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ADVANCING CANADIAN MANUFACTURING

Volume 73, No. 04 May/June 2014

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Editorial

Energize export inertia

As if there aren't enough challenges, manufacturers are among the national underperformers competing in the global arena. Outside of commodities, Canadian companies are almost invisible on the world stage. Only 3.6% export, according to the Export Development Canada (EDC). And TD Bank CEO Ed Clark told an investor's meeting in Calgary that Canada's share of non-commodity US imports has dropped 30% over the past decade. He warned the country is losing its edge because less than 10% of SMEs are involved in exporting goods or services.

Our tepid productivity growth – deemed an impediment to improving competitiveness – is also “worrying” according to the Conference Board of Canada.

Canada gets a B from the Ottawa-based research firm's comprehensive analysis of the factors that determine its competitiveness against 16 peer nations. The Conference Board says nationally we're delivering an okay performance, but could do better.

Its *How Canada Performs* report card notes between 2002 and 2012, the US posted labour productivity growth of 1.7% to our 0.8%, and our five-year performance has been lower than other advanced economies for many decades.

This uninspiring effort is holding Canada back. The Boston Consulting Group's analysis of 25 major exporting countries puts us in the “losing ground” category, almost entirely because of lagging productivity. BCG estimates a Canadian worker produces 60% as much as a US worker. The average growth rate for 25 countries was 27%, compared to Canada's 1.3%. And the gap with the US is widening.

The Conference Board notes countries that invest in machinery and equipment generally have higher productivity growth, but Canada's investment as a percentage of GDP is among the lowest of other advanced economies. It recommends harmonized sales taxes, investment tax credits, reduced corporate taxes and reduced regulatory burdens to help provinces boost investment.

Innovation must also be addressed. Canada is way behind its peers, but public policy and business culture would help improve our standing. The Conference Board recommends credits and programs that encourage business to invest in R&D, investments in public infrastructure, and reduced barriers to trade and labour mobility.

On the export side, Clark identifies a need to focus on ways to help companies, especially small ones, compete outside Canada. Deloitte Canada has identified a clear, positive link between international trade and improved productivity through exporting. In a recent report, it details a three-stage “Smart Exporting” pathway to success.

Stage one is to think like an exporter and narrow the value proposition of your business to its strongest feature. The next step is to explore. Evaluate your beliefs and assumptions by chatting with successful exporters. Newsflash, the US market isn't as similar to Canada's as you may think.

Stage two is about becoming an exporter. Develop relationships, trust and credibility. Attend lots of trade shows and tap into their networks. When you choose a market, adapt to the culture and business practices, transforming your business into a “local player.” Protect yourself by conducting comprehensive due diligence and vetting prospective partners.

Stage three is about continually transforming the business, investing in new technologies and disseminating new knowledge across the organization. Collaborating with global partners to innovate, piloting new technologies and creating new opportunities is key to sustained long-term growth.

Success and growth hinge on engaging the world with greater gusto. Aggressively tackling productivity issues and adopting a more intrepid attitude by looking beyond North American markets will certainly go a long way to improving Canada's grade point.

Visit www.deloitte.com for a copy of *The Future of Productivity 2014*.

Joe Terrett, Editor

Comments? E-mail jterrett@plant.ca.



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» Bulletins

Northwest Pipe Co., a Vancouver-based manufacturer of welded steel pipe and tube products, will supply pipe for a multi-million dollar project that runs between Wyodak and Moorcroft, Wyo. It includes approximately 22 miles of 42-inch diameter, cement mortar-lined and polyurethane-coated spiral welded steel pipe for a pipeline that will expand the city of Gillette's groundwater sources.

Firan Technology Group Corp. was awarded a \$10-million three-year contract from an undisclosed aerospace OEM to supply printed circuits boards for use on key fixed wing platforms including the Boeing 787, Airbus A350, A400M and Bombardier C-Series. Firan, an aerospace and defence electronics product and subsystem supplier, will manufacture the product at its FTG Circuits Division in Toronto.

Cematrix (Canada) Inc., a Calgary-based manufacturer of cellular concrete products, has signed orders for \$1.1 million in aggregate destined for unnamed oil sands and infrastructure projects.

Northland Power Inc., a Toronto-based developer of clean and green energy has completed \$240 million in financing for the last phase of its 130-megawatt ground-mount program for five solar projects, totaling 50 megawatts. They're located in Cochrane and Burk's Falls, Ont. It will sell the electricity under Ontario's renewable energy Feed-in-Tariff (FIT) program.

MacDonald, Dettwiler and Associates Ltd., a global communications and information company in Richmond, BC, has signed a \$30-million contract to provide Aselsan Electronic Industries Inc. with an X-band communication-hosted payload solution for the Turksat 6A X-Band satellite.

ABC Group Inc., a Toronto based global automotive parts manufacturer, has sold its ABC Group Fuel Systems Inc. subsidiary in Gallatin, Tenn. to Rongshi International Holding Co. Ltd. for an undisclosed amount. The acquisition will help Rongshi, owned by a Singapore investment company, to supply its global customer base.

Bombardier's rail technology division based in Berlin has received firm orders worth US\$338 million for rolling stock from an undisclosed customer.

St. Marys is a golden energy saver Bowmanville cement plant wins UK excellence award

BOWMANVILLE, Ont.: St. Marys Cement Inc.'s Bowmanville, Ont. plant has been certified a gold-level energy saver by the National Energy Foundation in the UK.

The Gold Award Certification in Energy Excellence was presented to the plant as the result of an assessment that includes 160 energy management criteria based on world-class best practices.

The program is independently moderated and validated by the United Kingdom's National Energy Foundation.

Noting Bowmanville is one of the largest cement plants in North America with a rated capacity of over 1.8 million tonnes of product, John Pooley, the program's chief assessor, said "few other industrial operations in the world have come close to achieving the same level of integration in energy savings."



The Bowmanville plant's Energy Management Conservation Committee (E=MC2) team

PHOTO: ST. MARYS CEMENT

The company's E=MC2 energy management multi-department committee identified and acted on more than 100 energy efficiency initiatives that added \$10 million to the bottom line and the plant is on pace to reduce its energy bill by \$1 million.

Savings are achieved through smart energy buying, matching energy-intensive plant operations with off-peak rates,

common sense conservation practices and other plant-based initiatives.

So far the plant has reduced energy use by 171,429 megawatts and lowered CO2 emissions by 31,886 tonnes.

St Marys Cement, based in Toronto, is a wholly-owned subsidiary of Votorantim Cimentos, an international cement manufacturer based in Sao Paulo, Brazil.

TFWs should be able to immigrate: Unifor

TORONTO: Raising wages for workers in the temporary foreign workers program and increasing the fees paid by companies is a good start, but does nothing to make the workers any less vulnerable, said Unifor national president Jerry Dias.

"This program takes advan-

tage of the desperation of workers in other countries, forcing them to leave their families for jobs in Canada," Dias said, adding that promises to crack down on abuses of the program won't address its fundamental problems.

He wants the program to transition into allowing the workers

to stay in Canada permanently.

"The difference is that they could build that life with their families. The workers in this program deserve the same opportunity," Dias said.

"If they are good enough to work here, they are good enough to live here with their families."

Workers stay in Canada only as long as their work permits allow. They cannot bring their families with them, and most are barred from applying for citizenship.

Dias called on the Harper government to allow temporary foreign workers already in Canada, or who have arranged to come, to apply to immigrate permanently.

He said workers should also have full access to the same rights and protections as Canadians.

5N Plus acquires AM&M

MONTREAL: 5N Plus Inc. has acquired a metallic powder manufacturer in Kanata, Ont.

Financial details have not been released.

Advanced Machine and Materials Inc. (AM&M) manufactures micron size metallic powders for soldering, high thermal conductivity interfaces and thin film solar panels. The intellectual property and processing capabilities developed by AM&M allows for the cost-effective and high-yield production of spherical, low oxygen content powders with uniform particle size.

5N Plus makes specialty metal and chemical products.

Based in Montreal, it has manufacturing facilities in Europe, the Americas and Asia.

Héroux-Devtek investing \$90M for Boeing contract

LONGUEUIL, Que.: Héroux-Devtek Inc. is putting \$90 million towards a long-term contract to supply Boeing Co. with complete landing gear systems for its 777 and 777x aircraft.

Deliveries are to begin in early 2017.

The manufacturer of aerospace products based in Longueuil, Que. said its capital investment plan spanning the fiscal years ending on March 31, 2015 and 2016 will include the expansion of the existing facility network as well as investments in machinery and equipment for component manufacturing and system assembly.

The investments are in addition to planned regular maintenance currently projected at approximately \$30 million over the two-year period.

Eclipse opening its second US facility

CAMBRIDGE, Ont.: Eclipse Automation Inc. is making a second expansion in the US, opening a facility in Fremont, Calif. that will include engineering offices and a service shop that will serve customers in the southwest.

The company makes automated manufacturing equipment for the solar, transportation, industrial, telecommunications and electronics industries.

It operates from a vertically integrated ISO 9001 registered plant in Cambridge, Ont., featuring inhouse system design, fabrication, system integration and commissioning capabilities.

Eclipse has a similar 25,000 square-foot facility in Charlotte, NC.



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Bombardier, Rolls-Royce expand engine deal

Amsterdam, Singapore added to the aircraft-maker's maintenance list

MONTREAL: Bombardier Aircraft Service Centres in Amsterdam, Netherlands and Singapore have been authorized to service Rolls-Royce engines used in the aerospace company's aircraft.

The agreement with the UK-based aerospace engine manufacturer certifies Bombardier to perform line maintenance on the engines in Global Express, Global Express XRS, Global 5000 and Global 6000 aircraft; and perform engine removals for shipment to Rolls-Royce for heavy maintenance.

The deal expands support provided to aircraft customers. In March 2012, Rolls-Royce and Bombardier entered into a similar agreement authorizing Bombardier Aircraft Service Centers in Dallas, Tucson, Ariz., Hartford, Conn. and Fort Lauderdale, Fla. to perform maintenance on the



Bombardier's Global 5000 aircraft.

PHOTO: BOMBARDIER

BR710 engine installed on the Bombardier Global Express, Global Express XRS, Global 5000 and Global 6000 aircraft.

To date, Bombardier has 175 Global aircraft based in Europe and 35 in the Asia Pacific region.

BNQ to manage SCC 3D printing committee

E-forum will allow Canadian members to influence decisions

QUÉBEC CITY: The Standards Council of Canada (SCC) has tasked Bureau de normalisation du Québec (BNQ) with managing the SCC mirror committee SMC/ISO/TC 261 on additive manufacturing, also known as 3D printing.

Canada is one of 18 countries involved with the ISO/TC 261 committee set up in 2011 by the International Organization for Standardization (ISO).

"Additive manufacturing is revolutionizing the high-tech manufacturing field, facilitating the work of innovators with their designs, re-designs and prototypes," said John Walter, Standards Council of Canada's chief executive officer. "With BNQ having harmonized the Canadian and international ISO/TC 261 committees, Canada now has wide-ranging industry influence in setting these important international standards."

BNQ is currently completing the formation of the Canada mirror committee that will enable stakeholders to follow and influence the international



A MakerBot Replicator 2 desk top 3D printer for engineers. PHOTO: PEABODYBORE

committee's work. François Richard, project engineer for additive manufacturing at Pratt

& Whitney Canada will chair the committee.

Canadian members will be able to follow, comment on and influence standardization projects and proposals made by the international committee on the Canadian e-forum provided by the Standards Council of Canada.

BNQ is an administrative unit of the Centre de recherche industrielle du Québec (CRIQ), which is involved in standardization, certification, and publishing standards information.

Siemens gets K2 wind project order

OAKVILLE, Ont.: Siemens Canada will supply, install and commission one of the largest Canadian wind turbine orders from Samsung Renewable Energy Inc., Capital Power, and Pattern Energy Group for the K2 Wind project in Goderich, Ont.

Along with the South Kent Wind project in Chatham-Kent, the 270-megawatt project will produce clean power for up to 100,000 Ontario homes.

The project will require more than 1,000 workers, and once operational is expected to create up to 24 permanent full-time positions. Commercial operation is expected by spring 2015, and all of the 420 49-metre blades will be manufactured at a Siemens plant in Tillsonburg, Ont.

CS Wind will produce 140 towers for the project at its Windsor facility using Ontario-made steel.

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

Dr. Oetker is making pizzas in London

LONDON, Ont.: Dr. Oetker Canada has opened a new frozen pizza production facility in London, Ont. that will be the production hub for its North American pizza operations.

The facility will produce the company's Ristorante, Casa di Mama and Panebello pizza brands, with annual production expected to exceed 50 million frozen pies.

The company says it will source most of its raw ingredients from Ontario farmers and food processors.

Dr. Oetker Canada, in operation since 1960, is one of the top five subsidiaries for the food organization that operates in more than 39 countries. Its Canadian manufacturing and R&D operations in Mississauga and London, Ont., produce more than 190 products, including dessert mixes and baking ingredients.

YRT options 34 Xcelsior buses

WINNIPEG: York Region Transit (YRT) has exercised options to purchase an additional 34 clean-diesel Xcelsior 40-foot heavy-duty buses from New Flyer Industries Inc.

The buses are being purchased using an umbrella contract with Ontario's procurement department.

Financial details were not released.

The Winnipeg-based manufacturer will build the buses in the first half of the year for delivery in the third quarter.

Since 1989, New Flyer has delivered 225 low floor buses to YRT.

YRT serves an annual ridership of more than 22 million passengers with a fleet of 335 vehicles.

» Careers



Bryana and Nick Ganong.

Bryana Ganong has been appointed president and CEO of Ganong Bros. Ltd., Canada's oldest chocolate company. She's the fifth generation of the family-run company with a manufacturing facility in St. Stephen, NB. Bryana replaces her father David, who assumes the position of executive vice-chair of the board. Son Nick was appointed vice-president of sales and business development.

Hydruke Energy Services Inc. in Nisku, Alta. has a new president and CEO. **Patrick Ross** is a private equity investor with a history of successfully restructuring manufacturing and construction service related companies.

EcoSynthetix Inc., a renewable chemicals company in Burlington, Ont., has appointed **Jeff MacDonald** COO. Previously he was vice-president of marketing and business development at Husky Injection Molding Systems in Bolton, Ont.

5N Plus Inc., a Montreal specialty metal and chemical products company, has appointed **Bertrand Lessard** COO. Prior to joining 5N Plus, he was general manager of SEC Bloom Lake Iron Mine of Cliffs Natural Resources.

BluMetric Environmental Inc. an Ottawa-based cleantech company, has appointed **Jim Hotchkies** vice-president of its commercial Water Division. Most recently, he worked with LG Electronics, in charge of international business development for the Water Membrane Division.



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BRP invests in a third Mexican plant

VALCOURT, Que.: BRP Inc. is investing \$55 million to build a new manufacturing facility in Juárez, Mexico to expand its Can-Am product offering and meet future demand from off-road segments.

The new 495,000 square-foot plant will create up to 900 permanent jobs.

The company's capital expenditures for 2015 remains unchanged from \$165 million to \$175 million.

"The off-road industry is strong and growing fast and our Can-Am all-terrain and side-by-side vehicles continue to make inroads in the market place," said José Boisjoli, BRP's CEO. "This investment will also provide us with space for the potential insourcing of certain operations, and will bring logistics closer to our manufacturing operations."

The project is scheduled for completion by the end of 2017.

The facility will be BRP's third in Mexico, where it has been manufacturing its products since 2001.

BRP makes powersports vehicles and propulsion systems, including Ski-Doo and Lynx snowmobiles, Sea-Doo watercraft, and Can-Am all-terrain and side-by-side vehicles. The company employs 4,900 workers outside Mexico, including 2,800 in Canada and 2,100 in Austria, the US and Finland.

Manitoba leads export growth Agri-food, machinery and energy drive surge

OTTAWA: After an 11% surge in exports last year, Manitoba is leading all provinces in export growth with a 10% gain in 2014, according to a new forecast by Export Development Canada (EDC).

The province's growth was driven by solid gains in the province's agri-food, industrial machinery and energy export sectors.

The US still accounts for two thirds of the province's exports, but sales to China have almost doubled in the past decade from just over 4% to 8%. Approximately 19% of exports are shipped to emerging markets.

Next year's provincial export growth

is expected to slow to 4% as commodity prices soften, particularly for energy and grains, and expectations of lower production volumes that will weaken agricultural export receipts. The headline numbers, however, mask expected success in the aerospace sector, which should rise thanks to the expansion of Boeing's facilities.

A weaker Canadian dollar and continued recovery in the US will lift manufacturing exports, with industrial machinery exports forecast to grow by 9% in 2014 and 10% in 2015. In the transportation sector, New Flyer Industries continues to benefit from a strong pickup in pent-up US demand for public transportation vehicles.



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» Events

IMTS 2014

AMT

Sept. 8-13, Chicago

The Association For Manufacturing Technology (AMT) presents this manufacturing technology show, which includes more than 15,000 new machine tools, controls, computers, software, components, systems and processes from 1,900 exhibitors. Co-located with the Motion, Drive & Automation North America show and Industrial Automation North America. Visit www.imts.com/index.html.

Oil Sands Trade Show & Conference

DMG Events

Sept. 9-10, Fort McMurray, Alta.

Oil sands professionals showcase the newest technologies, products and services. Visit <http://oilsandstradeshows.com/2014>.

AMExpo/RAPID

SME

Sept. 23-24, Toronto

RAPID Canada, a comprehensive additive manufacturing/3D printing tradeshow and conference debuts at the Advanced Manufacturing Expo (AMExpo), a showcase of advanced manufacturing technologies. The Medical Manufacturing Innovations (MMI) Series for medical device manufacturing processes and technologies is included. Visit www.amexpo.ca.

International Pipeline Exposition & Conference

DMG Events

Sept. 29-Oct. 3, Calgary

This biennial event showcases the latest pipeline technologies, products and services. The Topics International Pipeline Conference is held in conjunction with IPE. Visit www.internationalpipelineexposition.com.

PTDA Industry Summit

PTDA

Oct. 23-25, Orlando, Fla.

Power Transmission Distributors Association (PTDA) presents educational programming, business development opportunities and networking. The event includes MD-IDEX and the Manufacturer/Distributor Idea Exchange. Visit www.ptda.org/IndustrySummit.

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Rights at Work: building a better Canada

BY JERRY DIAS

Your kids grow up, they leave home to make their way in the world, but you miss having them around – and then they come back.

