

PLANT

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Volume 73, No. 06 September 2014

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Remove Canada's "dumb" trade barriers

Manufacturers have to deal with many challenges, but doing business in other provinces shouldn't be one of them. It's one thing to squawk about being shut out of infrastructure projects in the US because of a blatantly protectionist Buy American law; quite another to bang into a provincial barrier that gives greater weight to a home team.

That was an issue Saskatchewan premier Brad Wall brought to the table during the Confederation conference in August when he threatened have-not Ontario with retaliation if it didn't eliminate preferential conditions on provincial infrastructure procurement. Indeed, a manufacturer from the EU under CETA would have clearer access to projects than an out-of-province company.

And there are plenty of other impediments across the country. Wall was surprised that a manufacturer of first aid kits would have to jump through regulatory hoops set up in 10 jurisdictions.

You like chicken? There are marketing boards that determine the origin and price of your Sunday dinner clucker. If you want wine with that, in Ontario (for example), it's easier to uncork a pretentious French plonk than a crisp vintage from BC's fine orchards. The Conference Board of Canada asks, why should each province have its own standards for blending ethanol with gasoline at the refinery? Each province accredits its own professionals, which makes changing employment jurisdictions a pain. And try to move merchandise across country without getting entangled in each province's red tape.

Provincial trade barriers are inefficient, they're a drag on the economy, and as Wall has declared, they're dumb. BC, Alberta and Saskatchewan have been going it alone with their New West Partnership, which endeavours to clear some of the regulatory flotsam out of the way. They call it leading by example, but getting all of Canada's provincial and territorial governments in line will require more aggressive federal leadership.

Business groups are predictably in favour of breaching the trade walls sooner rather than later and they recommend a tune-up for the 1995 Agreement on Internal Trade (AIT). The Canadian Chamber of Commerce, Canadian Manufacturers & Exporters, the Canadian Federation of Independent Business, the Dairy Processors Association of Canada and Restaurants Canada have laid out five principles for a new Canada free-trade zone deal:

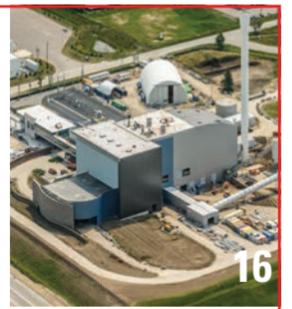
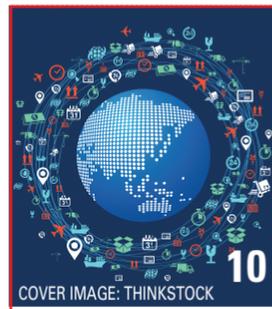
- It should be as ambitious and comprehensive as any free trade deal with a foreign country, covering all sectors of the economy with only specific, argued for and agreed to exceptions.
- Base the agreement on mutual recognition: if a product is made and sold in one province or territory it should be sold in any other jurisdiction, even if standards and regulations differ. Very clear evidence must be provided for any exceptions.
- Provinces and territories would work together to develop common standards and practices.
- An effective and efficient dispute resolution mechanism is needed with fair adjudication and enforcement.
- A new AIT would have an effective, transparent and inclusive governance structure.

Canada is part of a global economy. It has trade pacts with 40 countries. The five business groups point out provincial barriers put companies at a disadvantage on their own turf competing against foreign competitors, add costs and hurt productivity.

The premiers, fresh from their Charlottetown sojourn, need to turn good intentions into action with a reinvigorated AIT. To paraphrase Ronald Reagan speaking on another matter involving a barrier, the time has come to tear down these walls.

Joe Terrett, Editor

Comments? E-mail jterrett@plant.ca.



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» Bulletins

Pacific Safety Products Inc., a manufacturer of body armour based in Arnprior, Ont., has received a \$235,000 contract to produce armour vests for an unnamed customer in Ontario. Another contract for \$357,000 is for non-ballistic products.

Solutions D'alarme Incendie Maple Armor Canada Inc., a Chinese company, is building a plant to manufacture fire alarm systems in Saint-Bruno, Que. The \$30 million investment will generate 70 jobs when the plant is operational by the end of 2015.

Finavera Wind Energy Inc., a renewable energy developer in Vancouver, has signed an agreement to acquire 100% of the equity of Solar Alliance of America Inc. in San Diego, Calif. for US\$6 million. The sales and marketing firm focuses on residential solar installations.

BIOREM Inc., a clean tech company based in Guelph, Ont., has three new orders from unidentified customers worth \$2.1 million for three large odour control systems used in waste water treatment plants in Canada.

Nova Scotia Business Inc., a Crown agency, says it will provide up to \$6.2 million in subsidies to a Dutch company planning a \$30-million investment in its fish oil processing factory in Mulgrave. About \$1.2 million will go to Royal DSM NV if it creates 50 jobs over five years. The money would be offered through payroll rebates after jobs are created.

Innovative Composites International (ICI) Inc., a manufacturer of proprietary "green" composite materials and building systems in Toronto, has closed the sale of its wholly owned subsidiary plant in Sault Ste. Marie, Mich. for \$1.3 million. The unnamed purchaser has an exclusive right and licence for the use of all intellectual property used in the operation of the facility, but the company is limited to the automotive industry.

EnWave Corp., a Vancouver-based developer of a patented dehydration technology, says its **NutraDried LLP** subsidiary has received an initial private-label purchase order for its dried cheese snack product. The first order is to be delivered to the major North American private-label customer in the second half of the year for an initial product test launch.

Skyjack tunes up for a UK sale

1UP Platforms buys an articulating boom for a song

GUELPH, Ont. — Skyjack has found a novel way to sell scissor lifts thanks to area sales manager and singer/songwriter Kevin Fox.

He was challenged by Ben James, owner of UK-based 1UP Platforms and a long-term customer of the Guelph, Ont.-based Skyjack, to sing to a crowd of 200 at the British Open golf tournament, with an offer to buy an SJ 63AJ in return.

"I first sang Happy Birthday, but Ben deemed it to be cheating, so I sang two more songs including Hotel California, at which point the crowd started to join in," said Fox.

That sealed the deal.

The Skyjack articulating boom was personalized to commemorate the unique sale with the caption: "Kevin Fox, Singer/Songwriter, Friend to the Stars."

A native of County Durham in the UK, Fox played in local bands before emigrating to Canada in 1976 where he continued his musical interests



Kevin Fox (far left) is a member of Playback.

PHOTO: PLAYBACK

in the Toronto area.

He had a number of his songs recorded by country music star Ronnie Prophet with one in particular reaching number five in the country music charts and nominated "Song of the Year."

Skyjack is part of Linamar Corp., the Guelph-based global manufacturing firm.

Cascades expands US tissue production

\$55 million investment moves it closer to key markets

WAGRAM, NC — Cascades Inc. is targeting the southeast US market with a \$55 million investment in a Wagram, NC tissue converting facility.

The manufacturer of green packaging and tissue paper products based in Kingsey Falls, Que. said the investment will reorganize and expand

its converting activities in the southeast US.

Start-up is planned for the end of 2014.

Suzanne Blanchet, Cascades Tissue Group's president and CEO, said the investment in one of the fastest growing US markets involves relocating equipment presently used elsewhere,



The converting plant will have an annual capacity of approximately 10 million cases. PHOTO: CASCADES

by adding new manufacturing equipment and installing robotized warehouse management.

The converting plant will have an annual capacity of approximately 10 million cases on six converting lines producing bathroom tissue, kitchen towels, paper napkins and hand towels.

Borex acquires \$36.5M French wind power project

MONTREAL — Borex Inc.'s European subsidiary has acquired the Calmont 14 megawatt wind power project in the Midi-Pyrénées region in France.

Borex, a renewable power producer based in Montreal, said Borex Europe S.A. has a 15-year power sales contract with EDF France, the EDF Group's transport and distribution arm in France.

Construction of the \$36.5 million project will begin during the first quarter of 2015. Commissioning is set for the end of 2015.

Calmont is located a few kilometres from Borex's Avignonet-Lauragais hybrid solar/wind site.



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CCL Industries buys Bandfix

TORONTO — CCL Industries Inc. is acquiring Swiss label company Bandfix AG for \$18 million.

The privately owned company focuses on European specialty customers and has sales of \$47 million (2014 calendar year).

Geoffrey Martin, president and CEO of label and packaging firm CCL Industries in Toronto, said Bandfix gives it a foothold in Switzerland, especially in the healthcare and specialty space.

The operation will change its trading name to CCL Label, Switzerland.

BluMetric wins Far North services deal

OTTAWA — BluMetric Environmental Inc. has been awarded an up to three-year, \$3 million contract from the federal government for environmental consulting services in the Northwest Territories, Nunavut and the Yukon.

The Ottawa cleantech company's BluMetric Professional Services Division will service storage tank leaks and spills; abandoned dump sites and landfills; remote northern communities; wharf sites; and other active and abandoned federal sites in the far north.

The sites are funded and managed through the Federal Contaminated Sites Action Plan.

BluMetric will also provide assistance with project planning, assessment, provision of tender documents and site supervision for various environmental projects throughout the northern territories, and administrative and logistical support services.

The company operates two divisions covering professional services, and industrial/commercial water and wastewater treatment.

BCG projects \$67B market for robots by 2025

Industrial segment is the largest, personal is the fastest growing

BOSTON — Robotics is gaining traction much faster than most manufacturers realize and will have a major impact on the competitiveness of companies and countries alike, according to the Boston Consulting Group (BCG).

The Boston-based firm's study projects spending on robots worldwide will more than quadruple from just over \$15 billion four years ago to about \$67 billion by 2025, a 10.4% compound annual growth rate since 2010.

BCG notes state-of-the-art robots are beginning to replace labour in a wide range of industries. As prices come down and performance improves, they're migrating from industrial and military uses to commercial applications and the personal-service realm.

The industrial segment will continue to be the largest, growing at a compound growth rate of 10.1% from \$5.8 billion to \$24.4 billion.

The military segment is projected to grow at a compound growth rate of 8.1% and will be second largest, at \$16.5 billion.

The personal segment (robots used for entertainment, cleaning, education, security, and household applications) will grow the fastest at a compound annual rate of 15.8%, advancing from \$1 billion in 2010 to \$9 billion in 2025.

Growth for the commercial segment (medical and surgical, agriculture, construction, etc.) is projected to be 11.8%, from \$3.2 billion to \$17 billion, overtaking military applications.

BCG says falling prices and performance improvements are driving growth. Demand is highest in South Korea and Japan.

Roughly 40% of the industrial robots used today are in the automotive sector, where density (the number of robots per 10,000



Prices for robots are coming down and performance is improving. PHOTO: THINKSTOCK

manufacturing workers) tops 1,000 in Japan, France, Germany the US and Italy.

China is the fastest-growing market for imported industrial robots.

» Careers



Basha Hussein

Vista Projects Ltd. has appointed **Basha Hussein** CEO, assuming responsibilities from the company's founder, **Alex Campbell**. Hussein started at the Calgary-based oil and gas engineering firm in 2008 as a project engineer. He joined Vista's shareholder team in 2010 and most recently held the position of chief projects officer.

Stewart Emerson has been appointed president and CEO of Supremex Inc., a Montreal-based manufacturer of custom envelopes and packaging. Emerson was most recently the company's COO. He joined Supremex in 1990 and has held a number of senior management positions, including vice-president and general manager.

Randall MacEwen has been appointed president and CEO of Ballard Power Systems. He replaces **John Sheridan**, who is retiring after serving as the clean energy fuel cell developer's CEO since 2006. MacEwen formerly served as executive vice-president of Stuart Energy Systems Corp., an onsite hydrogen production company and as CEO of Solar Integrated Technologies Inc., a manufacturer of commercial solar systems.

Pacific Future Energy Corp. has appointed former International Trade Minister **Stockwell Day** to its management team as a senior advisor, director, and chair of the company's advisory committee. Vancouver-based Pacific Future plans to build and operate a \$10 billion "green" refinery in BC.

CAE lands US Air Force aeromedical deal

System prepares evac crews for pre-flight, emergency procedures

TAMPA, Fla. — CAE has been awarded a contract through ADS Inc. and the Defense Logistics Agency Tailored Logistics Support program to provide an Aeromedical Evacuation Training System to the US Air Force Reserve Command at Dobbins Air Force Base in Tampa, Fla.

The system, which covers a range of air mobility aircraft platforms, will provide a realistic training environment to prepare aeromedical evacuation crews for pre-flight and emergency procedures, as well as in-flight patient care.



iStan human patient simulators will feature internal robotics that mimic human cardiovascular, respiratory and neurological systems. PHOTO: CAE

CAE, the Montreal-based manufacturer of simulation systems, will provide a high-fidelity C-130 fuselage trainer configured for aeromedical evacuation missions.

Healthcare iStan human

patient simulators will feature internal robotics that mimic cardiovascular, respiratory and neurological systems.

When the iStan bleeds, his blood pressure, heart rate and other clinical signs change automatically, and he responds to treatment with minimal input from an instructor.

The system provided by CAE will include courseware and curriculum, as well as a handheld, wireless tablet instructor operator station to provide full control and customization of a variety of training scenarios.

Financial details were not provided.

CASL CLARIFICATION

The Confused about CASL? article in the July/August issue of **PLANT** contains an editing error related to dates in the section on implied consent, **Transaction or inquiry**. This paragraph should read: *If someone bought something from your company or made an inquiry, you have until July 1, 2017 to send commercial e-mails on the presumption the transaction or inquiry denotes implied consent. After that date, a transaction will allow for two years of implied consent and an inquiry for six months.*

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TransAlta to build \$580M power station in Western Australia

CALGARY, Alta. — TransAlta Corp. will build, own and operate a 150 megawatt combined cycle gas power station in South Hedland, Western Australia to supply power to a state owned utility Horizon Power and a Fortescue Metals Group subsidiary.

The \$580 million project, to be built on an existing site at Boodarie Industrial Estate, includes the cost of acquiring existing equipment from Horizon.

The development has been fully contracted under 25-year power purchase agreements with Horizon Power and Fortescue, and may be expanded to accommodate additional customers at later dates.

The station will supply Horizon Power's customers in the Pilbara region as well as Fortescue's port operations. It's to be commissioned in 2017, creating approximately 250 jobs during construction and 20 permanent jobs.

TransAlta, a Calgary-based power generation company, has been operating in Western Australia since 1996.

Pembina acquires Vantage pipeline to N. Bakken

And a Portland site for \$500M pipeline export terminal is chosen

CALGARY — Pembina Pipeline Corp. is acquiring the Vantage pipeline system and Mistral Midstream Inc.'s interest in the Saskatchewan Ethane Extraction Plant (SEEP) for US\$650 million.

Vantage is a recently constructed high vapour pressure pipeline that originates in Tioga, ND and terminates near Empress, Alta. The 700-kilometre, 40,000 barrel per day line provides access to North Dakota Bakken natural gas.

Calgary-based Pembina says the transaction provides access to a new and prolific resource play in North Dakota and has the potential to expand to 60,000 bpd.

As part of the deal, Pembina is also acquiring pipeline infrastructure from Mistral and Mistral's interest in SEEP. The 60 million cubic feet per

day deep cut gas processing facility is centrally located to service the southeast Saskatchewan Bakken region.

The pipeline infrastructure includes a 105-kilometre, four-inch ethane pipeline and an 75-kilometre gas gathering pipeline, both under construction.

Pembina expects SEEP and the pipeline to be in-service in mid-2015.

Pembina has also selected the site for its West Coast propane export terminal project, which will be in Portland, Ore.

It intends to have the US\$500-million, 37,000-bpd facility in service by early 2018 to move propane supply from Western Canada to large, international markets.

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» Events

DMG Events

Sept. 29-Oct. 3, Calgary

The International Pipeline Exposition & Conference (IPE) showcases more than 200 of the pipeline industry's brands and 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. MD-IDEX and the Manufacturer/Distributor Idea Exchange are included. Visit www.ptda.org/IndustrySummit.

National Supply Chain Forum

JWN/AIPMAC

Oct. 28-30, Calgary

The National Supply Chain Forum (NSCF) brings energy companies and their supply chain partners together to explore long-term strategies. Presented by JuneWarren-Nickle's Energy Group (JWN) and The Alberta Institute of Purchasing Management Association of Canada (AIPMAC). Visit www.supplychainforum.ca. E-mail regsupport@junewarren-nickles.com.

Energy 2014: Powering the Future of Manufacturing

CME-Ontario

Nov. 6, Mississauga, Ont.

Supply chain and energy management opportunities will be highlighted. Roundtable sessions will cover the energy supply chain, finance, management and policy. Visit <http://on.cme-mec.ca>, Upcoming Events. Contact Terry Adamo at terry.adamo@cme-mec.ca or (905) 672-3466.

