

PLANT

ADVANCING CANADIAN MANUFACTURING

Volume 73, No. 05 July/August 2014

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BUILDING A BEAST

Prinoth plows the competition with process refinement

Growth through US acquisition?

It's time to buy America

The Connected Car

Automotive technology converges

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St. Marys energizes power savings

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Reasons to invest

The stars appear to be aligning favourably for Canadian manufacturers. An Export Development Canada (EDC) forecast notes OECD nations are driving global growth and they're generating demand that will energize emerging markets through this year. Meanwhile the US economy is looking at growth of about 3% and just under 4% in 2015 – good news for our manufacturers who are ideally positioned to serve their biggest customer. But are Canadian businesses prepared to make the most of these opportunities?

Lagging per worker business investment suggests they are not.

The C.D. Howe Institute lays out the numbers in a policy brief, and Canada doesn't look too good against its international peers, particularly the US. It averages \$13,200 per worker this year, compared to \$14,800 among OECD nations and a whopping \$18,500 for the US. Central Canada, where most manufacturers are based, is even farther back in the pack. For the first time in three decades, businesses in this region are investing the least (Ontario averaging \$7,000 and Quebec \$5,700).

Canada has long lagged the US in investment, but the Toronto-based not-for-profit research firm points out companies were catching up between 2008 and 2012, making the timing of this inertia puzzling.

Business prospects are promising. A KPMG outlook announces a strengthening US economy, a more favourably valued dollar and a trend to reshore manufacturing in North America are all conditions moving them past survival mode to actually increasing their revenue. Reshoring is key to this growth. Only 14% of companies intend to source from China this year compared to 31% last year (and 3% from India compared to 12%). Barring any glitches with the Canada-EU Trade Agreement (keep an eye on Germany), CETA will add \$12 billion to Canada's GDP.

But to capitalize on these opportunities, manufacturers need to invest in their operations. And more aggressive business investment is critical to improving productivity, which also lags our international peers.

So what's the problem? Companies may be spooked by global business prospects. Bank of Canada governor Stephen Poloz has noted a lack of confidence and investment, but caution is also reflected in the results of the 2014 EMC-PLANT salary survey, which shows average wage gains for many executive and management titles have stalled.

Statistics Canada says private companies were sitting on \$626 billion in cash holdings as of the first quarter, but KPMG has some ideas about how some of that money would be well spent. For example, be less risk averse and invest more in breakthrough innovation as well as the safer, more routine incremental improvements to existing technologies. And spend more on technologies for the shop floor. Automation is a good start but also spend on data and analytics that will expand business intelligence in-house and into the supply chain.

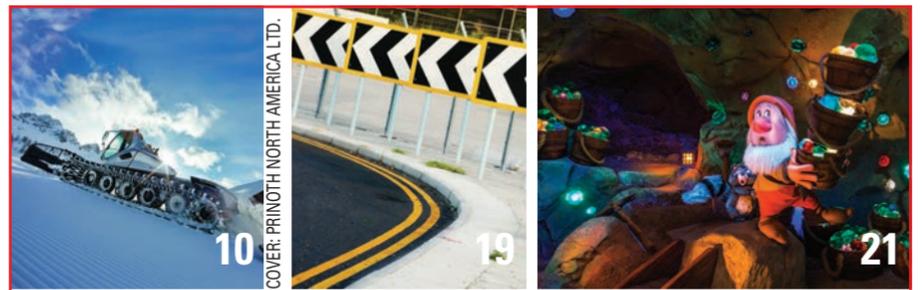
Of course many manufacturers – mostly SMEs – aren't hoarding huge piles of cash and don't have an easy time prying capital loose from banks or other third party sources. To that end, the C.D. Howe Institute has some recommendations for policy makers that would create a more hospitable investment environment:

- encourage private sector funding of infrastructure construction;
- reduce taxes on profits from innovations, and various business taxes (retail, land transfer and property); and
- create an investment-friendly fiscal and royalty regime in the energy sector.

Manufacturers have an opportunity to significantly improve their prospects by leveraging a skilled, educated workforce, their reputation for producing quality goods and a close proximity to one of the most lucrative markets in the world. It's up to companies and policy makers to take the risk.

Joe Terrett, Editor

Comments? E-mail jterrett@plant.ca.



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» Bulletins

New Flyer Industries, the Winnipeg-based bus manufacturer, has ordered a FCvelocity-HD7 fuel cell power module from **Bal-lard Power Systems** in Burnaby, BC for a bus that will be sent to Altoona, Penn. for testing before being deployed into service under the US National Fuel Cell Bus Program. The project is administered by CALSTART, a member-supported organization for clean transportation alternatives.

The Quebec government has formed a task force to strengthen the province's wind energy sector. The **Canadian Wind Energy Association** says Quebec's industry has created more than 5,000 jobs, generated \$10 billion worth of investments over the past decade and contributed \$500 million to the province's annual GDP.

Acklands-Grainger, is expanding its reach. The Richmond Hill, Ont.-based distributor of industrial, safety, and fastener products is acquiring **WFS Enterprises Inc.**, a Windsor, Ont. distributor of industrial tools and supplies for the Ontario and US markets. Terms of the transaction were not disclosed.

Manitoba Hydro has awarded engineering firm **SNC Lavalin** in Montreal a \$112-million contract for the design and construction of the Keewatinow switchyard project near Winnipeg. Work will carry through to mid-2017. The switchyard will transfer power from gathering stations at the northern part of Nelson River to customers in the southern region.

Heroux-Devtek Inc. has renewed a multi-year \$46 million contract with **Bell Helicopter** for several aircraft programs. The Longueuil, Que. aerospace company says the agreement involves manufacturing the main and tail rotor hubs for the new Bell 505 Jet Ranger X, 206B and 206L; and components for the 212, 407 and 412 aircraft.

Export Development Canada (EDC) introduced innovative Canadian companies striving for export markets to **GE Power Conversion** and **GE Hitachi Nuclear Canada** in a one-day session July 15 in Peterborough, Ont. It was part of a joint program targeting companies from across Canada that have developed excellence in environmental, health and safety services. EDC expects to hold additional sessions.

Celestica opens Toronto microelectronics lab

Facility will accelerate prototyping, commercialization

TORONTO — Celestica Inc. has opened a new microelectronics laboratory at its Toronto headquarters to enable start-ups, small and medium enterprises, and large original equipment manufacturers to quickly commercialize ideas for miniaturized electronics products from prototyping to volume production.

"Microelectronics is in demand for high-reliability markets such as healthcare, aerospace, defense, communications and renewable energy. As optics and photonics technologies permeate these high-reliability sectors, it's becoming increasingly more important to miniaturize and reduce cost," said Shawn Blakney, senior director of technology and innovation at Celestica. "Smaller electronics provide the flexibility for lighter, portable and potentially more affordable devices, a trend that is already proven in the consumer market."

The 1,100-square foot, ISO class-6 clean room



A controlled environment for temperature, humidity and airborne particles. PHOTO: CELESTICA

is a controlled environment for temperature, humidity and airborne particles. The laboratory uses bare die packaging technologies to reduce production costs, enhance signal integrity and improve thermal performance.

Morgan shifts defence business to Burlington

BURLINGTON, Ont. — Morgan Advanced Materials has relocated its composites and defence systems business to its plant in Burlington, Ont.

The company makes advanced composite hard armour, soldier systems, vehicle armour, lightweight vehicle technology, and aerospace armour.

The 100,000 square-foot plant will combine technical expertise and equipment from three different plants located across Canada. This represents five times more capacity than the prior manufacturing facilities.

ABB wins \$400M Maritime Link deal

MONTREAL — Power and automation technology group ABB has been awarded a \$400 million order from NSP Maritime Link Inc., a subsidiary of Emera Inc., to supply high-voltage direct current (HVDC) power transmission for the first electricity link between Newfoundland and the North American power grid.

The 500-megawatt HVDC connection will transmit renewable electricity generated in Newfoundland and Labrador to Nova Scotia.

The Maritime Link will deploy ABB's HVDC Light Voltage Source Conversion technology incorporating a full bipolar configuration.

The project includes two converter stations for the 200 kilovolt link, and two 230-kilovolt AC substations in Newfoundland, one 345-kilovolt AC substation in Nova Scotia and two cable transition stations.

The project is to be online in 2017.

ReMAP to bring innovative products to market faster

TORONTO — The Refined Manufacturing Acceleration Process (ReMAP) network has launched with a mandate to drive Canadian innovation by supporting emerging technologies and associated manufacturing processes that will bring new products to market faster.

"As products are being launched exponentially faster than ever before, the role of the network is to accelerate researchers' innovative ideas and emerging technology through to product commercialization," said Irene Sterian, executive director of ReMAP.

Sharing resources across 38 labs and factories throughout ReMAP's 25 partner network will lower costs, improve processes, differentiate products and promote sustainability.

Along with \$7.7 million it received from Business-Led Networks of Centres of Excellence (BLNCE) program, ReMAP has attracted more than \$11 million from partnership commitments in cash and in-kind contributions over the next five years.

The federal BLNCE program addresses private sector research and development (R&D) challenges in priority areas.

Ontario Toyota plant No. 1 for quality

J.D. Power cites Cambridge-made Lexus for fewest defects

DETROIT — Toyota Motor Corp.'s Cambridge South, Ont. plant, which produces the Lexus RX has received the top quality accolade from J.D. Power.

The Detroit-based research and analysis firm's Platinum Plant Quality Award went to the Cambridge plant for producing vehicles with the fewest defects or malfunctions — 12 per 100 vehicles manufactured.

Two other Lexus plants in Japan tied for second with 18 defects per 100.

A General Motors plant in



The Cambridge, Ont. produced Lexus RX SUV. PHOTO: TOYOTA CANADA

Ingersoll, Ont. that makes the Chevrolet Equinox and GMC Terrain placed second in North America and fifth globally with

20 defects per 100 vehicles. J.D. Power said the quality awards exclude design-related problems.

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Employee loyalty is declining

Randstad report urges companies to focus on engagement

TORONTO — Having trouble keeping key employees? You're not alone. A global Randstad Workmonitor study finds company loyalty is on the decline in Canada, but it's not dead if employers focus on keeping their people engaged and satisfied.

Randstad Canada's quarterly Workmonitor study surveyed employees in 33 countries around the world, with more than half of Canadian employees (56%) stating they have the perfect job, but 65% reporting they would leave their employers at any time.

What would draw them away? Most would leave for more money (75%), to improve career



Losing good employees drives up costs associated with recruiting, training and lost productivity.

PHOTO: THINKSTOCK

opportunities (70%) or for a job that was a better match with their education backgrounds (58%).

The Toronto-based human resources company says global results are in line with Canada: 75% of respondents would leave

for more money; 69% would change jobs to improve their career opportunities and 59% would switch based on suitability to their education.

"To keep favoured employees, companies must ensure salaries are competitive and that each person feels challenged and appreciated within the organization. This involves treating them fairly, offering plenty of opportunities to learn and develop, and giving them responsibilities and projects that match their abilities and ambition," says Shannon Young, HR manager at Randstad Canada.

Get a copy of the report at www.randstad.com/press/research-reports.

>> Careers



Elyse Allan

PHOTO: GE CANADA

Elyse Allan, president and CEO of GE Canada, has been appointed Member of the Order of Canada. The citation recognizes her achievements as an innovative business leader and for her community engagement. GE has manufacturing, sales and services operations across Canada.

CVTech Group Inc. in Drummondville, Que. has appointed **Pierre Gauthier** to succeed **André Laramée** as president and CEO. Gauthier comes to the energy services company from Alstom Power & Transport Canada Inc., where he was chairman and CEO.

Catalyst Paper Corp. has appointed **Pierre Raymond** as an independent director of the Richmond, BC-based paper manufacturer. Raymond retired recently from Stikeman Elliott as a partner in the Montreal office.

Avcorp Industries Inc. has added aerospace and manufacturing executive **Peter George** to its board. Over his 25-year career he has worked with Boeing, Airbus, Northrop, Spirit, Gulfstream, Bombardier and Cessna. Avcorp builds airframe structures at plants in Delta, BC and Burlington, Ont.

Pure Technologies Ltd. has appointed **Geoff Krause** CFO of the asset management technology and services company based in Calgary. He comes from Tervita Corp., an environmental solutions firm, where he was vice-president of finance.