For many families, this is the new reality. Despite getting the education and training they've been told they need, young people are finding few opportunities to build the kind of stable livelihoods their parents enjoyed. And that's forcing them to move home, putting their lives on hold as they struggle to establish themselves.

“Youth are being shut out of the middle class; their lives on hold at a time when they should be building a future...”

It doesn't have to be this way. A better Canada is possible, and it starts with strengthening the middle class.

I have been travelling across the country talking to local leaders and activists about Conservative threats to labour rights and the middle class. It's all in preparation for our Rights at Work campaign aimed at countering such attacks.

According to the Organisation for Economic Cooperation and Develop-

ment (OECD), countries with the highest levels of unionization also have the lowest levels of poverty.

Unions work to improve the lives of all working people, not just its own members, but they're facing an unprecedented attack on their rights by Conservative politicians at both the federal and provincial levels who scapegoat organized labour for the challenges Canada faces.

For example, the Harper government's



Temporary jobs are limiting opportunities for youth workers. PHOTO: UNIFOR

Bill C-525 would make it more difficult to organize a union in federally regulated industries – such as telecommunications, railways and airlines – and easier for employees to have a union's bargaining rights revoked. The bill has received third and final approval in the House of Commons and is now before the Senate.

Provincial politicians are likewise launching attacks on labour.

Despite Ontario Conservative leader Tim Hudak setting aside his plans to eliminate the Rand Formula, he carefully left the door open to revisiting the idea. Any move in that direction would put pressure on other provinces to do the same. And his anti-labour agenda remains intact as a centrepiece in his party's platform. In Alberta, the ruling Conservative party has made it illegal for some unions to even talk about striking.

Such changes weaken unions, and that's bad news for all Canadians.

In for a fight

As unions gained strength and membership after the Second World War, hourly wages for all Canadians rose steadily and helped to establish the middle class. But as unions came under attack in the early 1980s, wages began to flatline – and at points even fell.

Meanwhile, we've seen rapid increases in temporary and precarious work, limiting the opportunities available to our young people. Without secure employment, youth are shut out of the middle class at a time when they should be building a future. Indeed, young people could be the first generation that's actually worse off than their parents' generation.

That's what makes the Rights at Work campaign so important and why I am so invigorated by the large and enthusiastic crowds that have come out as we prepare for the campaign.

Hudak calls his proposed changes a modernization of Ontario's labour laws. They are in fact, a giant step backward.

The Rights at Work campaign makes sure that Canada keeps moving forward.

Jerry Dias is the national president of Unifor, Canada's largest union in the private sector with more than 300,000 members. It represents a merger of the Canadian Auto Workers and the Communications, Energy and Paperworkers unions.

Comments? jterrett@plant.ca.

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ECONOMIC DEVELOPMENTS AND TRENDS

ONTARIO It's kind of a drag

Poor growth and increasing public debt are holding Canada back

Ontario's poor economic performance and its status as a have-not province are dragging down Canada's economy, according to a study by the Fraser Institute.

The public policy think-tank examines Ontario's shift from the economic engine to "have not" in *Can Canada Prosper without a Prosperous Ontario?* noting the province received \$3.2 billion in equalization payments from Canadian taxpayers in 2013/14.

"Because of Ontario's immense size and population, and because the Canadian economy is highly integrated, what happens in Ontario significantly affects Canada's national economy," said Livio Di Matteo, co-author of the report, a Fraser Institute senior fellow and economics professor at Lakehead University in Thunder Bay, Ont.

The study tracks Ontario's performance, showing that over the past decade, and particularly since the recession of 2008/09, it has not performed on par with the rest of Canada due in part to its slow economic growth and spiralling public debt.

For example, from 1981 to 2004, per person GDP was either above or equal to the rest of Canada. However, by 2012 per person GDP (\$45,933) was 5.6% lower than the rest of Canada (\$48,643). If Ontario data were excluded, Canada's per person GDP would be 2.2% higher.

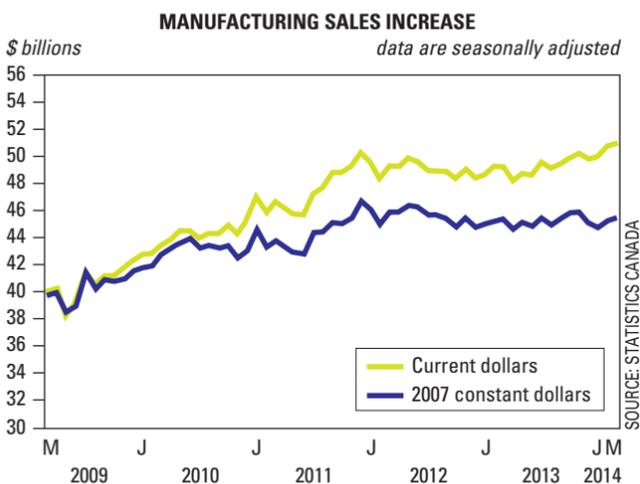
In terms of job creation, the province has recorded the third lowest rate since 2000, ahead of only Nova Scotia and New Brunswick. Employment growth between 2000 and 2013 totalled 14.1% compared to Alberta's 42.1%, or the national rate of 19%.

From 2009 to 2013, excluding Ontario, the national unemployment rate (currently averaging 7.6%) would have been 7.3%.

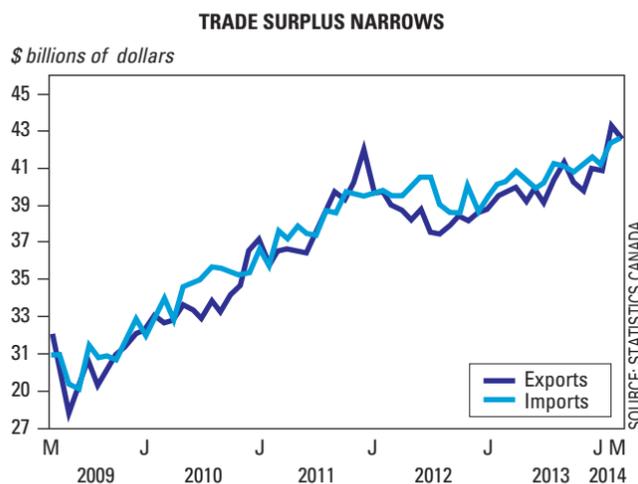
From 2003 to 2012, the average annual growth of business investment in things such as buildings, machinery and equipment was 3% compared to 5.3% for the rest of Canada.

The study notes Ontario could change course by improving tax and regulatory competitiveness, boosting its capital investment, reforming energy and industrial policies, and making better use of natural resources in forestry and mining.

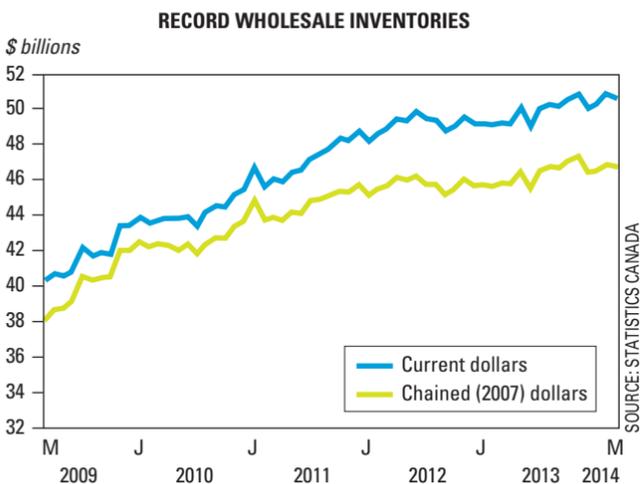
Visit www.fraserinstitute.org for the report.



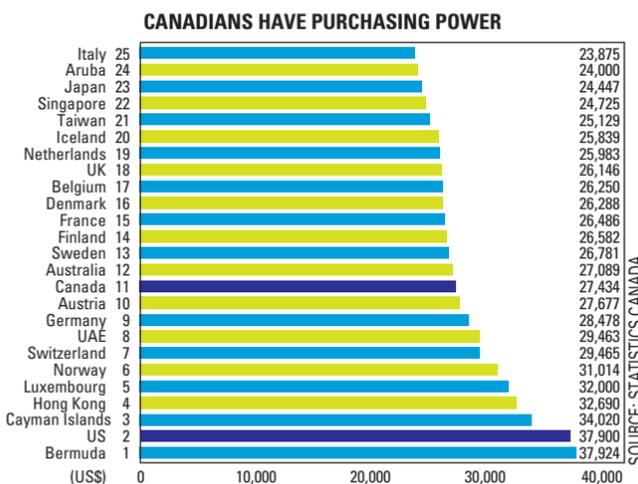
Manufacturing sales were up 0.4% in 11 of 21 industries in March to \$50.9 billion. Food (2.1%), machinery (3.3%) and plastics/rubber products (2.7%) led the way. Paper, petroleum and coal products declined.



Canada's global trade surplus went from \$847 million in February to \$79 million in March. Exports to the US were down 2.5% to \$10.5 billion while imports were up 1% to \$28.5 billion. Exports elsewhere were up 8.5%.



March tallied a 0.4% decline in wholesale sales to \$50.5 billion. Inventories rose 2.3% to \$64.1 billion. Increases were the largest in motor vehicle and parts (6.9%) and machinery, equipment and supplies (1.7%).



Canada is doing "OK" when it comes to purchasing power, says a World Bank report. In terms of relative size, Canada is 15th; 23rd based on GDP per capita; and individuals are 11th. The US is still tops based on GDP at 17%.



Hungry for growth

Food manufacturers didn't have a great year in 2013, with profits of \$3.5 billion compared to \$4 billion in 2010. But this year is looking much better, according to the Conference Board of Canada's *Canadian Industrial Outlook: Winter 2014* report. Consumer demand is being driven by products such as gluten-free foods and production is to rise by almost 3% thanks to export demand, creating about 16,000 more jobs. Pre-tax profits of almost \$3.9 billion represent 9.5% growth.

Hot for FDI

Guess who's looking pretty good to foreign investors sitting on piles of corporate cash? Canada moves up a spot to third on A.T. Kearney's 2014 Foreign Direct Investment Confidence Index (FDICI). It has the third-strongest investor outlook among the 25 countries ranked and it's high on the list for planned foreign investments in heavy industry, light industry and non-financial services. The global consulting firm says R&D centre investments by Samsung, Cisco and GE Aviation support this trend.



ONTARIO EXPORTS TO SURGE

Exporters in Ontario will see a surge in business this year thanks to a lower value dollar and the increasing pace of the US recovery.

The Export Development Canada (EDC) forecasts the province's international trade will grow by 6% this year and 7% in 2015.

Approximately 78% of Ontario's 18,681 exporters sell into the US. The total share of exports to emerging markets increased to 7% in 2013 from 5% in 2009.

EDC's Global Export Forecast identifies shipments of metal ores and international sales of industrial machinery as the province's main growth drivers through 2015.

Agri-food is well positioned to supply the world, but auto sector exports will not be as impressive, says Peter Hall, the federal export agency's chief economist.

"In spite of soaring US sales, Ontario shipments of vehicles and parts will be limited by tight capacity constraints. Even if there are large new investment announcements, any boost to exports will likely take root only after 2016. Ontario firms generally continue to favour offshore investments."

» Compensation

\$ALARY

A HARDER CLIMB IN 2014

The 2014 EMC-PLANT salary survey shows overall compensation growth has stalled but some titles are anticipating increases.

BY JOE TERRETT, EDITOR

Manufacturers are watching their dollars and cents as they work through 2014. Although forecasts suggest improved economic conditions globally and domestically, and the loonie has finally dipped below parity (good for exporters), the still recovering European Union has been put on edge by Russian intrigue in the Ukraine while all eyes are on the US as entrepreneurs await the promised resurgence.

Meanwhile, management-level salaries appear to be on hold this year, according to the results of the third national salary benchmark survey conducted by the Excellence in Manufacturing Consortium (EMC), a not-for-profit organization based in Owen Sound, Ont., and **PLANT** magazine, a Glacier Media Business Information Group publication.

Average executive remuneration in a sector dominated by small and medium-sized enterprises (71% with 5 to 499 employees) will actually shrink after a better than anticipated year in 2013 when respondents' salaries increased 8.2%.

The average salary for all executive and management titles is \$109,166, a 0.26% decrease over 2013 when the inflation rate was under 1%. Statistics Canada pegs the average weekly wage for all manufacturing titles so far this year at \$1,003, or an annual \$52,163, which is a 0.2% decrease over 2013.

The survey gathered a total of 1,734 responses from executives and managers who shared personal information about salaries and bonuses, and how their busi-

nesses are faring.

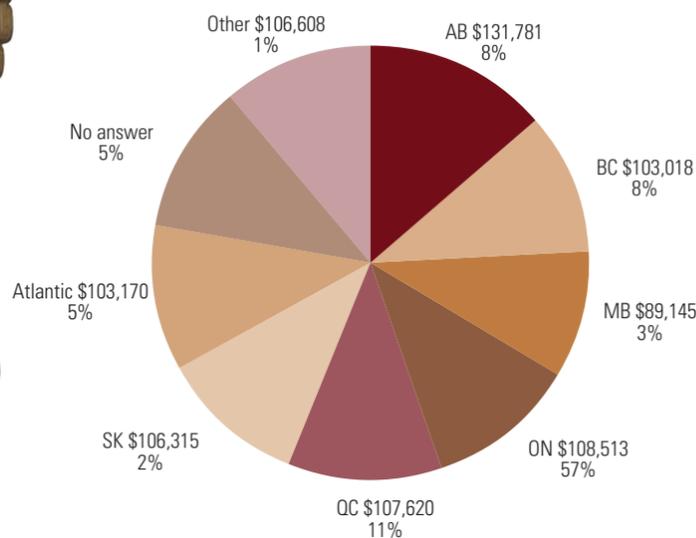
"There's a positive mood out there," says Al Diggins, EMC's president and general manager. "They're running as fast they can to keep up and they've learned a lot of lessons from the double-dip recession; that they can make other stuff with the same people and machinery, so there is a lot of diversifying going on...Companies are looking for other ways to do things and be successful."

Nonetheless, executives are viewing any perceived improvements cautiously. They are less optimistic about earning higher revenues (30% compared to 60% in 2013), but 57% intend to invest in new production equipment and processes over the next five years, 52% say they will hire new employees and 35% expect to add new lines of business.

Their major concerns are consistent with other surveys. Cost control tops the list at 55% of respondents, 39% identified skills issues, followed by capacity utilization and technology upgrades (both 28%) and reorganizing (25%).

"Payroll, taxes, the cost of administering legislative requirements and energy are driving manufacturers crazy.

Salary by location
1,059 respondents



Salary by company revenue
1,059 respondents

Company revenue	2014	2013	2012	% replies
\$1M to < \$5M	\$84,494	\$84,274	\$81,436	14%
\$5M to < \$10M	\$103,307	\$99,346	\$94,735	12%
\$10M to < \$30M	\$105,494	\$108,915	\$100,004	21%
\$30M to < \$50M	\$142,601	\$146,983	\$135,302	10%
\$50M to < \$100M	\$114,903	\$109,222	\$104,422	10%
\$100M to < \$250M	\$124,873	\$119,358	\$110,347	8%
\$250M to < \$500M	\$115,837	\$112,666	\$97,709	4%
\$500M to < \$1B	\$116,140	\$111,260	\$106,460	4%
\$1B plus	\$120,366.27	\$115,876.72	\$112,406.67	6%
No answer	-	-	-	11%
Total survey average	\$109,166	\$109,455	\$101,197	100%

INCREASES

It takes a lot of resources to manage it all," says Diggins. How is all of this managing translating into higher remuneration for some?

CEOs and presidents foresee a 4.8% increase this year after a 7% advance last year. Owners and partners are looking at 2.3% compared to 7.5% last year, which is a much better outcome than the 1.9% decrease the 2013 sample predicted. Vice-presidents are expecting a 5% boost compared to 4.3% last year, while plant managers will get a more modest 1.9% raise compared to the 5.4% they received in 2013.

Directors are experiencing feast and famine conditions. They fare the worst with a 14.6% drop in remuneration following a whopping 28.9% increase in 2013 (which last year's sample anticipated to be 17.5%).

Other titles that slid into the negatives include materials managers (-7.6%), other managers/supervisors (-2.1%), purchasing/supply managers (-10.5%), and safety managers (-3.4%).

About 30% of the surveyed firms are at least partly unionized. The average increase for unionized labour in manufacturing last year was 1.9%, according to Statistics Canada.

Their businesses cover a range of interests based on the federal agency's categories from automotive to sophisticated electronics with 19% identifying their organizations as large (more than 500 employees) and the rest falling under the SME category.

Global conditions are positive

While most industries show salary increases, several recorded declines, including: beverage and tobacco; computer and electronics; electrical equipment; appliances and components; leather and allied products; miscellaneous manufacturing; motor vehicle body and trailer; and petroleum and coal.

Global conditions overall are looking pretty good. TD Economics is forecasting 3.4% growth this year, with better prospects for advanced economies. And unlike 2012, Canada's economic growth surged in the final quarter of 2013 by 2.9%, ending the year at 2% compared to the prognosticators' forecasts of 1.7%. The Bank of Canada is predicting 2.5% growth this year and in 2015. Meanwhile, inflation was below 1% for the year and currently running at 2% year-over-year as of May, while the Bank of Nova Scotia is pegging the loonie at below 90 cents through the end of 2015.

So why has executive/manager compensation stalled?

One reason may be uncertainty about where markets are going. That's the view from ground level at Canplas Industries Ltd., a manufacturer of injection moulded and thermoplastic products for the construction industry.

Steve Thompson, vice-president of manu-

facturing, sourcing and logistics, says much depends on "where the market is and where demand is going to go. Whatever the title, it falls back to products and where they are sold."

The company, based in Barrie, Ont. with locations in Edmonton, Langley, BC and Denver, has experienced variable growth in volumes since 2009 and Thompson says they were down significantly coming out of the recession.