MainTrain 2014

PEMAC

Nov. 17-20, Niagara Falls, Ont.

Presented by the Plant Engineering and Maintenance Association of Canada (PEMAC). Learn how to measure maintenance, reliability and asset management success. Visit www.maintrain.ca. E-mail events@pemac.org.

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We've all seen flat air nozzles. Some are yellow. Others are orange. The oldest ones are blue or metal. Those other manufacturers want you to believe you'll save money by conserving compressed air while protecting your workers from harmful noise levels. In reality, those colorful air nozzles that blow the air out of holes consume enormous amounts of air. The plastic ones often break off. Some might even get you an OSHA fine due to the dangerous dead ended pressures that exist if someone blocks the air exhaust.

EXAIR's award winning 2" Flat Super Air Nozzle™ has been engineered to replace those outdated flat nozzles. There are no dangerous holes. EXAIR's patented, award winning design is efficient, maintaining a precise amount of airflow through a thin slot. The result is a forceful stream of high velocity, laminar airflow with minimal air consumption and noise. You can increase or decrease the force of each flat air nozzle – using shims to tune it to the application so you'll never waste compressed air. EXAIR now offers a 1" Flat Super Air Nozzle with the same laminar airflow to fit in tighter spaces.



Flat nozzles from other manufacturers can consume over 30 SCFM (a refrigerator sized compressor) and aren't adjustable. Some manufacturers offer different flow rates but you need to guess at which one will do the job since you can't adjust them once you've made the purchase. By default, most users feel bigger is better and go with the highest flow rate, wasting compressed air.

COMPARE EXAIR's 2" Flat Super Air Nozzle Theirs (Old Technology)

- | | |
|---|--|
| <ul style="list-style-type: none"> • 2004 Product Of The Year Winner • Your choice of zinc/aluminum or Type 316 stainless steel • Flexible Stay Set Hoses™, swivel fittings and magnetic bases are available • Meets or exceeds OSHA standards • Quietest flat nozzle available • Easy to change the force and flow | <ul style="list-style-type: none"> • Can consume over 30 SCFM • Expensive – metal or plastic • No easy adjustment – wasted compressed air • May not be OSHA safe • Significantly louder • Plastic is easily broken |
|---|--|



Here's how:

- One popular flat nozzle consumes 31 SCFM @ 80 PSIG.
- EXAIR's 2" Flat Super Air Nozzle with .015" shim consumes 21.8 SCFM @ 80 PSIG.
- 31 SCFM (theirs) – 21.8 SCFM (EXAIR's) = 9.2 SCFM compressed air saved.

Most large plants know their cost per 1,000 standard cubic feet of compressed air. If you don't know your actual cost per 1,000 SCF, 25¢ is a reasonable average to use.

- SCFM saved x 60 minutes x cost/1,000 SCF = dollars saved per hour.
- In this case, 9.2 SCFM x 60 x .25/1,000 SCF = **13.8 cents saved per hour.**
- 13.8 cents per hour x 24 hours = **\$3.31 saved per day.**
- \$3.31 per day x 365 days = **\$1,208.88 saved in one year** (in this 24/7 operation).

And, This Savings Is For One Nozzle!

Air Nozzle	Air Consumption @ 80 PSIG	Noise Level dBA	lbs. of Force @ 80 PSIG
Yellow	29 SCFM	83	1.7
Orange	28 SCFM	82	1.7
Blue	26 SCFM	78	1.5
Metal (machined)	29 SCFM	82	1.7
Metal (cast)	31 SCFM	80	1.9
EXAIR 2" Flat Super Air Nozzle	*7.3- 30 SCFM	62-81	0.5 – 1.9

*Air consumption dependent upon shim size.

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Rebuilding manufacturing for jobs

BY KEN NEUMANN

Even after Statistics Canada corrected the July job numbers, they still indicate full-time employment is falling short. Over the past year, employers added only 38,500 full-time positions while Canada's working-age population grew by 374,200. Assuming just half of them want full-time work, there's a shortfall of 148,600 jobs.

A major reason is flat employment in manufacturing since the economic crisis. Almost all manufacturing jobs are full-

“What sets these countries apart from Canada is a public-policy focus on fostering a dynamic manufacturing sector...”

time, yet almost none are being created. How can we restore manufacturing as an engine of employment?

Canada lost jobs in a massive relocation of manufacturing offshore, but KPMG's *Canadian Manufacturing Outlook 2014* suggests this trend can be reversed. It notes companies are beginning to pull back from low-cost jurisdictions such as China and India because of ongoing problems with the quality and

consistency of their manufacturing.

Compressed lead times between orders and deliveries, plus high energy and transportation costs now favour production close to North American consumer markets. KPMG also cites Canada's highly skilled workforce as a key advantage.

Another factor is a Canadian dollar that's almost at par with the US dollar. Canadian companies now face less of an

export disadvantage.

Although these conditions allow for a renewal of manufacturing, they certainly don't guarantee it. A database assembled by the US Bureau of Labor Statistics indicates that since 2002, manufacturing output expanded by 12% in Germany, 22% in Japan and 23% in the US, but shrank by 12% in Canada.

What sets these countries apart from Canada is a public-policy focus on fostering a dynamic manufacturing sector. Our federal government showed its lack of commitment to manufacturing a year ago when US Steel permanently ended steelmaking at what had been Canada's largest steel mill.

US Steel had gained approval to take over Stelco in 2007 by promising to maintain production and jobs in Canada. When the company violated its Investment Canada Act commitments, the federal government began legal proceedings in 2009 but dropped its case in 2011. When US Steel announced in 2013 that it would never resume production at the former Stelco plant in Hamilton, the federal government did nothing.

Advocating for industries

It's one thing to accept US Steel falling short of its commitments during the financial crisis, but why quietly accept a decision to never honour its commitments? The company reported a profit for the latest quarter. There are indications steel is recovering, but there has been no action to maintain Canada's share of this market.

Advocating for industries such as steelmaking might seem to be at odds with environmental objectives, but just as manufacturing in Canada avoids the cost of long-distance transportation, it also avoids the associated greenhouse-gas emissions.

Canadian manufacturers are subject to stronger environmental regulations than companies in most other countries. For example, producing a ton of steel in China emits three times as much greenhouse gas as production in North America.

Rebuilding Canadian manufacturing should be seen as an environmental imperative. Indeed, some of the best opportunities for new manufacturing are in producing windmills, solar panels, transit vehicles and other equipment needed in the fight against climate change.

The factors identified by KPMG and an exchange rate closer to fair value provide an opportunity to renew Canadian manufacturing. Doing so could create much-needed full-time jobs and contribute to a cleaner global environment.

We need a federal government that sees the importance of manufacturing and will apply policy levers to support it.

Ken Neumann is national director for Canada of the United Steelworkers Union, North America's largest industrial union.

Comments? E-mail jterrett@plant.ca.

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PLANT PULSE

ECONOMIC DEVELOPMENTS AND TRENDS

PACE IMPROVES

RBC PMI shows growing output and business growth

Canadian manufacturing has picked up the pace. It's showing the fastest improvement in business conditions since November 2013, according to the RBC Canadian Manufacturing Purchasing Managers' Index (RBC PMI).

The RBC PMI, conducted in association with Markit, a global financial information services company and the Supply Chain Management Association, is an early indicator of trends in the manufacturing sector.

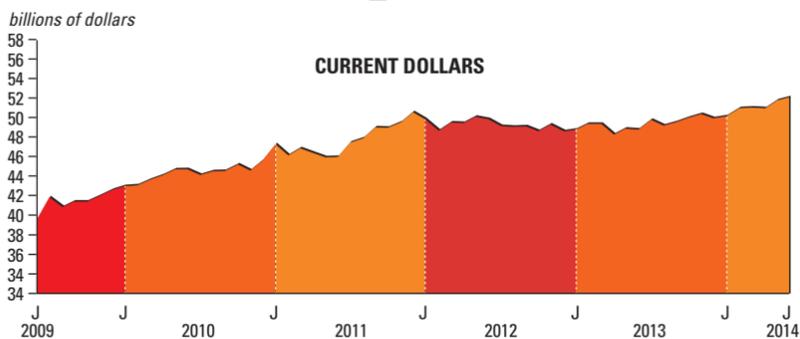
Adjusted for seasonal influences, it registered 54.8 in August, up from 54.3 in July and comfortably above the 50.0 neutral baseline. It's the highest reading for nine months and RBC says it indicates a "robust improvement" in operating conditions.

Output and new business growth both accelerated, while job creation hit its strongest level for 11 months. And cost pressures subsided to their weakest point so far this year, which RBC says contributed to a further moderation in factory gate price inflation during the latest survey period.

Here are some key findings:

- August data pointed to the most marked increase in new work from abroad since March, with a number of manufacturers attributing the rise to greater spending by US clients.
- Employment numbers rose for the seventh month in a row, and at the strongest rate since September 2013.
- Pre-production stocks were accumulated for the first time in four months, while finished goods inventories were depleted at a marginal pace.
- Average input prices increased at the slowest pace since December 2013.
- Alberta and BC recorded the sharpest improvement in business conditions.
- Manufacturing employment numbers continued to increase in all four regions.
- New export order gains were strongest in Alberta and BC, followed by Ontario.

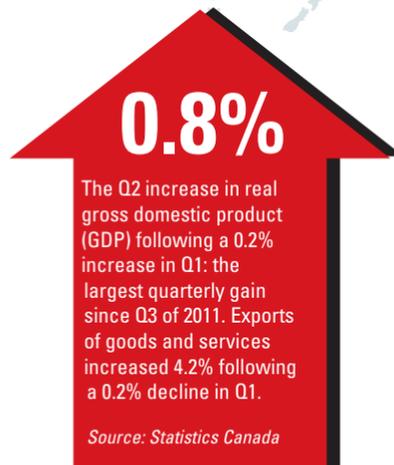
The report is based on monthly data compiled from more than 400 industrial companies.



SALES CONTINUE TO RISE

Manufacturing sales rose 0.6% in June to \$52 billion, the fifth gain in six months thanks to a 3% increase in non-durable goods sales led by chemicals, petroleum and coal products, and food. Alberta and Quebec led, while Ontario showed a 1.3% decrease. But the heartland of Canadian manufacturing is up 5% for the first half of the year. June's decrease can be pinned on sagging vehicle manufacturing sales.

Source: Statistics Canada



The amount of debt the federal government is carrying after running consecutive deficits since 2008/09.

Source: Fraser Institute



Canada's place in the World Economic Forum's global competitiveness rankings of 144 economies. That's down one spot from last year and well behind the top three (in order): Switzerland, Singapore and the US. Key weaknesses are poor business sophistication and innovation performance.

Source: Conference Board of Canada



The amount manufacturing machinery and equipment prices dipped in Q2. But investment in machinery and equipment was down 2.4% for the quarter. Overall, prices were down 0.7%.

Source: Machinery and Equipment Price Index, Statistics Canada



The percentage of Canadians who believe their jobs could vanish in a few years due to the rise of technology.

Source: Randstad Canada Workmonitor study

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» “Smart” Manufacturing

“Connected” technologies bridge the shop floor to the top floor and provide major benefits to maintenance, efficiency and productivity.

BY MATT POWELL, ASSISTANT EDITOR

When Google purchased Nest Labs Inc. for \$3.2 billion in January, the internet giant was buying more than a company that manufactured “smart” thermostats and smoke detectors – it was buying a position in the race to digitize people’s homes.

The thermostats learn how inhabitants like their homes to be heated and cooled, and then automatically adjust the temperature.

Google certainly has the bankroll to hedge bets on deals like the one with Nest, a fairly new company that grew fast. Co-founded in 2010 by two former Apple engineers, the company had more than 130 employees by the end of 2012 and now analysts at Morgan Stanley estimate it’s selling 100,000 thermostats a month. At \$250 each, annual revenue is expected to top \$300 million. That’s a drop in the bucket when you consider Google has more than \$60 billion in revenue, but it’s money that can be used to develop a suite of smart home products including locks, doorbells, baby monitors and humidity monitors, all packed with sensors that capture user information and a wi-fi chip to relay the data.

Nest’s “smart” innovations are a prime example of the capabilities home automation and “connected” technologies are playing in the current consumer market place. Other technology giants, including Apple, Samsung and Sony, are developing wearable devices such as watches and smartbands that collect data about users’ activities and provide them with details such as how many steps they’ve taken in a day or how many calories they burned on a weekend bike ride.

Now thanks to this growth in the consumer market, costs of sensors, controllers and communications have dropped, and connected devices are making a big splash in business. A sector that will truly benefit is manufacturing.

Intelligent sensors, cameras and tracking devices are transforming how companies operate and changing how businesses use data.

The basis of what’s called “Industry 4.0” builds on the fundamentals of its first, second and third iterations. But it also takes mechanical and mass production, and the electronics and control systems of today to a new level where manufacturing is driven by machine-to-machine (M2M), person-to-machine (P2M), and person-to-person (P2P) connections within the Internet of Everything (IoE, a.k.a Internet of Things).

It connects everything from industrial equipment and systems to the internet via wireless and wired networks to gather and transmit data that manufacturers use to improve efficiency, productivity, asset health, quality, safety and environmental impact.

Big money, big possibilities

According to research conducted by General Electric, enabling internet-connected machines could add up to \$15 trillion to global GDP by boosting annual productivity growth by 1% to 1.5% in the US.

“It’s extremely important that we explore the potential of connectivity, says Victor Woo, general manager for IoE at Cisco Canada. “We’re gaining intelligence from dark assets, such as machines and other systems that will help businesses make better decisions.”

A report for Cisco by Lopez Research suggests as costs decrease for standard “smart” sensors with IP

The Internet of EVERYTHING

HARNESSING MANUFACTURING’S



communications and embedded controls, solutions will be implemented across manufacturing equipment and into new areas that have not seen much investment in automation, such as Balance of Plant equipment and supply logistics. The benefit for manufacturers comes from the information collected by these sensors that’s communicated back to shopfloor workers, plant managers and software systems.

Although in its infancy, IoE is already having an impact, and manufacturers are reaping the benefits. Some of the world’s largest industrial players are leading adoption, including Cisco, General Electric, General Motors, Toyota, Samsung, Intel and Dell.

A forecast prepared by IT research firm IDC Canada and telecommunications company Telus Corp. suggests companies are preparing to increase their spending on data collection and analysis, the beginning of a rapid industrial-scale innovation that will have far reaching implications.

IDC estimates Canadian companies will spend \$21 billion on such projects in 2018, up from \$5.6 billion last year – a 375% increase. About 13% of study respondents were already working in the IoE, while another 30% say they are planning to adopt the technology within two years.

The survey suggests advancements in the reach and speed of wireless networks and technologies such as cloud computing are fuelling growth for IoE and opening up its potential for manufacturing.

Connecting machines creates intelligent networks along the entire value chain that communicate and control each other autonomously with significantly reduced intervention from operators. Machines predict failure and trigger maintenance processes autonomously, while self-organized logistics would react to unexpected changes in production, such as materials shortages and bottlenecks.

“IoE can not only increase productivity, it enables entirely new business models. Companies need to examine its possibilities as a competitive advantage or they risk falling behind global innovators already utilizing

new applications to creatively reinvent their businesses,” says Tony Olvet, group vice-president of research at IDC Canada.

Equipping people with mobile technology, you dramatically shrink the delta between when a problem occurs and when it’s acted upon, says Mark Bernardo, general manager of automation software for GE Intelligent Platforms, in the Cisco study.

“If there’s a quality control problem in a production line, they can shut down the line before it continues to create products that will all be waste.”

For example, Harley Davidson installed software at its York, Pa. plant that records how different equipment is performing, such as the speeds of the fans in its painting booth. Software automatically adjusts machinery if it detects a measurement, such as fan speed, temperature or humidity, has deviated from acceptable ranges.