D-Wave partners on quantum software

BURNABY, BC — D-Wave Systems Inc. has two new partners developing software applications that take advantage of its quantum computing capabilities.

DNA-SEQ, a scientific task force and a collaborative technology group based in La Jolla, Calif., wants to target more precisely drug therapies for cancer patients using 3D precision crystallography; and a patient's full genomic data, to identify early drug resistance and match specific mutations to more effective therapies.

The deal with 1QBit, a creator of quantum computing software based in Vancouver, involves building toolsets and working with organizations to address complex finance problems.

D-Wave, based in Burnaby, BC, develops and makes superconducting quantum computers.

CO2 Solutions, NSG to pilot carbon capture project

QUEBEC CITY — CO2 Solutions Inc. is collaborating with a Colorado emissions control solutions provider on a pilot industrial carbon capture project.

Neumann Systems Group Inc. (NSG), a manufacturer of emissions control systems for power plants and other industrial applications based in Colorado Springs, Colo., will combine its technology with CO2 Solutions, a developer of enzyme-enabled carbon capture technology based in Quebec City, to create a "significantly" lower cost process for CO2 capture from industrial effluent gases.

The companies intend to co-market the solution.

The pilot combines CO2 Solutions' enzyme-based technology with NSG's NeuStream high mass transfer gas-liquid contactor technology.

The companies said development of NSG's small footprint technology demonstrates the potential to reduce capital costs by 50%.

CO2 Solutions says its equip-

ment generates cost savings of more than 30% compared to conventional solvent-based processes. It also uses low-grade, nil-value heat from industrial sources that reduce process energy costs.

The pilot at NSG's Colorado Springs facility, running for one month starting in April next year, will capture about 10 tonnes of CO2 daily for use in enhanced oil recovery and other commercial applications.

Agropur acquires Davisco Foods, doubles US processing

LONGUEUIL, Que. — Agropur is acquiring the dairy processing assets of Davisco Foods International, an American cheese and dairy ingredients company.

The deal doubles Agropur's US processing operations and will increase its global milk intake by 50% while strengthening its position in the North American and international dairy industries.

Serge Riendeau, president of Agropur, said the acquisition combined with three others in July increases Canada's largest dairy cooperative's sales to more than \$5.8 billion, and processing to 5.3 billion litres of milk annually in 41 plants across North America.

"As a result of this acquisition, the US operations of Agropur should reach the top five cheese and ingredients processors in the US," he said.

Davisco, based in Le Sueur, Minn., processes 1.7 billion litres of milk annually and has 900 employees.

The acquisition includes three Davisco cheese-processing factories in Le Sueur Jerome, Idaho and Lake Norden, SD. It also includes an ingredients plant in Nicollet, Minn., a Friendly Confines Cheese Shoppe in Le Sueur, plus global sales and distribution outlets.



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Northern Courier pipeline approved

CALGARY — The Alberta Energy Regulator has approved TransCanada Corp.'s application to construct and operate the \$800 million Northern Courier Pipeline Project.

Russ Girling, TransCanada's president and CEO, said construction starts in the third quarter and the pipeline will in service by 2017.

TransCanada was selected by Fort Hills Energy LP to design, build, own and operate the line.

The 90-kilometre system consists of two lines: one to transport bitumen and the other to move diluent between the Fort Hills mine and bitumen extraction facility, and Suncor's East Tank Farm, north of Fort McMurray, Alta.

SNC-Lavalin awarded \$30.5M BC hydro project

MONTREAL — SNC-Lavalin has been awarded a \$30.5 million engineering, procurement and construction management contract for the Jimmie Creek hydro project in BC by Plutonic Upper Toba Holdings Inc., a subsidiary of Alterra Power Corp.

The Montreal-based global engineering firm said the project involves a run-of-river hydro generation facility on Jimmie Creek in the Toba Valley near Powell River, BC. A rubber dam will be installed across the creek to divert flow into a three-kilometre-long buried penstock and surface powerhouse with two 32.5-megawatt units.

Work on Jimmie Creek began in 2012. The in-service date is July 2016.

GLV expands India plant with \$2M EDC loan

OTTAWA — Export Development Canada (EDC) has issued a \$2 million loan to GL&V India, a subsidiary of Montreal-based GLV Inc., to grow its operations.

GLV Group is a global provider of technology for water treatment and pulp and paper production.

GL&V India, which produces equipment parts for the pulp and paper industry, wants to expand and modernize its existing production unit and will invest the money in new equipment.

EDC, a Crown corporation, provides export financing and insurance.

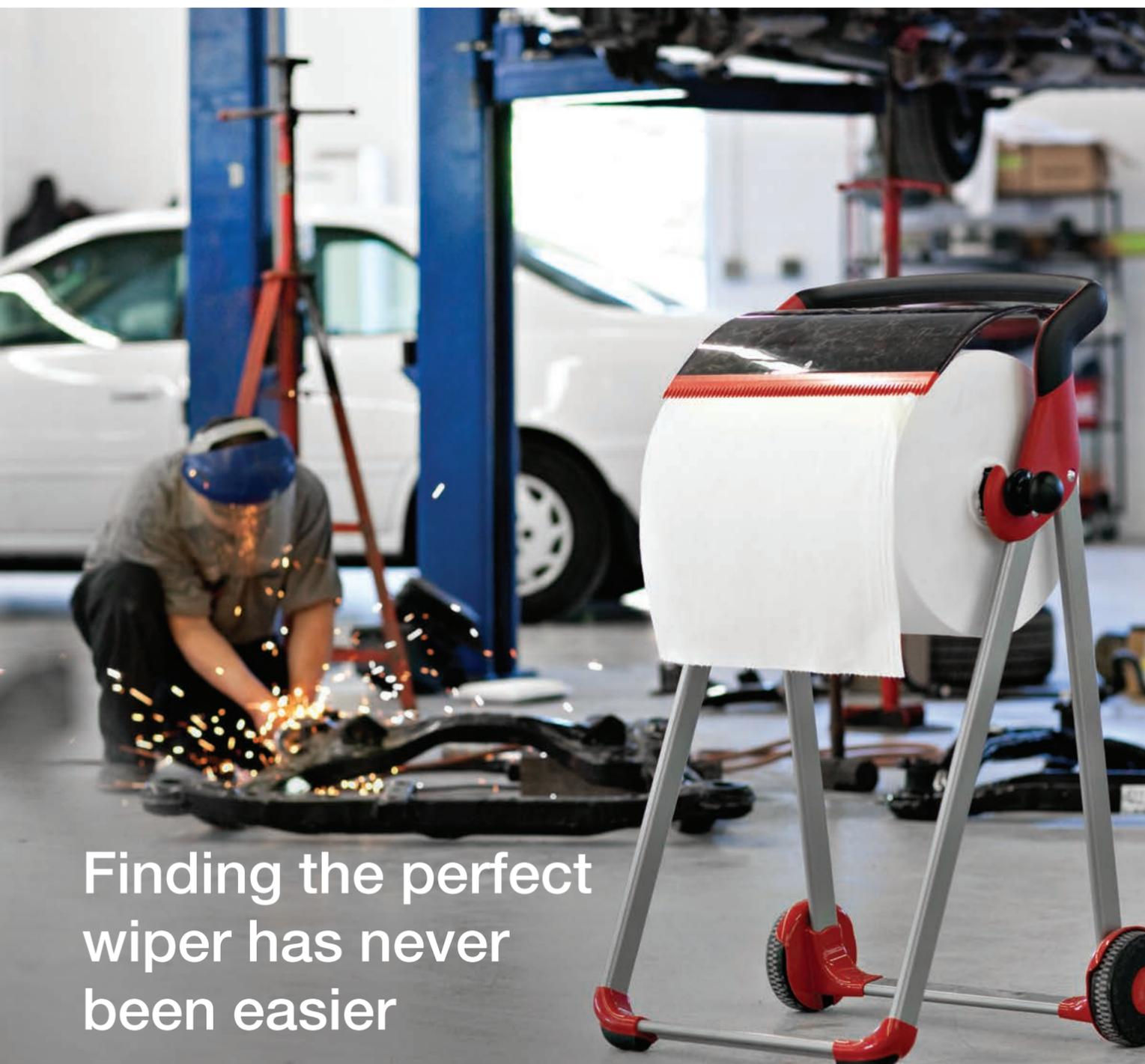
LTA lands in Montreal with \$90M investment

MONTREAL — LTA Aerostructures (LTA), a manufacturer of aircraft used to deliver heavy loads, is investing \$90 million in Montreal to establish Canadian operations.

The subsidiary of Washington, DC-based LTA Corp. says the investment over three years will create 180 jobs.

Airships provide an alternative for the delivery of materials in remote and inaccessible areas.

"Canada, and Québec in particular, represent a major market for transportation by airships in remote northern areas," said Michael Dymont, CEO of LTA Aerostructures.



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» Events

Oil Sands Trade Show & Conference DMG Events

Sept. 9-10, Fort McMurray, Alta.

Oil sands professionals will meet suppliers and services companies showcasing new technologies, products and services. Visit <http://oilsandstradeshows.com/2014>.

AMExpo/RAPID SME

Sept. 23-24, Toronto

RAPID Canada, Canada's first additive manufacturing/3D printing tradeshow and conference, debuts at the Advanced Manufacturing Expo (AMExpo), a showcase of world class advanced manufacturing technologies. Includes the Medical Manufacturing Innovations event. Visit www.amexpo.ca.

International Pipeline Exposition & Conference DMG Events

Sept. 29-Oct. 3, Calgary

This biennial event showcases more than 200 of the pipeline industry's brands and the latest technologies, products and services. The Topics International Pipeline Conference is held in conjunction with IPE. Visit www.internationalpipelineexposition.com.

PTDA Industry Summit PTDA

Oct. 23-25, Orlando, Fla.

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

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 supply chain 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. Call (866) 671-2778.



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NEMA 12 Cabinet Coolers

The NEMA 12 Cabinet Coolers for large heat loads up to 5,600 Btu/hr. are ideal for PLCs, line control cabinets, CCTV cameras, modular control centers, etc.

- Measures 8" (203mm) high
- Mounts top, side or bottom
- Enclosure remains dust-tight and oil-tight



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Type 316 Stainless Steel Cabinet Coolers

Type 316 Stainless Steel Cabinet Coolers for NEMA 4X applications are available for heat loads up to 5,600 Btu/hr.

- Resists harsh environments not suitable for Type 303/304
- Ideal for food and chemical processing, pharmaceutical, foundries, heat treating and other corrosive environments



Mini NEMA 12, 4, and 4X Cabinet Coolers

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- Mounts top, side or bottom
- Enclosure remains dust-tight and oil-tight

A bad choice could cost you thousands!



Look Familiar?

When hot weather causes the electronics inside a control cabinet to fail, there is a panic to get the machinery up and running again. The operator might choose to simply open the panel door and aim a fan at the circuit boards. In reality, the fan ends up blowing a lot of hot, humid, dirty air at the electronics and the cooling effect is minimal. If the machinery starts functioning again, the likelihood of repeated failure is great since the environment is still hot (and threatens permanent damage to the circuit boards). Worse yet, that open panel door is an OSHA violation that presents a shock hazard to personnel.

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www.exair.com/18/44018.htm



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- NEMA 12, 4 and 4X



Jeff Hauck, Lasercraft Inc. Cincinnati OH

"It took us three days to get a replacement computer cabinet and we didn't want to risk another heat failure. Fans weren't an option since they would just blow around a lot of hot air. Freon-type air conditioners like those on some of our other machines were a constant maintenance project of their own. We purchased EXAIR's Model 4330 NEMA 12 Cabinet Cooler System since it was easy to install and requires no maintenance."

If you would like to discuss an application, contact:

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Canada needs a national forestry policy

BY JERRY DIAS

With new collective agreements covering 2,000 workers at 11 Resolute Forestry Products plants across Quebec and Ontario – a deal that will set the pattern for negotiations covering 8,000 other workers east of Manitoba – forestry is on a renewed footing and ready for a long-overdue national dialogue about its future.

Canada is rich in natural resources, but we must consider how to harness them and serve everyone's interests by

“Action items include sustainable rules for wood harvesting that secure investments and jobs...”

generating good jobs and supporting communities while leading innovation and meeting the highest standards of environmental stewardship.

As one of the industries upon which our country was built, forestry is as an integral part of our modern economy and a renewable natural resource that can have a stronger future.