Canada didn't get too far into a drop in house building during the recession, but the US industry was decimated, going from what he described as an average of

Continued on page 12

Bonuses and incentives 1,059 respondents		
Average of Salary 2014	Bonus	% replies
\$85,577	0	35%
\$79,700	1-3%	11%
\$89,694	4-5%	10%
\$103,829	6-10%	15%
\$129,238	11-15%	7%
\$142,752	16-20%	6%
\$207,115	20+	12%
No answer	-	4%
Total survey average	\$109,166	100%

Industries served based on products 1,059 respondents				
Industry	2014	2013	2012	% replies
Paper manufacturing	\$150,542	\$149,220	\$124,710	3%
Textile product mills	\$128,187	\$108,900	\$105,627	1%
Fabricated metal product	\$125,506	\$123,755	\$118,841	18%
Primary metal	\$123,228	\$121,231	\$114,909	2%
Plastics and rubber products	\$120,545	\$116,894	\$111,614	8%
Aerospace product and parts	\$118,818	\$114,568	\$112,444	2%
Transportation equipment	\$115,911	\$114,541	\$109,094	2%
Petroleum and coal product	\$115,823	\$161,470	\$101,368	2%
Chemical	\$112,169	\$111,819	\$109,302	4%
Electrical equipment, appliance and component	\$110,703	\$116,603	\$111,867	3%
Miscellaneous manufacturing	\$110,702	\$121,851	\$89,602	4%
Motor vehicle	\$105,585	\$94,116	\$88,683	1%
Machinery	\$105,553	\$103,026	\$96,310	5%
Non-metallic mineral product	\$104,047	\$99,215	\$93,674	1%
No answer	\$102,984	\$126,870	\$92,942	5%
Printing and related support activities	\$101,673	\$97,885	\$96,010	4%
Wood product	\$100,750	\$95,225	\$92,795	5%
Other	\$98,697	\$96,850	\$91,052	10%
Furniture and related product	\$98,377	\$96,666	\$89,444	1%
Motor vehicle parts	\$94,915	\$87,521	\$85,659	4%
Computer and electronic product	\$93,279	\$96,990	\$95,495	2%
Durable goods industries	\$92,905	\$91,266	\$87,255	1%
Food manufacturing	\$91,746	\$88,903	\$85,087	10%
Beverage and tobacco product	\$78,441	\$83,515	\$79,407	1%
No answer	-	-	-	5%
Total survey average	\$109,166	\$109,455	\$101,197	100%

Job titles 1,059 respondents				
	2014	2013	2012	% replies
CEO/president	\$249,019	\$237,520	\$221,266	6%
Vice-president	\$159,622	\$152,001	\$145,688	7%
Owner/partner	\$130,801	\$127,832	\$113,450	5%
Director	\$123,962	\$144,148	\$111,840	6%
Plant manager	\$106,974	\$105,194	\$99,841	15%
Materials manager	\$106,436	\$115,181	\$112,643	2%
Engineer	\$94,850	\$92,378	\$89,216	7%
Maintenance manager	\$92,342	\$88,667	\$85,532	4%
Other managers, supervisors	\$90,543	\$92,454	\$86,016	24%
Technician/technologist	\$81,632	\$79,819	\$77,389	4%
Administrative management	\$81,088	\$78,125	\$73,008	6%
Quality assurance manager	\$79,617	\$79,276	\$76,361	4%
Safety manager	\$79,521	\$82,330	\$78,736	3%
Purchasing/supply manager	\$78,789	\$88,079	\$72,854	7%
Total survey average	\$109,166	\$109,455	\$101,197	100%

Gender gap 1,059 respondents				
	2014	2013	2012	% replies
Female	\$78,974	\$81,767	\$72,248	17%
Male	\$115,497	\$115,318	\$107,029	78%
No answer	-	-	-	5%
Total survey average	\$109,166	\$109,455	\$101,197	100%

Salary by age 1,059 respondents				
Age	2014	2013	2012	% replies
26-35	\$80,242	\$75,184	\$69,130	8%
36-45	\$100,735	\$97,992	\$92,201	23%
46-55	\$111,242	\$111,491	\$102,780	40%
56-65	\$114,848	\$120,905	\$108,979	23%
Over 65	\$220,956	\$212,190	\$215,401	2%
No answer	-	-	-	4%
Total survey average	\$109,166	\$109,455	\$101,197	100%

Salary by experience 1,059 respondents				
Years	2014	2013	2012	% replies
1 - 5	\$76,255	\$75,705	\$67,287	5%
6 - 10	\$86,745	\$83,260	\$78,730	8%
11 - 19	\$100,958	\$99,581	\$90,933	22%
20 - 29	\$110,320	\$113,047	\$103,376	31%
30 +	\$131,222	\$130,370	\$121,339	27%
No answer	-	-	-	7%
Total survey average	\$109,166	\$109,455	\$101,197	100%

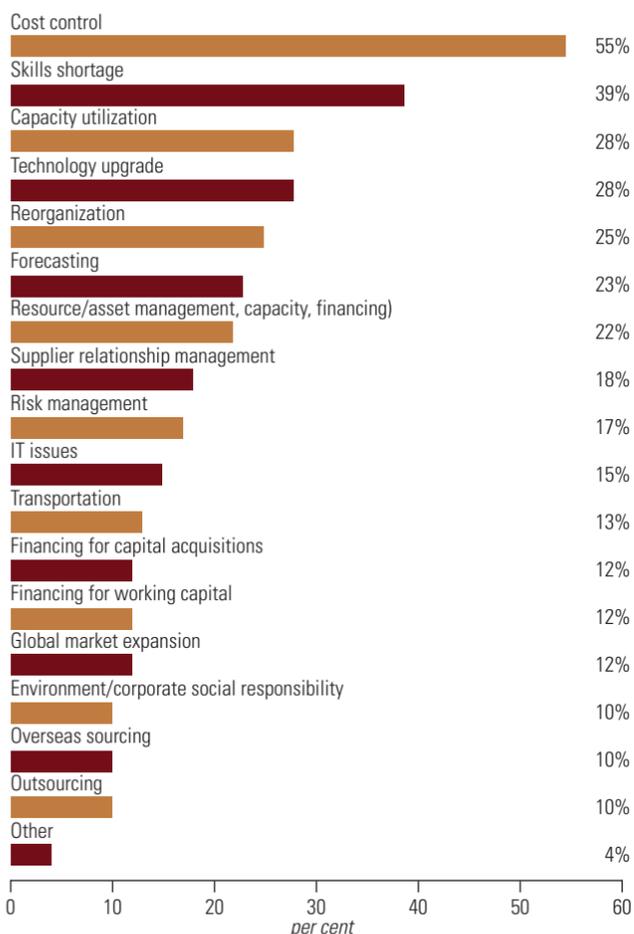
Education 1,059 respondents				
	2014	2013	2012	% replies
University degree	\$126,765	\$128,446	\$115,686	42%
Trade/technical diploma	\$112,017	\$115,664	\$103,086	14%
CEGEP	\$96,300	\$89,954	\$85,860	2%
College diploma	\$90,714	\$88,969	\$86,543	26%
High school or less	\$88,791	\$87,321	\$85,235	12%
No answer	-	-	-	4%
Total survey average	\$109,166	\$109,455	\$101,197	100%

» Compensation

Executive and management pay stalls

Continued from page 12

Most significant short-term issues
1,455 respondents



2 million housing starts a year to about 550,000; way off the historical peaks and valleys.

In 2010, volume grew by double digits (but still short of pre-recession levels) as government infrastructure spending kicked in on both sides of the border, and it has taken a long time for housing construction to recover.

In 2011, the industry was impacted as a lot of government programs expired and the US went into a double-dip recession.

“It was a roller coaster trying to figure out what was going on,” says Thompson, who notes they were gunshy going into 2012, when growth was low. The next year volumes were on the way back up and this year, with federal programs winding down in Canada, they are looking for growth in the US. But 2014 didn’t start out all that well thanks to a tough winter that delayed construction. “Guns were blazing” in May though and he expects volumes will be up.

However – and this relates to the survey results showing fewer executives are expecting revenues to grow – he says no one expects the US to boom.

Job satisfaction is high

What’s driving the salaries that are increasing? Demand for talent is one factor. The survey’s job satisfaction question got a 62% response for competitive salary and 52% for benefits.

Most (62%) report no change in employment status since the last survey while 22% note that they are working harder for their money. Although they hold the same job and salary, they’ve taken on more responsibility because of reduced staff. Most put work-life balance ahead of all other desired work conditions and 81% are satisfied with it (although they’re averaging 47 hours per week on the job). CEOs and presidents log the most time at 53 hours, followed by owner/partners and vice-presidents (each 51) and plant managers (48).

But they’re also very happy with their jobs overall (90%), job security (88%), vacation time (84%), benefits (76%) and compensation (77%).

Almost two thirds (61%) of the respondents reported a portion of their pay made up of bonuses and incen-

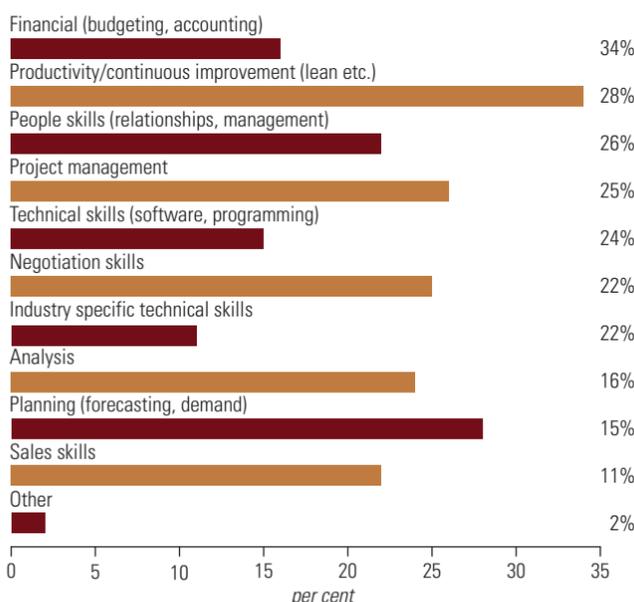
Top three skills needed

1,162 respondents

	1st	2nd	3rd
People skills (interpersonal relationships, management)	41%	17%	13%
Industry specific technical skills	11%	10%	10%
Analysis	7%	10%	14%
Project management	7%	12%	11%
Productivity/continuous improvement (lean etc.)	7%	14%	19%
Financial (budgeting, accounting)	6%	6%	7%
Planning (forecasting, demand)	6%	10%	7%
Negotiation skills	4%	8%	7%
Sales skills	4%	5%	4%
Technical skills (software, programming)	4%	6%	5%

More training needed

1,734 respondents



tives with those showing the highest percentage (20% or more) averaging \$207,115. Almost half (47.4%) of the respondents report perks or extras, such as profit sharing (48%), a vehicle of some kind (32%), other enticements (27%), access to private health care (10%), club memberships (9%) and stock options (9%).

Manufacturers are spending more money on benefits to acquire and retain employees, says Diggins. “This is helping to steady millennials who have a propensity for moving around.”

“One of the trends we’ve seen over the past five years is self-directed plans where the employer allocates a specific dollar amount to each employee and they can spend it one whatever they chose to,” says Scott McNeil-Smith, EMC’s director of strategic planning and communications, and president at Canadian Manufacturing Network.

There are also new ways to look at bonuses and

incentives. Diggins notes in Italy, many manufacturers have discarded tying bonuses to profit. Instead, they’re tied to the reduction of waste, “and they are making more money.”

Salary levels are affected by a variety of other factors, including company revenue, years of experience, education, the kind of industries served and gender (only 19% are female – and this year’s sample reveals a 37.6% pay difference between the sexes).

Owners, senior executives, plant managers and materials managers top the \$100,000 a year mark. CEOs and presidents are the highest earners averaging \$249,019, followed by vice-presidents (\$159,622), owners/partners (\$130,801), directors (\$123,963), plant managers (\$106,974) and materials managers (\$106,436).

Engineers average \$94,850, maintenance managers \$92,342, technicians/technologists \$81,632, while many of the other categories, including administrative management, purchasing/supply management, quality managers, and safety managers, earn between \$78,789 and \$81,088. The “other” category, which covers various manager and supervisor roles that aren’t on the main list, averaged \$90,543.

Most of the respondents (72%) have a management role only in their companies, while 12% have an ownership stake as partners or minority owners.

The average Joe has been on the job 22 years, 14 at the same firm and 10 at the same job.

Forty-three per cent have a university degree, 28% have a college diploma, 14% a trade or technical diploma, 13% a high school education or less and 3% a CEGEP. University grads score the highest wage rate at \$126,765, 13.2% ahead of the next best paid group, trade/technical school grads at \$112,018.

Seventy per cent of the companies pay for educational courses, memberships in professional associations (54%) and professional certification programs (45%).

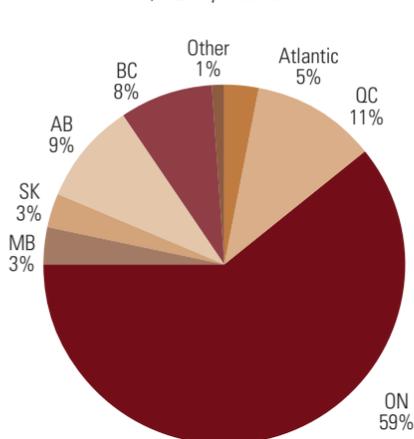
Similar to last year’s survey results, investing in the business is the highest priority for respondents over the next five years. Fifty-seven per cent will put money into new production equipment and processes, 52% will hire new employees, 35% are adding lines of business, 27% are expanding their plants and intend to enter new geographic markets, and 25% are entering new lines of business.

Asked about what skills they needed most to do their jobs, 41% of senior executives and managers cited people skills, followed by industry specific technical (11%) and way down the list there’s a three-way tie at 7% for analysis, negotiation skills and productivity/continuous improvement.

What additional training do they need? Most cited financial (34%), productivity/continuous improvement (28%), people skills (26%), technical skills (24%) and industry-specific technical skills (22%).

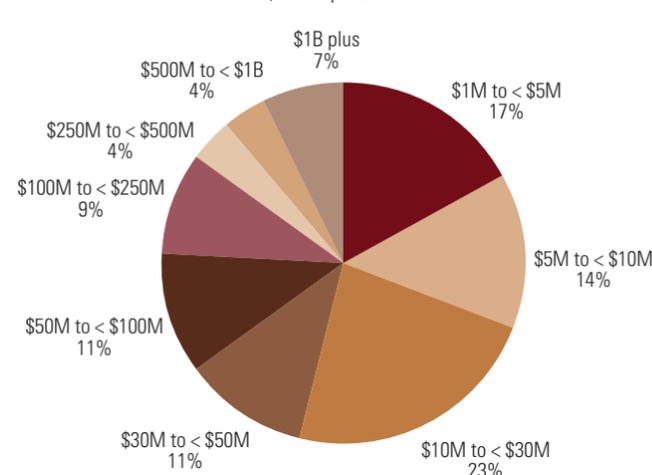
Where you’re from

1,142 respondents

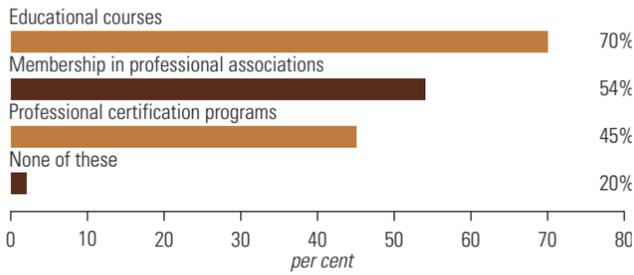


Revenue

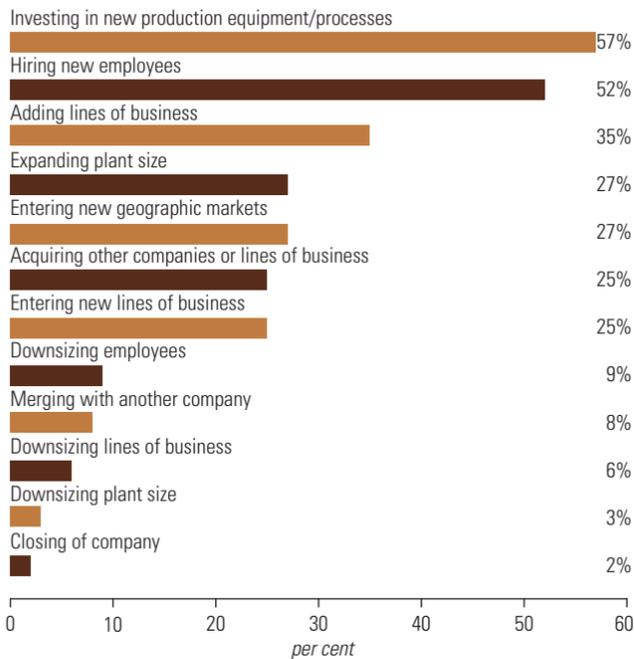
1,066 respondents



What companies pay for
1,734 respondents



Changes in the next 5 years
1,480 respondents



Skills are mismatched

The EMC/**PLANT** survey results continue to serve as a reminder that manufacturing is short of skilled labour and the workforce is aging, which will exacerbate the problem. Most respondents (69%) are 46 to 65 or older. Of the total, 41% are 46 to 55, 25% are 56 to 65 and 3% are older. Just 8% are 26 to 35 and 23% are in the 36 to 45 group.

As noted in the 2013 survey, a significant number of experienced people will be leaving over the next decade. Although TD Economics issued a report last year, as have others, debunking the notion there is an imminent skills crisis, it does note mismatches across occupations and provinces. One of these is manufacturing, which impacts Ontario.

In a forward-looking report a year ago the Conference Board of Canada announced the province is losing out on as much as \$24.3 billion in economic activity and \$3.7 billion in tax revenues because employers can't find people with the right skills.

"We've seen this over three consecutive surveys, and we're seeing it in more granular detail in other areas as well," says McNeil-Smith. "There's a lot of debate about whether there is a skills shortage. Some argue there are lots of people available for work, but matching the skills to the needs of manufacturers is not there in many

cases. The problem for some is extreme while others are trying to make do."

Canplas has about 10 skilled trades staff and one apprentice in Barrie, Ont. The company runs apprenticeship programs and uses market wage surveys to ensure pay rates are competitive to attract talent.

Thompson says there are a couple factors affecting the shortage/mismatch in manufacturing skilled trades: those who couldn't find jobs and have gone on to others things; and wavering commitment from schools and industry.

"Schools and colleges can't do skills training without support from business," says Thompson. That support includes 8,000 hours of training, mentoring, filling out apprentices' books.

