism is also encased in a threaded body to fit an opening in the fixture with optional mounting nuts.

The hard-coated aluminum body is lighter. A hard chrome piston rod, alloy steel pivot pins, self-lubricating bearings and high-quality seals enhance durability.

Four bore sizes are available – 25-, 32-, 40- and 50-mm, depending on clamping force needs between 45 to 170 lb.

DE-STA-CO is a manufacturer automation and workholding equipment based in Auburn Hills, Mich. www.destaco.com

MACHINING

GETS THROUGH ISO P/K MATERIALS EASILY

Walter's DC170 solid carbide drills have been updated to deliver enhancements that boost reliability and hole quality while lowering overall production costs and increasing tool life.

The internally cooled drill improves stability and reliability in the drilling of ISO-P and ISO-K materials. A land design that orients the margins radially improves performance thanks to shallow cooling grooves at the drill end.

Coolant flow encompasses the entire drill point to produce optimal cooling of both the drill and the workpiece interface, and inhibits chip packing. This is particularly important given the high temperatures generated during drilling.

The drill also adds more material behind

the cutting edge, making it sturdier to boost tool life stability and process reliability.

The ability to control the coolant flow contributes to surface finish that helps users avoid reworking. The alignment of the lands-design smoothes operation and reduces vibration to enhance quality.

Eight visible cooling grooves provide a scale for regrinding and the drills can be reconditioned up to three times.

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

LIGHTING



IP66, NEMA 4X-rated.

REPLACES FLUORESCENT AND HID LIGHTING.

Appleton Group's Viamaster linear LED luminaire provides up to four times more energy efficiency than standard HID or fluorescent fixtures. It enhances reliability and productivity, and reduces maintenance in hazardous environments including onshore and offshore petrochemical operations, chemical processing plants, mining, waste water treatment centers, and pulp and paper manufacturing.

The light delivers clean, high lumen illumination of areas classified as Class I, Division 2 by the NEC and Zone 2. With an IP66 and NEMA 4X-rated resistance against water, it's also used in wash down areas.

It's rated to 60,000 hours of service life, and can be specified in either 2- or 4-ft. lengths with voltage choices of 120-277 VAC or 347-480 VAC, with three lumen outputs. A low profile permits installations in areas that previously couldn't accommodate overhead lighting due to height restrictions.

Appleton Group is a worldwide manufacturer of electrical products based in Rosemont, Ill. www.appletonelec.com



Smooth operation, minimal vibration.

VISION

PROFILERS PROVIDE PRECISION

Ophir Photonics Pyrocam IVs pyroelectric laser-beam profiling cameras are equipped with a 160 x 160 pixel image array that profiles beams up to 1/2-in. without any reduction to optics.

It measures both pulsed and continuous wave lasers from 13 to 355 nm and 1.06 to >3,000 µm. A focal plane chopper is included for continuous wave beams and thermal imaging. Users see the beam for dynamic alignment and proper operation of CO2 and telecom NIR lasers, as well as infrared sources.

There's an interface to GigE cameras for high-speed applications. A 14-bit A/D converter provides reliable measurement and analysis of both large and low-level signals. A signal to noise ratio of 1,000:1 makes 30 mW/cm2 beams easily visible.



2D/3D viewing.

The camera ships with BeamGage analysis software for 2D and 3D viewing and includes algorithms and calculations for accurate, ISO-approved NIST-traceable beam measurements.

Measurements include total and peak power/energy, peak and centroid location, beam diameter, and X/Y knife edge beam widths. The Ultracal baseline algorithm eliminates background noise to enhance accuracy.

Ophir Photonics, a Newport Corp. brand, is a developer of laser measurement equipment based in North Logan, Utah. www.ophiropt.com

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For additional information regarding our products and technical support services, visit our website at: www.brecoflex.com or call 732-460-9500.

One-Touch Swing Clamps Are Quick Acting

One-Touch Swing Clamps from Carr Lane offer simple, cost-effective clamping and unclamping of workpieces. Simply rotate 70° clockwise into position, then clamp down in one continuous motion. These manually operated workholders are available in three styles, including horizontal cam, vertical cam, or hex drive.

Visit One-Touch Quick-Acting Clamps in the Featured Product section at www.carrlane.com/featured.