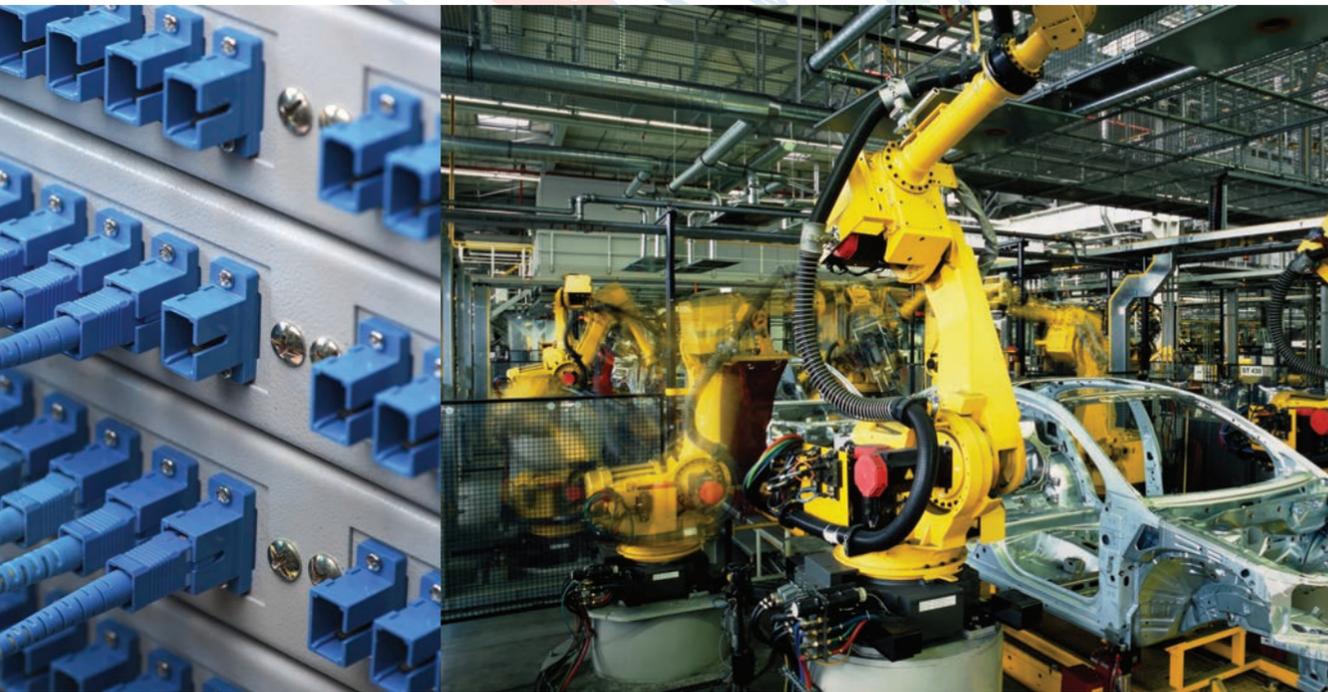
General Motors has implemented a standards-based network architecture called the Plant Floor Controls Network. It standardizes the design of each of its plant networks to establish a single engineering team that monitors and troubleshoots network operations globally. The automaker has since reduced network downtime by 70%.

And at a General Electric plant in Schenectady, NY, tens of thousands of miniature sensors are collecting data about each step in the manufacturing of batteries. The sensors know information relating to humidity on the shop floor and how much pressure each machine must apply to particular battery components. The company says it’s using the data to improve its factories by determining which conditions are associated with the best products.

Meanwhile, Cisco Canada is in the process of opening an IoE Innovation Centre in Toronto, one of four locations around the world, where it expects to spend \$100 million over the next 10 years on the development of infrastructure and technology.

“Convergence is the key work here,” says Woo. “We have to bridge information within the business by con-

NEW FRONTIER



necting the shopfloor to the top floor.”

Woo, looking at Cisco research, estimates that IoE will drive net profits of \$3.9 trillion in the global manufacturing sector alone over the next 10 years. Canada's share would be about \$100 billion.

He contends manufacturing has the most to gain from IoE globally.

Leveraging value

While sensors and computerized automation have been around for decades, PLC and PC-based controllers and management systems are largely disconnected from IT and operational systems. They're organized in a hierarchical fashion within individual data silos that often lack connections to internal systems.

But Dave McPhail, the CEO of Memex Automation in Burlington, Ont., says that's changing thanks to IoE.

“Having the ability to connect equipment via ethernet is providing businesses with a new value stream based on the fact that you can pull data in a cost effective way,” he says.

Memex develops real-time shop-floor-to-top-floor technologies, and its flagship product MERLIN provides overall equipment effectiveness (OEE) metrics in real-time to allow manufacturers to enhance their production through shop-floor data analysis. The company has strategic partnerships with Microsoft and tool builder Mazak, which has installed the MERLIN OEE system at its plant in Florence, Ky.

Thanks to new sensor information, wireless connectivity and big data processing tools like Memex's, IoE would help manufacturers improve OEE by gathering information related to equipment health to minimize machines failures.

The next step in IoE development, McPhail says, is a ubiquitous platform.

“We have the hardware part figured out. Now we need an open source protocol that allows data to be consumed by any number of applications to add even more value, such as overall equipment effectiveness,

The Internet of Everything is changing how data centres, ethernet connectivity and machines communicate.

PHOTOS: THINKSTOCK

total predictive maintenance and the cost of core performance,” he says. “I think we've only scratched the surface in terms of how we can use data. Our imagination is our only limitation.”

So you want to enter the IoE realm? A Cisco research paper suggests there are four elements that provide the foundation for smart manufacturing within IoE:

Network. “Smart” manufacturing environments require a standardized IP-centric network that enables all devices within a plant to communicate to operational and enterprise business systems. A standard IP network also makes it easy to connect and collaborate with suppliers and customers to improve supply chain visibility.

Security. Safeguards must be built into any solution, including security procedures such as hardware encryption, physical building security and network security for data in transit.

Software systems. Systems must translate information from the physical world into actionable insight that humans and machines can use. For example, Toyota is using Rockwell Automation software for real-time error corrections at its Alabama plant to minimize rework and scrap rates. The software is saving the automaker \$550,000 annually.

Big data and analytics. Processing tools are enabling real-time data stream analysis that provides dramatic improvement in problem solving and cost avoidance.

Smarter manufacturing may only have scratched the surface of the Internet of Everything, but sooner rather than later, the sector will leverage the age of the machines, and unlike James Cameron's Skynet (artificial intelligence run amok) in the Terminator movie series, that's a good thing.

Comments? E-mail mpowell@plant.ca.

» Automotive R&D



Head tribology researcher Stephen Veldhuis.

PHOTO: AUTO21

Advancing tribology Tuning up automotive tooling

BY STEPHEN VELDHUIS

Canadian automotive manufacturers are searching for ways to increase productivity and quality while reducing costs. Tooling represents a significant opportunity. Machines run at much higher speeds than traditional tooling can withstand, limiting which materials are processed and how quickly a part is made. Addressing this limitation would improve productivity with minimal investment.

Friction and wear directly impact the performance and life of tools, running up billions of dollars per year in worn parts and consumed energy. Tribology offers a solution to some of these tooling issues.

AUTO21 researchers are focusing on the engineering and testing of advanced surface treatments. So far, a range of forming and metal cutting tools have lasted two to three times longer under lab testing, and industrial testing under production conditions has further validated the results. Researchers are now looking to develop local sources for these surface treatments.

A key part of the research involves detailed study of manufacturing processes and worn tooling for a thorough understanding of chemical, thermal and physical wear. Once the root causes of wear are understood, researchers link the problems with suitable coatings or surface treatments that allow the tools to run longer and faster.

On its own, the cost of tools don't represent a lot of money (3% to 5% of a manufacturer's total operating budget) but they have a significant impact on other costs. For example, when a tool reaches the end of its life, the machine stops. A changeover involves resetting offsets and operating parameters. There's lost production time but this activity also triggers a lot of low value-added manual labour, an area in which Canada is not very competitive.

Advanced coatings also lower capital costs by getting more productivity from fewer machines and higher performing tools process materials with better mechanical properties. This is key for automotive companies introducing high strength, lightweight alloys and performance improvements to their vehicles.

There are environmental benefits, too. Coolants and lubricants used in manufacturing accumulate pollutants over time, which makes safe disposal time consuming and expensive. If liquid lubricants are used, companies pay to wash and dry the parts before shipping them. Advanced coatings reduce and sometimes eliminate the need for coolant and/or liquid lubricants by building lubricity into the tool's surface, and by making the tool less susceptible to thermal damage. Using less lubricant reduces the amount of materials to be disposed of.

AUTO21 researchers are currently working with local industries to transfer this technology into production, which will help automotive companies pursue opportunities in global markets.

Stephen Veldhuis is a professor at McMaster University and director of the McMaster Manufacturing Research Institute. He's also the lead researcher of AUTO21's Advanced Tribology for Products and Processes project. Visit www.auto21.ca.

» Engagement

An effective strategy starts with getting out from behind the desk and communicating with people directly.

BY JOE TERRETT, EDITOR

Since manufacturers are having so much difficulty finding people with the right skills to fill positions at all levels within their operations, having fully engaged employees is critical, but not just to reduce turnover cost.

Engagement also affects health and safety in plants, which brought Al Lutchin to the Partners in Prevention safety event (in April) presented by Workplace Safety and Prevention Services. The president and CEO of Career Compass Canada, a talent management and human resources firm based in Mississauga, Ont., was pretty engaging himself, running an interactive session for safety pros who came from a range of industries looking for tips on how to keep workers focused.

He led with some obvious benefits. Doing so reduces incidents and injuries, drives attention to detail and thought, engages conversation on hazards and solutions, increases performance and the quality of work, and promotes team work and care for others while creating a better sense of self-awareness and health.

And his first tip: “This is not us and them. It has to be ‘we’ for engagement to work.”

What is engagement? The workforce understands, supports and embraces the company’s mission, vision, goals and values; workers are keen to contribute to the success of the business; they build a culture of passion; they demonstrate innovation, solutions and service exceeding expectations; and they’re part of an environment that creates a personal sense of well-being, awareness, self esteem and confidence.

Yet survey results reported by *Benefits Canada* reveal more than half (56%) of companies worldwide find their engagement strategies are falling short of delivering bottom line results.

There are two drivers of engagement: compensation and the less visible characteristics of emotional intelligence, which include respect, being and feeling valued, communication, coaching to build relationships, recog-



Engagement reduces mishaps and injuries. PHOTO: THINKSTOCK/VSTOCK LLC

Working SAFE

HOW TO KEEP YOUR WORKFORCE FOCUSED

ognition, teamwork, fairness and trust.

Lutchin itemized a number of reasons why people leave their companies. Among them, a lack of empowerment; work overload; inadequate compensation; lousy managers; unclear goals and decision making; they’re not involved in decision making; favouritism; office politics; bullying; lack of recognition; lack of control; and being micro-managed.

An effective employee engagement strategy starts with communication, especially on the shop floor.

“Technology, as wonderful as it is, has created more isolation. We need to get out from behind the computer,” said Lutchin. “See what’s going on – good or bad. If there’s a problem on the floor, you want to hear about it first.”

One-on-one communication at a large company isn’t possible, but he said there’s a pathway through supervisors and managers (providing they are capable of conveying the the company’s mission, vision and values).

He emphasized the importance of trust and building it so people will come to you to share a problem. When engaging feedback, respect employees’ opinions.

More than managers

Leading by example, demonstrating fairness and rewarding performance are key. He stressed the importance of senior management thanking people or praising them for doing a good job.

And develop a coaching culture. This requires supervisors to be more than managers. They must be excellent communicators, demonstrate respect and sensitivity, adopt a non-threatening approach to issues and challenges, advocate fairness and demonstrate leadership through accountability and responsibility.

Generations Z, Y and X will respond differently than baby boomers, so integrating them will be key to engagement, retention, performance and productivity. Look at hard versus soft skills and hire for the right fit.

Aside from creating workplace harmony and balance, engagement reduces employee turnover, which is costly. The rule of thumb (according to the American Management Association) is an exiting employee costs 150% of his or her remuneration package and costs climb the higher up the management ladder you go.

As noted in the *Harvard Business Review*, a 5% increase in retention rates decreases costs 10% while increasing productivity 25% to 75%.

But Lutchin noted some other important pluses. Retaining employees protects intellectual property, ensures quality standards are met, reduces training time and disruption, keeps your company ahead of the competition by maintaining continuity, and builds customer relations with trust.

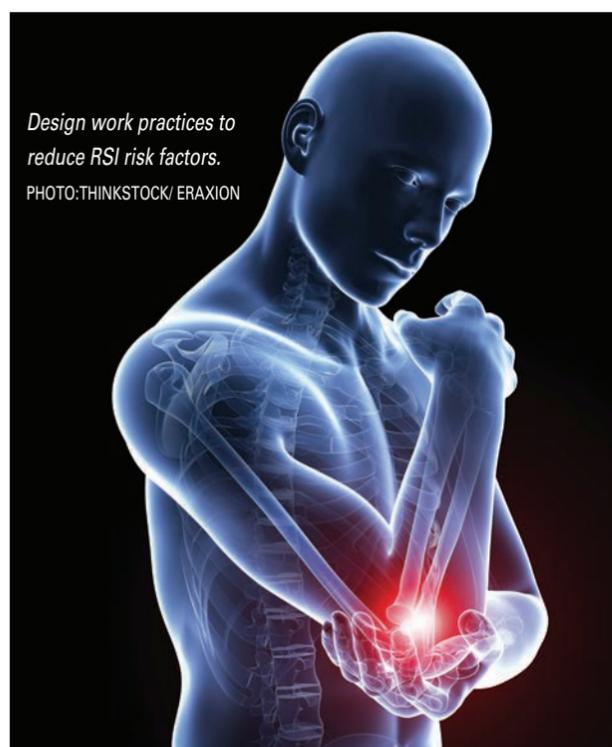
When it’s hard to find the right people, keeping the ones you have on the job is a smart strategy that works best when employees are engaged and focused on safety.

Comments? E-mail jterrett@plant.ca.

» CCOHS Safety Tips

Are RSIs slowing your workforce?

What you need to know about tendon disorders



Design work practices to reduce RSI risk factors. PHOTO: THINKSTOCK/ERAXION

Just as a well-oiled machine functions better than a rusty one, our bodies need smooth, healthy tendons to move freely and without friction. But some conditions in the workplace put workers at risk of developing repetitive strain injuries (RSIs) involving tendon disorders.

Tendinitis (also tendonitis) describes a condition in which the tendons become swollen. Tasks that are repetitive or performed for a long period of time; or that involve awkward or stationary postures, vibration and localized mechanical stress, fray tendon fibres. Injured tendons become thickened, bumpy and irregular. If they’re not given time to heal, they end up permanently weakened.

This disorder is common in the shoulder, especially among those doing jobs that involve overhead work, arm elevation and specific postures that include bending and elevating the arm.

Jobs that require repeated or forceful movements of the fingers, wrist and forearm cause tendinitis of the elbow (tennis elbow). It’s associated with simultaneous rotation of the forearm and bending of the wrist, stressful gripping of objects with inward or outward movement of the forearm, or jerky, throwing motions. Tendinitis of the hand and wrist is linked to tasks such as assembly line work, meat processing, manufacturing and typing.

Tenosynovitis, occurring in the palm side and back of the wrist and hand, is an inflammation of the sheath that produces a lubricating fluid for the tendon. Prolonged activities, forceful exertion, awkward and static posture, vibration and localized mechanical stress causes the sheath to produce less fluid or fluid with poor lubricating qualities. This creates friction that results in inflammation, swelling and other problems.

Tendon disorders rarely require surgery. The usual treatment is to avoid activities that cause or aggravate the disorders, or by applying pain relief such as non-steroidal anti-inflammatory drugs, ice or heat, friction massage, stretching and strengthening exercises, transcutaneous (through the skin) electrical nerve stimulation or ultrasound.

Prevention involves identifying and reducing the risk factors by designing work practices and equipment that minimizes repetitive movements, the need to use significant force, awkward postures and the amount of time a worker spends in one position. Workers should be encouraged to take rest breaks.

Ongoing, consistent training and education are also key for workers, managers and health and safety representatives.

Visit www.ccohs.ca/oshanswers/diseases/tendon_disorders.html for more information.

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.

» Efficiency Programs

Smarter ENERGY use

NRCan offers financial assistance for improvement projects

Natural Resources Canada (NRCan) provides resources to help incorporate energy management into best practices. This approach focuses on machinery and its maintenance, establishes procedures that ensure greater efficiency, and encourages the responsible use of resources.

NRCan has several programs in place to help your plant use energy smarter, but there's also funding available. Financial assistance flows through its ecoENERGY Efficiency for Industry program. It's directed at projects that improve industrial energy performance with assistance of up to 50% of eligible costs to a maximum of \$40,000.

ISO 50001 studies aim to support organizations that take a systematic approach to achieving continuous energy performance improvement. Funded projects require a final report detailing energy performance improvements and the measures undertaken to meet the standard, including energy baseline and performance targets, timelines for achievement of targets, monitoring and reporting procedures, as well as project implementation results.

Financial assistance is also available for process integration (PI) studies, which consist of a global energy analysis to determine the best use of heat in a facility. A site-wide approach employing an energy-mass balance and specialized tools (such as pinch analysis) helps improve energy efficiency and competitiveness.

Other eligible projects may include:

- development and dissemination of tools and information related to energy efficiency;
- development, organization and delivery of training;
- assessments, evaluations and benchmarking studies; and



NRCan funding is available for some ISO 50001 studies.