"I believe that a lot of industry was struggling to survive, and when you look at the cost of an apprentice program... we deferred it and just committed to another millwright apprentice in 2013."

More interest in training

But there's another issue. A late 2012 labour report for the Wellington-Waterloo region in southwestern Ontario noted Conestoga College suspended several skilled programs related to manufacturing because of disinterest. Programs such as general machinist, tool and die maker and millwright have seen 45% to 65% fewer applications since 2008. One of the reasons cited is young people being told manufacturing is a dying industry, despite its growth in the region and employers who are desperate for people with the right skills.

When times are tough, often companies will cut training, among other things. "But some companies are doing quite an update; they recognize the need to do something and do it fast," says Diggins.

EMC is seeing more interest in its certification programs and the rapid delivery of training online, in addition to more traditional on site, classroom activities. It partners with Harvard Business Publishing to deliver a supervisory certificate program during the spring and fall. So far 100 people have completed it.

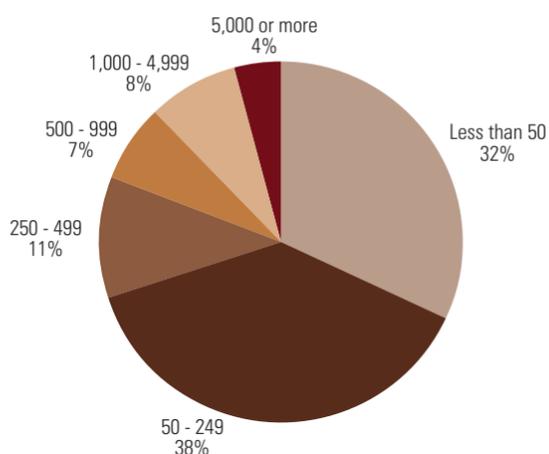
"A lot of those companies are very busy, and they have to more with less. That kind of training is essential to be successful," says McNeil-Smith. "They're also doing lean and productivity training, but cost is key – not having employees out of production while they are taking the training."

No question conditions are tough for manufacturers. Many EMC members have been wooed to move their operations to the US. But Diggins says plants are becoming a lot more efficient with highly knowledgeable and skilled workforces, which wouldn't be available in southern US states that are offering the attractive incentives. "We'll still have plant closures; that's a fact of life, but manufacturers are always looking for other ways to do things and be successful."

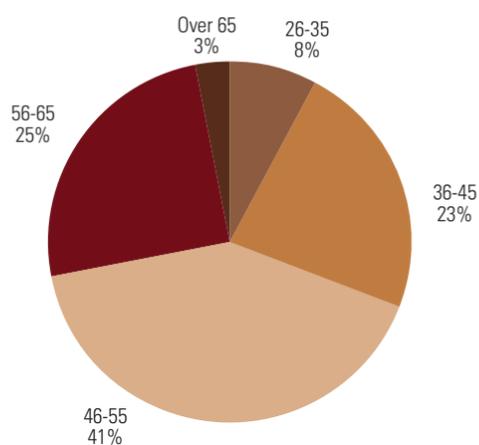
This entrepreneurial energy will eventually deliver greater certainty that will guide compensation levels in the years ahead.

Comments? E-mail jterrett@plant.ca.

Number of employees
1,138 respondents



Age
1,158 respondents



» Marketing

CASL is coming...? Are you prepared?

CANADA'S ANTI-SPAM LAWS WILL IMPACT HOW YOUR COMPANY CONDUCTS ELECTRONIC MARKETING

Make sure your business e-mail lists are completely opt-in by July 1, or risk paying fines of up to \$10 million.

BY MATT POWELL, ASSISTANT EDITOR

Remember Bill C-28? The contentious federal anti-spam legislation that was met with fierce lobbying from Canadian businesses and groups and spent a few years in limbo? Well, it's back and Canada's anti-spam legislation (CASL) will have a considerable impact on how businesses use e-mail and other electronic communications for marketing purposes.

By the way, it comes into effect July 1, (a move by the government that gave companies just six months to prepare for its implementation), which will undoubtedly send many scrambling.

CASL imposes some of the strictest anti-spam laws in the developed world, and Canada is the last of the G20 countries to do so. The Canadian Radio-Television and Telecommunications Commission (CRTC), the office of the privacy commissioner and the Competition Bureau will provide enforcement, and penalties will range from up to \$1 million for individuals to \$10 million for corporations.

And Martin Kratz, a partner at Calgary law firm Bennett Jones LLP, says Canadian businesses can expect aggressive enforcement.

"They're going to try to make examples of people," he says. "You have to make sure you're satisfying the formalities under the act, and if you're not, you can be liable. There's not going to be any first or second strikes."

By 2017, the law will also allow individuals and organizations to bring a private right of action in court against the individuals and organization who they allege have violated the law, according to Industry Canada.

It applies to any commercial electronic message (CEM) sent by any medium, and it differs from laws in other countries, such as the US where anti-spam legislation has been around since 2003, because it requires consent. Now companies will have to make sure sendees have opted-in to receive messages instead of simply providing the person with an option to opt out, and it applies to personalized communications including "e-mail or SMS messages delivering any form of communication, such as text, images, voice or sounds, or technologies not yet available."

It also includes Tweets.

Businesses that sell and promote products online and electronically will need to prove they have consent to reach out to new, existing and potential customers.

Come July 1, CASL (read the full literature at www.fight-spam.gc.ca) will generally prohibit:

- sending CEMs without the recipient's consent, including messages to e-mail addresses, social networking accounts and cell phone text messages;
- alteration of transmission data in an electronic message resulting in the message being delivered to a different destination without express consent; and
- the use of misleading representations online in the promotion of products or services.

"The long and short of it is, all of your e-mail marketing lists must be (as they should be now) 100% opt-in, without exception," says Andrew Shedden, an industrial marketing consultant at Peterborough, Ont.-based Broadfield Consulting.

Consent comes in two forms. Implied consent applies to existing business relationships, family and friends, but it expires after two years and you must be able to prove the deal and track its timing.

Express consent is a little more complicated.

As described by Bennett Jones, it can be obtained "either orally or in writing from a recipient...the CRTC has indicated that a person giving express consent must take some positive action to do so." This would include checking a box that says they're willing to receive electronic communications from your company. Messages must also provide an "unsubscribe" mechanism for future submissions.

To prepare yourself, Bennett Jones suggests the following compliance strategies (a full list is available at www.bennett-jones.com):

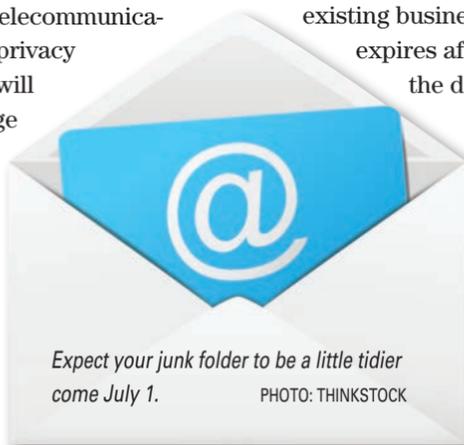
- Review existing communication practices internally and with external service providers.
- Determine which entity in your organization should "own" the consents.
- Assess each business or non-business relationship to ascertain if implied consent is available for CEMs to be sent.
- Take steps necessary to collect express consents.
- Identify communications where consents are not required by the information requirements and formalities are still required.
- Ensure all records of compliance procedures and policies are maintained.

Once the law is in force, Shedden expects manufacturers to use more direct mail, place a heavier reliance on teleprospecting from inside business development reps, use more print and online advertising, and focus on inbound sales leads as a result of content marketing.

Are you ready?

Find even more tools to prepare your company for CASL from PLANT's sister online-publication CanadianManufacturing.com at www.canadianmanufacturing.com/in-depth/canadas-anti-spam-legislation-useful-links.

Comments? E-mail mpowell@plant.ca.



» Training



Set clear training objectives to immediately improve your workplace. PHOTO: THINKSTOCK

Time to learn

How to make job instruction more effective

BY HUGH ALLEY

A CFO challenged an operations person about a training issue. "This training is very expensive; besides, what if we train these people and they leave? We'll lose the investment," he said. The operations person replied, "What if we don't train them, and they stay?"

You have to train. The challenge is how to train effectively in less time.

One company that had to make quality decisions about fabric asked several operators to sort a sample of 100 pieces into "OK" and "not OK", but there was no consistency because the decisions they made were subjective. Providing clear definitions of both followed by training resulted in an immediate improvement.

Instruction was also changed. Rather than pairing an inexperienced person with a veteran to watch and learn, then deal with the mistakes that would surely follow, the operation is presented several times, each time adding important information. The operator does the task several times and repeats the information in increasing detail. It takes at least eight repetitions before the operator goes solo. With most industrial processes, that's enough to move an operator more than half way along the learning curve, compared to just 20% after one repetition (Statistics Canada, *Building on our Competencies: Canadian Results of the International Adult Literacy and Skills Survey, 2003*. Download at <http://en.copian.ca/library/research/booc/booc.pdf>).

Results from this method are dramatic. Six hundred firms that participated in a study reported at least a 25% reduction in training time, with significantly fewer mistakes. A manager in the food industry, where regulations change frequently, reported her time to develop new training material dropped 50%, her people learn in 30% less time and they retain more of the material.

This method comes from the Training Within Industry program (see PLANT, July/August 2013). See the original documents at www.trainingwithinindustry.net.

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>.

» Feedback

I enjoyed reading Mark Drake's article on South Korea (April 2014, PLANT). Every sentence carries a message.

Isidor Buchmann
Cadex Electronics Inc.
Richmond, BC

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



Sabian Cymbals Pushes the Boundaries with SYSPRO ERP

The Company

Nestled in central New Brunswick is Meductic, a small, quiet, riverside village which happens to be home to one of the major players on the worldwide music scene: Sabian Cymbals. With clients like Phil Collins, Chad Smith, Mike Portnoy, Evelyn Glennie and the New York Philharmonic, along with a host of music industry awards, Sabian can truly lay claim to making the world's finest cymbals. This 20-year old company with a 300-year Zildjian family history of cymbal making is an industry leader with sales in 120 countries, involving multiple affiliates and operations around the world.

The Challenge

In 1997, Sabian ran on an accounting program that was purchased the year before for \$150,000. Greg Hartt, a Certified Management Accountant and Sabian's Manager of Information Systems, says: "In 1999 we had to deal with the fact that our accounting system wasn't Y2K compliant. The vendor informed me that the cost of compliance would be another \$200,000 – for a program that didn't have a manufacturing system, or many of the other components we depend on today. Not wanting to throw good money after bad, I decided to take a look at an ERP."

The Solution

Sabian chose SYSPRO after a detailed search of product reviews, reference checks, and a thorough evaluation. "Our priority was to purchase a system that could be highly tailored to play to our strengths and conform to our business processes," Hartt says.

"SYSPRO was exactly what we were looking for. Our initial investment was approximately \$100,000. Half of that was spent on software and the other half on consultants. It was the best \$100,000 we ever spent."

Over the years, Sabian has pushed the boundaries of what SYSPRO can do. "We've worked extensively with the SYSPRO Halifax office, and with other third parties, to write custom software. SYSPRO head office has even written scripts for us that are now part of their product. These days, we're writing our own software with Visual Basic. The beauty of SYSPRO is its flexibility – we can leverage our investment without affecting the core reliability of the software."

The Result

Despite having thousands of SKUs, Sabian manufacturers

“The beauty of SYSPRO is its flexibility – we can leverage our investment without affecting the core reliability of the software.”

**Greg Hartt, Manager of Information Systems
Sabian Cymbals**

only three major product lines. The company's basic cymbals are formed from brass 'uniroll' blanks, purchased from suppliers in whatever thickness desired. Sabian's premium 'cast metal' cymbals are made of bronze, forged from an ancient family recipe in the Sabian foundry. When the metal is molten it's poured into discus-shaped ingots, which are cooled and allowed to rest before being subjected to a lengthy manufacturing process: rolling, shaping, cutting, hammering (by machine and hand), two stages of testing, and a period of maturation in what's known as the Sabian Vault.

Before SYSPRO, Sabian had no way to track its products through the manufacturing process. "We didn't know how much copper or tin we had on hand, or how many uniroll blanks we had – and those have a 20-week delivery time. SYSPRO allows us to track the movement of product on the floor, and when we issue a job the system tells us how much materials and product we still have on the shelf," Hartt says. "When we do a forecast we can see what we need over time. And when the customer places an order, we can provide a very good estimate of when that order will be filled. SYSPRO allows us to be more proactive, which gives us a definite competitive advantage."

Barcoding can present problems for manufacturers. According to Hartt, it used to be a nightmare.

"Each individual stock code has to have a barcode, and we have approximately 6,000 stock codes. We cannot buy labels ahead of time – we manufacture 500,000 cymbals in a year representing 1000 or 2000 SKUs. An economic quantity from a printer would be 10,000 labels – but we have SKUs we may never manufacture 10,000 times. SYSPRO allowed us to create a simple system that lets our factory people key in the stock code and get the barcode returned. By using barcode software that ties back to SYSPRO we've made the system much more efficient."

In 2003, the SYSPRO Halifax office developed a custom module to conform to the flow of Sabian's packaging process. "We brought the packaging system in six years after the barcode system, and now we're using the barcode to tell us what's in the box," Hartt says. "When we hit the final function, the barcode tells SYSPRO what we're shipping. All of the effort that used to go into packaging is now being done by computer – the whole process has flattened out for a substantial gain in efficiency."

SYSPRO has also made it easier for Sabian to process vendor invoices, such as credit cards. "There are close to 60 credit cards that we don't have to enter information for anymore," says Hartt. "That's knocked a whole lot of processing time off at month end. All in all, SYSPRO creates better and more accessible information. That in itself makes us more efficient, because we're no longer dependent on a filing system – everything we need is right at our fingertips."

Although Sabian has never subjected SYSPRO to a formal ROI, Hartt is positive that the numbers add up to success. "When I came here in 1997 the company was making X-dollars in revenue, selling about 480,000 cymbals annually. Fifteen years later we were at 2X-dollars in revenue, selling about 900,000 cymbals per year. During all that growth we only hired one additional person in an administrative capacity. That's twice the volume with only one more body, and that would not have been possible without SYSPRO."

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Q&A

with Jayson Myers



Jayson Myers at the podium during the Manufacturing Canada 2014 conference. PHOTO: DONNA SANTOS

WITH CHANGE COMES OPPORTUNITY, SAYS CANADIAN MANUFACTURERS & EXPORTERS CEO

PLANT's assistant editor Matt Powell caught up with CME's chief executive and economist at the Manufacturing Canada 2014 Conference, where he discussed challenges posed by change and the opportunities that lie ahead.

You mentioned in a speech at a Kitchener Waterloo Chamber of Commerce event that you think manufacturing is going through a transformation. What do you mean by that?

There are four big drivers of change.

The first is access to new markets. The recession taught a lot of manufacturers that they have to find new customers, which will require better products, production systems, technology and processes.

Those new customers are coming from international markets such as Europe and Asia, but also from the US where the economy has rebounded. In Canada, there's a trillion dollars of business opportunity in energy, infrastructure and resource projects.

Secondly, new technologies such as additive manufacturing, mechatronics, the connection between IT and machining, products and systems, and new materials in biotechnology and nanotechnology are important. There's also big data and how that information is used, which is changing processes as well as the business side.

Third is changing customer and stakeholder expectations for processes such as sustainable development and manufacturing, and the social licence to operate. Then there are customers looking for an experience with products – a huge change and opportunity.

Fourth is the competition, and that's always driving change, now so more than ever.

Canadian companies need to see these challenges as opportunities that are reshaping the industry. Five years from now, businesses can't operate the way they do today. **A few years ago CME articulated a vision of what manufacturing should look like by 2020. Is the transformation on track?**

In many ways, I think change is happening a lot sooner. There are new technologies that weren't even on the radar when we put that plan together, such as the challenge of getting into the US market.

We must look at the business of manufacturing and focus on customer solutions rather than just getting product out the door. Implementing the policies necessary to

sustain new processes is key.

Most Canadian manufacturers appear to be reluctant to look beyond North America. How will companies act on new opportunities presented by recent trade deals?

We've established a network called the Enterprise Europe network (www.een-canada.ca) to identify qualified leads for companies looking for technology partnerships in Europe. We've already done 26 joint ventures.

I see a lot of small and mid-sized European companies looking for partnerships here to gain access to the North American market. Canada's a pretty attractive market of sophisticated technology and with the sources that we have, there are big opportunities for direct partnerships, export activity and investment because there are lots of companies that look to Europe for growth.

But we also need to understand that direct exporting is not the only opportunity through the trade deal. They make Canada a very attractive place for multinationals to invest because they'll have access to both Europe and the US. I see a lot of Canadian suppliers getting access to multinationals and becoming part of their supply chains. **Tim Hudak is against what he calls "corporate welfare" but Kathleen Wynne describes it as partnering with industry. Your thoughts?**

[Ontario Progressive Conservative leader] Tim Hudak needs to reassess his view on the role of government. It needs to be a partner with business, and maybe that's providing low cost energy or working with educational and training institutions or simply getting the red tape out of the way. But when you're up against other governments in the US that are actively subsidizing and providing lucrative incentives for companies to go south, you need to be in the game.

Hudak's right about the need for governments to set the right business conditions, but if they want economic growth from manufacturing, they have to be prepared to put some money on the table. It's not about subsidizing failures. They must provide seed money to encourage investment, particularly in Canada where it's still impossible to get venture capital.

This interview has been edited.

The Manufacturing Canada 2014 Conference, presented in May by CanadianManufacturing.com and PLANT magazine, brought together more than 200 business leaders for a one-day forum focused on the technologies, strategies and innovation driving competitiveness.

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» Maintenance

Managing a plant's assets is a business driver that the new ISO standards elevate to the executive suite.

BY STEVE GAHBAUER

When your equipment fails, everything comes to a standstill. Machine maintenance is a critical part of asset management although it can be costly, and there may be difficulties when ideals must dovetail with shop floor realities.

Asset management covers machinery and equipment, required resources, the knowledge/competence of the workforce and the data needed to develop, optimize and implement plans. To that end, ISO 55000 standards developed by 31 participating countries (in effect since January) are welcome tools for effective and smart asset management. They provide an overview, standard principles and terminology: ISO 55001 is the requirements specification for an integrated, effective system for physical assets while ISO 55002 provides guidelines for interpretation and application.