Canada is the world's largest forestry exporter, shipping more than half of its

\$57 billion annual output. Logging, pulp and paper, and wood products manufacturing employ 190,000 Canadians. Most have good jobs with decent wages and working conditions.

The industry and its workers make important contributions to the public purse, helping to pay for essential services such as health care, education and infrastructure.

But the sector is in transition.

There have been many challenges over the past decade, including the loss of one third of its jobs, rapidly changing markets, a shift in consumer demand away from newsprint and other papers, an over-valued loonie that hit all exporters, and the global financial crisis and recession. After painful restructuring supported by some solid government policies that drew on the dedication and sacrifices of forestry workers, the industry is rebounding and poised for a much brighter future.

What lies ahead? New, innovative products; the development of biopathways and nano-cellulose technologies that apply forestry resources to never previously imagined consumer and energy uses; and a sustained transition to higher-value growth products and markets. But a wave of imminent retirements means the industry could need up to 60,000 new workers by 2020.

Federal program expansion

Successful forestry industries around the world adopt smart and innovative policies to manage public resources, harness opportunities, and address responsibilities. Canada must do so as well. This will require a significant expansion of the federal Forest Industry Transformation program, hand-in-hand with complementary provincial initiatives.

Action items include sustainable rules for wood harvesting that secure investments and jobs while meeting the highest environmental standards; stable and appropriately priced hydro electricity; a modernized transportation infrastructure; and trade policies that support high-value forestry exports while protecting against unfair measures imposed by other countries; and control over the export of unprocessed raw logs.

To develop a successful national forestry policy, the federal government must bring together business, government, labour, and community leaders in a reinstated National Forestry Council.

It must have a specific mandate to investigate all issues and make public recommendations for a strengthened, high-value forestry industry with the full participation of provincial governments. This requires adequate resources to engage stakeholders and deliver recommendations within a set timeframe.

Workers have done their part to put the industry on a renewed footing and in the course of our negotiations, Resolute Forestry Products has joined our call for a reinstated council.

Canada's forestry industry is at a crossroads. If we make the right choices, the future will be bright.

Jerry Dias is the national president of Unifor, Canada's largest union in the private sector with more than 305,000 members, including more than 21,000 in forestry.

Comments? E-mail jterrett@plant.ca.



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Energy prices drove Canada's inflation rate to a two-year high in June thanks to year-over-year price gains in natural gas (19.4%) and gasoline (5.4%). Ontario, where the rate rose 3%, was the hardest hit. Quebec was the lowest at 1.7%.



Business was good for manufacturers in May, with sales rising to \$51.6 billion, the fourth increase in five months. Almost two thirds of the gain came from Ontario.

BOOMER EFFECT

Retirements are having an impact on the labour participation rate

Retiring baby boomers are mostly to blame for Canada's declining labour participation rate, while discouraged workers dropping out of the job hunt aren't driving the declining unemployment rate, according to an analysis by RBC economist Nathan Janzen.

The participation rate (percentage of those 15 and over either working or actively looking) has been trending down since hitting a pre-recession peak of 67.8% in February 2008.

What explains the decline in Canada's labour force participation rate says with a relatively modest job growth averaging 12,000 per month over the past year, the downward trend is causing speculation that weak labour markets are discouraging workers who are giving up on the job search. This takes them out of the participation and unemployment rates, which is thought to have driven a decline in the unemployment rate (rather than fundamental improvements in labour markets).

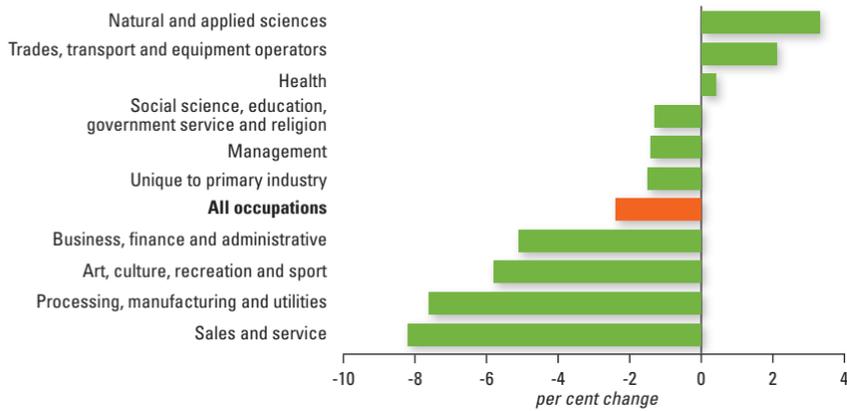
But there are other longer-term forces at work.

Most of the increase in the number of people not working since Oct. 2008 comes mostly from those 65 and over, which account for more than 68% of the one million Canadians classified as out of the labour force, according to Statistics Canada. The decline was exacerbated in 2011 by the first of the baby boomers reaching retirement age.

He notes the number of students who reported they'd rather be working than in school is not out of sync with pre-recession levels, nor is the number of workers waiting for recall.

Janzen says the distinction between the impact of discouraged workers on the participation rate compared to longer-term factors such as retirements has important implications for the labour force.

Discouraged workers lower both the participation and unemployment rates, while retirements just lower the participation rate. The good news is a decline in the participation rate, driven largely by worker retirements, suggests any drop in the unemployment rate does reflect a cyclical improvement in labour markets rather than the exit of discouraged workers.



DECLINE IN EI RECIPIENTS

There were 12,000 fewer employment insurance recipients in May after a year of little change. The total for the month was 504,100, a 2.3% decline that was most noticeable in Nova Scotia, Ontario, PEI and Quebec. Processing, manufacturing and utilities (-7.6%) and sales and service (-8.2%) dropped the most.

EXPORTS UP, TRADE DEFICIT DOWN

Canada's trade deficit took a tumble from \$961 million in April to \$152 million in May. Exports were up 3.5% to \$44.2 billion, led by motor vehicles and parts. Imports grew 1.6% to \$44.3 billion, driven by vehicles and parts, plus metal ores and non-metallic minerals. Exports to the US were up 2.2% to \$33.5 billion and 8.3% (\$10.7 billion) to the rest of the world.

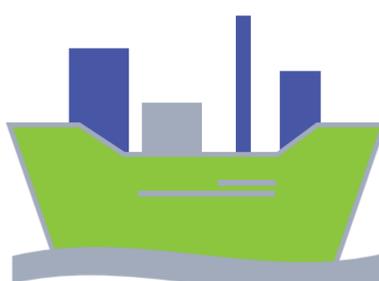


Canadian biz gets techy

The Internet of Things or IOT (interconnected devices) is changing the way Canadian businesses operate, a trend that's expected to peak by 2018 when spending on the category tops \$21 billion. That's a 375% increase over 2013, according to an IDC and Telus survey. While only 6% of businesses have implemented an IOT solution, another 7% are preparing to deploy in 2014. In the next 24 months, integration will grow by 30% as more companies adopt the latest way to maximize productivity, reliability, quality and cost savings.

Repatriation: it's happening!

A report from KPMG suggests fewer Canadian manufacturers are pre-occupied with cost-saving and outsourcing production, instead focusing on growth strategies. Only 14% plan to source from China, down from 31% in a 2013 survey, and 3% intend to source from India, down from 12% last year.



SLAYING DEFICITS: IT'S ALL ABOUT TIMING

A C.D. Howe Institute report by McMaster University professor William Scarth says Ontario should not delay its fiscal consolidation, while Ottawa needs to take a more gradual approach to deficit reduction than planned to create jobs.

The report recommends keeping the deficit at 0.5% of GDP for the next three years to lower Canada's unemployment rate by 0.4% for an additional 75,000 jobs.

While the change in strategy would keep the federal deficit at about \$10 billion over those three years, Scarth says that's insignificant because it would mean missing the 25% national debt-to-GDP target in 2021 by just one percentage point.

He concludes a 1.5% multiplier effect from carrying the deficit would actually enlarge the economy by \$15 billion.

Profitable process IMPROVEMENT

REFINING PRINOTH'S OPERATIONS PAYS OFF GLOBALLY

The snowgroomer and utility vehicle manufacturer dealt with aggressively priced competition from Asia by simplifying processes without sacrificing quality.

BY MATT POWELL, ASSISTANT EDITOR

Realizing the potential in your operation doesn't always mean starting from scratch or spending a bunch of money on new machinery, equipment and fancy data collection technology. Sometimes all that's necessary is a close look at your processes to realize the biggest payoff.

Such was the case at Prinoth North America Ltd., a Granby, Que.-based manufacturer of tracked utility and snow grooming vehicles under pressure from competitors in Asia, which started to bite into market share by delivering products priced up to 40% cheaper.

Faced with this growing competition, an ailing product line and a manufacturing process that wasn't exactly efficient, the company focused on improving its operations to regain market position.

"We were being held back in production by products too complex to do in an efficient way," says Jean-Claude Perrault, Prinoth's vice-president of sales for North America, a role that includes the management of a purchasing department responsible for more than \$60 million of production material.

Headquartered in Sterzing, Italy, Prinoth Ltd. is the snow grooming and all-terrain vehicle division of the Leitner Group, which has 70 subsidiaries, 124 sales and service points and production locations in 10 countries.

Founded in 1951 by race car driver Ernst Prinoth, the company started out as an automotive garage before transitioning into snow and slope vehicles in 1962 with the P60 prototype.

Perrault, an engineer, has been along for the ride since 1996 when the division was still owned by Bombardier Recreational Products, which included

the manufacture of snowmobiles and personal watercrafts.

The company's history with Bombardier is a long one, he says, and it still builds on the original products developed in the 1940s.

"These products are very special. They're a niche, and the knowledge we need to build them is extensive," he says. "We still have all of the old Bombardier drawings from the 1950s in our shop."

In late 2004, Bombardier decided the utility vehicle division no longer fit within its recreational group and sold the business to Camoplast, a Sherbrooke, Que.-based manufacturer of components and assemblies for original equipment manufacturers. Ironically, the company also manufactures polymer and rubber components for all-terrain, snow and industrial vehicles.

By October 2005, Camoplast had formed an alliance with the Leitner Group for the design, sales and support of the BR350 and BR180 snow machines, but by 2009 Camoplast had sold off both the snowgrooming and utility divisions, giving 100% ownership to Prinoth.

The company not only kept production in Granby, it increased capacity by 50%.

The 144,000 square-foot plant, 70% of which is dedicated to two production lines and a custom shop, employs 250 people who manufacture 14 different snow grooming and utility vehicle mod-



The Beast was one of two Prinoth snowgroomers sent to Russia for the 2014 Sochi Winter Olympics.

PHOTOS: PRINOTH NORTH AMERICA LTD.

els. It has an engineering staff of more than 25 and produces 450 vehicles annually, including the Bison X and Beast snowgroomers, and the Panther and Trooper utility vehicles.

"Forty per cent of what we build is snowgroomers, the balance is utility vehicles," says Perrault.

The utility vehicles are a mix of small track sidewalk snow removal vehicles, and track carriers used to carry equipment off-road or perform applications such as power line maintenance. They're also used in mining, drilling and pipeline construction.

Shake up

Although utility vehicles lead Prinoth's production numbers, snowgroomers lead revenue. And when competition from Asia was stepping on its turf with machines that were almost half the price, the company realized it was time for a shake up. For example, GO-TRACT carriers were made of 2,200 different parts, 50% of which were unique to one of the six models it produced.

Prinoth restructured its line of util-

ity vehicles and took a hard look at its processes to ensure the new line of products would be tuned for growth, cut production costs and inefficiencies, and increased capacity for the future.

The first step was to develop a platform strategy, which led to a new Panther utility vehicle to replace the GO-TRACT line. It would be offered in five models with two cab configurations – down from six models with 11 cab configurations.

Next, innovation and stage gate product development processes were established, a multi-disciplinary team made up of representatives from every level of the organization was created and development tools such as Design for Manufacturing and Design for Assembly were implemented.

Perrault went through a similar scenario during his time at Bombardier when he led the establishment of an elaborate product development process.

"One of the key steps is to develop a multi disciplinary team, because its faster and you include the needs of everyone. We had too many products that were purely engineering driven, and in those cases, you're basically designing cost into your products."

The overhaul involved two phases, starting with a lean project that involved limiting inventory from two weeks to



Prinoth's Granby plant produces 450 units annually across 14 vehicle models.