PHOTO:THINKSTOCK/ DMITRY KALINOVSKY

- development of technical guides and reports, implementation roadmaps, and best practices studies.
- Visit <http://nrcan.gc.ca/energy/>

[efficiency/industry/financial-assistance/5387](#).

Comments? E-mail jterrett@plant.ca.

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» Maintenance

Troubleshooting AIR-OIL systems

COMMON PROBLEMS AND HOW TO CORRECT THEM



Air flow means oil flow with this lube alternative for high-speed bearing applications.

BY STEVE GAHBAUER

Air-oil systems are a simple alternative to oil-mist lubrication for rolling element bearings, especially in high-speed applications.

In a technical paper on troubleshooting air-oil systems, Tim Fawcett, technical sales specialist for HASTEC Rebs Inc. in St. Catharines, Ont., described lubrication systems as simpler and cheaper than oil-mist systems because a precise volume of oil (that never changes state) is introduced to a turbulent air stream. It's carried along the inner wall of small-diameter tubing, relying on the wall adhesion effect. Wherever air goes, lubricant follows, coating components and there's no oil to drain.

The major components of an air-oil system are a main oil supply, satellite stations and air-oil distributors. The primary functions of the main oil supply (MOS) are oil filtering and storage, and oil pumping to the satellite stations. The satellite stations (SAT) provide oil flow dividing, air-oil mixing, and air-oil moni-

toring. Finally, at the air-oil distributors, the functions of turbolubes are a coarse division of air-oil from the satellite stations, a final division of air-oil flow to lube points and the provision of a system back-pressure control.

Typical system fault alarms involve MOS oil levels, air pressure at MOS and SAT, high or low oil and air flow.

Here are some problems and their fixes:

- **Nuisance air flow alarms.** They're usually caused by widely fluctuating plant air pressure or too high oil viscosity. Check plant compressors and oil viscosity. Use lower viscosity during winter months.
- **Oil stops flowing and backs up into the satellite stations.** The cause

is likely ongoing SAT air flow issues that have been ignored for a long time, or the system continues to run when equipment is shut down for a prolonged outage. Check for and correct low air flow, and shut the system down during outages.

- **Too much, too little or no oil in the bearings.** There are two possible causes: oil solenoid interval or cycles have been adjusted incorrectly; or the flow in and out of a turbolube distributor is blocked. Reset oil solenoid interval or cycles, and disassemble and clean defective turbolube distributors.

- **Low air flow resulting in hot or dry bearings.** This is caused by bearing seals that close under pressure, or when the flow in or out of a turbolube distributor is blocked. To remedy, correct

seal orientation. Disassemble and clean turbolube distributors.

- **Water ingress or contamination.** Causes include damaged, loose or worn bearing seals, or SAT air pressure is set too high, causing pumping action with frequent "burping." Repair or replace seals and lower SAT air pressure.

Following these practices will help prevent unscheduled machinery downtime.

This article is adapted from a presentation hosted by the Society of Tribologists and Lubrication Engineers in Hamilton. Steve Gahbauer is an engineer and freelance business writer. E-mail gahbauer@rogers.com.

Comments? E-mail jterrett@plant.ca.

» Tech Tip

Analyzing VFDs

How to read fault signatures and peaks

Analyzing equipment driven by variable frequency drives (VFDs) poses a real mystery for some.

There's no mystery. Fault signatures and peaks are the same as in a standard motor, although there are exceptions. Users of diagnostic technologies just need to broaden the way they think when checking the data.

Currents should be balanced within 7% because voltage must be balanced on the output of the drive. If there are voltage-related unbalances, evaluate the drive. If a current unbalance exists without a voltage unbalance, evaluate the motor and connections. Note the allowable current unbalance is meant for certain winding designs that



A Z1000 Bypass variable frequency drive from Yaskawa America Inc.

PHOTO: YASKAWA

are common in smaller (less than 250 hp) motors.

Expect very high harmonic content because of the type of voltage and current waveforms that exist. In most cases, this requires the application of filters or shaft brushes to avoid shaft currents.

Line frequency and speeds will vary from test to test, or even during the same test. Evaluating and confirming the line frequency and operating speed, either through the signature or separate readings, is important. Virtually all faults are related to one or the other.

Know the fault signatures and look past the electrical noise in higher frequency data analyses to identify the issues in the system.

Source: *Success By Design*, with permission.

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» Think Lean

Bombardier's quest for EXCELLENCE

Bombardier's Toronto plant, where it makes twin-engine aircraft, received an AME excellence award for continuous improvement. PHOTO: BOMBARDIER

HOW IT'S CULTIVATING A CI CULTURE

The Montreal aerospace company's Achieving Excellence System provides a roadmap that integrates world-class best practices.

BY MATT POWELL, ASSISTANT EDITOR

Bombardier Aerospace started its lean journey in 1997 when the transportation giant introduced Six Sigma practices into its operational model.

Nearly 20 years later, with 2013 revenues topping \$9.4 billion, more than 37,000 employees and a \$37.3 billion order backlog, it has developed those initial practices into the Achieving Excellence System (AES). This integrated management program fosters employee engagement through a continuous improvement roadmap that defines and integrates world-class best practices.

The system drives continuing advances and stable processes achieved by creating a culture of continuous improvement from the bottom to the top.

"We now know how to measure what we do, and where we need to improve every day, every week and every month," said Gordon Castle, a Bombardier AES manager during a session presented at the Association for Manufacturing Excellence's (AME) Measure Up for Success event May 6-8 in Mississauga, Ont.

AES is based on lean principles and driven by continuous learning through a plan-do-check-act (PDCA) cycle. Its success depends on involving employees in process strategy development.

It's made up of five stages, starting with Bronze, which means the company is working to build a foundation through developing employee awareness of its enterprise strategy, introducing lean principles such as 5S, and developing a strategic baseline. The pyramid peaks at Diamond, with the company operating in a daily continuous improvement mode and embracing global best practices as outlined in the enterprise strategy.

Castle, who has been working with the Bombardier system for four years, said the company has reached Gold and is now deploying a focus on common

behaviours and tools, which includes a PDCA approach to problem solving and the use of balanced scorecards.

Balanced scorecards, a central component to AES, help translate strategy into action and provide a series of key performance indicators for uncovering deviations from planned objectives.

By using the scorecards, the program engages employees and focuses the organization on operational levels that include: safety, quality, productivity, human development, cost and AES deployment.

Key to the program's success is Xcell, an enabler award system that encourages employees to initiate and imple-

ment their own solutions to challenges in day-to-day work.

"We've created an army of problem solvers by developing the capability within our team. It's not a suggestion box – we want to engage employees at all levels to initiate the idea. It's about empowerment," said Castle.

Achieving Excellence managers like Castle also spent a lot of time with management to coach them on how not to turn down an idea.

"We want to harness the energy from the idea and turn it into something tangible."

In 2013, more than 69,700 Xcells were implemented thanks to an 86% participation rate from Bombardier Aerospace employees, due in large part to the focus on coaching.

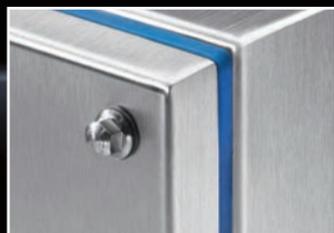
Bombardier's efforts have been noticed and recognized. In October its Toronto facility, where twin-engine turboprop airliners and Global Express business jets are manufactured, was presented with the AME Manufacturing Excellence Award for continuous improvement and enterprise excellence. More importantly, fostering employee engagement to drive continuous improvement is proving to be very good for business.

Comments? E-mail mpowell@plant.ca.



LEAN ALERT

If you're a lean beginner, the Lean Institute recommends limiting the scope of your initial project. You'll need a "deeply" knowledgeable leader and a "gemba" attitude (base your thinking on a close observation of the work), and never relax your efforts. Each lean victory uncovers new problems and bigger challenges. Visit www.lean.org.



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A CLEANER burn

DURHAM-YORK'S ALTERNATIVE TO LANDFILLS

A regional energy centre will process 140,000 tonnes of solid waste and create enough renewable energy to power 10,000 homes.

BY PLANT STAFF

A Michigan landfill will no longer be the final resting place for most non-recyclable municipal waste from Ontario's Durham and York regions.

This fall, the \$284 million Durham-York Energy Centre will be commissioned, an energy-from-waste (EfW) facility that will process 140,000 tonnes of post-diversion residual waste in Clarington, Ont.

The facility will use thermal mass technology to burn household waste that isn't recycled, but the process also produces high-pressure steam, which is fed through a turbine generator to power the plant.

Durham and York Region will co-own the EfW facility and Covanta Energy Corp., a New Jersey-based operator of energy from waste projects, will manage it on a 20-year design-build-operate contract. Covanta anticipated the creation of nearly 700 direct and indirect jobs during construction and more than 40 permanent plant operator positions when the facility comes online.

Thermal mass burn technology involves feeding municipal solid waste into a furnace where it's burned at temperatures above 1,000 degrees C. The remaining ash is shipped to landfill or reused in product manufacturing.

Durham will process up to 110,000 tonnes each year and York will handle the remaining 30,000 tonnes.

Here is how the process will work: when trucks arrive at the facility, garbage is dumped into a pit, where two crane grapples operated from a nearby control room, stir then feed it into one of two combustion chambers, where the trash generated by more than 500,000 people will be reduced to ash in about an hour.

Meanwhile, heat from the combustion chambers boils water in surrounding pipes to create steam, driving a GE turbine-driven generator to create 17.5 megawatts of renewable energy annually. Excess energy will be sold to the provincial power grid under a power-purchase agreement with the Ontario Power Authority. The electricity will go through Hydro One's 44-kilovolt distribution system at the Wilson Transfer Station to power up to 10,000 homes, helping to offset the facility's operating costs.

A planned district heating system will also produce heat equivalent to the needs of 2,200 homes.

After the combustion process, heavy ash falls into a recovery area where



The Durham-York Energy Centre under construction; and a 3D rendering of the finished project, to begin operations in the fall. PHOTOS: YORK REGION



it's picked through for leftover metals, which are sorted and sold.

Gas and fly ash are fed through a system that injects lime to reduce acidity and carbon to bind with heavy metals such as mercury. In the bag house, the gas is forced through fabric filters that capture particulates before the clean exhaust exits the stack. Remaining ash, which is about 70% less material by weight and 90% less by volume, is sent to landfill and used as cover rather than newly mined gravel, but it can also be used as filler in construction materials such as concrete or asphalt.

The energy centre hasn't been well received by all. At a ground-breaking ceremony in 2011, protesters had to be restrained by police, arguing the energy-to-waste plant was a glorified incinerator and that its emissions pose health hazards, create an ongoing demand for waste, discourage recycling, and they're incredibly expensive.

But the regions, as well as Covanta Energy, are adamant the energy centre will meet stringent environmental standards

and reduce greenhouse gas emissions. It's equipped with a state-of-the-art advanced air pollution control system that includes a selective non-catalytic reduction (SNCR) system to reduce nitrogen oxide (NOx) emissions.

Lacking landfill space

The plant is part of an ongoing trend of energy-from-waste facilities popping up across North America where growing residential development lacks landfill space. There are more than 85 EfW facilities in operation in the US alone, and on the West Coast, Covanta's Burnaby Waste-to-Energy facility (commissioned in 1988) processes 285,000 tonnes of solid waste that's converted into 940,000 tonnes of steam to produce up to 170,000 megawatt-hours of electricity for Metro Vancouver.

The project is funded by \$213 million in federal Gas Tax funds, which have been used to pay back a loan needed for construction. The fund is one of the only permanent sources of funding for municipal infrastructure, and provides Ontario with \$744 million per year. The City of London also used gas tax funds to build its Regional Materials Recovery Facility.

Commissioning the facility has been a long journey that started in 1999 when Durham decided it wouldn't develop any new landfill sites. Fifteen years later, the region has an alternative that's a lot closer to home than sending waste on a long trek down the 401 to Michigan.

Comments? E-mail jterrett@plant.ca.

» Biomaterials

Tomato, tom-auto

Ford and Heinz form an unusual collaboration

BY PLANT STAFF

You may think the Ford Motor Co. and the H.J. Heinz Co. have little in common business-wise, but they have found a good reason to work together thanks to the garden-variety tomato.

They have developed a sustainable composite from repurposed tomato skins that Ford wants to use to reduce its dependence on petrochemical-based plastics in its cars.

This collaboration has been in the works since 2012, with Heinz and Ford validating the material's durability for use in wiring brackets and storage bins.

"We are exploring whether this food processing by-product makes sense for an automotive application," says Ellen Lee, plastics research technical specialist for Ford. "Our goal is to develop a strong, lightweight material that meets our vehicle requirements, while at the same time reducing our overall environmental impact."

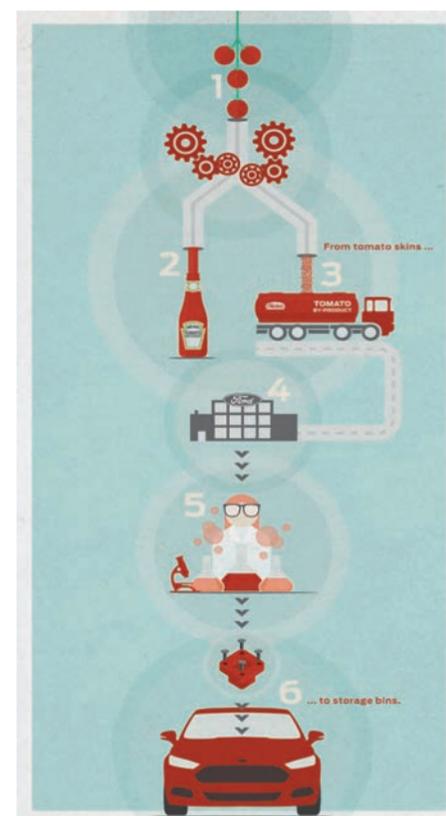
In recent years, Ford has increased its use

of recycled non-metal and bio-based materials, such as cellulose fibre-reinforced console components and rice hull-filled electrical cowl brackets. The bio-based portfolio now includes eight materials in production including coconut-based composite materials, recycled cotton material for carpeting and seat fabrics, and soy foam seat cushions and head restraints.

The Ford and Heinz partnership is part of an effort that includes other companies such as Coca-Cola, Nike Inc. and Procter & Gamble to accelerate development of a 100% plant-based plastic for making everything from fabric to packaging with a lesser environmental impact than petroleum-based materials.

Heinz researchers, looking for innovative ways to recycle and repurpose peels, stems and seeds from the more than 2 million tons of tomatoes the company uses annually to produce its famous ketchup, are delighted the technology has been validated.

"We're in the very early stages of research, and many questions remain, but we're excited about the possibilities this could produce,"



From repurposed tomato skins to wiring brackets and storage bins. PHOTO: FORD

said Vidhu Nagpal, associate director, packaging R&D for Heinz.

You say tomato. They say tom-auto.

Argus Industries – Journey into Kaizen

Kaizen – translated loosely from the Japanese it means “good change.” Masaaki Imai, founder of the Japan-based Kaizen Institute, defined kaizen as: “...continuous improvement in the personal life, home life, social life and working life.” Even more profoundly, Imai taught that kaizen was a “...state of mind that encourages everyone to consider it unusual when conditions do not continuously evolve.”

The Company

Argus Industries opened in 1962 as a distributor of portable toilets. Today, headquartered in Winnipeg, Manitoba and over 80 employees, Argus is a mid-sized custom manufacturer. Its offerings comprise rubber molded products and custom die cut gasket seals.

In 2009, Argus’s CEO chair was assumed by Michael Easton, the company’s former VP, Production. Easton, who had already implemented lean practices on the shop floor, now championed the adoption of lean across the entire company.

Complementary to his drive for lean manufacturing standards, CEO Michael Easton championed a profound change of corporate culture at Argus Industries. By flipping the standard org chart upside-down, he created a culture in which lean and kaizen are likely to thrive. “Think of Argus as a tree,” says Easton. “If you invert the org chart, the CEO isn’t at the top anymore, he’s at the bottom of the tree where the roots are. It’s my job to protect those roots and to provide nutrients for the entire company. Practically speaking, I support the VPs, who in turn support the managers, who support the workers at the top of the tree. Those are the people who touch the fruit – our products – and who reach out to our customers. It’s the people on the shop floor punching out the gaskets who are making what the customer really wants. They’re the experts, and the rest of us are here to support them. That’s the core foundation of our company – our tribe. We are, at heart, a service culture.”

The Challenge

In line with Easton’s drive for lean, VP Finance Leslie Galbraith, who has been with Argus since 1998, began to take a deeper look at the company’s enterprise resource planning (ERP) software.