In a special presentation on the future of asset management with ISO 55000 standards, reliability professional Kevan Slater of K.J. Slater Associates in Toronto provided an overview to the Toronto Section of the Society of Tribologists and Lubrication Engineers (STLE). The following is a synopsis of the key points.

The ISO 55000 standards are based on PAS 55, the Publicly Available Specification first published by the British Standard Institution in 2004 for physical assets. It outlined a 28-point requirements checklist for good practices with Part 1 covering specifications for optimized asset management and Part 2



The ISO 55000 standards emphasize training, awareness and competence. PHOTO: THINKSTOCK

Smarter ASSETS

ISO 55000 STANDARDS MAKE MANAGING THEM EASIER

providing application guidelines.

In 2008, PAS 55-1 and 55-2 superseded the original 2004 standards and it's from these the new standards were developed.

Based on PDCA

The new standards, which mandate life cycle activities based on criticality, machine condition and performance as well as stakeholder expectations, have an effective organizational structure based on PDCA methodology: plan what you do, do it, check it, and act to continuously improve performance.

Training, awareness and competence are emphasized by spelling out that "any

organization shall ensure that persons under its direct control who undertake asset management-related activities have an appropriate level of competence in terms of training, education and experience," and it also covers monitoring, outsourcing, performance and audits.

Slater found, based on more than 100 company systems over the past five years, that fewer than 30% of firms are competent in this area, and 80% have no criticality assessment, a condition he stressed must be changed.

As the future unfolds, asset management will be driven by industry with the rate of acceptance depending on broad

national and cultural interests. But one of the most significant effects ISO 55000 will have on maintenance is its shift from "bottom up" to "top down."

Slater said shareholders, customer expectations and insurance costs will force companies that apply ISO 9000 series standards to implement the new set. He speculates ISO 55000 will align and integrate with ISO 9001 for quality management, ISO 14001 for environmental management, ISO 31000 for risk management and OHSAS 18000 for occupational health and safety.

However ISO 18436, which deals specifically with condition monitoring and machine diagnostics, is not referenced in 55000. This is an important tool for tribologists and maintenance staff involved in lubrication. Part 4 specifies the requirements for qualification and assessment of personnel who perform equipment condition monitoring and diagnostics by using field lubricant analysis; and Part 5 lays out the specific requirements for lubricant laboratory technicians and analysts. Also missing are asset hierarchy terminology and definitions; standardization of KPI definitions; and any reference to CMMS/EAM work order content.

Some companies will be interested in improved asset management without getting ISO 55000 certification. Concepts incorporated in PAS 55 can be used without the piece of paper, but certification is the way to go if you want to enjoy all the potential improvements.

Steve Gahbauer is an engineer, a Toronto-based freelance writer, and the former engineering editor of PLANT. Contact him at gahbauer@rogers.com.

Comments? E-mail jterrett@plant.ca.



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» Think Lean

Small lot production, short lead-time, minimum inventory and work-in-process and high quality, which are accomplished with flow manufacturing.

BY RICHARD KUNST

A key focus of lean is to do only what's needed when it's needed, which is contrary to a traditional economies of scale approach with the long lead times and high inventories that are so troublesome. You might expect a loss of efficiency with this change, which is a legitimate concern and why you must change the way you do things if lean is to be successful.

Large lot sizes are a way of compensating for the fixed costs of a process, such as changeover or set-up, transactions and other "per order" factors. These costs are distributed over a larger number of units and thus become a lesser cost on a per-piece basis. As long as set-up and change-over costs are high, small lot quantities can't be cost efficient. The obvious answer is to lower or eliminate these "fixed" costs as much as possible so smaller lot quantities become more feasible.

Add TOC to your flow

MANAGING THE BOTTLENECK TO MAXIMIZE THROUGHPUT

This leads to cellular manufacturing and the complete rearrangement of production facilities from departmental to self-sufficient, multi-process cells or lines. They complete work on a part or product with minimal movement and are designed for little or no cost to change from one product to another so a lot size of one (or a few) is as economical as a large lot on less efficient facilities. This is achieved by restricting the range of products processed. Many companies end up with multiple cells dedicated to specific parts and products.

Lean is viewed by many in industry to be synonymous with flow manufacturing, which focuses on minimizing movement, handling and eliminating the need to process work in large lots. Lead times are greatly reduced and plant flexibility is tremendously improved. Lean also targets the same sources of waste as just-in-time (JIT) and similar initiatives. In essence, these approaches attempt to minimize inventory, handling and any

activities that do not contribute directly to making the product.

JIT especially targets inventory and typically uses a physical trigger such as a card or a tag to pull work into a process or inventory into a point-of-use location. The intent is to delay bringing in inventory or engaging in production until the part or product is needed. In this way, extra inventory or work-in-process is not sitting around the plant taking up space, tying up capital and waiting to become lost, damaged or obsolete.

In flow manufacturing, shop work moves through operations continuously. There are no batches or work orders.

The theory of constraints (TOC) is based on the idea there's a point (one resource) within a plant that determines throughput. Control and manage that constraining resource or bottleneck and you maximize the throughput of the entire plant. Its drum-buffer-rope (DBR) implementation methodology manages flow to greatly reduce work-in-process and increase throughput while dramatically improving on-time shipment.

Three simple elements form the control system. The bottleneck is the drum that sets the plant's tempo. Sometimes work doesn't flow quite as it should (machine breakdowns, materials shortages, personnel issues) so a buffer in front of the constraint ensures the flow never runs dry. The rope connects the constraint to the release of new work to the



The bottleneck sets the plant's tempo and flow.

PHOTO: THINKSTOCK

plant. Companies should only release work at a rate that's the same as the constraint's production.

TOC is implemented by following five simple steps:

1. **Identify the constraint(s).** This is usually pretty easy; just look for the piles of WIP and/or ask the plant supervisor where the biggest bottleneck is.
2. **Decide how to exploit the constraint.** Maximize the amount of work that flows through the constraint, but ensure there's a smooth flow coming into this process so there's never a work delay.
3. **Subordinate everything else to the constraint.** One of the main principles of TOC is that efficiency at other resources doesn't matter. No point in up-stream processes produces more work than what flows through the constraint, and downstream processes won't have more than that to do.
4. **Elevate the constraint.** Increase its capacity by offloading some of the work, subcontracting, buying more capacity or adding a shift.
5. **Go back to step 1 and repeat for continuous improvement.** Changes are good by elevating the constraint it won't be the bottleneck. Identify the new constraint and apply the other steps.

TOC can be counterintuitive so it takes some study and thought to understand how and why it works. Nevertheless, many companies are using it with great success.

Richard Kunst is president and CEO of Cambridge, Ont.-based Kunst Solutions Corp., which publishes the "Lean Thoughts" e-newsletter and helps companies become more agile, develop evolutionary management and implement lean solutions. Visit www.kunstsolutions.com. E-mail rkunst@kunstofsolutions.com.

Comments? E-mail jterrett@plant.ca.

LEAN ALERT



Be aware of the difference between automating the whole manufacturing process versus using it to solve a specific job or problem. You can automate just one step and make the entire process more efficient. For lean podcasts visit www.boschrexroth-us.com/leanpodcast.

Lean Manufacturing and Automation Technology, Bosch Rexroth

» Safety Tips

Avoiding handcart hazards

Ergonomics reduces the risk of injury

When a handcart isn't used properly, workers overexert; their extremities and limbs get caught, bumped or crushed in the cart or by other objects; they slip, trip and fall; or they suffer muscle and joint strain injuries. These precautions will help reduce risks:

- Keep aisles clear of clutter and ensure they're wide enough for the operator to stand behind the cart and push. Corners should accommodate the cart without stopping and starting.
- Use winches for large ramps and power assists on smaller ones. If there are multiple ramps, use powered carts, or include a hand or foot brake to control heavy loads.
- Keep floors in good repair and clean. Use powered carts if floors are very uneven.
- Use a larger diameter wheel to decrease the amount of force needed to operate. A harder caster/tire generally



Using a handcart to move loads is safer than carrying them.

PHOTO: THINKSTOCK

reduces the amount of force needed. Pneumatic wheels may flatten so don't use them for heavy loads.

- Use swivel castors on the same end of the cart as the handle, which should be long enough to prevent the worker's feet from being struck by the body of the truck.
- Fix horizontal handles between 91 and 112 cm above the floor. Vertical handles (narrow carts) allow hand placement at comfortable positions based on height. Handles should be apart 46 cm or less. Wider separations increase the load on smaller shoulder muscles.
- Ensure handles are thick enough (2.5 to 3.8 cm) to grip easily. Fix handles horizontally at a minimum length of 20 cm.
- Carts longer than 1.3 m and/or wider than 1 m are difficult to manoeuvre. Use them where aisles are narrow and do not exceed recommended load limits.
- Train operators on appropriate body positioning for the type of cart and its load, and how to manoeuvre heavy loads. An appropriate walking/cart speed is typically 3 to 4 km/h.

This article was provided by the Canadian Centre for Occupational Health and Safety (CCOHS), a not-for-profit federal corporation that promotes the physical, psychosocial and mental health of Canadian workers by providing information, training, education and management systems. Visit www.ccohs.ca.

» Automotive

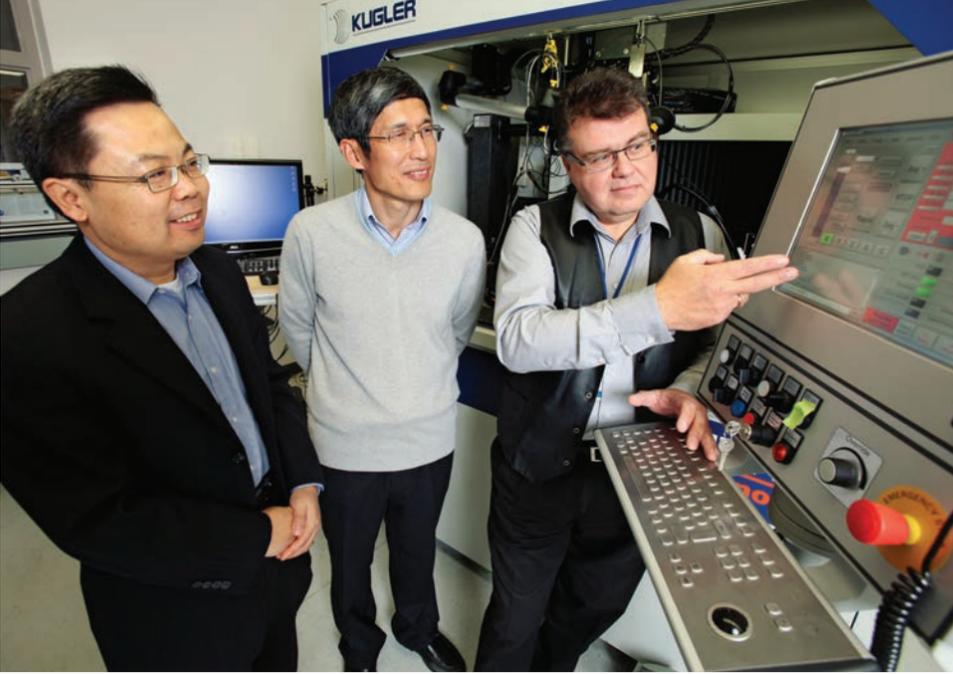
Automotive manufacturers are harnessing the power of wireless to improve supply chain efficiency and processes.

BY WEIMING SHEN

To be globally competitive, manufacturers must adopt advanced information and communication technologies to reduce production costs while maintaining high product quality. Among these technologies are wireless sensor networks and other mobile devices that provide real-time data collection, communication, collaboration and decision support. Examples include Microsoft Dynamics AX enterprise resource planning (ERP) software, which allows companies to access its global business solution on mobile devices; Prometheus Group's Mobile, which extends SAP maintenance to shop floors; and Oracle's Manufacturing Operations Center, which delivers accurate and timely information on product and process quality, plus insight into manufacturing operations, performance and assets.

Automotive manufacturers are harnessing the power of wireless to improve supply chain efficiency, address traceability issues and solve error-proofing problems.

For example, General Motors has deployed RFID in its engine plants. Direct benefits include reduced operating and manufacturing costs thanks to better condition monitoring, effective product quality control, improved machine efficiency and greater reliability. Wireless is preferred because nodes are integrated in moving and rotating parts, machines



(L-R) Xianbin Wang, Weiming Shen and Evgueni Bordatchev of Western University contribute to the AUTO21 Reliable and Secure Sensor Networks for Factory Automation project. PHOTO: AUTO21

Going WIRELESS

AUTO21 R&D FOCUSES ON SECURITY, RELIABILITY

and equipment; fault localization and isolation is improved; and deployment/maintenance costs are reduced.

However, the reliability of sensing and communications can be poor because of the harsh conditions on plant floors – particularly the metallic signal reflections, channel variation due to rotations of machinery and tools mobility, and interference generated from power equipment and co-existing wireless devices.

Sensors and devices are also subject to tampering, which would seriously disrupt production, damage machines,

and possibly endanger the lives of employees.

Researchers, funded by the AUTO21 Networks of Centres of Excellence, are working on eliminating these obstacles with industrial partners who will further the work and commercialize it.

Five researchers from Western University, the University of Windsor and the University of Calgary are designing a system with a high degree of secure communication and privacy under typically extreme conditions where a large number of sensors are involved and obstacles may block or disrupt communication.

The project covers the integration of reliable and secure wireless sensor nodes on rotating machine tools, work pieces and assemblies.

The end game is to increase the productivity and profitability of automotive manufacturers.

Weiming Shen is a professor at Western University in London, Ont. and an AUTO21 leader of the Reliable and Secure Sensor Networks for Factory Automation project. AUTO21 is a national research initiative supported by the Government of Canada. Visit www.auto21.ca.

Comments? E-mail jterrett@plant.ca.

» Computing

Hackers, eavesdroppers beware!

IQC discovery advances quantum cryptography

Quantum science nerds rejoice. Institute for Quantum Computing (IQC) physicists at the University of Waterloo have demonstrated the distribution of three entangled photons at three different locations (Alice, Bob and Charlie) several hundreds of metres apart, proving quantum nonlocality for more than two entangled photons.

Nonlocality describes the ability of particles to instantaneously know about each other's state, even when separated by large distances. IQC has demonstrated it might be possible to transfer information faster than the speed of light.

It could open multipart quantum communication protocols, including:

- quantum key distribution, which enables two parties to produce a shared random secret key known only to them, to encrypt and decrypt messages;
- third man cryptography where the third-man controls whether two others communicate in a secure way while he has no access to the content of their communication; and

- quantum secret sharing, where a protocol splits a message into several parts so that no subset of parts is sufficient to read the message, but the entire set is.

What are the implications for business?

Martin Laforest, senior manager, scientific outreach at IQC says quantum technologies will lead to more sensitive, more efficient tools, such as sensors, and processes that could have yet to be imagined impacts on other areas of manufacturing.

» R&D Services

XRCC boosts authentication capabilities

Xerox Research Centre Canada (XRCC) has signed a multi-year agreement with Authentix Inc. for materials research services.

The Dallas-based company is a provider of anti-counterfeiting, brand protection and program integrity solutions for a variety of industries, including oil and gas. Its fuel authentication programs include the use of nano-scale molecular markers and taggants, proprietary detection devices and data management.

XRCC in Mississauga, Ont. is one of five research centres that make up the global Xerox Innovation Group. It specializes in the design and development of electronic materials and specialty components; environmentally-friendly processes; coatings, applied nanotechnology; and polymer science, engineering and pilot plant scale-up.

» Capital

Nothing ventured...

Lack of management heft is an obstacle to funding

New Canadian businesses seeking financing from outside sources need an estimated \$3 billion in debt and \$2.5 billion in equity to adequately fund their innovations every year.

But an analysis by the Conference Board of Canada's Centre for Business Innovation says these start-ups often fail to obtain financing because they don't demonstrate the management expertise they need to successfully take their products to market.

The report, *Start Me Up: Funding Canada's Emerging Innovators*, says Canada has many talented entrepreneurs who aren't averse to risk-taking, but they are missing managerial competence in sales and marketing, and business processes. The structure of Canada's capital markets also makes the process of matching financiers and entrepreneurs difficult.



Angel investment is underdeveloped.

PHOTO:THINKSTOCK

The Ottawa-based think tank says Canada has enough institutional funders and high-net-worth individuals to improve the depth and breadth of the nation's risk capital; however, the industry's track record for selecting deals and earning returns needs to improve.

The Centre for Business Information notes Canada's specialized forms of risk capital finance, such as angel investment and early-stage venture capital, remain underdeveloped.

However, the federal government has begun to take action through its Venture Capital Action Plan (VCAP), which includes the Northleaf Venture Catalyst Fund, announced in January. It's the latest step in the \$400 million VCAP strategy to help increase private sector investments in early-stage risk capital.

Visit <http://actionplan.gc.ca/en/initiative/venture-capital-action-plan-0> for more information.

» Transportation

Onboard energy storage system captures waste heat and converts it into energy to power a truck's HVAC system.

BY MATT POWELL, ASSISTANT EDITOR

Jack MacDonnell has had an interesting career, but even that's an understatement. An unabashed auto junkie, he was once an aspiring car designer, and has since tackled technical writing and a stint in the telecom sector. Then he led an automotive sales and marketing company, and even hosted a TV show on the Speed channel, career choices that have tied in nicely with his love of car racing.

Continuing the trend, he's now the CEO of EnerMotion Inc., a Bolton, Ont.-based outfit that has developed an innovative way of capturing waste exhaust heat and converting it into useful, practical and efficient energy. This alternative to idling and diesel-fuelled auxiliary power units (APUs) keeps truckers comfortable on long hauls.

EnerMotion's Hybrid Power & Energy Recovery (HYPER) storage system reduces operating expenses for trucking companies and provides a solution to upcoming anti-idling laws due in January for APUs and EPA standards for Class A heavy trucks. The unit also improves a vehicle's overall efficiency in motion and at rest, removing thousands of kilotonnes of carbon dioxide emissions from the atmosphere each year. And the market potential is huge: \$31 billion in North America alone, MacDonnell says.

The HYPER system captures waste heat from a truck's internal combustion engine's exhaust system, which drives a refrigeration cycle similar to your fridge. HYPER works with a thermal compressor to provide full heating and air conditioning systems to the vehicle's cab and sleeper without consuming any additional fuel. Meanwhile, thermal conditions are stored in a control unit to provide the same HVAC capabilities for short and long haul routes while the vehicle is at rest. This eliminates idling the main engine or using already popular diesel APUs, lowering operational costs and cutting greenhouse gas emissions (GHGs).