The Panther utility vehicle is assembled with less than 1,000 parts.



four hours, introducing kanban processes and eliminating batch manufacturing, which gives the company the flexibility to better manage and streamline its labour.

“There’s certain areas of our production where it’s not as easy to find qualified labour, so we needed to make sure we could control [those areas] and manage labour properly.”

The Granby plant’s workforce is a significant reason production stayed in Canada, he adds.

“We have people that have been here for more than 30 years: they’re skilled workers. We have to leverage that expertise because it’s something we wouldn’t have outside of Granby.”

When Prinoth turned its attention to the product line, it cut part numbers in half – a factor Perrault says had a huge impact on the outcome of the process overhaul.

“It’s only when you achieve the kind of improvement we have that you realize how much impact a single part can have on the entire process. It had a huge impact on being more competitive,” he says.

Big payoff

The result is a platform strategy of five new vehicles made up of less than 1,000 parts, a 55% reduction from the GO-TRACT line. Assembly time was reduced by 30% and welding hours were cut by 68% for significant cost reductions.

Cutting the number of Panther configurations didn’t require many trade offs for

customers because Prinoth still dedicates a significant portion of its shop to custom work.

Now the company is working to boost production where it currently manufactures 450 vehicles a year, but has capacity to make more than 600. The utility vehicle division will drive the company’s growth because snow-grooming is a flat market, Perrault adds. And it’s targeting export markets, where Prinoth sells more than 70% of its vehicles.

“We’re not manufacturing here to be driven by the Canadian market. If we did that, we’d be doing 15% to 20% of the business we’re doing today.”

The payoff for the Granby plant’s efforts came in more forms than one, culminating last February when the company’s Bison and Beast snow groomers took to the mountains in Sochi, Russia to build snow parks, half pipes and snowcross courses for the 2014 Winter Olympics, a deal worth a reported \$20 million. The plant manufactured 30 of the 62 groomers sent to Russia.

Its presence in Canada is also growing. The company’s new 17,665 square-foot location in Calgary houses sales offices, a parts department, meeting rooms and a service shop – smack in the heart of Canada’s oil country.

Thanks to its focus on process improvement, the Asian competition isn’t looking so tough, and Prinoth is on its way to filling out that excess capacity.

Comments? E-mail mpowell@plant.ca.



The Panther is used in a number of off-road applications, including power line maintenance.

»Think Lean

5S: It’s not just housekeeping

Getting the most out of a clean and tidy plant

BY RICHARD KUNST

It’s surprising how many facilities don’t use 5S. The simplest of techniques is an ideal starting point for any manufacturer wishing to embark on a lean journey.

The 5Ss are Japanese words: seiton (sort); seiri (straighten); seiketsu (shine); seisi (systemize); and shitsuke (sustain).

Or more simply, “everything should be in the correct place, all the time, in a clean environment.” This means the plant, machinery and equipment are always clean; floors are free from oil and other hazards; the work area is clear of unwanted equipment, tools or work pieces; and aisles and ‘no go’ areas are clearly marked and free of obstructions. Store tools on tool boards, not the bench or the floor; store components tidily in racks; eliminate work in progress; and clean everywhere regularly.

A 5S program starts in a small area of a facility where success is guaranteed, and it will be used as a model area for other groups. Start in the cafeteria or meeting rooms so folks see the immediate impact and enjoy the benefits of operating in an organized environment.

Stage one is about tidying up. Photograph or video the area for posterity. Remove items that are obviously scrapped and fix a red tag to all questionable items. If the item is used during the following week, remove it. After one week, a second tag should be attached to remaining items. Include old machines and equipment.

At the end of the second week, remove all items with two red tags and store them for a short period, just in case they’re needed. A word of caution! Some items may only be used once a month, so don’t get rid of them.

When all red tagged items have been removed, stage two begins.

Everything should be cleaned – machines, shelves, floors, containers and skips. Specific areas should be identified, such as the place for the waste bin and the location of cleaning equipment. Next, paint the whole area, including the floor.



PHOTO: THINKSTOCK

Create employee meeting areas and identify materials storage areas. Convert the floor to “talking floors,” marked to identify areas such as aisles, dividing lines, dangerous places, ‘no go’ areas and traffic flows.

Signs should identify areas, processes, special equipment and reject/scrap materials. Place tools in their correct position on tool boards and identify all production material.

The regular clean program begins at stage three. Procedures should be prepared to indicate what needs to be cleaned, how often, who will clean it and what equipment will be used.

Encourage every employee to spend at least five minutes a day cleaning his or her own work area.

Establish cleaning stations containing all the equipment required to tidy an area and mop up spills. Remember, cleaning is not a special event when a customer visits – it should be a way of life for all employees.

Once the area is clean, tidy and everything is stored correctly, stage four (standardization) kicks in.

This ensures similar standards are used across all areas within a plant. Checklists and regular auditing ensure the newly created standards are maintained.

Have empowered work teams audit each other’s areas and make the results available on notice boards. When an area is ‘perfect’ take photographs to use as a reference for the future and as a benchmark for other areas.

Stage five covers training and discipline. All members need 5S training. This involves preparing checklists for each machine, cell or area, and schedules for auditing the employee’s own and other areas. Checklists cover all aspects of the work areas including jigs, tooling, the surrounding area and common areas within the plant.

And remember there are two additional S components: safety, which should always be top of mind, and “shikkari-yarou,” which means “let’s try harder.”

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

Comments? E-mail jterrett@plant.ca.

» Inside Maintenance



PHOTO: THINKSTOCK

Smart ENERGY management

IT SAVES YOU MONEY

Reduce costs by committing to best practices that reduce consumption.

BY STEVE GAHBAUER

There are several ways to reduce maintenance costs, and one is to look at energy management.

In the past, plant managers didn't trace the energy costs of specific production areas, certain machines, or maintenance, thus ignoring potential savings. Now that energy costs are critical, the picture has changed: we need to know how much power machines use, make them more efficient, and aim maintenance practices at reducing consumption.

Energy management is part of Lincoln Electric's corporate culture.

"We are a profit-sharing company, so everyone reaps the profits of energy management. That makes integrating it into the corporate culture much easier," says Adel Mir, the company's director of engineering services.

Lincoln Electric produces welding equipment and wire in Toronto's Leaside Business Park, where its three distinct manufacturing facilities are ISO 9001, 14001 and 50001 certified. Up to 300 employees work year-round at the three plants that cover just under 810,000 square-feet.

The company was first introduced to ISO

50001 through a 2011 pilot project funded by the Ontario Power Authority's Conservation Fund, and delivered by Hatch Ltd., an engineering company based in Mississauga, Ont.

At the end of the pilot project, Hatch estimated that improvements in electricity use intensity ranged up to 16.5%, with concurrent greenhouse gas emission reductions of up to 950 tonnes annually.

Each site was provided with an assessment of key systems, customized training, measurement and analysis support, templates and coaching on all aspects of the requirements for attaining ISO 50001 certification.

Encourage sustainability

Suggestions for initiatives come from employees and the company has implemented projects that include converting old steam boilers to more efficient natural gas units for plant heating, changing DC motors to AC, and lighting retrofits.

To encourage sustainability and bolster a solid understanding of energy management and what it means to the future of the company, all employees participate in full training sessions, which include lessons on how to spot "energy waste."

There are initiatives, funds and programs to assist with energy management. Funding for embedded and roving energy managers is one of many efficiency programs offered through saveONenergy, a

suite of programs funded by the OPA and operated by local electric utilities.

"Having an energy manager is one of the best ways for plants to uncover savings opportunities," says Andrew Pride, vice-president of conservation at the Ontario Power Authority (OPA).

To qualify, companies with an embedded energy manager must implement 300 kilowatt hours (kWh) of peak demand savings and 300 kWh multiplied by the facility's load factor, times 8,760 hours in energy savings annually. Pride notes that 30% of these savings must be achieved without incentives from the OPA or local electric utility. Estimated payback is 3 or 4 cents per kWh.

The initiative funds 80% of energy manager salaries, as well as an additional 80% of annual expenses.

Less than two years after the program's launch, it has exceeded all expectations. The initial funding cap has been lifted and the program has been extended to 2015.

The number of energy managers currently sits at 55, 20 more than the original goal of 35. In 2012 alone, 39 of them helped organizations save more than 7 million kWh.

Alberta's Energy Efficiency Assessment Program (EEAP) provides small to medium-size manufacturers with access to services provided by professional energy auditors to identify savings. The incentive funds up to 50% of the cost of an energy audit up to a maximum of \$25,000.

Another Alberta program, the Industrial Efficiency Program launched by Productivity Alberta and delivered by C3, a province-based climate change and sustainability agency, assists small to medium-size enterprises identify and implement energy retrofit projects that to reduce consumption and greenhouse gas emissions.

The program is eligible to companies with fewer than 300 employees and annual energy expenditures between \$175,000 and \$5.5 million.

Managing energy is a tough job. There are challenges and priorities, but opportunities as well. Committing to energy management best practices provides new tools that make your job easier and more effective.

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

Comments? E-mail jterrett@plant.ca.

» CCOS Safety Tips

STAYING COOL

How to manage exposure to heat

Whether you work in a hot plant or outdoors, heat exposure can be dangerous. Heat stress results from exertion, the environment, clothing and wearable equipment.

Most people feel comfortable when the air temperature is between 20 and 27 degrees C with relative humidity ranging from 35% to 60%. However, very hot environments increase internal body temperature several degrees above a normal 37 degrees C, overwhelming natural cooling systems and leading to a variety of serious and possibly fatal conditions. Risk to health increases for workers who are over 65, overweight, have heart disease, high blood pressure, or respiratory disease, take medications affected by extreme heat or have skin diseases/rashes.



Furnaces and molten material are key sources of extreme heat. PHOTO: THINKSTOCK

Illnesses include heat stroke, cramps, loss of consciousness and exhaustion. There's also the risk of accidents resulting from slippery sweaty palms, contact with hot surfaces or fogging of eyeglasses while moving from hot to cold.

Reduce risk by following these tips:

- Provide training on the serious health risks of heat illness, how to avoid it, how to recognize the symptoms and what to do if it happens.
- Keep workers cool and hydrated. Allow some flexibility during hot conditions. If possible, schedule heavy tasks and work that requires personal protective equipment for cooler times such as early mornings or evenings. Keep the work area cool, or provide air-conditioned rest areas. Encourage workers to drink water even if they don't feel thirsty, and to take frequent rest breaks.
- Workers need to acclimate. It can take up to two weeks to build up a tolerance to hot conditions.
- No shady or cool place? Workers should reduce their physical efforts.
- Alcohol and drugs worsen the effects of heat illness. Those on medication should be informed about how it will react to the sun and heat.

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.

LEAN ALERT



Here's a common mistake: seeing lean as a tool for headcount reduction or mindless cost cutting. This misses its purpose, warns the Lean Enterprise Institute, the "not think but do" tank founded by lean guru James Womack. The aim is to create value by eliminating waste. As your company improves processes, re-allocate productive resources to new value-creating work. Also avoid implementing individual lean tools without understanding the system in which they fit. All lean workers must understand the "why" behind the tools, or their value will be lost.

Visit the Lean Enterprise Institute, www.lean.org.

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» Marketing

If you are having trouble getting express consent from contacts, don't panic – you have three years to meet Canadian Anti-Spam Legislation standards.

BY MARTIN MILLICAN

During the lead up to the implementation of the Canadian Anti-Spam Legislation (CASL) on July 1, many companies were in a panic, launching millions of e-mails to their contacts seeking “express consent” to continue sending commercial e-mail, text and social media messages.

These easy to ignore consent requests have many companies wondering how they can communicate with their customers without being in contravention of the new law.

Well, you can relax! If you didn't send your consent request prior to July 1, it's likely the best move you didn't make. CASL's real teeth – the right for individuals to sue – will not come into effect until July 1, 2017, so unless your firm is a nasty serial spammer deserving a major slap-down from the CRTC, you have three years to get your sales and marketing databases aligned with CASL.

Before putting a strategy in place, understand what “consent” means.

As of July 1, CASL requires companies to have one of two kinds of consent, each with distinct processes.

One is express consent. Think of it as a single documented “agreement to communicate electronically” between your organization and the contacts in your database.

The other is implied consent, which involves three broad scenarios:

- **Transaction or inquiry.** If someone bought something from your company or made an inquiry, you have two and a half

Confused about CASL?