AVAILABLE IN FOUR SIZES

SIZE	MAX. CLAMPING FORCE
1	1100N
2	1800N
3	2200N
4	3500N

Variations



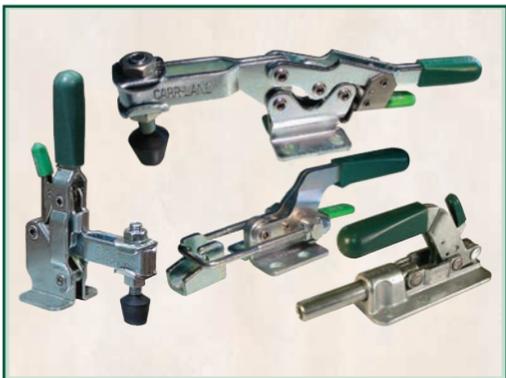
Simply rotate clockwise into position, then clamp down in one continuous motion.



WIDE VARIETY OF CLAMP STRAPS

Carr Lane provides a huge assortment of rugged steel clamp straps, including slotted-heel, tapped-heel, swivel-heel, double-end, drill-spot-heel and forged adjustable clamp straps. Options include assemblies with nuts and knobs, and stainless steel and aluminum alloy versions.

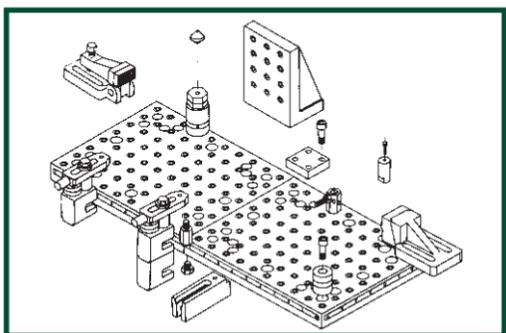
Carr Lane Mfg. Co., www.carrlane.com.



TOGGLE CLAMPS WITH SAFETY LOCKS

Carr Lane has introduced a variety of new toggle clamps with optional safety locks, including latch-action, vertical-handle, horizontal-handle, and push/pull types. Carr Lane toggle clamps have a comfortable handle grip, and are made of durable high-grade steel (many also available in stainless steel).

Carr Lane Mfg. Co., www.carrlane.com.



MODULAR FIXTURING

Modular fixturing from Carr Lane is ideal for one-time jobs, prototype parts, jobs that do not repeat often, replacement parts, or while permanent fixtures are built or repaired. See our wide variety of modular fixturing components in our online catalogue, including economical starter sets.

Carr Lane Mfg. Co., www.carrlane.com.

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Learn more at CarrLane.com/CarrLock

POWER MODULES

POWER MODULES PACK A PUNCH

Siemens's 230 V, single- and 3-phase AC power modules used in its Sinamics G120 drives have a smaller footprint and higher power density than the current PM240 generation.

The modules mount side-by-side without derating, and a push-through version with an extended heat sink reduces required cabinet size for an IP55 (NEMA 12) seal when it's used with an optional external mounting bracket. Standard IP20 open-type versions are also available.

Quick connectors on the motor and cable sides simplify in-field commissioning and maintenance. Removable terminals for line supply, motor and braking resistors are quickly replaced.

A variable speed fan runs based upon actual conditions with simple on/off operation to reduce noise generation and power requirements.

Use the power modules with general-purpose and servo-drive styles. Options include braking resistors, input reactors, output reactors and sine-wave filters.

Siemens is a global manufacturer of industrial products based in Berlin, Germany.

www.usa.siemens.com



IP20 open-type versions available.

PUMPS

APP EASILY PICKS PUMPS

Armstrong Fluid Technology has updated its ADEPT pump selection software with a new mobile application that allows engineers and end-users to quickly select HVAC products from all over the world.

An intuitive interface displays view line



iOS and Android compatible.

drawings, multi-curves, photos, voltage, motor size, seal operating limits, seal options, construction options and more than a dozen motor options.

The app then lists the pumps that meet specific criteria, plus key characteristics of each selection such as efficiency at average load, operating costs and motor size. It's compatible with most popular browsers and mobile devices and features a native application for Apple's iPad.

Armstrong Fluid Technology is a global manufacturer of fluid-flow equipment headquartered in Toronto.

www.armstrongfluidtechnology.com

DOSING PUMPS ARE MAINTENANCE-FREE

Moyno's dosing pumps increase efficiency where low flow, accurate dosing is required.

A smooth pumping action without pulsation and low shear for intermittent or continuous dosing duties in high pressure, low flow applications (1,044 psi/72 bar) provide a cost-effective alternative to gear pumps.

Without valve components, the number of wearing parts is reduced to eliminate blockages. Stators are available in different materials.

All pump components except the body, coupling rod and suction chamber are made of stainless steel. Internal components are available in Hastelloy for severe chemical environments.