"A lot of trucking companies don't want their fleets idling to run the heating and air condition units, which is still what 90% of the industry does, and that's unacceptable," says MacDonnell.

Clean alternative

Although diesel auxiliary power units were an initial answer to the idling issue, they depend on diesel fuel-powered motors that are noisy, smell bad and have maintenance issues.

"Sure APUs save a bit of fuel, but those maintenance costs off-set that savings," says MacDonnell.

EnerMotion has eliminated as many moving parts, such as seals and gaskets, within the HYPER unit to maximize maintenance savings. The fourth generation provides heating, cooling and hotel



Mounted to the back of EnerMotion's test Class A truck, HYPER is comparable in size and weight to diesel APUs. PHOTO: ENERMOTION INC.

EnerMotion keeps on truckin'

HYPER REDEFINES COMFORT FOR LONG-HAULERS

load power for up to 10 hours. It functions with gasoline, diesel, liquid and compressed natural gas engines, and hybrid driveline technologies.

"You've got five kilowatts of energy being consumed by the compressor on the crankshaft and intrinsic power train loss to free up additional horsepower and drop RPMs, both of which reduce fuel use," he says, adding that up to 30% of the energy produced by a diesel engine, which is lost through the tailpipe as heat. Based on testing metrics, the company says HYPER reduces fuel consumption by 9% to provide a payback in less than a year.

The unit is similar to a trailer refrigeration unit in both size and shape, mounted to the back of the cab and weighing about the same as most diesel-powered APUs. MacDonnell says the thermal storage unit boasts a higher energy density than lithium ion batteries.

"The absorption cycle is a novel approach because the unit operates autonomously without user intervention, except when the driver wants the cab and sleeper to be cool or warm."

A trend in increasing oil prices sparked the idea. MacDonnell recalls, "What if we could use waste energy to drive a refrigeration cycle?"

By 2008 EnerMotion was incorporated and the company's five founders were brainstorming. A design was finalized and a prototype was built by 2009 thanks to a cash injection from a group of angel investors and funding from the National Research Council of Canada's Industrial Research Assistance Program.

"It worked, then it didn't work, then it worked again – it took us about a year to figure out the magic behind the dark art, then another year to refine that design in the lab," says MacDonnell. "We started testing in our own Class A truck two and a half years ago, and are now on our fourth generation unit."

He expects a production version to be validated by the end of 2014, and will go to market by mid-2015 once manufacturing plans are finalized. In the meantime, EnerMotion has garnered a healthy amount of attention from major players in the trucking sector, and has developed partnerships with Challenger Motor

Freight and Loblaw Companies Ltd., which committed to field-testing the system. JD Smith and Sons is so impressed with the system it actually purchased a stake in the company, and provided a truck for testing.

Power partners

The company has developed relationships with a number of key Canadian public sector funding agencies including the Toronto Atmospheric Fund and Sustainable Development Technology Canada, which provided a \$1 million grant in 2010.

The Ontario Centres of Excellence (OCE) also gave it a boost, investing \$250,000 through its Market Readiness 3 and Special Energy Fund programs last February, citing HYPER's tremendous global market potential.

MacDonnell says OCE's involvement in HYPER's development is a major benefit. The organization acts as an innovation centre that has become extra headcount.

"They have a lot of experienced people and the people we do work with help us with the corporate governance aspects of the business and introduce us to partners from the supply standpoint. They provide us with a lot of guidance," he says.

Shantanu Mittal, a business development manager at OCE, works with EnerMotion and says the organization sits on the company's board as an observer, but also advises the company on key strategy and funding opportunities. The company, he says, is a prime example of what OCE looks for in a corporate partner.

"We're not only looking for innovation, but also whether or not the technology is solving a problem in the marketplace, and I think EnerMotion has done that with HYPER," says Mittal.

EnerMotion currently has academic partnership with both McMaster and Queens universities, and has recently hired one of its McMaster summer students to a full-time engineering role.

"OCE has definitely recognized the economic impact our technology will have in Ontario as we increase our staff count, and with that will come tremendous growth as we continue to seek out additional funding," says MacDonnell.

Operating out of its facility in Bolton, the company now has seven full time employees, mainly engineers and technologists, that focus on testing and getting the units ready for production. It's also in the process of hiring two more full timers as it finalizes manufacturing plans (two Tier 1 automotive suppliers would like to build the units).

"We're working to develop as much of a line kit as possible to keep final assembly down to a few components," he says, and there is a chance final assembly will stay in the Bolton area.

"Our ultimate goal is to keep as much as we can in Ontario."

Comments? E-mail mpowell@plant.ca.

CIEN

CANADIAN INDUSTRIAL EQUIPMENT NEWS

» IT for Industry

Omnify's Empower PLM software smoothes integration with ERP and engineering tools for better data quality.

Genetec Inc. had a bit of a problem with its open-source product life-cycle management (PLM) system.

The provider of IP video surveillance, access control and licence plate recognition (LPR) technologies for various markets implemented a system to replace the use of spreadsheets to manage product information. It did improve some of the processes in its electronics manufacturing environment, but minimum functionalities such as reference designators, redlining, bill of material (BOM) compare, and importing capabilities required customization. The time spent by software designers to customize the tool was extensive and counterproductive.

It was important for the Montreal manufacturer to catch product documentation problems before production and to have a complete history of the changes for accountability. It needed a PLM system that delivered robust, out-of-the-box functionality including: electronic management of part data, engineering changes, BOMs, and product documentation that didn't require customization. The system also had to be easily integrated with existing engineering design tools (Altium Designer and SolidWorks) and interface with the ERP system (MS Dynamics).

This led Genetec to Omnify Software, a PLM provider based in Tewksbury, Mass.

The primary goal of Omnify's Empower PLM was to fill the voids of previous tools to make engineering processes, such as new part creation, completely automated and more formal. "Previously, MCOs/ECOs were processed in Excel, even while using the old PLM system, because it did not provide redlining functionality to visualize the details of product changes," says Danny Roy, Genetec's hardware development manager.

Another goal was to improve the visibility of hardware product changes across the organization. This process was mature and well in place for software, but not for hardware.

Empower PLM allows Genetec to automatically notify appropriate parties of the intended changes and when they are released. "We already see the benefits with this aspect of the tool and ... we still have plans to make use of task assignment features and giving viewing abilities to other groups to continuously improve the awareness across the organization and foster team communication."

With Altium Designer, electronics de-



Genetec's Montreal facility needed a PLM that integrated easily with existing engineering design tools.

PHOTO: GENETEC

Empowering GENETEC

PLM SYSTEM IMPROVES MANAGEMENT OF PRODUCT INFO

signers browse existing parts inside the Empower database directly from within their Altium environment. This promotes team collaboration by enforcing official library management for part symbols/footprints. Designers quickly determine if they need to create a new part, and then get immediate access to it in Altium during the approval process. Thanks to the pre-configured mapping, BOMs are exported from Altium and imported into Empower PLM easily and quickly. When a schematic is modified, an engineering change order (ECO) is issued directly from a new BOM out of Altium and redlining on the existing products is automatically generated.

Full integrated

Roy says the loop is closed and efficient. "Omnify feeds Altium with parts, Altium feeds Omnify with design/assembly information such as BOMs and drawings

and then Omnify confirms visually any change that was implemented in Altium at the schematics level."

The process is similar with SolidWorks, except parts are not browsed directly from within its environment, but performed via a BOM export/import and accurate field mapping.

Genetec planned to reach full integration by using the Omnify CAD toolkit, which allows SolidWorks to push a BOM directly into Omnify.

"Since the highest level BOM in the hierarchy is a mechanical assembly for most of our products, SolidWorks has control over the final end-assembly details through its native PDM vault for progressive versioning during development, and once the design is ready to release to production, SolidWorks pushes this official released version (assembly) to Omnify and makes manufacturing

Continued on page 22

» Supply Lines

EXCLUSIVE BATTERY DEAL

Canadian Energy Corp. is now the exclusive distributor of Schneider Electric's solar products in Canada.

The Calgary-based supplier of renewable energy technology will handle Schneider's Conext SW, Conext XW, Conext, ComBox, Conext MPPT products.

The companies said their alliance will reduce lead times, increase sales service and support, and improve access to Schneider's inverters, batteries, modules and battery-based balance of system products.

Schneider Electric, with offices in Burnaby, BC, is a global manufacturer and supplier of energy management products and systems.

GREEN LUBES FOR MEXICO

Eco-Tek Group Inc., a Toronto-based supplier of green lubrication products for the transportation, industrial and marine sectors, has appointed Inversiones Y Construcciones Fabriles (ICF) its exclusive distributor in Mexico.

"ICF has been in discussions with Eco-Tek for some time and after significant market research has concluded that our products will be well received in Mexico," said Stephen Tunks, Eco-Tek's CEO.

INTRODUCING EAB'S BRANDING

Exchange-A-Blade, which offers exchangeable tool accessories, has changed its name.

Its new corporate handle is EAB Tool Co. Inc., and it will market its core line of exchangeable products under the EAB brand name.

The Vancouver company's exchange system allows customers to buy carbide saw blades and return them after use for credits toward next purchases. The blades are remanufactured in Canada to new condition. Products that can't be remanufactured are recycled.

CSA, HCT FORM ALLIANCE

The CSA Group, the standards organization, and HCT Co. Ltd, a provider of certification and compliance testing in Korea, are combining efforts to expand one-stop testing and certification services for electronics and electrical appliances that will give Korean manufacturers access to global markets.

HCT will test a wide range of products including batteries, electronics, electrical appliances and medical devices to the applicable US and Canadian standards. Customers of both organizations will have shorter turnaround times for reports, and a streamlined process for testing and certification to North American standards.

CSA has offices across Canada.

Closed-loop efficiency

Continued from page 21

documentation available to the NPI/production group," Roy explains.

Applying Empower PLM has increased productivity with notable improvements in data quality and time savings that have allowed Genetec to transition to a completely automated system for managing product documentation and changes, eliminating the need to partially manage processes in Excel spreadsheets. This environment removed the data integrity issues commonly associated with entering information by hand.

For the engineering group, the more formal and thorough part creation process addresses issues early on. Parts are verified via an automated approval process before they're released and propagated to outside sub-contractors. Communications between the NPI/production group and engineering group has improved, with guided workflow approvals and easier traceability of product versions.

Eliminating the need to customize the system or perform partially manual processes has saved the company a significant amount of time and money. A design engineer now imports a large BOM (electronic board or mechanical assembly) into Empower PLM easily and within seconds rather than the item-by-item cut and paste of the previous system. And the software compares BOMs between different, but similar flavours of the product to quickly confirm correct implementation of the new product version.

"Overall we executed close to ninety changes over the course of nine months and I could not imagine performing those changes via manual formatting in Excel," says Roy.

Productivity is improved with the fully automated system, data quality is better, as is communication. Genetec is calling its PLM issue resolved.

Visit www.omnifysoft.com.

This is an edited version of an article provided by Omnify Software, a PLM solutions provider based in Tewksbury, Mass.

Comments? E-mail jterrett@plant.ca.

Motors

BASE PROMOTES BETTER BELT TENSION

Browning's new Tenso-set 600 horizontal sliding motor base with optional quick release automatically maintains belt tension for extended periods and allows changes in just minutes.

The heavy steel base, which comes in NEMA motor frame sizes 56 to 286 and IEC equivalents, is a drop-in replacement for standard motor bases that reduces energy use, plus travel and site visits for technicians.

It operates like a standard motor base, using a jackscrew to adjust and hold tension on the belt. However, a coil spring inside the screw housing pushes against the carriage to maintain tension as the belt wears or seats itself further into the sheave groove to eliminate frequent belt re-tensioning, including during the first 24 hours of run time.

The QR option allows release of all belt tension after

just a few turns of the tensioning screw, rather than the typical 50 to 60 turns of a wrench.

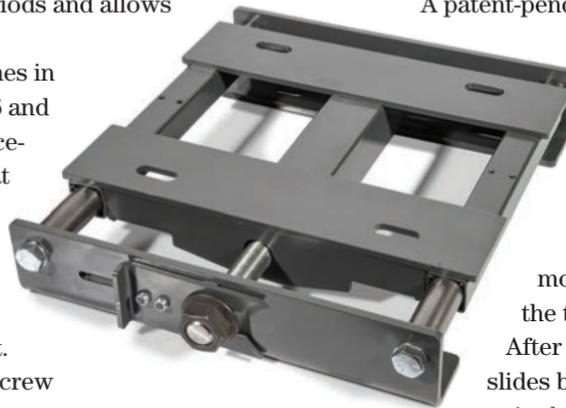
A patent-pending lever releases the motor carriage from the base after a few turns of the tensioning screw, allowing it to slide forward several inches. This provides slack in the drive for quick and safe belt changes.

The lever covers a cut-out in the motor frame that allows the head of the tensioning screw to pass through. After belt installation, the carriage slides back and the sliding lever closes to retain the head of the screw for tensioning.

Emerson Industrial Automation, based in St. Louis, provides products and solutions that

increase machine performance, efficiency and reliability, including those from Browning.

www.powertransmissionsolutions.com



Quick release for V-belt maintenance.

SERVO MOTORS DELIVER MORE POWER

B&R has added servo motors with high torque and an extended range of speeds to its product line. The 8KS series provides up to 140 kW of power and stall torque up to 555 Nm.

They come in two sizes with speeds up to 3,000 rpm for applications in a wide range of industries that require high power. For example, the version with reinforced bearings makes it possible to set up high-torque belt feed axes for electric injection moulding machines.

They also come with either axial or radial fans, water cooling and optional mounting feet.

Servo motors are equipped with a resolver interface, an optical encoder with EnDat interface and an embedded parameter chip for seamless compatibility with ACOPOS multi drives and easy integration into B&R's system landscape.

B&R Industrial Automation Corp. is a manufacturer of automation equipment with US operations in Roswell, Ga.

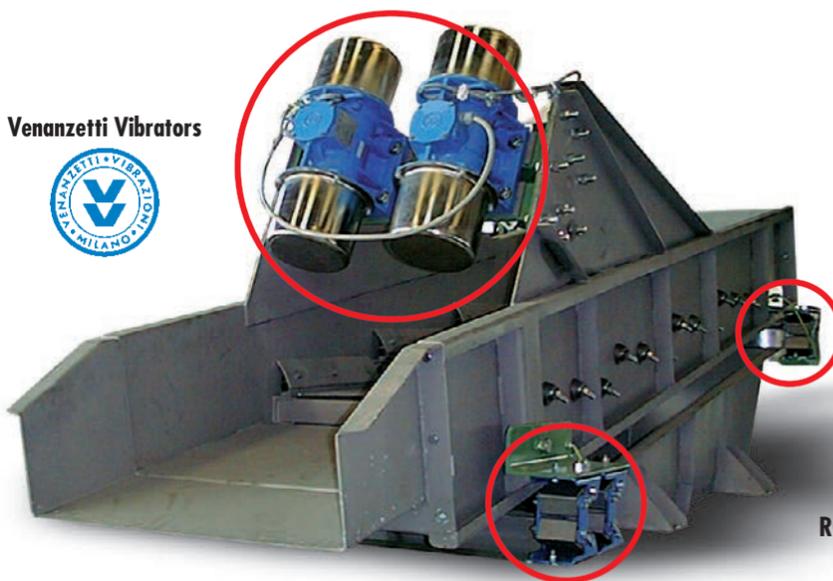
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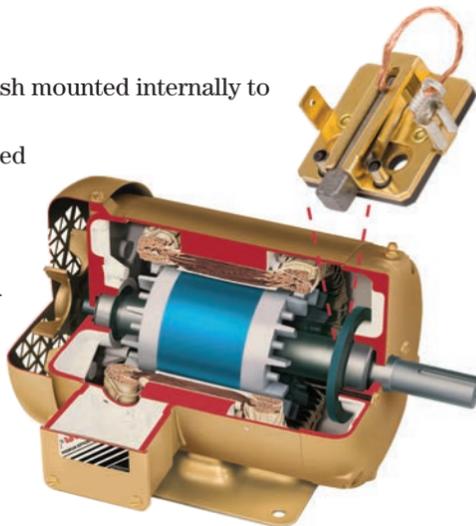
SUPER-E MOTORS PRESERVE BEARING LIFE

Baldor Electric Co.'s Super-E motors sport a carbon shaft grounding brush mounted internally to increase motor bearing life.

Using a drive to control the motor is beneficial because it provides speed control on different applications such as fans, pumps and conveyors, allowing motors to run at optimum efficiency. However, when a motor is controlled by a drive, there's potential for common mode voltage that could cause spikes in the rotor. These spikes seek the path of least resistance – the bearings – and lead to their premature failure. The shaft grounding brush diverts the spikes.

Stock ratings include one through 50 HP in totally enclosed fan-cooled (TEFC) or open drip proof (ODP) foot-mounted designs, and 1/2 through 5 HP in TEFC, C-face foot mounted designs.

Baldor, a Fort Smith, Ark. manufacturer of industrial electric motors, drives and power transmission products, is a member of the ABB group. www.baldor.com



Features a shaft grounding brush.



Single- and three-phase motors.

NEMA 4 PROTECTS CGP STARTERS

Carlo Gavazzi's made-in-Canada CGP motor starters are housed in a NEMA 4 metallic enclosures (non-metallic are also available) for use with both single and three-phase motors up to 600 V/200 HP.

There is a wide range of coil voltages and the starters come in single or three-phase models.

The starters are available with start/stop, hand/off/auto and custom configurations.

A pilot light, control transformer, and fused or non-fused disconnect switch are optional.

Carlo Gavazzi is a manufacturer of automation products in Mississauga, Ont. www.GavazziOnline.com



Based on the 1LE1 platform.

VSD 10S OPTIMIZED FOR G120S

Simotics VSD10 motors from the Siemens Drive Technologies Division are optimized for operation with Sinamics G120 frequency converters.

Based on the 1LE1 motor platform, they come in aluminum (Simotics GP) or cast-iron housings (Simotics SD) and cover a 2.2 to 200 kW output range.

The motors, used for pumps, fans, compressors and conveyor systems, include temperature sensors and insulated bearings for large shaft heights, which boost the drive components' useful life.

VSD 10's integrated system with speed control demonstrates its advantages in partial load range applications, which saves energy.