FIVE TIPS FOR AN EFFECTIVE CONSENT STRATEGY



CASL requires express or implied consent from your business contacts.

PHOTO:THINKSTOCK

years from the contact date to send commercial e-mails on the presumption the transaction or inquiry denotes implied consent.

- **Conspicuously published e-mail address.** If someone has published an e-mail address online or elsewhere, it's okay to send commercial e-mail messages if the content is relevant to that person's position or role (assuming there isn't a notice saying not to).

- **Existing business relationship.** The contact has an existing business relationship with your company and has

provided an e-mail address without any express notice that they don't want to receive messages from you. This is the designation most companies are likely to rely on to continue sending most e-mail marketing during the three-year transition period.

Capturing consent

It's best to begin capturing express consent now from your implied consent contacts. Here are some tips to get you started:

- Add a checkbox, pop-up or confirma-

tion mechanism to all new e-mail sign up forms. You'll need to capture a number of key details such as the date and time the consent was received, and possibly the IP address of the subscriber's computer.

- Include a description of the type of e-mail communication the recipient is agreeing to accept. This can be written as broadly as you want and easily enhanced through subscription preference settings that allow contacts to see the types of communication available so they select only the ones they want to receive.

- The request for express consent must be explicit and not combined with anything else. For example, you can't say, “By downloading this case study you agree to receive messages from XYZ Inc.”

- Express consent can't be presented as an opt-out mechanism.

- Be clear the contact can withdraw express consent at any time, and there must be a simple and immediate mechanism to do so.

For many companies, developing a CASL consent strategy is daunting because the law extends beyond e-mail, but by putting an effective engagement process in place, compliance will be automatic and relatively painless for all involved.

Martin Millican is the president of Envoke.com, a Toronto-based service provider and developer of permission-based automated marketing solutions. E-mail martin@evoked.com.

Comments? E-mail jterrett@plant.ca.

» Data Theft

USB drives: a security risk

Protect portable data with biometric encryption

BY MARK BORKOWSKI

Has this happened to you or someone in your organization? You arrive at a business meeting and your USB drive is missing. Now the fun begins. Was it encrypted? It's not just about the information that may be lost, it's what can happen if the wrong people get their hands on it.

A study by the Ponemon Institute, a data security research firm in Traverse City, Mich., shows an alarming percentage of companies do not consider the protection of information on a USB drive to be high priority.

Less than a third of organizations believe they have adequate policies to prevent USB misuse, yet an average of 12,000 customer records per company are lost. Indeed, nearly half of large organizations lost sensitive or confidential information in the past two years, and the rate of loss is accelerating.

How can we securely protect USB information inexpensively?

A small company in Toronto suggests biometrics. The Encript One



PHOTO:THINKSTOCK

AM1 fingerprint scanner (www.encriptrone.com) from Great Durable Products Ltd. scans a fingertip, but the square pad also accommodates any part of a finger or hand that shows a pattern.

The product is for PCs only. Plug the unit into any USB port and run the Setup.exe file from a CD to install your fingerprint into the scanner. Then plug any USB thumb drive into the back of the scanner and using the installed software, format the thumb drive.

Data can't be seen without your imprint.

USB drives are easy to lose and easily stolen.

Encrypting your flash drive information ensures your data doesn't get into the wrong hands.

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

» Legislation

To avoid trouble with tougher Canadian laws, start with a detailed risk assessment, then identify what needs attention and how to proceed.

BY SANDY BOUCHER

There have been significant changes in the world of foreign corruption enforcement, which includes Canada's Corruption of Foreign Public Officials Act (CFPOA), in effect since June 2013.

In addition to increasing the maximum penalty to 14 years in prison, CFPOA changes provide additional jurisdiction over Canadian companies and individuals, add a new offence related to creating false accounting records to conceal bribery, and phase out facilitation payments. Companies are slowly becoming aware of these changes, but they're unsure what needs to be done to protect themselves in this new environment.

Canadian manufacturers looking to foreign markets for both sales and production face increased risks, and the consequences for non-compliance can be severe. They include fines, jail time, class-action lawsuits, crippling costs, and damage to reputations.

The US and UK governments published guidance to help companies navigate the laws, be aware of their responsibilities and understand what's expected of them. Although no formal guidance has been provided in Canada, there's a roadmap for companies operating overseas with the 2011 bribery conviction of Niko Resources Ltd., a Calgary-based oil and gas company focusing on India and Asia. Canadian courts assessed fines and penalties of \$9.5 million, and three years of probation. The following high-level summary of the order provides a good starting point for manufacturers wishing to up their game.

Companies are required to have a rigorous anti-corruption compliance code. Standards and procedures need to detect and deter the violation of CFPOA and other applicable anti-corruption laws. At a minimum these should include: a clearly articulated and visible corporate policy against violations of the act, and other foreign law counterparts; strong, explicit and visible support of the policy from senior management; compliance standards and procedures to reduce violations; and a program that applies to all directors, officers employees and third parties acting on behalf of the company.

The Niko probation order also highlights several areas recognized as particularly high-risk, including gifts, hospitality, entertainment and expenses, customer travel, political contributions, charitable donations and sponsorships, facilitation payments, solicitation and extortion.

What steps should companies take? Assign responsibility to one or more senior corporate executives for the implementation and oversight of the anti-corruption program, with a direct line of control from the board of directors.



Penalties for non-compliance to CFPOA can be severe.

PHOTO: THINKSTOCK

Looking at FOREIGN markets?

PUT AN ANTI-CORRUPTION PROGRAM IN PLACE

Develop the program as a risk assessment that addresses potential bribery issues. In particular, consider the following factors: the organization's locations; interactions with government officials; industrial sectors of operation; involvement in joint venture agreements; the importance of licences and permits; the degree of government oversight; and inspection, volume and importance of goods as well as personnel that are cleared through customs and immigration. Experience has shown the use of third-party agents is also a key risk factor.

Have an effective system of financial

and accounting procedures in place to identify suspicious activity. Include internal controls, accurate books, records and accounts to ensure they can't be used for bribery, or concealing bribery.

But policies and procedures aren't enough. Systems are needed to ensure details of the anti-corruption program are effectively communicated to directors, officers, employees, agents and business partners, and should include periodic training at all levels and annual certifications to verify compliance with the training requirements. This training should be focused on high-risk areas and

ensure all staff have a general awareness and knowledge of the law, as well as their responsibilities. Individuals in key positions identified in the risk assessment will require more detailed knowledge of what to look for, how to behave, and what to do if problems arise.

The use of third-party agents and business partners warrants special mention, but ensure they're properly informed of the company's commitment to abide by anti-corruption laws, ethics policies and reciprocal commitments.

Preventing problems

Put a confidential whistle-blower or reporting system in place and offer informants protection against retaliation, and have an effective system for providing guidance, advice and timely information to staff and agents. This prevents problems from arising at an early stage.

Review the program at least annually and update as appropriate. All program elements require ongoing review and testing to evaluate and improve their effectiveness while incorporating recent developments and changes.

Carefully tailored policies and controls are key, but so is enforcing an organization-wide culture change by ensuring the anti-corruption message is broadcast and followed from the top down.

The Niko probation order provides a framework for an anti-corruption program, but the elements must be actively implemented and monitored. Even the best program, if unused, will not help if the police come knocking.

Download a copy of the Niko probation order at www.cba.org/ABC/ladefense/Pdf/Niko%20Probation%20Order.pdf.

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Comments? E-mail jterrett@plant.ca.

» Training

Be a better coach

Five questions that improve performance

BY HUGH ALLEY

You are expected to coach employees, but what does that look like? Here are five powerful coaching questions that will improve your team's problem solving skills and performance.

1) What's your target condition? This isn't a goal with a defined timeline, but how you want things to work. The answer (for example, I want this production cell to produce 400 parts per day) will serve as a reference for all later discussions.

2) What's the current condition? A manufacturer wanted to improve its quality index by 30%. Understanding the current condition required understanding the circumstances contributing to the current quality issues. Where in the process did they originate? What caused the quality failures?

3) What are the obstacles to achieving the target condition, and which one are we working on? Identify the obstacles. Some will be external, some internal. Sometimes we don't know enough about a process. If we change too many things at once, we won't know which one is driving the new outcome. Prioritize, but it's not essential. You learn

something that will take you to the next step, even if you pick an obstacle that doesn't resolve the situation.

4) What is the next step/experiment/PDCA cycle that will overcome the obstacle? It may take more than one round to resolve.

Using Plan/Do/Check/Act, start the experiment with your guess about the outcome. Conduct the experiment or take the step see the outcome. What have you learned? If you didn't progress to the target, you've still learned something that will inform your next trial.

5) How soon can we see what we've learned? A supervisor considering a new jig built a cardboard test unit. He was planning to run a trial for a month, but realized all the needed information would be available in three days. That shortened the trial time by 85%, saving several hours a week in just two weeks, instead of two months.

To learn more about this approach, read Toyota Kata by Mike Rother. See www-personal.umich.edu/~mrother/Homepage.html for details of his work and some other resources.

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» Collaboration

Introducing the CONNECTED car

APMA-LED PROJECT MEETS GROWING DEMAND FOR AUTOMOTIVE TECHNOLOGY CONVERGENCE

Showcasing the art of the possible with “connected” automotive technologies by Canadian companies.

BY MATT POWELL, ASSISTANT EDITOR

The Automotive Parts Manufacturers’ Association (APMA) showcased Canada’s high-tech automotive know-how at its annual June conference and exhibition in Windsor, Ont. with the unveiling of the country’s first connected vehicle.

The 2014 Lexus RX350 crossover, donated by Toyota Canada is parked at the University of Waterloo and is loaded with features from 13 Canadian automotive companies, including Magna International, Leggatt and Platt, and start-ups such as B.R.A.K.E.R.S Early Warning Systems Inc. and Weather Telematics.

“The Connected Car is a great example of what Canada does very well – collaboration. We do a great job of bringing together academic research, the federal and provincial governments, our automakers and high-technology companies,” said APMA president Steve Rodgers in a presentation alongside Ross McKenzie, managing director of the Waterloo Centre for Automotive Research (WatCar).

“But unveiling this project is only the beginning of its journey.”

The APMA Connected Vehicle Program is aimed to help Canada’s auto sector lead the global development of the autonomous vehicle, Rodgers added. The



Technology converges in this 2014 Lexus RX350.

PHOTO: APMA

program was established in 2010 to meet what he calls a “growing demand for technology convergence.”

Art of the possible

The suped-up Lexus crossover has an internet connection, wireless charging plus side and rear-view mirrors that rotate 360 degrees. Its operating platform was developed by Ottawa-based software maker QNX, which is already working with other Tier-1 suppliers and automakers including Kia and Mercedes.

Weather Telematics warns drivers of road conditions, while B.R.A.K.E.R.S alerts drivers of emergency vehicles and bad weather such as flooding, tornadoes or bridge collapses.

“We’re working to showcase the art of the possible,” said McKenzie.

The “mobile incubator of evolving connected vehicle technologies,” as the vehicle has been dubbed, will be toured around North America at manufacturing facilities including Toyota, the Detroit Three, Honda and Nissan.

The APMA plans to launch similar vehicle projects that incorporate an even wider collection of suppliers, new technologies and vehicle platforms to demonstrate autonomous capabilities.

“This program is a showcase of where the automotive industry is headed,” said Rodgers. “Canada has an abundance of advanced technology experts and companies that can lead on the world stage for the next generation of vehicles. This project proves that.”

Comments? E-mail mpowell@plant.ca.

» Aerospace

Lightweighting the jet engine

Ceramic components boost efficiency

Ceramic might seem like an odd choice as a leading material candidate for the development of advanced aerospace components. Coffee mugs and breakage come to mind. But it’s not that kind of ceramic.

It’s harder and lighter than steel, handles corrosion better and takes more heat – factors driving a General Electric (GE) research project 20 years in the making.

GE Global Research and designers at GE Aviation have developed a ceramic composite that outperforms most advanced material alloys and cuts hundreds of pounds from a jet engine.

GE says the material will help lower fuel burn and emissions.

Ceramic matrix composites (CMCs) combine silicon with ceramic-coated silicon carbide fibres that make them tough enough to handle the intense heat inside the engine of a jetliner – temperatures exceeding the capability of current nickel alloys typically used in high-pressure turbines.