Four different models handle requirements from 0.53 US gph (2 L per hour) and 1,044 psi (72 bar pressure), up to 330 US GPH (1,250 L per hour) and 174 psi (12 bar pressure).

Moyno is a pump manufacturer based in Springfield, Ohio.

www.moyno.com



Up to 3.2 scfm vacuum flow.

VENTURI CARTRIDGES REDUCE DOWNTIME

Vacon Co.'s RTM maintenance-free venturi cartridges replace failed or clogged multi-stage pumps to maximize productivity and minimize downtime.

The single stage cartridges allow dirt, dust and debris to pass through without clogging and thread directly into existing multi-stage vacuum pumps and grippers.

The venturi design produces high internal velocities that carry dirt through and out of the pump. Without obstacles to impede flow or trap dirt, the pumps don't lose suction, require filters and maintenance is reduced.

RTMs are directly interchangeable with installed multi-stage units or vacuum grippers, eliminating retooling.

They're available in 11 performance levels up to 3.2 scfm vacuum flow and 28 in. Hg [948 mbar] vacuum level.

Vacon Co. manufactures air-powered venturi vacuum pumps, cups, and end-of-arm tooling products in Medway, Mass.

www.vacon.com

YOU Count on, Brands People You Trust

Rexnord's new Thomas® XTSR52 and XTSR71 Disc Couplings provide the highest value solution for rotating equipment, including higher torque, lower mass and an all-metric design. Combining compact size and powerful performance, the Thomas XTSR Disc Couplings feature simple installation and maintenance, and strengthened operation and safety.

And, you can find **Rexnord's** Thomas Disc Couplings at your local **Motion Canada** location. Our local sales and service specialists are experts in application and technical support, providing the parts and the know-how you need to stay up and running.

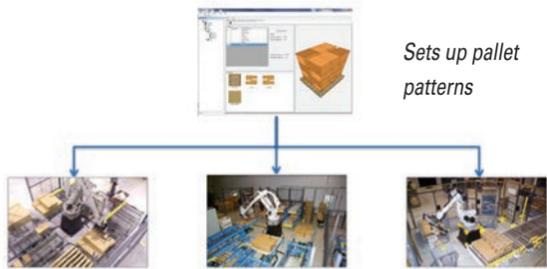
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» Plantware



Sets up pallet patterns

PALLETSOLVER KEEPS ROBOTS ONLINE

Yaskawa Motoman's PalletSolver software suite sets up pallet patterns and robot motion on a PC so Motoman's robots don't have to be taken offline for teaching.

Changeovers are quick without stopping production to validate pallet patterns and it's easily customized for complex applications.

The offline generation tool supports multiple robotic workcells, dynamic gripper zone management, constraints handling and unlimited SKUs.

It has an intuitive graphical interface for configuring cell parameters and a guided step-by-step process for developing patterns. The suite directly imports patterns generated from TOPS or CAPE software to build optimal sequences for the robotic build process.

PalletSolver is available on both the DX100 robot controller and the PLC-integrated MLX200 platform.

Yaskawa Motoman is a manufacturer of robots based in West Carrollton, Ohio.

www.motoman.com

GoTo REXROTH PRODUCTS

Bosch Rexroth's GoTo Products app accesses the GoTo Focused Delivery Program provided by the industrial products manufacturer for a range of electric drives and controls, hydraulics, linear motion and aluminum structural framing products.

Link in using an iPad, iPhone and Android devices for specific pricing and sales contact information.

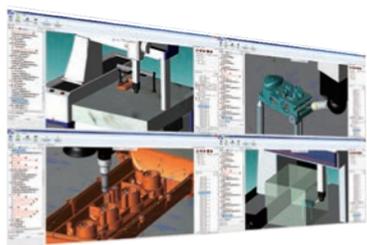
It also provides useful how-to videos, podcasts and technical information.

Easily shares content.

Users can easily share content to social media channels directly through the app and its resources feature allows users to save frequently accessed content.

Bosch Rexroth Canada is based in Burlington, Ont.

www.boschrexroth.ca/GoTo



Generates parts programs.

MICAT REDUCES PROGRAMMING TIME

Mitutoyo's MiCAT Planner automatically generates part programs for inspection. The software reduces programming time by up to 95% (compared with programming using general purpose software).

Mitutoyo CNC CMM users upload CAD file data with PMI (GD&T), and CMM system configuration data, and the software creates a measurement program with a single click.