Siemens is a German supplier of automation and drive technology with manufacturing operations in Canada. www.siemens.com/industry

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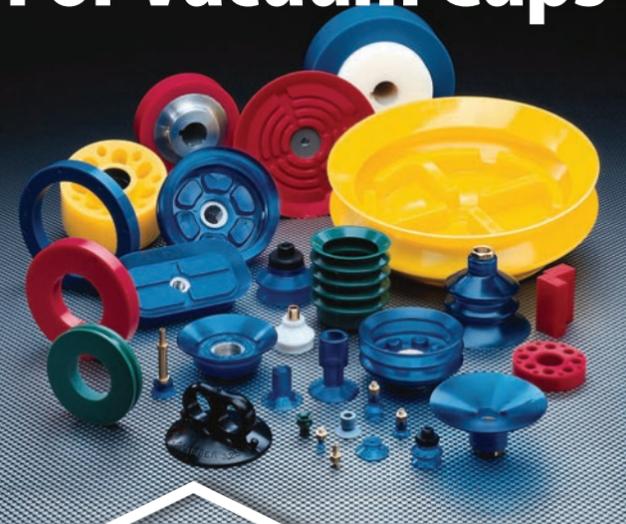
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Fisnar Inc.'s THERMADOSE hot melt production equipment provides pulse-free temperature-controlled thermoplastic dispensing. It uses pressure-sensitive and contact adhesives, waves and sealants for direct-contact, non-woven, ribbon-coating, high-speed jetting and product assembly operations.

Tank controllers include independent over-temperature and over-pressure protection to enhance safety, while independently controlled heat zones minimize adhesive degradation for precise, uniform patterns.

Reservoir tanks are coated with inert Teflon heated by quick-change cartridges for easy maintenance.

Configurations are controlled by a hand-valve or automated valve applicator. Control settings are input using a touch-pad to ease setup, and LED indicators monitor operation status and functions.

Pail and drum melters handle high volume production requirements of hot melt EVA, PSA, and PUR supplied from 5- or 55-gal. drums. Melters include precision gear-pump technology to provide pulse-free flow of adhesive for precise gluing applications.

Fisnar is a manufacturer of fluid dispensing equipment based in Wayne, NJ. www.fisnar.com

METAL WORKING

KEEP INDUSTRIAL PARTS CLEAN

Walter Surface Technologies' Clean-Box Flow industrial parts washing system handles bulk cleaning of small to medium-sized parts. It's used with Walter's Bio-Circle CB 100, a natural water-based solvent that's biodegradable and VOC-free.

The system consists of a sink and flow-through cleaning brush, a basin and heavy-duty pump that circulates through heavy oils, greases and contaminants.

The compact, entry-level system is



Compact system.

made for rugged manufacturing environments with accessories for a wide range of uses. They include the Bio-Circle Air Drying Gun for quick drying of industrial parts; a two-level cart that puts the parts washer at the ideal height for working and makes the system mobile; and a lid that prevents dust and other contaminants from entering the system.

Walter Surface Technologies, based in Pointe-Claire, Que. with offices across Canada, provides products and systems for the metal working industry.

www.walter.com

www.biocircle.com

TUBE PROCESSING

MAKE TUBE BENDING MORE PRODUCTIVE

The ELECT XL150 from BLM GROUP USA delivers advanced levels of accuracy and productivity to tube bending up



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to 6 in. in diameter. The all-electric tube bender handles difficult applications with little or no straight between bends or where a tight radius is required.

Electric axes ensure optimal working parameters are reproduced without relying on operator expertise.

With multi-stack tooling (up to eight stacks), several bend tools pre-mount to minimize changeover. Incorporating a direct gearbox drive within the head assembly gives the unit greater clearance around the bend. The machine also combines conventional and variable radius bends in the same automatic cycle.

A controller automatically manages critical settings and tooling for the machine when a part program is selected and correct positional and torque settings are assured. Remote access permits offline management and troubleshooting.

BLM GROUP is a manufacturer of tube processing technologies with North American operations in Wixom, Mich.

www.blmgroup.com

VACUUMS

VACUUM RECEIVER INCREASES HOLDING VOLUMES

Flexicon's stainless steel, modular Vacuum Receiver has been fitted with a pneumatically-actuated dump valve for dilute phase pneumatic conveying systems that facilitates tool-free disassembly for filter cleaning and maintenance.

The added cylinder segments increase holding volumes.

A flap-type dump valve is actuated by a pneumatic cylinder via manual contact closure, or programmable controls based on weight



Tool-free disassembly.

REELS

REEL PREVENTS REVERSE WINDING DAMAGE

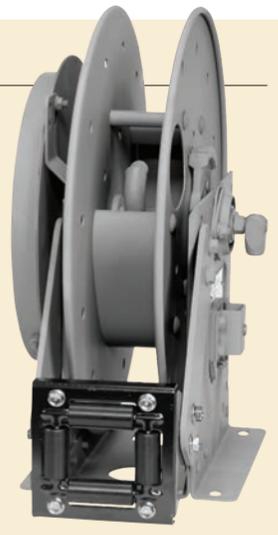
The N500 Series high-pressure, spring rewind reel from Hannay Reels efficiently handles hose used in hydraulics, air/water, and chassis grease applications.

A heavy-duty spring motor with self-contained rewind power, four-way roller assembly and a declutching arbour prevents damage from reverse winding. And a non-sparking ratchet assembly locks the reel at the desired length of hose payout. A pull on the hose unlocks the reel for the spring motor to retract it.

Installation almost anywhere is easy with its compact frame and narrow base.

Hannay Reels is a manufacturer based in Westerlo, NY.

www.hannay.com



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WELDING

KEEP YOUR GUN TIP DRY

Parker Canada Division's Weld Retract Actuator (WRA) eliminates water during weld gun tip changes. It reduces clean-up downtime and machine operators aren't exposed to hazardous weld water because it stays in the system.

Made of aluminum, stainless steel and composite materials compatible with all cooling water fluids, the WRA applies Parker's cylinder and actuation technology while the Viking Lite valve provides reliable and precise operation of the pneumatic control.

Parker Canada Division is based in Milton, Ont. and is a Parker Hannifin company, a diversified manufacturer of motion and control technologies and systems.

www.parker.com/weld



Water stays in the system.

gain, elapsed time or other user-defined parameters. The unit employs a single, larger diameter filter cartridge for quick changes, and automatic reverse pulse jet cleaning to maintain conveying efficiency.

Solids are separated from the air stream using filter media and gravity, and are generally specified when materials contain smaller particles that are prone to dusting and/or when dust containment is a primary requirement.

Flexicon, a manufacturer of material handling systems based in Bethlehem, Pa., recommends the receivers for high-volume applications above storage vessels or process equipment such as blenders and bulk bag fillers.

www.flexicon.com

FILTRATION

PURIFY TRANSFORMER INSULATING OILS

HVTOPS and DOPS oil purification systems from Oil Filtration Systems remove impurities from dielectric insulating oils in either transformers or circuit breakers to keep them clean and dry.

The manufacturer of oil purification systems based in Boerne, Tex. says the systems improve dielectric strength to



Removes impurities.

meet or exceed 40 Kva per ASTM D877 as well as improve interfacial tension to meet or exceed 40 dynes/cm per ASTM D971. They remove 100% of free water and 99% of dissolved water to achieve an overall moisture content of less than 10 ppm.

Dissolved air and entrained gases are removed to less than 0.25% of overall content. The systems also remove all carbon and particulate contamination down to 1-micron, and can remove acids to achieve .05 mg KOH/gm or lower.

Both systems, available in sizes from 5 to 44 gpm, are effective for use on paraffin, naphtha-based or silicone-based insulating oils, as well as Envirotem FR3 insulating oil.

www.oilfiltrationsystems.com

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PUMPS



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PUMP DOWN TO 3/16 IN.

Allegro Industries' DC enclosed, submersible dewatering pumps operate on 12-V truck or car batteries to deliver up to 43 gpm down to 3/16 in., extracting standing water that contains sand or solids at civil engineering sites or utility pits.

The discharge hose is made of tough PVC and includes fire-hose-style quick-connect fittings. It's collapsible for compact storage. A V-ring protects the shaft seal from abrasives.

Allegro is a manufacturer of safety and confined space equipment based in Piedmont, SC.

www.allegrosafety.com

PUMPS TARGET ENERGY SAVINGS

KSB Pumps Inc. has two new pump families that will help reduce your energy bill.

Its PumpDrive variable frequency drives for mid-sized pumps have adjustable operating speeds to match output characteristics with system requirements. Reducing operating speed cuts energy use for savings of up to 60% compared to adjusting pump outputs by bypass circuits or flow restriction.

The speed controls are compact, modular units that the Mississauga, Ont.-based pump company says easily integrate into any plant environment. Smaller units (up to 55 kW) mount directly on pump motors, while the larger ones (up to 110 kW)



SuPremE rotor design.

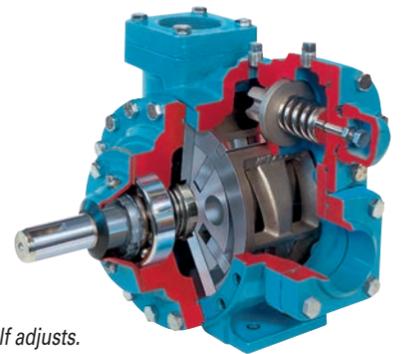
are wall or panel mounted.

The units would normally be combined with flow, pressure or temperature sensors as part of a control system that automatically fine-tunes output according to system requirements.

KSB's SuPremE high-efficiency synchronous reluctance motors with their optimized rotor design deliver 30% higher energy efficiency than conventional electric motors, especially when the motors run at partial loads.

KSB Pumps is a member of the KSB Group, a global pump manufacturer based in Germany.

www.ksb.ca



Self adjusts.

HANDLE LOW VISCOSITY FLUIDS EASILY

Blackmer's XL series sliding vane pumps meet the handling characteristics of crude oil that's produced from shale formations, which is typically lighter and cleaner than traditional crude and needs to be transferred by pumps that handle liquids with lower viscosities and particulate levels.

A sliding vane design allows them to self adjust to maintain required flow rates, even when handling thinner liquids. Made of ductile-iron, the pumps withstand sudden thermal shock allowing them to be used in rugged conditions, along with replaceable casing liners and end discs that enable easy rebuilding of the pumping chamber to like-new condition in the field.

Other features include self-priming and dry-capabilities, leak-free mechanical-seal and ball-bearing construction, symmetrical bearing support for even loading and long wear life and an adjustable relief valve that protects against excessive pressures.

The pumps are available in five sizes ranging from 1.25 to 4 in. with flow rates from 17 to 345 gpm. Working pressures are up to 350 psi (24.1 bar) in temperatures up to 148 degrees C.

Blackmer is a producer of pumps headquartered in Grand Rapids, Mich.

www.psgdover.com

LIGHTING

BRIGHT LIGHT FOR DOCK WORK

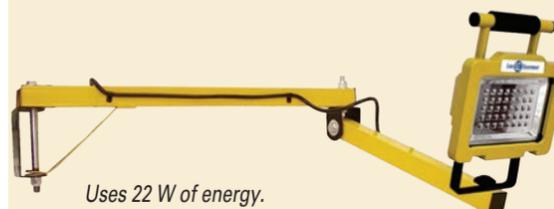
Lind Equipment's L41LED dock light projects a bright white light that illuminates an entire trailer using just 22 W of energy compared to 500 W for a traditional quartz halogen.

It's built on the same rugged platform and housing as the L41 quartz halogen dock light;

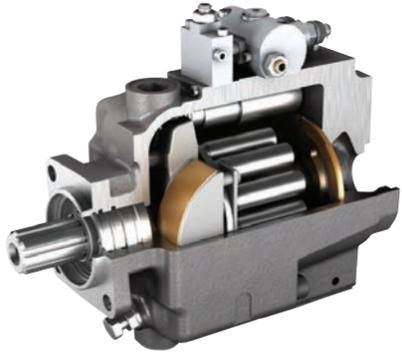
however, the L41LED does not heat up and the LEDs are rated for more than 50,000 hours.

Lind Equipment is a Markham, Ont.-based manufacturer industrial lighting, portable power and GFCI products.

www.lindequipment.net



Uses 22 W of energy.



Direct flange mountable.

PUMPS ELIMINATE TRANSMISSION OVERLOADING

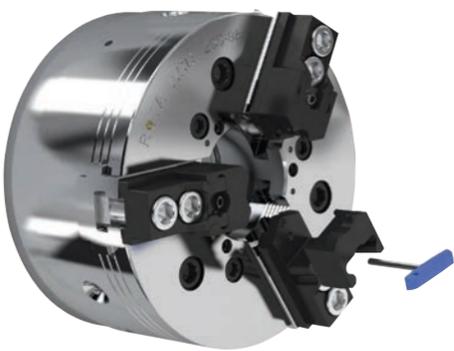
HAWE's Hydraulics' V60N-130 pump is equipped with a variety of option controls, flanges and adaptations to connect additional pumps to a utility vehicle's through shaft while a serial built-in performance controller protects against transmission overloading.

The pump is direct flange mountable to the power take-off on commercial vehicle gearboxes, or for a standard connection using an SAE flange. A high self-suction speed rating and low noise level make the pump suitable for a range of applications.

Variations with through shaft for flange mounting additional pumps are also available.

HAWE is a manufacturer of hydraulic components based in Charlotte, NC. www.haweusa.com

CLAMPING



Extends clamping range.

CHANGE JAWS PRONTO!

Schunk's Pronto quick jaw change system does the job in five seconds per unit for all standard lathe chucks with fine serrations of 1/16 in. x 90 degrees and 1.5 mm x 60 degrees.

The retrofit set consists of support jaws and clamping inserts, and suits O.D. clamping of pre-machined and finished parts.

Using the interchangeable insert extends the clamping range by up to 16 mm, without having to re-set the supporting jaw, an increase of 300% in comparison to conventional lathe chucks.

For changes with exact repeat accuracy, locking is released with an Allen key, the jaw is removed and replaced by another to ensure correct positioning. In locked condition, a six-sided form-fit clamping ensures maximum process stability and provides high force and torque transmission.

Three supporting jaw variations handle small, medium and large clamping ranges. Four hard claw inserts are provided for various diameters and clamping ranges as well soft interchangeable

inserts for finished parts processing. Once turned, the inserts are used repeatedly. The clamping depth varies using a workpiece stop. The Canadian office of clamping and gripping technology provider Schunk Intec Corp. is in Mississauga, Ont. www.ca.schunk.com

ENCLOSURES

PROTECT SENSITIVE ELECTRONICS

Keep sensitive electronics used in a variety of harsh environments cooled and protected with EIC Solutions Inc.'s Protector enclosures.

The pre-packaged units are made of stainless steel and are wall, pole or floor mountable. They're available in several sizes, including 12 x 12 x 8 in., to 36 x 30



Thermoelectric cooled.

x 16 in. for smaller-size applications such as lab equipment, surveillance systems and traffic controls.

Larger units measure 48 x 30 x 10 in. to 72 x 30 x 16 in. and house sizeable electronic and electrical equipment in telecommunications networks, power distribution equipment and factory automation systems.

Less maintenance is needed because the thermoelectric cooled enclosures don't have compressors, refrigerants, filters or moving mechanical parts other than fans.

Drop-in rack mount brackets to house DVRs and other 19 in. rack mount electronics are optional. Integrated coolers keep contents at safe operating temperatures for risk-free operation. They're NEMA 4/4X rated and shipped complete.

Cooling options include thermoelectric air conditioners with a 200, 400, 800 or 1,500 Btu/hr cooling capacity. Power options include either 120 or 220 VAC modes.

EIC Solutions is a manufacturer of cooling and protection technologies based in Warminster, Pa. www.eicsolutions.com

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There was a time when every company leader had one question at the top of their agenda: how to produce and sell more? But times have changed, and so has the question. Today, you need to know how to deliver more while consuming less: less energy, less raw materials, less CapEx and less OpEx.

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Interview with Jean-Pascal Tricoire

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MATERIAL HANDLING



Instantaneous parameters.

NON-CONTACT YAG, FIBRE LASER MONITORING

Ophir Photonics' BeamWatch non-contact, focus spot size and position monitor for high power YAG and fibre lasers eases material processing applications in automotive and aerospace manufacturing.

Because there is no contact with the laser beam, the system has no power re-

striction and handles high power lasers up to 100 kW. A new algorithm optimizes the measurement window to remove imprecise, manual judgements from the process and improves the overall precision of measurements.

The unit instantly checks laser parameters without contacting the laser beam, making a set of complete measurements at camera update rates. It measures the Rayleigh scatter caused by the beam to provide instant readings of focus spot size and beam position, as well as dynamic measurements of focal plane location during process start-up.

It monitors high power YAG, disc, fibre and diode lasers in the 980-1,080 Nm range. The system takes measurements of the beam at frequent intervals

without shutting down the process or removing extensive tooling and fixtures. It measures focal spot location at 60 ms intervals to indicate whether shifts are occurring during critical start-up moments.

The system sets up to compare initial process validation numbers and runs in automated pass/fail mode. An Automation Server uses Visual Basic for Applications (VBA), C/C++, or an ActiveX application such as Microsoft Excel, Microsoft Word, or National Instruments LabVIEW.

Ophir Photonics, which has North American operations in North Logan, Utah, develops infrared and photonics instrumentation.

www.ophiropt.com/photonics

COUPLINGS



Precise torque transmission.

POSITIONING ACCURACY IN BOTH DIRECTIONS

Ringfeder Power Transmission's RING-flex multiple-disc couplings are compact and have multiple connection options for drive applications that require positioning accuracy in both directions, such as machines with frequent start/stop or reverse operation.

The hubs attach to the shafts with keys, clamping hubs, shrink discs or locking assemblies.

All couplings are made of high-strength steel, and they cover a range of applications thanks to nominal torques of up to 260,000 Nm and shaft diameters of up to 250 mm. They handle temperatures up to 240 degrees C for installation in high-temperature fluid pumps.

Ringfeder Power Transmission is a manufacturer of connection technologies with North American operations in Westwood, NJ.

www.ringfeder.com

VALVES

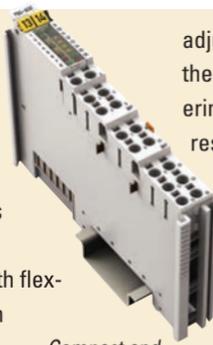
SIMPLIFY VALVE CONNECTIONS

WAGO Corp.'s 750-632 proportional valve module simplifies the connection of hydraulic or pneumatic valves to its I/O-SYSTEM 750.