Today’s metal parts require extensive dedicated cooling air, which takes away from the primary engine airflow and reduces efficiency. CMCs operate with little or no cooling, providing a significant efficiency boost to the cycle. They also weigh 66% less than nickel.

GE has already completed more than one million hours of testing on the new material and has committed to incorporating it into its LEAP jet engine, which is to enter airline service by 2016 for use in the Airbus A320neo, Boeing 737 MAX, and COMAC C919 aircraft.

In May 2013, GE Aviation invested \$27 million and committed to adding up to 70 jobs by 2018 at its Newark, Del. facility that manufactures aircraft engine components from CMCs.

» Investment

Cisco supports new innovators with \$150 million

Funding will go to start-ups, entrepreneurs

Cisco Canada is investing \$150 million over the next 10 years in Canadian start up companies, entrepreneurs and technology incubators to accelerate innovation here.

The tech-giant plans to invest across a mix of technologies, businesses and investment stages, and will actively engage with partners and start-ups to mentor and develop new innovators.

“Canada continues to produce some of the top engineering and management talent in the world and is home to dynamic industries that are ripe for business transformation,” said Nitin Kawale, president of Cisco Canada at a Toronto Board of Trade event in mid-June.

Direct technology sector investment will investigate opportunities in areas such as cloud infrastructure, digital media, big data, analytics, information management, intelligent infrastructure and mobility.

Cisco’s venture capital investments will focus on the Canadian “innovation engine” and will cover a broad spectrum of technology to provide insight into the start-up community and build on its relationship with the federal government.



Cisco Canada’s Nitin Kawale announced Toronto as the location for one of four global Internet of Everything innovation centres.

PHOTO: CISCO CANADA

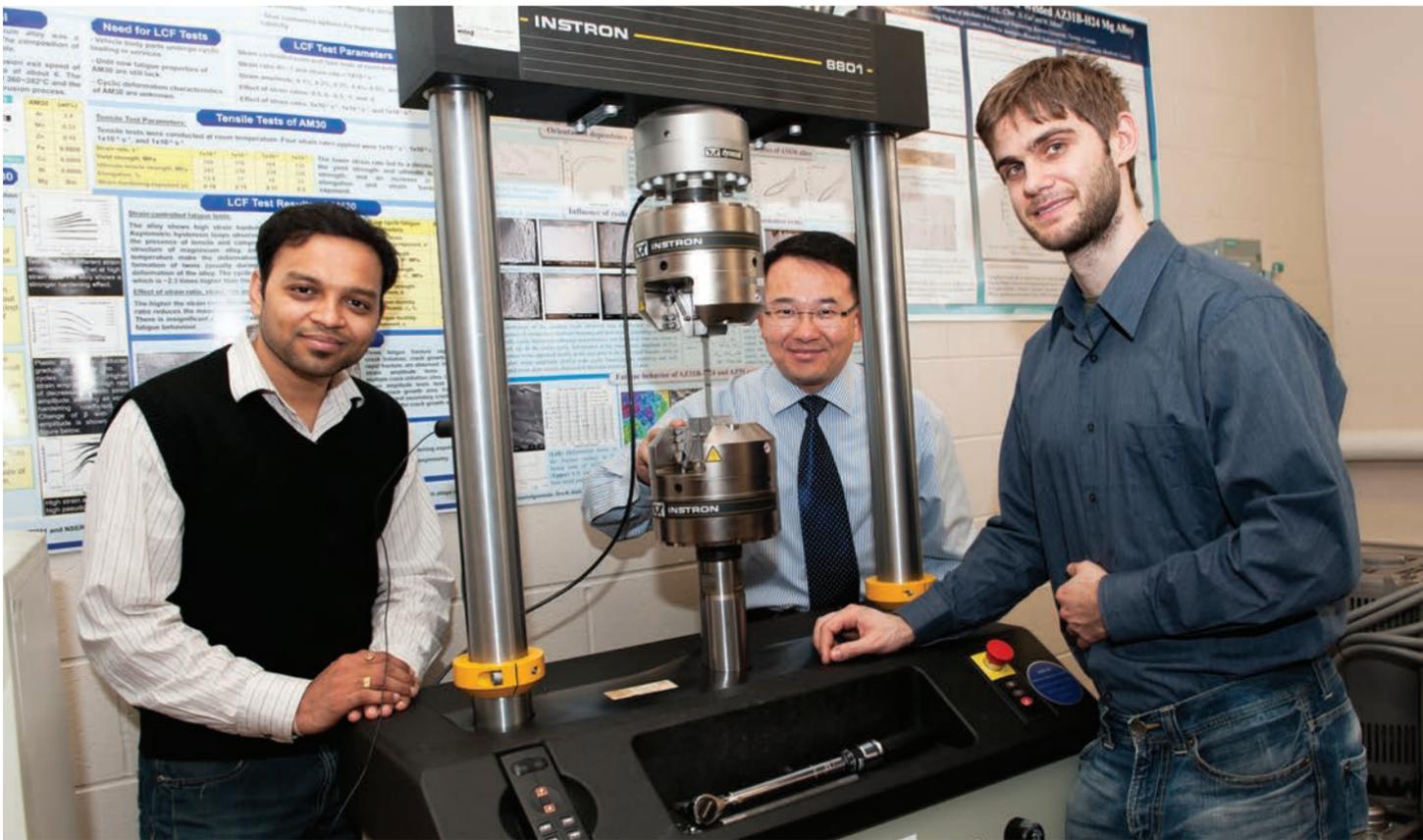
Incubators will provide early stage companies with mentorship and technology support to stimulate industrial, service provider, and enterprise technologies.

The networking equipment conglomerate has an active portfolio worth \$2 billion with more than 80 direct investments and partnerships with 35 funds globally.

Cisco Canada is also in the midst of investing \$100 million in Toronto for one of its four global Internet of Everything (IOE) centres to foster local innovation, industry transformation and economic development. It’s scheduled to open in 2015.

The Toronto IOE Innovation Centre will occupy approximately 15,000 square feet of space in RBC WaterPark Place. It will also be home to Cisco’s new Canadian headquarters.

The building will be the first commercial office tower in North America to take advantage of a fully integrated IP-based building and energy network.



Daolun Chen (centre) leads the AUTO21 laser welding and durability of advanced high strength steels project. PHOTO: RYERSON UNIVERSITY

» Automotive R&D

Advancing HIGH-STRENGTH steel

AUTO21 RESEARCH TARGETS WELDING DEFECTS

AHSS materials are high strength with good formability, but researchers are looking for ways to eliminate changes in the internal microstructure of the steel that affect weld performance.

BY DAOLUN CHEN

Demand for safer and more fuel-efficient transportation has automotive manufacturers searching for alternative materials that increase

vehicle integrity and decrease weight. The answer may lie in durable and lighter tailor-welded blank components made of advanced high-strength steel (AHSS). This will lead to reduced fuel consumption (6% to 8% for every 10% reduction in vehicle weight) and carbon emissions without risking the integrity of the ductility, formability and crashworthiness of the vehicle.

Several types of AHSS developed through research funded by the US departments of energy, defense and the Canadian government are high-strength with good formability, but there are welding issues. Pieces are heated to different peak temperatures across the weld and

then quickly cooled to an ambient temperature, which causes a change in the internal microstructure of the steel. This deteriorates weld performance.

AHSS used for automotive applications is coated with zinc for corrosion resistance, but this complicates lap welds. Zinc melts and gets trapped inside the molten steel, solidifying at the grain boundaries of the fusion zone, causing embrittlement. And it evaporates during the butt-welding process, increasing the vapour pressure in the fusion zone. This creates defects such as concavity and porosity, which affect fatigue resistance and durability.

High-strength steel's fusion zone is

harder than the base material, which reduces the weld's malleability. Another issue is softening, which occurs when carbon atoms react with iron atoms, causing the accumulation of strains in the area. This contributes to the weld's premature failure.

Welding defects also depend on the types of AHSS used. For example, softening occurs in DP980 dual-phase steel, but isn't present in high-strength low-alloy steel. Both types show superior tensile strength, but fatigue strength is higher in the DP980 steel.

Advanced technique

Softening is minimized with higher welding speeds and smaller laser-beam sizes, which form narrower heat-affected and fusion zones. However, AUTO21 researchers discovered too high a speed causes defects in the weld, or incomplete penetration. They did find a way to work through these complications using fibre laser welding, the industry's most advanced technique. Optimizing the welding speed and laser power has achieved defect-free, industrially acceptable welds.

The research in collaboration with the Waterloo, Manitoba and Ryerson universities continues to investigate reducing heat-affected zone softening. The focus has shifted to fibre laser welded materials and their response to monotonic and fatigue loading, which will help auto-body parts manufacturers design lighter, stronger parts.

Achieving repeatability for consistently strong, durable welds will improve the safety and fuel efficiency of vehicles, but it will also make Canadian automotive companies more globally competitive.

Daolun Chen is a professor at Ryerson University and an AUTO21 project leader. AUTO 21 is a national research initiative supported by the Government of Canada through the Networks of Centres of Excellence Secretariat. Visit www.auto21.ca.

Comments? E-mail jterrett@plant.ca.

» Fuel Efficiency

Magna, Ford collaborate on multi-material concept car

Aluminum architecture reduces weight by two vehicle segments

Magna International Inc. and Ford Motor Co. have unveiled a multi-material lightweight vehicle (MMLV) concept that uses advanced materials to reduce the car's weight by nearly 25% compared to the current production model.

The project led by Magna, the Aurora, Ont.-based auto parts maker, is co-funded by the US Department of Energy (DOE) and includes engineering, a prototype and validation testing of the new aluminum-intensive architecture.

The vehicle is based on a 2013 Ford Fusion but reduces its weight to that of a subcompact B-class car – two vehicle segments lighter – without compromising performance or safety.

"There isn't a one-size-fits-all approach to lightweighting. The research vehicle gives us the platform to continue to explore the right mix of materials and applications for future vehicles," said Matt Zaluzec, Ford technical leader, global materials and manufacturing research.

The Fusion is part of the US DOE's Vehicle Technologies Office lightweight materials project, which addresses future CAFE (fuel economy) legislation.

Vehma International, an engineering and prototype division within the Cosma International operating unit of Magna, manufactured and integrated the multi-material body-in-white,



The MMLV concept weighs 25% less than the production vehicle.

PHOTO: MAGNA INTERNATIONAL INC.

closures, chassis and bumper components.

Ford supplied the vehicles and weight-optimized powertrain, tires/wheels, suspension, interiors, glass and seating.

» Design

Adidas scores big with Brazuca

World Cup match ball is a technological marvel

There was a touch of irony when Germany's Mario Gotze skilfully corralled a cross with his chest then sent a neatly placed volley past Argentinian goal keeper Sergio Romero in the 113th minute of the World Cup final July 13.

The irony of course (and maybe the stuff of Argentine soccer conspiracy theorists) is that the golden goal was scored with a soccer ball produced by German sporting goods giant Adidas called the Brazuca, a name taken from an informal local term for Brazilian and homage to the 2014 host country of the planet's largest soccer tournament.

Perhaps more impressive than the tournament deciding goal is the amount of technology and innovation Adidas put into the ball's design and performance. The company describes it as a breakthrough in innovation that features a revolutionary six-panel design and a unique pimped surface to improve grip, touch, stability and aerodynamics.

It features the smallest number of panels of any ball in soccer history, with six identical propeller-shaped pieces of flexible plastic that are thermally bonded together to protect a sheet of foam that encases the air-filled inner bladder. Brazuca has a diameter of 69 centimetres and weighs 437 grams, which is on the higher side of FIFA's 420 to 445 gram weight requirements, after testing revealed players preferred a heavier ball.



Each game ball is worth about \$170. PHOTO: ADIDAS AG

Adidas, which has been producing the official World Cup ball since 1970, says it spent more than two and a half years testing, which involved more than 600 world cup players and 30 teams in 10 countries.

But humans weren't the only participants in the ball's testing. Adidas employed robotic legs, wind tunnels, and shooting machines, part of a FIFA requirement that balls go through 2000 cycles in the shooter machines.

The extensive testing, the company says, is the result of a number of criticisms about the design of the Jabuliana ball in the 2010 World Cup South Africa, which moved, swerved and dipped unnaturally, wreaking havoc on strikers and goalkeepers, and was described by critics as a "beach ball."

To avoid any "knuckling," Adidas covered the Brazuca with thousands of small nubs, creating a rougher surface to improve touch and accuracy.