In 2010 Galbraith attended a SYSPRO conference in Dallas. “I began to understand the real strengths of ERP and what it could do for us. We had already invested a good deal of time and energy in moving the production floor to lean, and I was certain there was a lot we could do for the front office people, as well.”

The Strategy

Argus’s executive team decided to start investing in ERP, and in June, 2012, the company upgraded to SYSPRO 6.1. “When we flipped the switch,” says Galbraith, “we saw some of our pains disappear. The following weekend SYSPRO guru Ajay Saxena arrived from Ontario to spend a week with Argus, living and breathing our processes. Ajay came up with some potential opportunities for improvement.

From that our kaizen event was born.” A kaizen event is an extremely focused short-term project, often orchestrated by a consultant, that aims to improve one or more business processes. Argus’s event was five days long.

“We had to learn best practices,” says Galbraith, “but we also needed to find out what we wanted our ERP to do, and to see if our hopes and dreams were viable. The event comprised a full evaluation of our supply chain process, from order entry to fulfillment.”

In order to let the kaizen team focus on what they were doing, adds Galbraith, the rest of the organization had to respect the time it was spending away from the daily functioning of the company. “We had support and participation from all corners and levels of the organization, and the fact that the voices for change started at the senior level made it that much easier.”

The Result

“With Ajay’s help,” says kaizen team member and Process Unit Leader Mario Vechina, “we were able to automate processes that used to eat up a great deal of our time. One of the biggest gains for my department was to auto-generate the Job Card and have it linked to Sales Orders. That lets us automatically attach production drawings to the backside of the Job Card. A 45-line PO that might have taken 3.5 hours to prepare the old way now only takes 30 to 45 minutes.”

Vechina is also appreciative of SYSPRO’s advanced trial kitting. “We now enter a single finished part number or a list of finished part numbers, run the advanced trial kit, and it lets us know if we have any material shortages. Before I get back to a customer on delivery dates I know exactly what inventory is in stock. The old way was horrible – we had to type in the raw-material part numbers individually to make sure we had enough. Advanced trial kitting has created a huge benefit on the customer service side.”

Kaizen does more than improve productivity. It also eliminates unnecessarily hard work, teaches people how to spot and eliminate wasteful processes, and humanizes the workplace.

“The benefits we reaped were amazing,” says Galbraith. “A lot of changes came out of our kaizen event that resulted in enormous payback in terms of customer satisfaction, employee satisfaction and employee engagement.”

For more information about Argus Industries please visit their website, www.argusindustries.ca.

ERP Support for Lean: The When, Why and How.

“We had to learn best practices, but we also needed to find out what we wanted our ERP to do, and to see if our hopes and dreams were viable.”

Leslie Galbraith
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“The benefits we reaped were amazing. A lot of changes came out of our kaizen event that resulted in enormous payback in terms of customer satisfaction, employee satisfaction and employee engagement.”

Leslie Galbraith, VP Finance, Argus Industries

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» Exporting

A new government promises to get the economy moving and create opportunities for Canadian businesses.

BY MARK DRAKE

French President Charles de Gaulle famously wondered how he could run a country that made 246 different cheeses. He would have found India much harder to run. It has 22 national languages, 844 dialects, six major ethnic/religious groupings and a population of 1.2 billion.

The national election in May saw the BJ party under Hindu nationalist Narendra Modi oust the rather tired Congress party with a promise to get the economy moving again.

It badly needs to happen. An impressive boom followed the 1991 deregulation, and although India weathered the 2008 financial crisis fairly well, growth has slipped recently bottoming out at 4.5%.

Asia's third largest economy has the potential to grow much more rapidly. Recent optimistic government forecasts pre-suppose that the country will be able to rise to its many challenges, not the least of which is the upgrading of its infrastructure, encouraging more foreign investment and above all, providing job opportunities for the 50% of the population under 35, despite a sclerotic bureaucracy and the ever-present impact of corruption.

India is a land of sharp contrasts: massive wealth next to extreme poverty, highly modern industrial operations next to medieval agriculture, great opportunities alongside major challenges. While not for the faint-hearted, the market is hugely worthwhile for Canadian businesses to explore.

Drive in any major town and traffic congestion overwhelms – there are bottlenecks everywhere (Google Indian traffic). That's why India is investing



A MARKET WORTH EXPLORING

between \$500 billion and \$750 billion over the next five years in essential infrastructure: roads, railways, seaports, electricity generation (natural gas rather than coal or imported oil), and metro systems in major towns. Twenty five per cent of urban residents live in slums and they desperately need water treatment technology with improved sanitation. Canadians have the technology for all this, and for oil and gas exploration, which India has yet to widely develop.

The Indian rupee slipped badly earlier this year, but has recovered somewhat and is expected to be stronger moving into 2015. Inflation is on the high side at 9.48% (2013), and while India's overall GDP is greater than Canada's at \$1,925 billion, on a per capita basis it's only \$1,548 (\$53,518 in Canada).

Reciprocal trade is roughly equal at \$2.8 billion each way, but foreign direct investment (FDI) is very much in India's favour with \$3.7 billion invested in Canada. Canadian investment in India is

\$600 million.

Part of that discrepancy is no doubt due to the challenges of starting up a business in that country. The World Bank ranks India only 134 out of 189 countries in "ease of doing business." When it comes to starting up operations, it's at 179 and in dealing with construction permits it's way down the list at 182.

Open for FDI

Transparency International's Bribery Perceptions Index puts India at # 94/177 with a score of 36 (0 is very corrupt and 100 is clean).

It's not all bad, though. Most industrial sectors are open to foreign investment. There are special economic zones (SEZ) with tax and other advantages. Canada and India have negotiated a taxation treaty (to avoid double taxation) and the country is considered "reasonably safe" for intellectual property protection. There are many Canadian companies with operations in India (see www.international.gc.ca).

Options for start-ups include the subsidiary company, registered office, branch office, project office or a joint venture, with different rules for each. Local legal advice is recommended, and above all, choose a local partner carefully.

There have so far been eight rounds of negotiations on a Canada-India Comprehensive Economic Partnership Agreement (CEPA,) and the Canadian government suggests that the following sectors present opportunities: automobiles (particularly components); telecommunications (especially wireless, with 10 million new users signing up each month); oil and gas exploration (India currently imports 40% of its needs); transport (rail, metro); energy; medical devices and services; environment related technologies; ICT; education; and business services.

For a detailed view of the challenges and opportunities, take a look at Export Development Canada's 58-page publication, *Doing Business in India*. Download it at www.edc.ca. Listed in the appendices are Canadian contact points in India, useful organizations such as the Canada India Business Association (www.canada-indiabusiness.ca) and the Confederation of Indian Industry.

Some cultural points to remember: the "Namaste" greeting, with hands pressed together below the chin is safer than an initial handshake, especially with ladies.

Indians want to build trust with you before doing business. As with most Asian countries, patience is counselled, and gift giving should be restricted to flowers, chocolates or Indian sweets to avoid giving accidental offence.

Let's hope the new prime minister can handle the challenge that is India! Just imagine what the country would achieve if it gets its act together.

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

Comments? E-mail jterrett@plant.ca.

» Finance

Looking for capital?

There's money to invest, some of it from "angels"

BY MARK BORKOWSKI

Having difficulty securing capital for much needed investment in your plant? Believe it or not, there is money for companies with well thought-out business plans, and especially for people who put their own net worth on the line.

There are three primary sources of capital and a fourth that's becoming useful for small to mid-market private companies.

The first is from owners. Internal equity capital comes from shareholders and business profits.

Lenders are a second common source. Loans depend on the state of a company's balance sheet and income statement. Money from financial institutions is secured by accounts receivable and inventory.

A third, more common source of capital is arranged through trade credit with suppliers.

A fourth and less publicized method comes from an angel investor (also known as a business angel, informal investor or



angel funder). This affluent individual provides capital for business start-ups, usually in exchange for convertible debt ownership equity.

A small but growing number of angel investors organize themselves into groups or networks to share research, pool investment capital and provide advice to their portfolio companies.

There are more than 30 of these groups in Canada, many of them members of the non-profit National Angel Capital Organization (NACO). It provides angel investors with a network of peers and includes a useful membership list that companies seeking funds can reference.

NACO notes on its web site (<http://nacocanada.com>) that the

OECD estimates angels invest between \$500 million and \$1-billion annually in Canada's growth-oriented companies.

Traditional lenders are fairly rigid about terms of financing and as a result of the recent credit crunch, there are few tangible assets left to use as collateral. The deciding factor becomes the willingness of an owner to share the business. Where control is a priority, debt leveraging becomes the single outlet for financing company objectives. It should be noted, however, that in today's economy, highly leveraged companies carry a heavy burden of risk.

The burden of risk appears in two principle categories. Senior debt, generally the least restrictive, depends on the company having a strong asset base value. Subordinate debt is a type of capital that's usually unsecured or ranks behind the security position of the senior debt lenders.

Using non-traditional lenders, including equity partners, is a more conservative and risk-averse method of raising capital, but there's a trade-off in terms of control. Equity partners may not require the leveraging of assets but those injecting significant capital will likely want a seat at the management table.

Mark Borkowski is president of Toronto-based Mercantile Mergers & Acquisitions Corp., which specializes in the sale of privately held companies. Visit mercantilemergersacquisitions.com.

» Venture Capital

Blair Beattie got all of CBC's Dragons to bite, but their offer didn't have enough firepower so he's building his workwear business solo.

BY MATT POWELL, ASSISTANT EDITOR

Blair Beattie did two things very few people appearing on CBC's Dragons' Den have done.

Not only did his pitch attract an offer from all five dragons, he also turned them down.

Beattie is the owner of Jerseyville, Ont.-based Meshwear Technologies Inc., a producer of convertible ventilated workpants and workwear. Appearing on the show in March, he sought a \$500,000 investment for a 25% equity stake in his Coolworks convertible vented workwear. The ask valued the company at \$2 million, which had just come out of 2012 with sales of \$1 million and revenues for 2013 expected to top \$1.8 million. Margins were about 35%.

All the dragons bit. Serial investors and famed Canadian entrepreneurs Arlene Dickinson, Bruce Croxon, Jim Treiving, David Chilton and Kevin O'Leary countered with an offer of \$500,000 for a 33% equity stake, plus a 5% royalty until they recouped half their investment.

In the interest of full disclosure, he accepted the deal on air. But when it came time for due diligence, Beattie backed out, unhappy with the valuation the Dragons' offer placed on his company. A 2.5% breakout that amounted to \$12,500 also didn't sit well.

"The TV show is a TV show, and it's not how any business deal would ever really happen. When you get down to doing the things you need to do, a lot can go off the rails," says Beattie, who leads a team of four working out of a 7,500 square-foot office and warehousing facility.

But he has no regrets about the appearance.

"A lot of people that had never heard of us know who we are now, and there's a lot of value in that."

During his Dragons' Den experience, he was also in talks with a couple of other entities that were interested in partnering. Beattie's ultimate goal is to break into the US market, where he says there's major opportunity in places such as the Texas oil patch and on drilling rigs in the Gulf of Mexico where heat stress is an ongoing issue for workers.

The company's line of vented pants, high visibility t-shirts, sweatshirts and coats are now in 800 stores across Canada, including Mark's Work Wearhouse. Manufacturing is done in China, a decision that Beattie says was because of the price-driven workwear market.

Unlike many of the companies that appear on Dragons' Den, Meshwear actually drummed up a lot of business before appearing on the show. Enough to be comfortable making its next step – conquering the workwear and rental-wash markets in the US.

"Going through a distribution model made the most sense to get sourcing costs as low as possible," he says, adding between 80,000 to 100,000 pieces would be needed to meet his \$1.8 million sales target last year.

His experience on Dragons' Den also speaks volumes to the lengths Canadian entrepreneurs have to go to secure financing for growth.

"To secure the capital we need to get into the US, giving up an equity stake is the best way for us," he says, now that he has maxed out his opportunities

Taming the DRAGONS

WHY MESHWEAR TURNED DOWN A \$500,000 OFFER



Blair Beattie shows off Meshwear's Coolworks vented workpants at the company's headquarters in Jerseyville, Ont.

PHOTO: MESHWEAR TECHNOLOGIES

with the banks and Business Development Bank of Canada (BDC).

"It's tough for a startup to get off the ground, let alone get the kind of capital you need to fund growth, and the banks in Canada aren't typically the place to go."

Beating the heat

The Meshwear idea was developed about 10 years ago by a friend of Beattie's who worked on a production line at a steel processing plant in Dundas, Ont. He was looking for an alternative to work pants he could wear on the factory floor in the summer months because safety rules prohibited wearing shorts. With his mother tagging along, Beattie's buddy made a quick trip to a

fabric store for some mesh material and made another stop for a pair of swim trunks. A few hours later, they had a prototype. Management at the plant approved the pants.

"After his buddies stopped laughing, they wanted a pair," says Beattie, which is when the two friends teamed up to investigate a patent.

Two and a half years later, Beattie and his partner walked out of the US patent office, lawyer in tow, with the patent for their vented pants. They reached out to a Toronto company specializing in the Scotchlite reflective business, but it didn't work out. They were going to have a go at it themselves, but during the process had different ideas about the direction the company should go. Beattie ended up paying almost \$900,000 to acquire the patent from his former partner.

It's been an eight-year journey for Beattie, but that patent has turned into a significant competitive advantage as Meshwear moves to enter the US. It opens up a number of options for Beattie. The difficulty is determining how marketable it is outside of the workwear market, but there could be an opportunity in licensing.

"The patent is at the core of what we're trying to do, and licensing it

is by far the strongest approach to pursue, especially in markets outside workwear," he says.

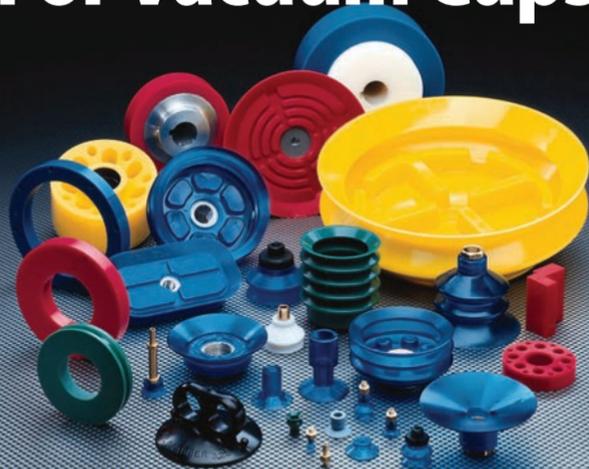
Beattie is still searching for a partner in the US, and is reaching out to companies Meshwear could align itself with, or other private investment enterprises.

"I believe there's opportunity with a strategic partner in the US, not only for the experience, but to shorten the time it would take to get any market penetration through existing infrastructure instead of trying to build it from ground zero."

For Beattie, it's not always about teaming with the biggest partners in the game, but finding the right ones.

Comments? E-mail mpowell@plant.ca.

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» M&A

Canadian SMEs need to learn about financing alternatives for buying and selling.

BY JOE TERRETT, EDITOR

Mergers and acquisitions (M&As) are on the rise globally – especially between the most progressive, fastest growing and most agile companies – as a way to boost their businesses, according to research from the Grant Thornton International Business Report. But there are some potentially serious ramifications for the Canadian economy as baby-boomer owners cash in and M&A activity in the US heats up.

The report, which draws from interviews of 12,500 senior executives worldwide, shows 40% of the Canadian businesses surveyed plan to grow through M&As in the next three years, compared to 38% last year. Planned M&A activity in the US has really picked up the pace at 48%, up 11% from last year. Both are well above the global average of 31%.

In terms of taking action, 39% of businesses confirm they've seriously considered at least one acquisition over the past 12 months. Canada is above the average at 45% but behind the US at 55%.

When asked where the acquisitions will

Business for SALE

WATCH FOR A PARADIGM SHIFT AS BOOMERS RETIRE



numbers should be watched closely.

“According to economic forecast numbers released last year, 20% of Canadian businesses are owned by those 55 and over, and in the coming five years, nearly \$2 trillion in business assets are poised to change hands, significantly increasing the liquidity in the Canadian market.”

An increasing number of US and global private equity firms are entering Canada. He says if their acquisitions continue at an increasing rate and (all levels of) government don't enhance their current programs, “we could see a re-shaping of the economic landscape that lasts into the next generation. Loss of businesses could also have devastating regional impacts.”

Pocock notes it's much harder to raise \$2 million than it is to raise \$100 million, and it takes just as much effort. Therein lies the difficulty for SME owners looking for an exit.