MiCAT Planner identifies tolerance information included in 3D models, defines the location for measurement and creates a program automatically. Using the optimization function, the program measures in the shortest possible time with the minimum number of probe repositionings and tool changes.

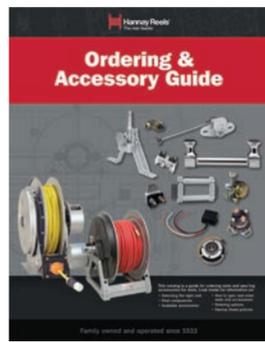
The customizable rule editor creates programs that use the same parameters each time, preventing variation in measurement quality.

MiCAT Planner will be available in early 2015.

Mitutoyo Canada Inc. is a provider of measurement and inspection solutions with offices in Mississauga, Ont.

www.mitutoyo.ca

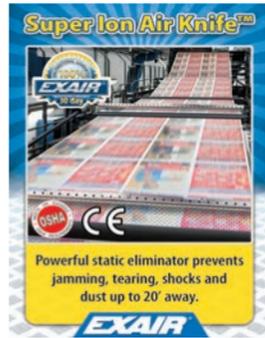
HANNAY REELS RELEASES NEW ORDERING & ACCESSORY GUIDE



Hannay Reels

Hannay Reels recently released a new ordering and accessory catalogue with updated information to support customers throughout the entire purchasing process, from choosing an appropriate reel to adding proper accessories. www.hannay.com

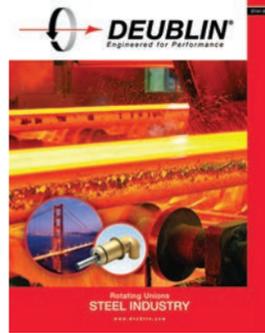
POWERFUL STATIC ELIMINATORS



EXAIR Corporation

EXAIR's Super Ion Air Knife removes static electricity from webs, sheet stock and plastic surfaces where dust, tearing, jamming or hazardous shocks are a problem. The balanced laminar airflow of the Super Ion Air Knife effectively eliminates static at distances up to 20 feet away. Production speeds, product quality and surface cleanliness can improve dramatically. www.exair.com/18/176.htm

STEEL MANUFACTURING ROTATING UNION CATALOG AVAILABLE



Deublin Company

A new catalogue of rotating unions for steel manufacturing applications is now available from Deublin Company, in both print and electronic versions (see below). The catalogue provides detailed operating information and specifications for several

model numbers and sizes, along with installation instructions. www.deublin.com/product-support/request-a-catalog/

THE NEW COXREELS® CATALOG IS HERE!



COXREELS

COXREELS® newest 60 page catalogue showcases refined features and helpful selecting tools for the most comprehensive and innovative industrial grade reel line. The new catalogue includes new models and the addition of specialty product lines such as the EZ-Coil® safety reel line which retracts 80% slower than conventional spring driven reels. www.coxreels.com

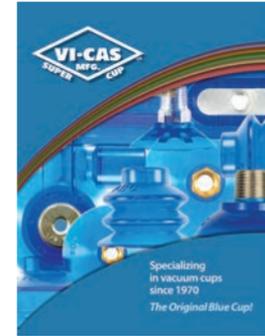
DUST COLLECTORS FULL LINE LITERATURE GUIDE



N.R. Murphy

This impressive guide outlines dozens of N.R. Murphy dust collectors, installations, capacities, styles and models. A must for any reference library. N.R. Murphy Limited has been in business over 65 years and has thousands of satisfied customers. "Dust Collectors are all we do; so get it done right the first time. Just Ask the Experts." www.nrmurphy.com

MOST POPULAR VACUUM CUPE



Vi-Cas Manufacturing

Vi-Cas Manufacturing's new 16-page, full colour brochure details the company's most popular vacuum cups. In addition to dimensional information (including lip diameter, height and mounting holes), the new literature shows photos of each cup to guarantee accuracy. Vacuum cups and accessories are used extensively in all types of packaging and labeling operations. www.vi-cas.com

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Let's follow the Fathers of Confederation

BY MARK MILKE

During Canada's pre-Confederation days, one selling point for uniting the then-disparate British provinces was to drop existing barriers to commerce. The hope was for a country with a free-flow of trade and services in which all could potentially prosper.

In 1865, George Brown, the *Globe* newspaper founder and Upper Canada politician, argued passionately "for the union, because it will throw down the

"Today, some provinces injure their own potential by simplistically and reflexively opposing sensible economic opportunities...."

barriers of trade, and give us a market of four million people," to which his colleagues responded "hear, hear."