If the tournament's deciding goal was any indication, the Brazuca lived up to expectations.

» Growth

Time to BUY AMERICA?

MANUFACTURING
MAGNATE ROB
HATTIN THINKS IT
MAKES SENSE



Rob Hattin, speaking at the Manufacturing Canada Conference in May, says there's less risk in buying US firms than we think. PHOTO: DONNA SANTOS

Low tax and interest rates, and a low dollar are creating favourable conditions for acquiring US companies.

BY MIKE OUELLETTE

Canada's small and medium-sized manufacturers – long accustomed to being thrashed by a volatile dollar, stacked border, plunging prices, polar vortexes and any number of other macro-economic vexes – may finally be able to take a long, full breath of fresh air.

And once they do that, they should head to the US and buy a company.

At least that's what Robert Hattin thinks. And don't kid yourself – he may be on to something.

Hattin, a businessman, founder of automation integrator ProVantage Automation, chairman of the Canadian Manufacturers & Exporters (CME) and hard-talking, good-natured provocateur, made his case in May at the Manufacturing Canada Conference at the Mississauga Convention Centre.

The pitch goes something like this:

The US economy is the largest, most dynamic in the world.

This economy is our largest trading partner and, in the case of many companies, our sole customer.

Having experienced recent economic shock, the US market has begun a process of retrenchment, compelling its captains of industry to return home and its industrial consumers to purchase products made within the market.

The call has been heeded. And with relative disregard to long-standing trade agreements, Canadian firms are now more often being shut out of certain industries in which they

once enjoyed a market-leading position – defense and infrastructure, to name two.

However, Canada is looking at a resurgent manufacturing sector buoyed by low interest rates, a low-ish dollar and a beleaguered manufacturing base south of the border looking for relief.

Let's buy America

So, instead of duking it out with other Canadian firms over limited geographical and sectoral turf, why not acquire an American company?

Underpinned by the relative strength of ongoing Canadian operations, you could then buy a shop in the US, be eligible for contracts under the bemoaned Buy American Act, and leverage the structural weakness of regional US markets to expand your business.

Buy Americans, if you will.

A bold move not without risk.

But Hattin thinks there is less risk than we may think.

"Business as usual is no longer an option, and we have to figure out other ways to continue to participate in the largest economy in the world," Hattin said during his closing remarks at the conference.

"Let's Buy America. Let's invest in America. It's time to turn risk into courage. But do you have the courage to be transformative?" he asked.

Good question, Mr. Hattin. But will manufacturers have an answer?

Mike Ouellette is the editor of *CanadianManufacturing.com* and former associate editor of *PLANT*.

Comments? E-mail mpowell@plant.ca.

» Conference Report

The experts predict a number of changes over the next decade, but the automotive industry can look to exports for growth.

BY MATT POWELL, ASSISTANT EDITOR

All attendees at the 2014 Automotive Parts Manufacturers' Association (APMA) Conference and Exhibition had to do to understand the next decade for the Canadian automotive industry was to look at the title of analyst Micheal Robinet's industry outlook presentation: *A decade of change within a globally integrated industry.*

Despite recent momentum there are obstacles on the road ahead.

Canadian auto manufacturers are looking at pre-tax profits of \$1.3 billion in 2014, the highest level since 2002, according to the Conference Board of Canada's Spring 2014 Industrial Outlook. And while retooling at several Canadian plants and increased competition from US and Mexican facilities drove production down by 3.6% in 2013, the industry is supposed to rebound by 3.1% at the end of the year. In 2015, the Conference Board predicts the industry will add 2,900 jobs.

Auto parts manufacturing is to finish the year strong thanks to robust demand from North American assemblers that have boosted production by 5.2% for pre-tax profits of \$1.5 billion.

The annual conference in Windsor, Ont. heard similar opening messages from IHS Automotive industry analyst Robinet and Export Development Canada's (EDC) chief economist Peter Hall: there's a pressing need for export diversification and innovation. And there's some urgency to act because of stricter US fuel emissions standards by 2025 that will speed up vehicle design cycles, plus improving economic conditions in Europe and the US.

There's also growing demand for autonomous vehicles, a conversation highlighted by the launch of the APMA Connected Car, loaded with features from 13 Canadian automotive and technology companies.



THERE ARE NEW CHALLENGES, BUT AUTOMOTIVE OPPORTUNITIES ARE PLENTIFUL

"Technology development is right on the money with respect to the automotive economy," said Hall, adding Canada needs to be a technological leader to encourage competitive industry growth.

Emerging markets are back too. He said good automotive fortune will also rely heavily on exports and trade-oriented investment.

He estimates short term automotive export growth of 3% this year and 4% in 2015. The dollar, currently averaging \$0.93, won't budge much either looking to 2015 – a good or bad thing depending on who you ask.

Better trade partners

Europe, where Hall sees the economic mood as more upbeat, will have a positive impact here thanks to the Comprehensive Economic and Trade Agreement (CETA).

"If they're positive, that's 48% of the world's GDP feeling good about itself again. That's a very good thing," he said.

Hall declares Canada a winner in the free trade agreement, and predicts auto exports to Europe will grow by 28.8%.

Robinet isn't convinced Europe will rebound as quickly as North America. But he believes CETA will provide a greater roadmap for shifting capacity and he expects European automakers to increase production on Canadian, Mexican and US soil.

"Exports, expansion and localization will give North America a more stable footing," he said.

He believes the global revival will be by the US, which is expected to account for 80% of NAFTA auto demand in the near future with an 8.3% increase in North American vehicle production between 2014 and 2020.

Globally, Robinet's production outlook predicts a 24% increase from 85 million to 106 million units between 2013 and 2021.

Launch activity, however, will decline in North America from 43 in 2014 to 32

by 2020. Globally, vehicle launches will decline from 130 in 2014 to 125 in 2019, possibly the result of a 60% increase in multi-regional platforms. Tightening US EPA fuel emissions standards that stiffen by 45% between 2016 and 2025 to 54.5 mpg are also a factor.

Those fuel emissions standards will cause NAFTA to begin to converge with global trends in the B, C and D segments, which will account for more than 60% of global volume by 2020. In NAFTA, Robinet estimates more than 75% of volume is D segment or smaller by 2020.

"Fuel emissions will be the toughest obstacle for car makers in the next 20 years," he said. "To stiffen the regulations by 5% each year starting in 2016, each vehicle cycle will need to reach emissions reductions goals of 25%, which will have a big impact on the composition of new vehicles."

He suspects a focus on weight reduction and the introduction of new materials such as aluminum will drive a technology development trend around powertrain and vehicle structure components.

Electrification will grow, too, but only after 2020.

These challenges will require manufacturers to up their technology game and see their businesses through a global lens.

"Canada has an abundance of advanced technology experts and companies that can lead on the world stage for the next generation of vehicles," said a confident APMA president Steve Rodgers, hosting his final conference before a planned retiring in October.

Changes are coming, but that doesn't mean the road ahead will be bumpy.

Comments? E-mail mpowell@plant.ca.

» E-commerce

Online shoppers boost manufacturing sales

Digital technology adoption is on the rise

Canadian enterprises sold more than \$136 billion in goods and services over the internet in 2013, up from \$122 billion a year earlier, according to Statistics Canada.

Wholesale, manufacturing and retail trade accounted for most (61%) of the value of e-commerce sales, while 13% of enterprises sold goods or services over the internet, up from 11% in 2012. Large enterprises accounted for nearly all growth in online sales in 2013, about \$87 billion, or 64%, of total online sales.

Twenty-four per cent of the value of their total sales came from online transactions. Most of the value (64%) is attributable to other businesses, not individual consumers.

Certain sectors saw higher e-commerce

adoption rates. In 2013, 22% of enterprises in the wholesale trade sector and 18% of those in retail trade sold online. Just under half of Canadian enterprises (47%) purchased goods or services online.

Nearly every enterprise used some information and communications technology (ICT). The most common barriers to further integration of ICTs were a lack of in-house technical expertise and skilled personnel (30%), and the high cost of technology and implementation (30%).





PHOTO: THINKSTOCK

How St. Marys Cement reduces its energy use, power costs and carbon dioxide emissions.

BY JOE TERRETT, EDITOR

Rising energy costs are becoming a competitive disadvantage for manufacturers of all sizes, which is why many companies are looking for ways to use power more efficiently.

St. Marys Cement Inc. (Canada) in Bowmanville, Ont., a massive user of electricity, has been on the case since 2005 and quality manager Jason Schultz shared the company's step by step approach to getting its energy use under control at the Energy Summit 2014 conference in Niagara Falls, Ont. (presented by the Excellence in Manufacturing Consortium and NRCAN in May).

First, a bit about the company, which is celebrating its 100th anniversary this year.

The Bowmanville plant has been operating since 1968 with a few ownership changes, but it's now part of Group Votorantim, a diversified Brazilian conglomerate. It operates 25 cement plants in the Americas with a combined annual capacity of 28 million tonnes.

The heart of the plant's production is a rotary cement kiln that operates at 1,500 degrees C to produce clinker (also "klinker") used to make cement. Each kilogram of clinker requires 800 kilocalories of energy, and that doesn't include the electricity needed to drive the plant's 900 motors, which are operating 24/7/365.

"Managing energy is not an option in our industry but how we manage it is," said Schultz.

The plant is well certified in system management standards, having attained ISO 9001, ISO 14001 and OHSAS 18001 in the 1990s, (and it was the first in North America certified to the ISO 50001 energy management

» Energy Management

Putting POWER into

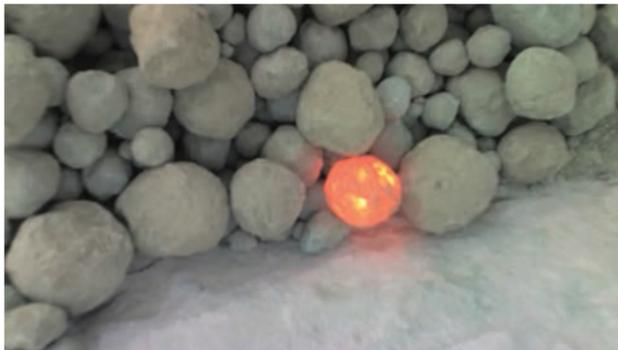
CONSERVATION

FOUR STEPS TO TRIPLE BOTTOM LINE SAVINGS

standard in 2012). Energy management efforts were integrated with these systems.

Schultz said there are just 120 people operating across a 10,000-acre site, more or less unsupervised, so walking through the plant you'd likely encounter one or two people at any given time.

"We needed a system that would capture information from their regular checks and normal work and leverage it, engraining energy management into what we were doing every day."



Clinker requires 800 kilocalories of energy per kilogram.

The goal amounted to a triple bottom line that reduces energy consumption and CO₂ emissions, and saves money. But a massive operation like a cement plant that's running 24/7 makes it easy for people to make excuses for not managing energy more efficiently.

"We needed to validate to the stakeholders that what we were doing was adding value," said Schultz, hence a four-step plan to achieve energy conservation consciousness.

Plan of attack

Step one was awareness. This led to the formation of the E=MC2 (the Energy Management Conservation Committee) brand, which included representatives from every department.

Engaging the workforce involved training sessions that analyzed their home energy use and where they could gain savings, making the plant's efforts more relatable. Supervisors focused on significant energy users, the dynamics of

energy efficiency, and identifying each person's responsibilities. Management was made aware of government programs and how the power market works.

Step two was about global assessment and benchmarking. The plan was centred around five categories:

- **Energy data management.** A database was built covering the facility's energy use to determine where the money was being spent, and which pieces of equipment were generating costs or providing benefits.
- **Energy supply management.** Time was invested in understanding energy market costs and how to schedule production.
- **Use of facilities.** The team looked at existing procedures and how to improve them rather than creating new ones. Energy components were added.
- **Equipment efficiency.** Dashboards added to the intranet gave people access to equipment information.
- **Organizational integration.** The E=MC2 team posted people in various coordination roles.

Step three built momentum with quick successes. The wholesale price of electricity was continually monitored and the information channelled in real time to operators, and trip points with alarms were installed so equipment would operate when it was most efficient to do so. Schultz said the committee continues to meet weekly to discuss ideas coming from the shop floor.

Step four involved ongoing engagement of the workforce and training to leverage its considerable knowledge. St Marys holds an annual Energy Conservation Week to discuss initiatives, learn about available technology and pay close attention to maintenance activities that centre on energy efficiency.