“There's not nearly as much money chasing small businesses, which is where the nuts and bolts of the Canadian economy really is. My fear is if they start to sell to non-Canadian investors, management might leave Canada, head offices might move somewhere else, or plant rationalization might occur. I think there could be a paradigm shift if we don't keep [SMEs] Canadian owned.”

Although he acknowledges governments have programs to facilitate some of these kinds of transactions, he says they need to do more. For example, a manufacturing company worth \$10 million looking at a management-led buyout by a general manager may need a few million dollars, but small equity financing is hard to find in Canada. Pocock would like to see governments step up in some way to help facilitate the financing with other options.

“When you look out a few years, I see that 74-year-old owner who doesn't know what to do with the business so one alternative is to just turn it off, which means he has to let his 30 employees go. We need to educate business owners across Canada there are alternatives.”

Comments? E-mail jterrett@plant.ca.

In the next five years, nearly \$2 trillion in business assets will change hands.

PHOTO: THINKSTOCK

take place, 84% of Canadian executives cite domestic buys while only 27% identify cross-border deals. In the US, 91% expect to grow through domestic acquisition and 51% through cross-border activity.

Changing hands

Jeff Pocock, national leader of Grant Thornton LLP's private equity practice in Canada, says a large proportion of privately held businesses are looking to transact in the next five years, “consistent with the growing demographics of succession-based businesses,” and he warns the

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» Manufacturing

Set the record straight

Engage your community during Manufacturing Month

Manufacturing: it's not like it was in Granpa's day.

That's the message Canadian Manufacturers & Exporters (CME) is delivering during October, otherwise known as Manufacturing Month.

There's a long-standing impression that manufacturing is 4D: dirty, depressing, declining and dangerous. Manufacturing Month will help change that impression and point out that making things in a plant isn't boring, either. It's high tech, skilled and the pay is pretty good (see below). Indeed, the CME offers the following stats for you to share with the unenlightened:

- Manufacturing is a \$590 billion affair.
- It employs 1.7 million Canadians.
- It accounts for 62% of exports.
- Its share of national employment is 10%
- It's responsible for 11% of GDP.
- Average weekly pay is \$1,020.

CME is kicking off the month on Parliament Hill in Ottawa on Oct. 7. Events will follow across Canada and manufacturers are encouraged to engage the public, politicians and young people with outreach efforts such as plant tours (how to kits have been developed for each province). There are also micro-sites: www.mfgmonth.ca and www.moisdumanufacturier.ca to provide stats, success stories and event information.

Take advantage of Manufacturing Month to set the record straight.

C I E N

CANADIAN INDUSTRIAL EQUIPMENT NEWS

» Machine Guarding



SAFETY systems up to DATE?

IMPROVE PROTECTION FROM MOVING MACHINERY

Upgrade systems to provide a safer workplace without impeding production and hurting your business.

BY RALPH BALBAA

Guarding keeps workers safe from moving machinery, yet as standards and systems changed, many plants lagged in the maintenance and upgrading of their safety systems.

It's the employer's legal responsibility to make every reasonable effort to ensure machine guards are in place, they function as intended and they're used according to established procedures.

Machine guarding requirements are more stringent than they were in the past. They focus on preventing access to hazards through elimination, design

and engineered controls. There's much less reliance on workers' common sense and more emphasis on reliability and continuous functioning. Changes of note to systems and standards include:

- Processes for the evaluation of risks to the worker are detailed and alternate options for solutions are outlined and ranked in CSA Standard Z432-04 – Safeguarding of Machinery.
- Standards for electrical control integrity/reliability such as ISO 13849-1 and EN 62061 have been revised to lead to the type of electrical control system likely to deal safely with the level of risk identified.
- Safety rated control components are more available, reliable, adaptable and affordable.

There are many innovative ways plants have successfully updated their machine guarding without affecting productivity.

A manufacturer of high voltage instrument transformers, bushings and coil

Newer machine guarding requirements emphasize reliability and continuous functioning.

PHOTO: THINKSTOCK

products was challenged by limited space in its Toronto facility. Reactors were being tested at high voltages in an area frequently used as an aisle. Procedural measures were taken but the residual risk was still considered unacceptable.

The plant owner considered using a physical barrier to protect staff but that would have limited and interfered with the movement of product within and near the testing area. That would have impeded production.

The speed and operation of lift trucks operating in the vicinity, the length of the tow motor forks, foot traffic, the height and size of the product and the speed at which the hazard could be stopped all had to be considered.

The solution involved a combination of light curtains, warning lights and markings. Physical barriers were used to provide the needed protection and to avoid accidental disruption to the testing. Production was not affected.

At a Mississauga, Ont. plant that produced roll-formed steel products, rollout tables were posing a safety problem. There was a shear hazard created between material and the rollers that created a risk to the operator who had to quickly remove lengths of thin steel from the conveyor.

The company solved the problem with sloped sheet metal inserts that eliminated the shear hazard and allowed the operator to get hands under the panels. The safety issue was addressed without reducing the speed products were removed from the roll.

A Toronto packaging plant built in the

Continued on page 22

» Supply Lines



KBC's team at its Mississauga headquarters.

PHOTO: KBC

25 YEARS FOR KBC IN CANADA

KBC Tools and Machinery has been around for almost 50 years. But the family-owned machine tool maker founded in 1965 by Karel Bass out of a Detroit shop, is also celebrating another anniversary: 25 years in Canada.

To develop a more direct relationship with Canadian customers, KBC set up its Canadian headquarters in Mississauga, Ont., with branches in Windsor, Ont. and Delta, BC, each with showrooms and stocking warehouses.

The company's actual anniversary date is Sept. 18. As part of the celebration, any KBC order placed in Canada on that date included maple cookies, a special edition KBC Canada T-Shirt, discounts, and a chance to win \$500 worth of KBC Tools.

\$5.3M AUTOMATION DEAL

Rockwell Automation has won a \$5.3 million order from LSB Industries Inc. to serve as the chemical and HVAC product manufacturer's main automation contractor.

Rockwell, an industrial automation company based in Milwaukee, Wis., will provide a \$3.5 million PlantPax process automation system with electrical, controls and instrumentation services, and a \$1.8 million ethernet motor control system.

The systems will be installed at LSB's nitric acid and ammonia plants currently being constructed at its El Dorado, Ark. facility.

CANADIAN GARLOCK SALES BOOSTED

Timken Canada is re-launching a partnership with Garlock Sealing Technologies (an EnPro Industries company) to more aggressively pursue sales of their oil seal and bearing isolator products.

Timken, a US manufacturer of power transmission products with offices in Mississauga, Ont., has been selling Garlock products since 2006, but now has an extensive domestic inventory of seals and isolators, supported by Garlock's manufacturing base in Palmyra, NY.

Safer guards

Continued from page 21

1970s had made various improvements over the years, but its equipment needed safety upgrades.

Machine drawings and electrical diagrams were not available, and areas on the line required different approaches to improve safety. One area needing attention was the coating application section of the packaging line. Since orders requiring the coating were difficult to predict, meeting production targets throughout the upgrading was essential.

There were a number of components that presented risks to workers. Conveyor chains and other moving parts weren't guarded sufficiently to reduce risk of injury, and safeguards for workers that required frequent access to the machine weren't adequate.

Necessary action

Upgrades included access doors that opened in two parts. This allowed access through the top to prod sticky product but not through the bottom (where there were hazards).

New safety certified electrical controls were also installed to remove power from the process controls used to start machinery that could be hazardous when operators needed access to certain areas.

The main safety panel was pre-assembled off site and electrical installation was complete in three days.

Upgrades were organized and timed around the plant's production schedule allowing the machine to be used up to the first day of the install. This approach also got the plant back into production by the afternoon of the third day.

Careful consideration of workflow and changeovers went into the design of the mechanical guarding so it wouldn't impede the efficiency of the process once changes were made.

Production requirements were met and productivity was not hindered during the installation of the safety upgrades – important deliverables for all the plant projects cited.

Employee safety must always be a plant's first priority. Overlooking procedural shortcuts and hazards that "have always been there" can result in serious injury or death. Upgrading safety systems seems daunting, but done with the right team and a bit of innovative thinking, they can be done while addressing all the key business priorities.

Ralph Balbaa is president of HITE Engineering, a Mississauga, Ont.-based consulting firm specializing in industrial and construction safety. He has more than 40 years of engineering experience and is a former Ontario Ministry of Labour consultant. Visit www.hite.ca.

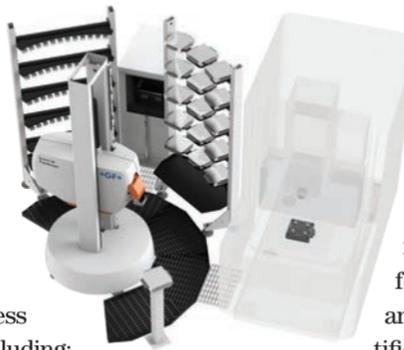
Comments? E-mail jterrett@plant.ca.

Automation

SYSTEM 3R SIMPLIFIES CELL INTEGRATION

GF Machining Solutions' modular automation System 3R TRANSFORMER integrates with a variety of technologies for incorporation into production systems with existing tooling systems. The system expands to include up to 12 machines within the cell.

TRANSFORMER accommodates machining technologies and components from different manufacturers. Additional in-process accessories easily integrate into the cell, including: a multiple loading station that can be used without stopping production; a draining station for emptying workpiece cavities after machining processes; a washing machine to clean workpieces; and a coordinate measuring machine for pre-setting and/or part inspection.



Accommodates up to 12 machines.

All production data is entered or imported through a data exchange interface for major enterprise resource planning (ERP) systems. The management software then controls every aspect of the cell, from automatically loading jobs to machines to recording and monitoring cycle times for each job. The core of the system is an efficient database that uses chip identification of the pallets to ensure correct

data is used for every part in the cell. GF Machining Solutions, based in Lincolnshire, Ill., is a provider of machines, automation solutions and services.

www.gfms.com/us

SIMPLIFY DATA LOGGING, TRACEABILITY

The Sysmac NJ machine automation controller from Omron Automation and Safety eliminates the maintenance complexities associated with PCs and middleware by providing direct connectivity to SQL databases, including Microsoft SQL, Oracle, IBM DB2, MySQL and Firebird.

It combines logic, motion, vision and database connectivity into a single platform that simplifies machine design, operation and maintenance and provides seamless production traceability with data logging for measuring return on investment.

Benefits are reliable and consistent data collection, maximized machine uptime, and minimized IT maintenance costs associated with PCs and middleware.

Sysmac NJ is quickly programmed with pre-made SQL function blocks for controls programmers to read and write data to/from the database at speeds up to 20 ms per transaction.

Applications include robot cell control, pharmaceutical packaging, food packaging, vision-guided pick-and-place, modular primary and secondary packaging machine control, data concentrator for critical data mugging without a PC or middleware, and semiconductor wet bench and process control.

Omron Automation and Safety is a manufacturer of machining and safety technology with Canadian offices in Toronto and Montreal.

www.omron247.com

CONTROLLERS CONNECT LOCALLY, REMOTELY

B&R has expanded its X20 system to include a new series of compact controllers with integrated I/O that connect locally or remotely.

Each system is equipped with 32 built-in digital and analogue I/O channels and an x86 processor. Integrated POWERLINK, standard ethernet, CAN, RS232 and USB interfaces are also available.



Real-time ethernet.

The compact controllers come with 200 MHz and 400 MHz CPU frequencies. Depending on the variant, there's up to 256 MB RAM and 16 KB non-volatile onboard RAM and a built-in flash drive with up to 4 GB for data storage.

Two variants with innovative, ultrafast reACTION technology allow integrated I/O channels to be controlled with response times down to 1 µs using a function block library.

B&R Automation is a manufacturer of automation equipment based in Roswell, Ga.

www.br-automation.com



Regular or prolonged exposure.

TRANSDUCERS WITHSTAND HARSH CHEMICALS

Automation Products Group Inc.'s PT-503 submersible pressure transducers with PVC housing are made specifically for prolonged exposure to harsh and corrosive chemicals, even from -34 to 54 degrees C and depths to 137 m.

Features support specific application needs, including: 4-20 mA, Modbus, 0-5 VDC and mV/V outputs; three cable options for improved chemical compatibility, including Hytrel, PVC and urethane; a Teflon-coated or a ceramic transducer face; a breathable hydrophobic vent tube cap that filters out moisture; temperature compensation; and built-in lightning protection.

Automation Products Group is a supplier of sensing technologies based in Logan, Utah.

www.apgsensors.com

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www.kuka-systems.com



KUKA

GEAR REDUCER WITH COMPACT FOOTPRINT

AutomationDirect has extended its SureGear line of precision servo gearboxes to include right-angle reducers for applications that require a more compact footprint.

They're available in four gear ratios (5:1, 10:1, 15:1, 25:1) with a thread-in mounting style, helical-cut planetary gears for quiet operation, and uncaged needle roller bearings for high rigidity and torque.

High-viscosity, anti-separation grease doesn't migrate away from the gears, so it doesn't have to be replaced for the life of the unit. *Four gear ratios.*

The reducers mount in any orientation and hardware is included for attaching to SureServo motors. They come with a six arc-min backlash rating for two-stage, and nine arc-min for three-stage.

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



Multiple I/O connections.

PANEL PC HANDLES RUGGED ENVIRONMENTS

Saelig Co. Inc.'s rugged GK-7000 Touch-Panel PC with multiple I/O connections, Windows CE 6.0 operating system and an optional built-in rechargeable battery is easy to install for embedded applications where power is intermittent.

The 7-in., 800 x 480 TFT colour display has a four-wire resistive touch panel that's powered by a Samsung ARM-based S3C2416 processor. A built-in 32-bit 500 MHz processor regulates power between 9 to 12 V, with low consumption of 8 W.

Built-in interfaces include: USB1.0 x 3, USB2.0 x 1, RS232, RS485, SD slot (for up to 8 GB memory), 10/100 ethernet mouse/keyboard support; and built-in speaker for audio output. Extras include: 802.11 b/g Wi-Fi, GSM/GPRS, Bluetooth, VESA 75 mm rail-mount, and a 2000 mAH battery.

The 7.9 x 6 x 2-in., 1.34-lb. unit handles operating temperatures between -4 to 60 degrees C in industrial machine operation (and other applications).

Saelig is a distributor of control and instrumentation equipment based in Fairport, NY. www.saelig.com

MONITORING WITH A LIGHT TOUCH

Siemens Industry Automation Division's flat-panel monitors and panel PCs with industrial standard 19- and 22-in. widescreen displays respond to light contact for intuitive and efficient single-touch, multi-touch, gesture and two-handed operation of machinery and the plant.

Simatic IFP1900 and IFP2200 flat-panel monitors and the Simatic IPC477D and IPC677D panel PCs include industrial standard anti-glare, ensuring easy legibility from wide viewing angles, high touch resolution for precise operation, and automatic detection of accidental touching and operation.

The continuous glass front is scratchproof and resistant to chemicals; and a metal surround protects the glass front from mechanical damage. Made with aluminum housings, the monitors and PCs are set for 24-hour continuous use, meet exacting temperature, vibration, shock and EMC requirements, and handle single-touch applications.

Siemens Industry Sector manufactures automation and drive technology. Its Canadian headquarters is in Oakville, Ont. www.siemens.com/industry



Clear wide-angle viewing.

GO MOBILE TO MONITOR OPERATIONS

The WAGO-WebVisu-App from WAGO Corp. delivers quick and easy access to equipment status, process data and production levels directly from a smartphone or tablet.

The app operates exclusively with up to 100 WAGO programmable quick access via URL.

Visualization screens are built in and the same software is used for programming to provide an all-in-one solu-



Built-in visualization.

tion. Straightforward graphic tools generate screens with multiple security levels, enabling task-based login strategies.

The app is free for both iOS and Android devices via Google Play and the Apple App Store.