We need that optimism today, especially as there are multiple opposition points to a prosperous country even if opponents don't characterize it that way.

Bizarrely, 147 years after Confederation, we still face trade barriers between provinces. But the main impediments to jobs, an improved standard of living

and even tax revenues, are different than the ones faced by Brown and others of that time. Pre-Confederation, provinces imposed tariffs on goods from other provinces; that hampered the general prosperity of all. Today, some provinces injure their own potential by simplistically and reflexively opposing sensible economic opportunities.

Examples abound. New Brunswick's premier Brian Gallant promised to im-

pose "a moratorium on hydraulic fracturing" if he and his colleagues won the recent election. So New Brunswick will limp by with just \$94 million in resource revenues (from mining and forestry) this year and for the foreseeable future.

In a nearby contrast, Newfoundland and Labrador have followed the optimism of Brown and McMillan by developing its energy sector. This year, it will garner an estimated \$2.5 billion in resource revenues, including mining taxes and royalties. Similar opposing positions can be found among native politicians. A group of First Nations leaders from Vancouver Island and Washington State just signed their own agreement to "prohibit" an expansion of the Kinder Morgan pipeline. On the other side of the Rockies Fort McKay First Nation in northern Alberta near the oil sands, has expanded local prosperity. They've capitalized on oil with their own businesses including service companies, heavy equipment operations, environmental services and an industrial park.

Opportunities for change

Then there are the policy decisions that make life difficult for the manufacturing sector in Ontario. The provincial government was correct to bring down business taxes over the past decade to attract new investment, but it then nullified a potential advantage with an ill-advised energy policy. That has increased electricity rates in a manner that makes Ontario unattractive for investment. It translates into less job creation and income growth, fewer opportunities, migration out of the province, and a squeeze on provincial revenues.

Unlike Confederation-era debates, there are obviously many more voices in the today's public square. There's legitimate concern about environmental protection and for a treaty. Still, while it always makes sense to look at economic decisions in a broad context, a flourishing human society matters. That includes the ability to find a job and make a living.

The spin-offs from a flourishing economy include everything from increased personal and family choices and charitable donations to tax revenues for social programs, schools, hospitals and public parks. The possibilities for personal and community benefits are of course, limitless.

Confederation was a grand idea for many reasons, but the Fathers of Confederation had it right when they saw the potential for widespread and increased prosperity. Their bias is still worth imitating today.

Mark Milke is a senior fellow at the Fraser Institute. Visit www.fraserinstitute.org. Twitter: @MilkeMark. This column is distributed by Troy Media (www.troymedia.com).

Comments? E-mail jterrett@plant.ca.



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AIR PREP



NITRA pneumatic air prep devices' modular design allows for stand-alone applications as well as easy field assembly for combining components.

- Filters
- Regulators
- Lubricators
- Combination filter/regulators
- Manual shut-off relief valves
- Soft-start/dump valves
- Modular assembly brackets

CONTROL VALVES



Manual or electrically controlled, NITRA's directional control solenoid valve selection offers capacity and form factor flexibility to meet your system configuration needs.

- Poppet and spool valve styles
- 3- to 5-port models
- Manual toggle, rotary, push-pull and foot pedal valves
- Process (pipeline)
- Compact modular
- Manifolds, silencers, cables, connectors
- Position switches

CYLINDERS



NITRA pneumatic cylinders are interchangeable with many other brands, offering styles for various application requirements in popular bore sizes and stroke lengths.

- Non-repairable round body style
- Compact (pancake style)
- NFPA heavy-duty, standard and cushioned-end styles
- Dual-rod guided
- All stainless round body style
- Position switches

TUBING AND FITTINGS



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- Brass adapter fittings
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Filter/Regulator Comb. 1/4" NPT, gauge, bracket	\$30.50 AFR-3233		---	\$138.55 42K92	\$115.47 42007401
Air cylinder, nose mount 3/4" bore, 1" stroke	\$12.50 A12010SN		\$16.33 6498K141	---	\$21.62 36696458
Nylon tubing 1/4" OD, black, 100 ft.	\$17.50 N14BLK100		\$68.00 ¹⁾ 5097T411	---	\$84.65 NB-4-035-0100-P

1) Sold by foot, price shown for 100 feet

All prices are U.S. published prices. Many other part numbers are available from all vendors. AutomationDirect prices are from April 2014 Price List. McMaster-Carr prices are from www.mcmaster.com 2/20/2014. Grainger prices are from www.grainger.com 2/20/2014. MSC prices are from www.mscdirect.com 2/20/2014. Prices subject to change without notice.

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