The 12-mm wide module provides high performance with flexible valve control operation modes for heavy equipment in the mining, oil and gas, and metal forming industries.

Two single-coil valves or one dual-coil valve are controlled either uni- or bi-directionally. For each channel or coil, the output current is 2 A in 1-channel operation and 1.6 A in 2-channel operation.

Two current-controlled pulse-width modulation outputs (24 V) with



Compact and convenient.

adjustable dither minimize motion, which is adjusted to the valve around the rest position. This allows the set point to be defined without considering static friction and prevents the valve from being stuck by medium residues.

Characteristic curve adaptations, such as zero offset, dual gain compensation or range limitations are adjustable according to parameters. Two additional digital inputs connect to sensors or switches and are configurable for multiple functions, including JOG, TRIP, and HOLD. Start-up and valve parameter adjustments are configured with WAGO-I/O-CHECK software or program code. It operates via MODBUS TCP, EtherNet I/P, CAN or PROFIBUS, and is equipped with CAGE CLAMP connection technology.

WAGO is a manufacturer of connection technologies based in Germantown, Wis.

www.wago.us



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Wide range of oscilloscope features.

SOFTWARE CONNECTS PC TO TEST DATA

PicoScope 6 For Linux allows a PC to be connected to a PicoScope USB adapter to produce a high-powered oscilloscope, FFT spectrum analyzer and data acquisition device.

With built-in buffering in the PicoScope adapter, the PC's display is updated frequently and smoothly even when set on long time bases.

Previously only available as Windows-based software, PicoScope 6 For Linux includes a wide range of standard oscilloscope features such as waveform display, spectrum display, interactive zoom, sophisticated triggering, automatic measurements and signal generator control. Waveforms are captured for off-line analysis or sharing with other users, or exported in text, CSV and Mathworks MATLAB 4 formats.

Pico Technology's real-time oscilloscopes are compact, economical USB adapters, available with bandwidths up to 1 GHz with up to 4 input channels, hardware vertical resolution to 16 bits, sampling rates up to 5 GS/s, buffer sizes up to 2 GSa and built-in signal generators.

Other features available on some models include flexible hardware resolution, switchable bandwidth limiters, switchable high-impedance and 50 ohm inputs, and differential inputs. All of these adapters now run on Linux-based PicoScope 6 software.

PicoScope 6 For Linux is available free from Pico Technology, a supplier of PC-based test equipment and data acquisition products, at www.picotech.com/linux.html.

Pico products are distributed by Saelig Co. Inc. in Fairport, NY.

www.saelig.com

CONNECTS WIRELESSLY AT HIGH-SPEEDS

Operators using commercial-grade devices for media-rich, mission-critical wireless applications may be getting satisfactory network service, but frequent maintenance and system downtime costs add up.

Moxa, a developer of networking and computing products solutions based in Brea, Calif., says its AWK-5232 Industrial a/b/g/n Wireless AP/Bridge/Client delivers high-speed wireless connectivity.

With data transfer rates up to 300 Mbps, the unit delivers plug-and-play scalability that reduces networking costs by eliminating the need for multiple pieces of equipment.

It supports 802.11n wireless connectivity and legacy a/b/g equipment, making it a drop-in solution for hard-to-wire deployments and most mobile devices connected over a TCP/IP network.

Integrated WEP/WPA/WPA2/802.11X security and powerful filters prevent unauthorized access to the network.

The system leverages two independent RF modules (2.4 GHz and/or 5GHz) to support a variety of configurations and applications, while redundant connections ensure consistent reliability across the network.

www.moxa.com

Plug-and-play scalability.



1/4 TON OF REFRIGERATION

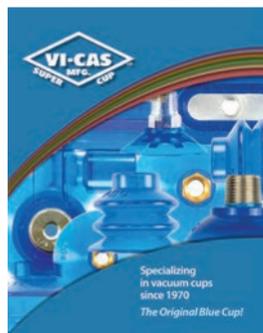


EXAIR Vortex Tubes produce up to 10,200 Btu/hr. with no moving parts. Stainless Steel Vortex Tubes convert an ordinary supply of compressed air into two streams; one hot and one cold. Temperatures are adjustable from -50° to +250°F. Applications include cooling hot melts, cutting

tools, welding horns, electronic controls, soldered parts and gas samples. www.exair.com/18/130.htm

EXAIR Corporation

MOST POPULAR VACUUM CUPE

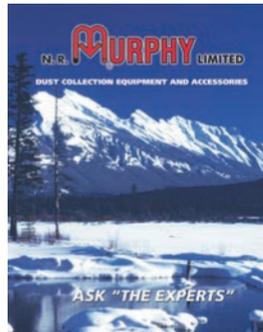


Vi-Cas Manufacturing's new 16-page, full colour brochure details the company's most popular vacuum cups. In addition to dimensional information (including lip diameter, height and mounting holes), the new literature shows photos of each cup to guarantee accuracy. Vacuum

cups and accessories are used extensively in all types of packaging and labeling operations. www.vi-cas.com

Vi-Cas Manufacturing

DUST COLLECTORS NEW - FULL LINE



LITERATURE GUIDE

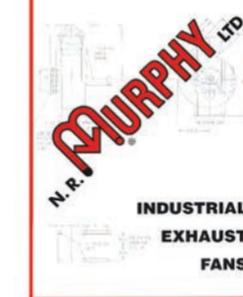
This NEW guide outlines dozens of N.R. Murphy dust collectors, installations, capacities, styles and models. N.R. Murphy Limited has been in business over 70 years and has thousands of satisfied customers. "Dust Collectors are all we do; so get it done

right the first time.

Just Ask the Experts." www.nrmurphy.com

N.R. Murphy

INDUSTRIAL EXHAUST FANS, IMMEDIATE DELIVERY

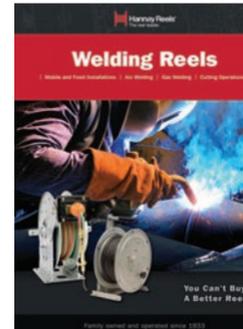


N.R. Murphy carries a large inventory of industrial Exhaust Fans in a vast range of sizes. The most popular versions are fully built and ready to ship. When an unusual requirement turns up, they have the experience and manufacturing capacity to quickly modify or build

a new fan. Free catalogue, includes N.R. Murphy's line of fans, specifications and guidelines. www.nrmurphy.com

N.R. Murphy

HANNAY REELS RELEASES NEW WELDING CATALOG



Hannay Reels recently released a new welding catalogue that provides updated specification details on a variety of welding reels. Thorough charts guide customers to a product specifically for their applications. www.hannay.com

Hannay Reels

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G-Force Intelligent Lifting Devices provide the responsiveness and flexibility of a human operator with the power of a machine. Capable of lifting up to 1,320 lb., Gorbel's ILDs increase productivity, reduce product damage and create a safer workplace. Find what lifting system is ideal for your

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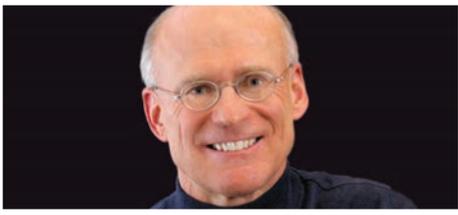
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Skills deal a model for Canada

BY GWYN MORGAN

Increasing the supply of skilled tradespersons is Canada's most critical educational need, yet barriers to training remain virtually unchanged.

Applicants face long waiting lists because funding hasn't grown with that need, while huge sums are spent turning out post-secondary graduates with skills that are neither useful to their own future nor that of our country.

To do their crucial job, Canada's polytechnics and trades-training community

“OECD data shows countries with the highest rates of apprenticeship also have the lowest youth unemployment...”

colleges must receive a substantially larger portion of the funding pie.

For students who get past the waiting lists, the next challenge is finding an inter-semester apprenticeship position. Many employers are reluctant to take on apprentices due to a perceived reduction in mentor productivity, yet surveys show that having a helper makes journey-persons more productive, not less.

Unfortunately, the country's disconnect-

ed jurisdictional structure means apprentices who manage to find work in another province or territory may be barred from counting their on-the-job-training hours towards journey-person status.

Now the shortage of trades has shot to the top of the skills gap agenda, we're starting to see signs of progress. BC, Alberta and Saskatchewan have announced apprentices will be able to move among the three provinces without

having to retrain. Positive steps, but a complete harmonization from coast to coast is needed.

OECD data shows countries with the highest rates of apprenticeship also have the lowest youth unemployment. In Germany, more than half of post-secondary students enter apprenticeship programs. In Canada, apprentices make up just 2% of the workforce.

In February, Labour Minister Jason Kenny led a delegation to examine the skilled trades system that lies at the heart of the Germany's stunning economic success. In stark contrast to Canada's balkanized trades training environment, Kenny found a positive partnership among educational institutions and employers, together with state and federal governments, was key to Germany's success.

Acute shortages

Not surprisingly, the provinces facing the most acute skilled labour shortages feel the strongest sense of urgency. In BC, liquefied natural gas (LNG), mining and shipbuilding are projected to require some 400,000 skilled tradespersons by 2020. To meet that goal, Premier Christy Clark has pledged to “re-engineer the education system from high school to post-secondary.” And a recent report commissioned by her government recommends that apprentices fill at least 25% of trade's jobs on public infrastructure and LNG projects.

The federal government could provide a huge national boost with a similar requirement for its \$14 billion New Building Canada Fund.

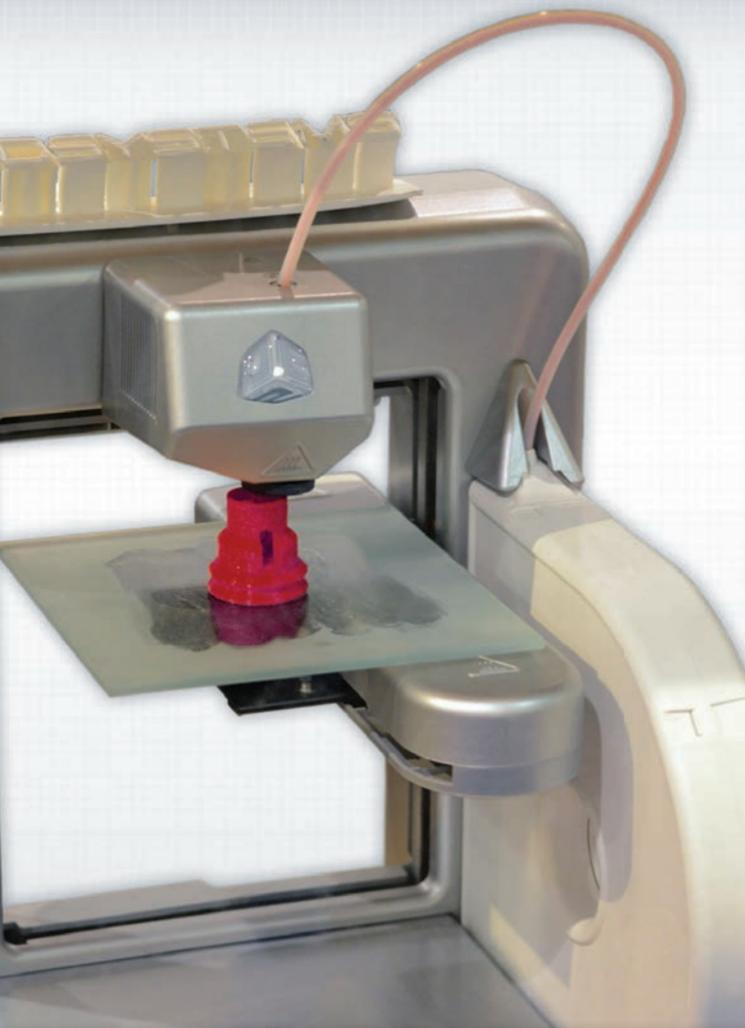
Recognition that skills availability is a major factor in attracting economic development is well established in the Southern US. When Yokohama was looking for a place to build a new 2,000-employee tire plant, Mississippi won the investment by promising a new community college program that would train workers in the specific skills needed. Georgia clinched a deal for a new 1,400-employee Caterpillar plant by funding a similar industry-specific college program, Florida announced a training program to help attract science and technology investments, Wisconsin announced funding for workforce development that includes customized training for business.

For far too long, governments have competed for investment by providing cash subsidies to corporations, but sooner or later, businesses needing subsidies almost always fail, leaving abandoned plants in their wake. By contrast, Clark recently noted: “One of the terrific legacies of (training people for) these projects will be a highly skilled, highly qualified workforce . . . that will attract more investment.”

Gwyn Morgan is the retired founding CEO of EnCana Corp. This column is distributed by Calgary-based Troy Media.

Comments? E-mail jterrett@plant.ca.

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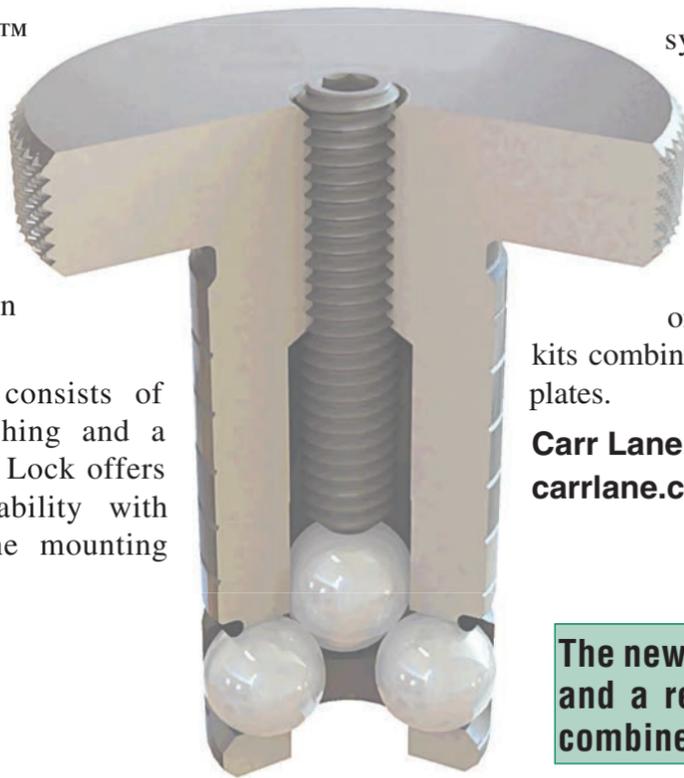
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—Jonathan Allen, Physicist, RF Electronics Consulting

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The new Carr Lock™ System from Carr Lane allows accurately locating and clamping at the same time, with just the twist of a hex wrench, for mounting quick-change tooling on a subplate.

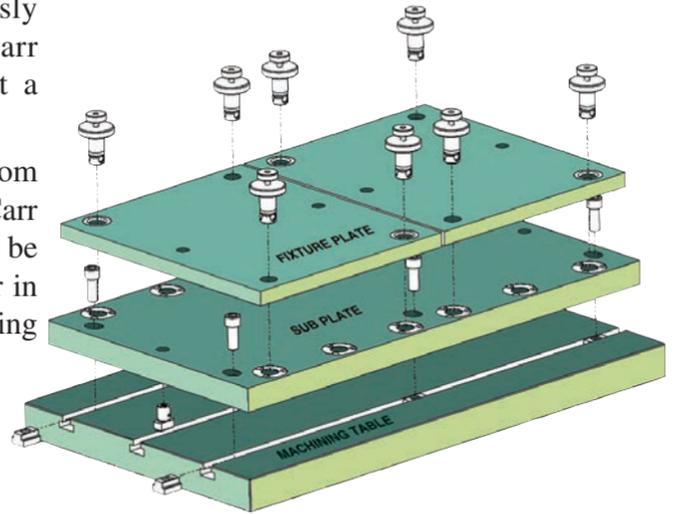
The new system consists of a clamp, a liner bushing and a receiver bushing. Carr Lock offers complete interchangeability with all components of the mounting



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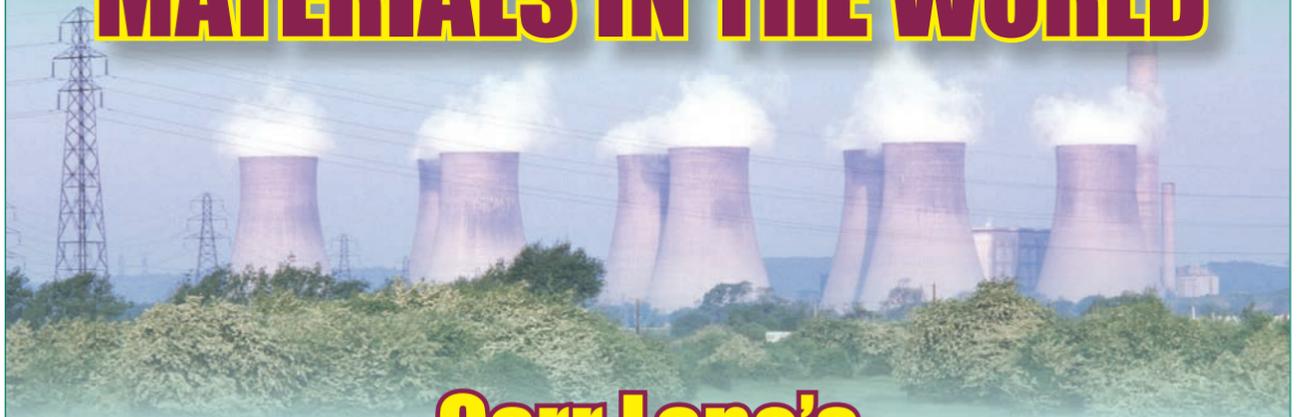


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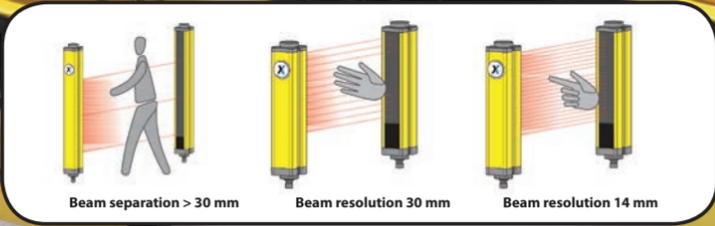
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