WAGO is a manufacturer of spring pressure connection technology based in Germantown, Wis.

www.wago.us

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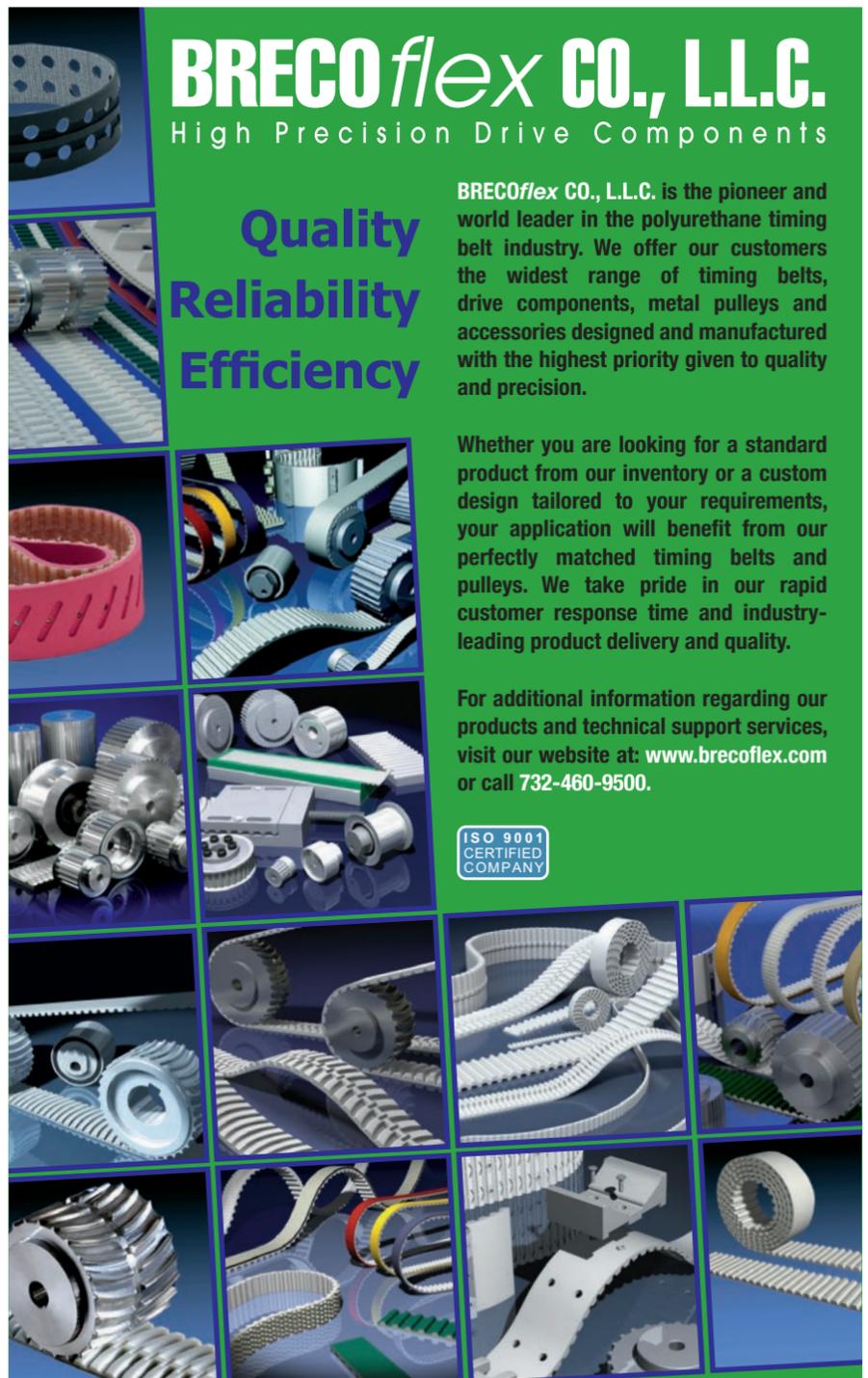
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IP67-rated.

I/O MODULE HANDLES TOUGH AREAS

Beckhoff Automation's compact IP67-rated EP1816-3008 EtherCAT I/O measuring device, with built-in tilt monitoring in longitudinal and transverse directions, has two integrated 3-axis acceleration sensors and 16 digital inputs. Use it in harsh environments for cost-effective acceleration and angle measurement directly in the field for shock/oscillation monitoring of machines, plants and buildings.

Robot arm vibrations are monitored via acceleration measurements. For wood sawing machines, a unit mounted on the work table enables monitoring of the saw-blade angle adjustment through EtherCAT signal acquisition.

The signals come directly through the main control system rather than being managed with stand-alone measurement solutions. Two sensors arranged at 90 degree angles make the system redundant for verification by the controller.

The unit has two integrated 3-axis, 16-bit acceleration sensors with resolution options of ± 2 , 4, 8 and 16 g at sampling frequencies between 1 Hz to 5 kHz.

Beckhoff is a developer of automation technologies based in Verl, Germany, with Canadian operations in Mississauga, Ont.

www.beckhoffautomation.com

TOOLS

PUNCH IMPROVES PRODUCTIVITY

Hougen Manufacturing's electro-hydraulic hole punching machines improve productivity when working with harder, more elastic materials that tend to grip.

A lightweight single body construction punches holes in steel in as little as 2.3 sec. The Ogura 75002.5PR and 75004PR models include a "power retractable" system that reverses the punch.

The 25-lb. units are easy to operate because there's no need for a lift or assistance. Both models use only electricity to power the motor and self-contained hydraulic system. No additional hydraulic pumps or hoses are needed.



10.1 tons of punching pressure.

The 75002.PR provides 10.1 tons of pressure to punch holes up to 19 mm in diameter through material as thick as 6.4 mm and oblong holes up to 14 x 21 mm.

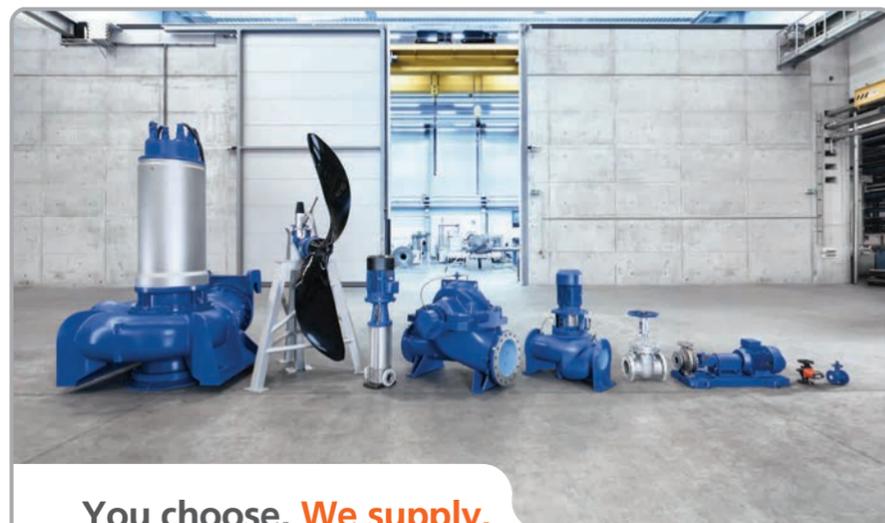
The 75004.PR has an increased punch pressure of 16.9 tons for round and oblong holes in materials up to 9.5 mm thick.

Both units handle flat bar, H-steel, angle iron and channel steel.

They're available in 120 and 130 V options and include a work stand for placement on a table and a foot switch for hands-free operation.

Hougen Manufacturing is a manufacturer of magnetic drills based in Swartz Creek, Mich.

www.hougen.com



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ENCLOSURES

APP EASES ENCLOSURE SELECTION

Rittal Systems has updated its WM Tool wallmount application with new features and functionality for iOS devices including iPhone 5 and 5s, and iPads.



iOS compatible.

A cross-reference tool includes additional competitors in the library and a distributor locator.

An easy-to-use tool selects by enclosure type and required dimensions.

Rittal Systems Ltd. is a German enclosure manufacturer with Canadian operations

in Mississauga, Ont.
www.rittal.ca

MATERIAL HANDLING

MAXIMIZE PICK-AND-PLACE EFFICIENCY

Schunk's EGP gripper is adjustable on two stages with a maximum force of 40 N to handle workpieces up to 200 g, making it as efficient as pneumatic grippers.

It has higher speeds and greater gripping force than most small part grippers. Closing time is 0.09 sec.

It's powered by a maintenance-free, brushless servo motor and is equipped with cross-roller guidance to maximize efficiency.

The mechatronic gripper, based on the pneumatic MPG-plus platform, transfers the sensor system onto the EGP to quickly change pneumatic systems.

Schunk is a producer of clamping technologies with Canadian operations in Mississauga, Ont.
www.schunk.com

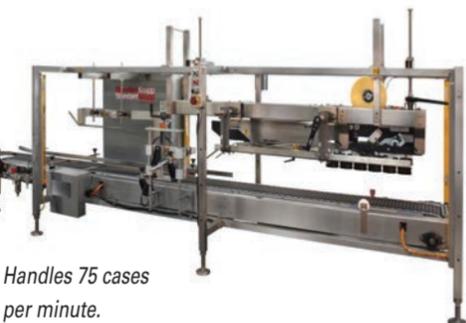


Eases small part handling.

SEALER WORKS IN CONTINUOUS MOTION

Standard-Knapp's 199 continuous-motion, high-speed case sealer handles up to 75 primed flap and re-shipper cases per minute.

It uses a one-hose, four-gun, hot melt glue system or optional tape dispensing unit. An on-demand servo-controlled flap tucker ensures precise timing with a consistent glue pattern or accurate tape placement. A pneumatically controlled flap tucker is also available for slower



Handles 75 cases per minute.

www.plant.ca

PLANT 25

speeds.

Fewer moving parts reduce downtime, and a rust-proof stainless steel frame keeps maintenance simple. A durable compression section uses a standard friction belt to handle lightweight cases and eliminate side belts, while a user-friendly HMI touch-screen control panel and easy entry for changeover or maintenance makes operation easy. There's no tools or change parts needed, making changeover less than two minutes. To eliminate guesswork, each changeover point is numbered and corresponding settings are documented.

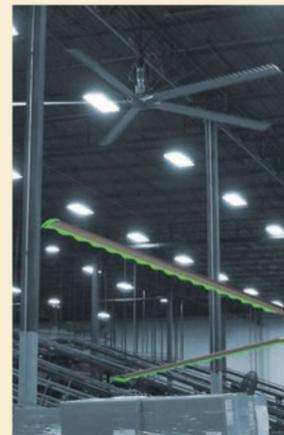
Standard-Knapp is a manufacturer of packaging machinery based in Portland, Conn.

www.standard-knapp.com

VENTILATION

FAN HARNESSES WHALE POWER

Envira-North Systems Ltd.'s Whalenado HVLS ceiling mounted fans stabilize facility temperatures to reduce heat loss in the winter and create cool conditions in the summer by combining fluid dynamics and biometrics to maximize the airfoils' effectiveness.



The fans harness the same aerodynamics that allow whales to move through water quickly by producing larger movements of air while using less energy to do so. They're available in span dimensions of 8, 12, 16, 20 and 24 ft.

Average return on investment is 12 to 24 months thanks to a combined reduction in natural gas consumption and utility rebates.

Reduce natural gas consumption.

Envira-North Systems is a manufacturer of ventilation technologies based in Seaforth, Ont.
www.whalenado.com

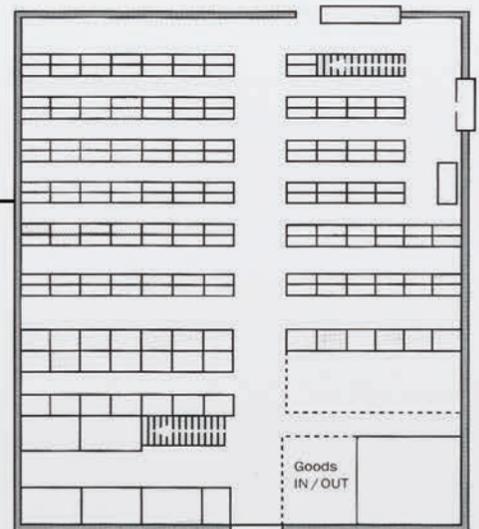
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BEARINGS

HANDLES HEAVY LOADS

Baldor Electric Co.'s Dodge Hydraulic ISAF pillow block bearing is available with higher load ratings. It's equipped with a hydraulic mount and dismount system, 231 series spherical bearings and is interchangeable with an industry-standard SDAF housing for large bulk handling conveyors.

The bearings, in bore sizes of 9-7/16 to 14 in., include a built-in hydraulic piston on both the mount and dismount nut. It tightens the bearing on the shaft during installation and makes it easy to replace.

A harsh duty, two-part sealing system protects the bearing from contamination.

Baldor is a manufacturer of electric motors and power transmission products based in Fort Smith, Ark.

www.baldor.com



Easy installation.

POWER CONVERSION

REGULATE POWER ACROSS MULTIPLE INPUTS

MicroPower Direct's MB5000RU DC/DC converters deliver 50 W of isolated, tightly regulated output power for applications that require wide inputs, compact size, high power, robust performance and long term reliability.

Ten standard models operate from wide 24 VDC (9 to 36 V) or 48 VDC (18 to 75 V). The 4:1 inputs provide tightly regulated single outputs of 3.3, 5, 12, 15 or 24 VDC. Standard features include line/load regulation less than 0.5%, input/output isolation of 1,500 VDC, a remote control input and efficiency as high as 92%.

All models are protected for output short circuit faults, over temperature



50 W output.

conditions and output over current faults.

The unit is housed in a 1 x 2 x 0.43-in. case and handles temperatures between -40 to 61 degrees C. Adding the heat sink option extends the temperature range to 69 degrees C.

MicroPower Direct is a supplier of power conversion products based in Stoughton, Mass.

www.micropowerdirect.com

INDOOR AND OUTDOOR POWER PROTECTION

Appleton Electric's PowerPlex P-Series panelboard is engineered for applications in potentially explosive environments and eliminates the need to install barrier glands or conduit seals.

They're ATEX/IECEx certified to Zone 1 - 2 and 21 - 22 requirements for indoor and outdoor protection and electrical circuit control in hazardous industrial locations, including petrochemical plants and refineries.

Fibreglass reinforced polyester housings and stainless steel hardware also qualifies the panelboards for wet, corrosive areas, such as water treatment centres.

Unlike epoxy-encapsulated versions, flameproof enclosures allow breakers to be replaced in the field. The panelboard's busbar design and modular configuration makes installation flexible and maintenance easy.

A 50-kA busbar system provides more robust, reliable and efficient electrical connections in a compact space, joining powermains through a hard-copper connection. Factory installed line and load connections increase breaker ampacity without rewiring.

Six standard configurations allow nearly 300 design possibilities between 40 to 250 A with 3- for 4-pole mains MCCB for primary protection.

With the flameproof labyrinth joint, standard off-the-shelf breakers can be used rather than costly, specialized sealed breakers, thus minimizing maintenance and inventory costs.

Appleton Electric is a manufacturer of electrical supply products based in Rosemont, Ill.

www.appletonelec.com



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SMALL DRIVES, BIG POWER

Servotronic's LVD Sercos III compact, high-power and intelligent servo for low voltage 1548 VDC motion applications drives brushless, stepper or brushed DC motors.

The company says the unit, about the size of a smartphone and weighing just 250 g, is one of the smallest drives available.

For stepper motors, control is achieved via a closed loop commutation that delivers servo-like performance.

With a 12-A peak current and a switching frequency of up to 100 kHz, the drive's high PWM switching frequency, field oriented control and space-vector modulation operates low inductance motors while minimizing current ripple and eliminating acoustic noise.

voltages and two-position modulating control.

Two-position actuators use the supply voltage to drive the valve open or closed, and accept inputs from 4 to 20 mA for positioning.

They're constructed of anodized and epoxy coated aluminum to provide thermal overload protection and a permanently lubricated gear train. The pneumatic double acting actuator uses an air supply to drive the valve open or closed.

The SN solenoid valve electrically switches the air supply pressure between ports for opening and closing the valve.

Dwyer Instruments is a manufacturer of controls and instrumentation based in Michigan City, Ind.

www.dwyer-inst.com

FILTERS



Continuous operating parameter recording.

PARTICULATE FILTER CUTS DIESEL EMISSIONS

Nett Technologies Inc.'s VorTEQ 100 active diesel particulate filter (DPF) system is a Level 3 Plus (greater than 85% reduc-

tion) diesel emission control system for off-road diesel engines between 65 and 175 hp. It's verified to particulate matter emission levels of 0.26 g per kwh and is compliant with CARB's 2009 nitrogen dioxide standard.

The system uses a diesel fuel burner to oxidize the soot that accumulates in the DPF and has a controller that continually records operating parameters. The controller is equipped with a cab mounted touchscreen HMI to provide feedback information, which alerts the operator when a regeneration of the DPF is required and indicates the presence of any errors within the system.

Nett Technologies is a developer of emissions control technologies based in Mississauga, Ont.

www.nettinc.com



Frequency up to 100 kHz.

Separate logic and bus power supplies make motor power-off safe while maintaining the drive state and fast restart.

Servotronic, a manufacturer of motion control equipment based in Isreal, says the LVD has been qualified by Bosch Rexroth to operate with the IndraMotion Control models, MLC motion logic control, MLD drive-integrated motion control and MTX CNC platform.

www.servotronic.com

VALVES

VALVES ARE BLOWOUT PROOF

The WE33 full port 3-way stainless steel ball valve from Dwyer Instruments Inc. has a blowout proof stem, reinforced PTFE seats and seals and a ball made of 316 stainless steel, which enhances safety and performance.

Actuators are direct-mounted for compact assembly in tight spaces, while limiter switches are mountable to the valve for remote position indication. Configure the valve with electric or pneumatic actuators, which are available in weatherproof or explosion proof versions, plus a variety of supply



Direct-mounted.

www.plant.ca

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CONNECTORS

SECURE YOUR CONNECTIONS

Binder-USA's Harsh Environment Connector (HEC) handles extreme environmental conditions and high-pressure, high-temperature washdowns.

The IP68/IP69K-rated connectors' contact arrangement is a hybrid 4x signal and 3+PE power configuration with removable crimp contacts. At eight contacts, maximum rated voltage is 400 V for power and 60 V for signal. The rated current is 3 A for signal contacts and 25 A for power contacts. Standard wire gauge for signal contacts is 26 to



IP68/IP69K-rated.

16 AWG. Standard wire gauge for power contacts is 16 to 14 AWG.

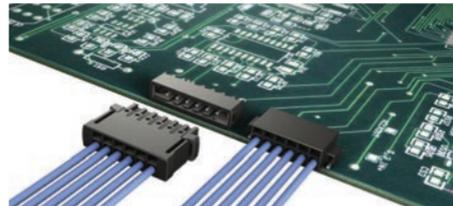
The connector is resistant to UV, acidic rain, saline mist, ozone and other airborne pollutants. A 3-point bayonet lock keeps connections safe and secure.

Binder-USA, based in Camarillo, Calif., is a subsidiary of Franz Binder GmbH & Co., a German-based connector manufacturer. www.binder-usa.com

WIRE-TO-BOARD FLEXIBILITY

Harting's har-flexicon discrete wire-to-board connectors and terminal blocks deliver PCB performance and density with robust connectivity.

Surface mount termination components for pluggable single conductor wiring of I/O signals come in two main pitches: 3.5 to 5.08 mm sizes with stan-



Surface-mountable.

Standard contact spacing and screw or push-in (spring cage) wire termination that are board-mount compatible.

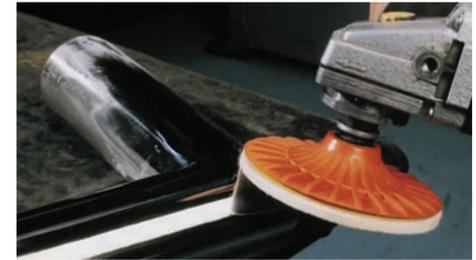
Device side connectors are directly wired to create a horizontal or vertical terminal block with high vibration and shock resistance. If high current is required, the 5.08 mm is rated up to 17.5 A for the terminal block and 15 A for the two-piece connector.

Smaller 1.27-to 2.54-mm units fill the evolving niche for finer pitch. The 1.27

mm with IDC caters to the miniaturization of PCB termination, while the 2.54 mm version includes connector and terminal blocks with two to 12 contacts and push-in termination as well as a positive latching system between male and female components.

Harting, a sensor manufacturer based in Germany, has a Canadian office in Montreal. www.harting.ca

METALWORKING



For confined spaces.

SURFACE TOOLS MAKE METAL FINISHING EASY

Walter Surface Technologies has added to its Quick-Step line of surface finishing and polishing products for stainless steel surfaces in food preparation, nuclear, pharmaceutical and construction applications.

The compact, lightweight variable-speed Quick-Step Finisher tool sands, finishes and polishes. An extra-large gear and adjustable DYNAMAX electronic speed control delivers plenty of torque even at lower speeds, and a smaller frame makes the tool easy to handle in tight spaces.

Blendex surface conditioning discs with non-woven construction prepare surfaces for final finishing treatments, such as painting on steel, aluminum and stainless steel materials. Flex finishing discs fit most sanding applications. And long-lasting flap disc finishes surfaces with a high removal rate of grinding and finishing welds.

Walter Surface Technologies, based in Pointe-Claire, Que., produces products and systems for the metalworking industry. www.walter.com

GUN ELIMINATES OVER/UNDER HEATING

Master Proheat's PH-1610 dual mode heat gun eliminates over or under heating with an electronically integrated infrared sensor and laser targeting system that controls work surface temperatures in soldering/desoldering, heat shrink tubing and plastic welding applications.



Variable heat shrink tubing and airflow.

By speeding up the heating process, operators work at the upper limits of the cure zone, automatically adjusting heat output to compensate for changes in the distance from the work surface. It works at dial-in, locked-in temperatures from 76 to 540 degrees C and airflow from 4 to 16 CFM to enhance process control.

Master Appliance Corp. is a manufacturer of heat tools based in Racine, Wis. www.masterappliance.com

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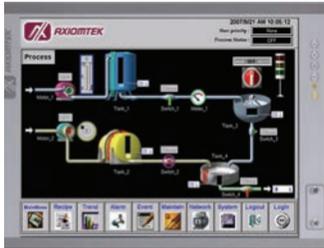


Canadian
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Network



A COMPUTER FOR EXTREME ENVIRONMENTS

The less screw design of Axiomtek's P1197E- 861 rugged 19-in. industrial touch-panel computer makes installs easy and operates in extreme environments.



Dual display interface.

The slim-type industrial grade panel unit supports a dual display interface, one expansion slot, eight USB 2.0 ports, four COM ports, Wi-Fi connectivity, plus third and second generation Intel Core i7/i5/i3/ Celeron/Pentium processors in LGA1155 socket with Intel H61 Express chipset.

The SXGA TFT LCD display with high brightness LED backlight (350 nits) has an IP65/NEMA 4 compliant front panel in a IP65-compliant housing and there's a PCIe x4 or PCI slot for expansion.

The expandable panel system is aluminum and has IP65/ NEMA 4 water/dust-proof protection.

It includes two DDR3-800 SO-DIMM sockets with up to 16 GB of memory. Also available are interfaces for DVI-D, VGA, four COM (3 x RS-232, 1 x RS-232/422/485), eight USB 2.0, two GB ethernet ports, audio (line-out), and two 2.5-in. SATA HDD drive bays.

Axiomtek is a manufacturer of industrial computers with US headquarters in City of Industry, Calif.

<http://axiomtek.com>

SOFTWARE ASSESSES CHEMICAL RISK

Version 10.2 of SAFER Systems' SAFER TRACE advanced consequence analysis software has several new features, enhancements, streamlined workflows and bug fixes. The engineering grade software is used to assess, understand and reduce chemical risk, and plan for worst-case scenarios. It has improved vapour cloud explosion modelling for materials such as ethylene oxide, and solid chemical explosion modelling for various materials and commercial explosives.

Exfiltration modelling allows plans to be created for indoor accidental releases and calculates how long the toxicity is expected to remain at harmful levels throughout an indoor chemical release event. This model takes into consideration the room size, temperature, ventilation type and rate to determine the toxic or explosive concentration as well as the exposure curve from point of release to end of event where safe levels are reached.

SAFER Systems is a chemical emergency response company based in Camarillo, Calif.

www.safersystem.com

SMART CAMERA FITS TIGHT SPACES

Manufacturing engineers looking for robust inspection, colour matching, symbol decoding or OCR can count on Microscan's Vision MINI Xi to fit tight spaces in assembly line manufacturing and component tracking applications.

This industrial compact smart camera with embedded ethernet measuring just 25.4 x 45.7 x 53.3 mm and weighing 91 g, performs close-range industrial auto ID, inspection and other machine vision jobs. It has serial connectivity, a 24-V interface and optically isolated I/O in one compact package.

It handles dot peen marks on power-train components, laser markings on medical devices or PCBs, as well as traditional printed barcodes on packaging and labels using AutoVISION machine vision software. Or upgrade to Microscan's advanced Visionscape platform with 50+ machine vision tools without switching cameras.

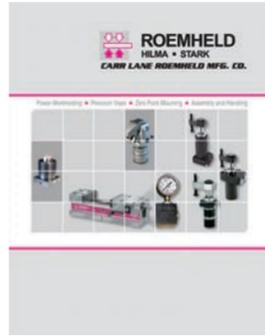
Microscan is a supplier of precision data acquisition and control based in Renton, Wash.

www.microscan.com



Smart camera cutline

POWER WORKHOLDING DEVICES

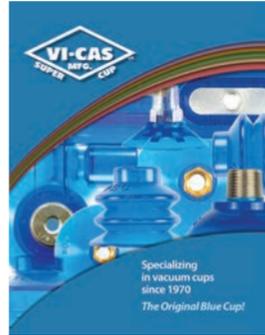


This 192-page power workholding catalogue provides specs, photos, charts, drawings and detailed descriptions of hydraulic clamps and cylinders, work supports, precision vises, zero point mounting, power units, valves, and assembly and handling devices. Find out the best uses of each

product, maximum clamping forces, dimensions and more. Click CNC Machining at www.clrh.com.

Carr Lane Roemheld Mfg. Co.

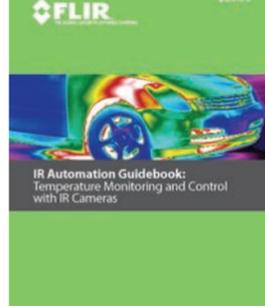
MOST POPULAR VACUUM CUPS



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

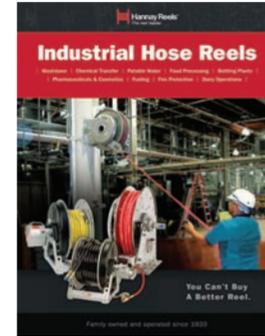
THERMAL IMAGING: INDUSTRIAL PROBLEM SOLVING



Take a thermal look at your problem: Download the FLIR Automation Guidebook to learn how automated thermal imaging can help you solve safety and process control problems. www.flir.ca

Flir

HANNAY REELS RELEASES NEW HOSE REEL CATALOGUE



Hannay Reels recently released a new hose reel catalogue that provides clarified specification details and refreshed charts for hoses commonly used in potable water and washdown operations.

www.hannay.com

Hannay Reels

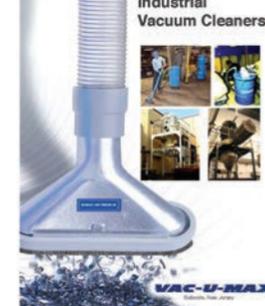
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SCOTT'S DIRECTORIES



BRIC economies hitting a brick wall

BY GWYN MORGAN

An article in Germany's *Der Spiegel* newspaper headlined, Developing Economies Hit a BRICS Wall, captured the global economic question of the decade.

Between 2001 and 2013, the collective GDP of those four countries grew 240% from US\$5.6 trillion to \$13.6 trillion. Now, a strengthening West and flagging BRIC performance are spawning predictions that the tables will turn in 2014.

Recently the UK-based Centre for Eco-

“The Economist predicts BRIC’s \$98 billion growth lead over the US, Japan, Britain and Germany in 2013 will reverse...”

nomics and Business Research lowered its predictions for BRIC growth. Brazil’s slide from a go-to country for foreign investors to struggling courtier was illustrated by President Dilma Rouseff’s speech at the Davos World Economic Forum, where she beseeched industry leaders to “bear in mind a medium and long term horizon in our reviews.”

Russia’s already uncertain outlook now faces the impact of tightening eco-

nomics sanctions.

India’s banks are facing a mountain of bad loans and corruption is rampant. Going into the recent national election, nearly a third of parliamentarians were facing criminal proceedings. This along with class-based discrimination, violence against women and abysmal law enforcement continues to deter potential investors. Now the hopes of Indians fall on the shoulders of new president Narendra

Modi, who vows dramatic reforms.

That brings us to China, the fourth and mightiest BRIC. A report from the *Globe and Mail* highlighted the issues. These include massive over-building of infrastructure and factories often with collusion by corrupt public officials bribed to circumvent environmental laws and obtain financing, leaving hundreds of billions of dollars in bad loans sitting as ticking time bombs on the balance sheets of government banks.

China’s growth rate, which hit a high of 14% a few years ago, is expected to drop to 7% in 2014. Likewise, India’s apex growth rate of 10% has fallen to half that level. Brazil’s growth rate, which peaked at 6%, is expected to be under 2% this year.

The *Economist* predicts that BRIC’s \$98 billion growth lead over the US, Japan, Britain and Germany in 2013 will reverse to fall \$44 billion behind the G4 this year. That’s a massive year-over-year reversal of \$142 billion in favour of the G4. The US is expected to add more to global economic growth than China in 2014 and Japan will add more than India.

More competitive US

Falling energy costs due to domestic oil and gas shale production have helped make US manufacturing more competitive. Over the past two years, 4.3 million jobs have been created. Personal debt is falling, consumers are spending and businesses are investing some of their enormous cash reserves.

Japan’s new Prime Minister Shinzo Abe’s “Abenomics” economic plan has started to lift the country out of deflationary stagnation.

Britain has staged an impressive economic resurgence and Germany continues its solid performance. Even in battered Europe, there are positive signs. Loosening of rigid labour laws are improving business productivity and sovereign bond yields have fallen sharply.

So is this, as an *Economist* report stated, “The West’s Turn?”

There’s little doubt 2014 will mark a hiatus in the economic rise of the four countries that dominated global economic growth for the past 12 years, and that Western developed countries are shaking off some of the self-inflicted wounds holding them back. But lest we lapse into self-congratulatory schadenfreude, let’s remember that world economic growth is not a zero sum game.

Prosperity in any single country contributes to the prosperity of all others. The crucial importance to Canada of resource exports to China is a clear illustration of that reality. Canadians would be wise to hope China, in particular, navigates its challenges successfully.

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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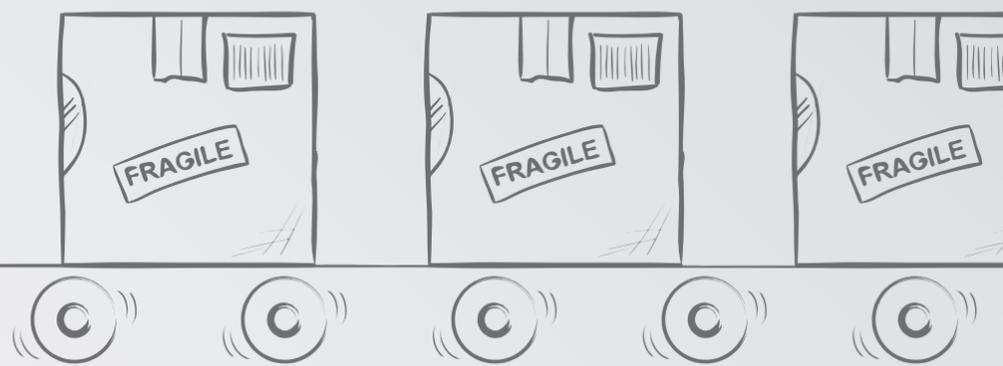
“As always, the show was informative...I was also impressed with the mix of cutting edge innovations, along with the traditional but still very necessary industries such as fasteners, springs, and bearings.”

—Jonathan Allen, Physicist, RF Electronics Consulting



Uh Oh.

As a manufacturer, you know the importance of paying attention to every last detail. You also know that even the smallest malfunction can have a huge impact on your productivity – and your bottom line.



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New C-more® Touch Panels

Higher Performance, Lower Price



The popular **C-more** HMIs have ALWAYS been a great value, but now they are better than ever. We have included some of the latest technology into the new EA9 series C-more panels, and all at a lower cost to you. But don't let the lower price fool you - with a redesigned, more robust housing, thinner bezel, LED backlights and more communications and data storage options, the EA9 series offers even more value and performance.

ALL EA9 SERIES C-MORE PANELS INCLUDE:

- 800 MHz processor
- SD memory card slot for data logging
- One USB 2.0 A-type and one USB 2.0 B-type port
- Serial communications interface
- 26MB project memory space (82MB on the 12- and 15-inch units)

FULL-FEATURED MODELS ADD:

- 10/100Base-T Ethernet communications
- Additional SD card slot on 12- and 15-inch models
- Two additional for a total of three serial communications ports (RS-232, RS422/485)
- One HDMI Video Output (12- and 15-inch units only)

REMOTE ACCESS AND CONTROL BUILT-IN

- No Additional Hardware required. The C-more Remote Access feature resides in all EA9 panels with Ethernet support, and requires no option modules. Access real-time data or initiate an action on a control system from anywhere, any time.

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- Selected Mitsubishi FX Series, Q Series
- Siemens S7-200 PPI and S7-200/300 Ethernet (ISO over TCP/IP)

HDMI



The C-more EA9 series 12- and 15-inch panels now have an HDMI video output port. This allows you to connect HDMI devices like larger screen TVs to the C-more panels for longer-distance viewing of operator screens.

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