So far the returns have been pretty good. Since starting its energy management program, the Bowmanville plant has achieved \$10 million in cost savings, reduced energy use by more than 171 million kWh; lowered its CO₂ emissions by almost 32,000 tonnes (since 2009); and the energized E=MC2 team is nicely positioned to improve on that triple bottom line.

Comments? E-mail jterrett@plant.ca.

» Building Materials

Concrete carbon capture

CarbonCure cleans up concrete production

BY MATT POWELL, ASSISTANT EDITOR

Concrete may be the world's most widely used building material, but it's also responsible for about 5% of global greenhouse gas emissions (GHGs), second only to coal.

Rob Niven, the CEO of CarbonCure Technologies Inc., is shaking up the concrete industry with a sustainable technology that "greens up" concrete production.

"There's a major need to find a solution to the carbon problem the cement and concrete industry is facing," says Niven, who founded the company in 2007 after earning a master's degree in environmental engineering from McGill University.

CarbonCure doesn't actually make concrete, and it doesn't manufacture the equipment necessary to perform its carbon dioxide injection process. It licenses the technology and takes a percentage of sales.

"I think this approach provides producers with a low-risk strategy to introduce a new technology into their plants," says Niven, who leads a team of 18 at the Halifax-based company.

The technology introduces waste carbon dioxide (CO₂) into the concrete production process to cut GHG emissions and strengthen the finished product.

When concrete is made, limestone (calcium carbonate) is heated to extremely high temperatures, which breaks the material apart.

When that bond breaks, CO₂ is released while calcium oxide (lime) is retained. Lime is the active ingredient in concrete.

Carbon dioxide, sourced from third party sources such as power plants and refineries, seeks out calcium oxide once the concrete is mixed with aggregate, admixture, sand and water. The chemical bond reforms with the limestone and permanently embeds 15 grams CO₂ in the concrete block.

The company currently has a manufacturing partner in Nova Scotia (Shaw Brick) and two more in Ontario (Permacon and Brampton Brick), plus licencees in New York, Chicago, San Francisco and Washington State, all with multiple manufacturing facilities.

While there aren't any regulations that require concrete producers to adopt technologies like CarbonCure's, structures with a neutral carbon footprint are becoming increasingly popular with architects and designers.

"We spend a lot of time with designers and



CEO Rob Niven.

PHOTO: CARBONCURE

developers to make sure they know what kind of green concrete they have available to them," says Niven.

What better place to start a greener construction movement than with the industry's most popular material.

Comments? E-mail mpowell@plant.ca.

CIEN

CANADIAN INDUSTRIAL EQUIPMENT NEWS

» Automation



Disney's Seven Dwarfs Mine Train is powered by the Siemens ride control system.

PHOTOS: DISNEY

Powering IMAGINATION

BRINGING DISNEY'S MAGIC TO LIFE

A strategic partnership with the entertainment giant is helping Siemens establish its brand with the North American public.

BY MATT POWELL, ASSISTANT EDITOR

The Disney World Resort in Orlando, Fla. does not come to mind as a venue for a global manufacturing giant like Siemens AG to score branding points with the general public.

But when it comes to The Walt Disney Co., anything is possible.

Thanks to a \$100 million strategic partnership formed in 2005, Siemens is now powering the attractions that bring the entertainment company's imaginative characters to life with a number of its automation, networking, monitoring and safety technologies, and its brand is getting noticed.

Siemens, the German manufacturing conglomerate that employs more than 360,000 people around the world, makes almost nothing that the average Disney

World visitor might want to buy, yet its brand is everywhere. Disney's Epcot theme park is now home to the Siemens VIP Centre, where the company invites employees and guests to experience its latest technologies, seminars and other events.

And it sponsors the Spaceship Earth attraction, which includes 9,000-square feet of interactive exhibits based on Siemens technology, including Scalance networking and monitoring devices that improve system diagnostics and uptime.

In May, Disney completed its "Seven Dwarfs Mine Train" roller coaster, the final piece of a multi-year expansion of Fantasyland, the largest in the nearly 43-year history of the Magic Kingdom. The family-style coaster, inspired by Snow White and her Seven Dwarfs, features first-of-its-kind cars that swing back and forth. It's powered by Siemens ride control systems, which are similar to those being used in Disney's "Cars Land Adventure Park" in Anaheim, Calif., where talking cars challenge each other across a colourful desert slot car race track that covers more than 12 acres. That much acreage conceals a whole lot of Sie-

mens technology behind a mountainous façade, such as Simatic S7 319F failsafe controllers that monitor all circuitry and wireless access points; Sinamics G120 variable frequency drivers that drive the race cars; programmable logic controllers (PLCs) that control drives and supply power; and universal series interfacers that allow PLCs to communicate with the ride's control room.

Disney says attendance has risen at its California Adventure Park since Cars Land opened in 2012.

Saving energy

Meanwhile, Space Mountain uses Siemens Sinamic G120 safety regenerative drives to put energy used by the roller coaster back into the park's electrical infrastructure. At Hollywood Studios, Siemens master drives help linear induction motors increase acceleration of the Aerosmith-themed Rock 'n' Roller Coaster.

But the relationship involves more than the attractions.

At more than 100 square kilometres, the resort is so big it's treated as its own

Continued on page 22

» Supply Lines



KSB Canada's tree planting team. PHOTO: KSB

25 YEARS AND 150 TREES

KSB Pumps Inc. is celebrating its 25th anniversary in Canada this year with trees.

The Canadian subsidiary of global pump manufacturer KSB Group in Mississauga, Ont. joined the city's One Million Trees initiative by planting six for each of its 25 years.

Canada's sixth-largest city wants to add the one million trees to its canopy by 2032.

One large tree can provide a day's supply of oxygen for four people while capturing up to 13 pounds of carbon each year.

KSB Canada launched a green initiative of its own in 2012 called Fluid Future, which targets energy reduction for pumping systems.

EXTENDING COMPOSITES REACH

Composites One, an Arlington Heights, Ill.-based distributor of raw composite materials and provider of various services, is acquiring distribution assets from Nexeo Solutions, a global chemical, plastics and composites distributor.

This will extend the company's reach serving the custom fabrication, marine, transportation and aerospace markets across the US and Canada. Nexeo has operations in Ontario, Quebec and Western Canada.

\$12.5M 3D POWDER DEAL

PyroGenesis Canada Inc., a manufacturer of plasma waste-to-energy and plasma torch systems, has signed a \$12.5 million contract with a major international manufacturer.

The deal with the unidentified customer involves 10 metal powder production platforms delivered over an 18-month period to provide a continuous supply of metal powder feedstock for its internal 3D printing production.

PyroGenesis has a 3,800 square-metre production facility in Montreal.

MORE INVENTORY FOR BRENNAN

Brennan Industries Inc., an international supplier of hydraulic fittings and adapters, is more than doubling its inventory at its distribution facility in Mississauga, Ont.

Its hydraulic line includes tube fittings, adapters, flanges and clamps. The instrumentation line includes valves and tube fittings.

Disney dream

Continued from page 21



Mine Train cars swing riders back and forth.

municipality. The Reedy Creek Improvement District is tasked with supplying utility needs to the park and provides wastewater treatment, collection and reclamation; generation and distribution; waste disposal; natural gas distribution; and water distribution services.

Siemens has a part in that, too, supplying drives and motor controls to produce millions of gallons of cool water at night for air conditioning to keep the 25 million annual visitors and 65,000 resort staff comfortable in central Florida's often overwhelming heat and humidity.

Disney's impressive transit system is also powered by Siemens electronics, including S7 PLCs and Scalance fibre-optic networking to shuttle visitors around four theme parks and 36 resorts.

And as families experience the Disney dream, they're at least more aware of from whom some of the magic comes.

Comments? E-mail mpowell@plant.ca.

Test & Measurement



Easy to read.

METER SITES SOLAR PANEL POSITIONING

The SLR-01 handheld power meter from Dwyer Instruments Inc. measures the sun's energy to determine the appropriate position or location for solar panels.

It also tests the performance of solar receivers and window treatments. The meter reads and displays in units of W/m² and Btu/(ft²/h). The LCD's large numbers and high contrast make reading the measurement easy, even in bright areas.

Applications include industrial sites that use energy harvesting sensors, and telemetry systems.

Dwyer is a manufacturer of controls and instrumentation in Michigan City, Ind. www.dwyer-inst.com

CAPTURE SURROUNDING CONTOURS

SICK's IP 67-rated TIM551 2D laser scanner sends information about surrounding contours via ethernet using time-of-flight technology.

The scanner, which is used in stationary and mobile applications, provides reliable object detection and accurate measurement information regardless of surface and ambient light conditions thanks to SICK's HDDM technology. It also gathers object size and shape information.

With its long scanning range of up to 10 m (8 m on black targets), one scanner will monitor an area up to 235 m².



For stationary, mobile apps.

A rotatable M12 connector provides easy device connection and replacement.

With a maximum height of 86 mm, the TIM551 easily integrates with a range of indoor and outdoor applications, including robotics, building automation, mobile vehicle and conveyor applications.

SICK Inc. is a manufacturer of sensors, safety systems, machine vision, encoders and automatic identification products for industrial applications based in Minneapolis. SICK Canada is based in Richmond Hill, Ont. www.sickcanada.com

SCANNER COVERS WIDER AREA

The R2100 multi-beam LED scanner from Pepperl+Fuchs handles challenging indoor and outdoor mobile equipment, intralogistics and machine and plant engineering applications where unique surfaces need to be accurately and reliably detected.

Pulse-ranging technology (PRT) combines with Ultra-IR LEDs and multi-beam scan to deliver two-dimensional measurement over an entire area.



Combines PRT with Ultra-IR LEDs.

The Ultra-IR LEDs deliver an 8 m operating range without a reflector, and they produce a larger light spot than laser emitters – an advantage when detecting objects with irregular surfaces or textures.

Sensors with PRT emit a very short, high-intensity light pulse. They calculate object distance based on the speed-of-light constant and time-of-flight of the reflected light pulse. Instead of transmitting a continuous light beam, PRT sensors emit short pulses of high-intensity light up to 250,000 times per second. Compared to a continuous source that uses lasers, the energy density of one PRT LED pulse is up to 1,000 times greater for stable and reliable detection, even at distances of 300 m or more.

Pepperl+Fuchs is a manufacturer of factory and process automation products based in Twinsburg, Ohio. www.pepperl-fuchs.us

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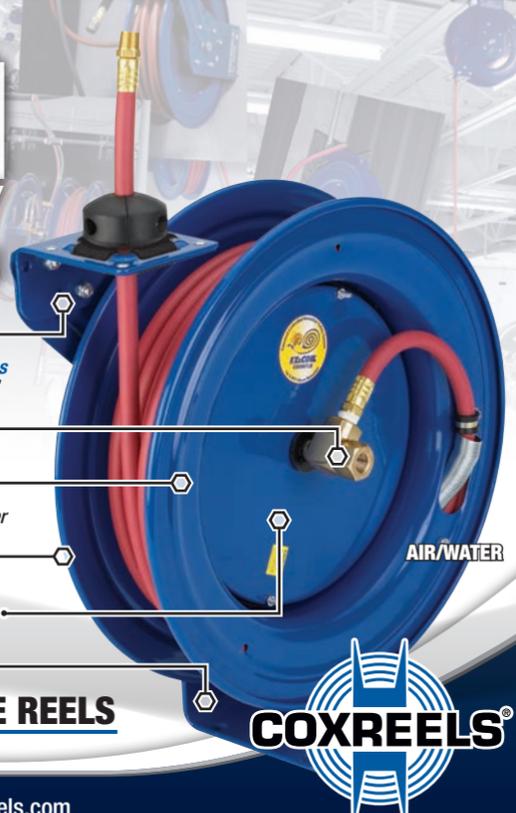
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Three new models.

POWER INSTRUMENTS UPGRADED

Dranetz HDPQ hand-held power quality and energy instruments are loaded with new features.

The Visa, Guide and Xplorer models integrate ethernet, Wi-Fi, Bluetooth, as well as USB communication technology.

Improvements include 1KV CAT III (arc flash safety), higher sampling rates and improved data resolution, a tablet-like GUI, real-time reporting, and enhanced Dranetz tech support.

Visa sports IEC 61000-4-30 Class A, IEEE 1159 power quality; IEC 61000-4-7, IEEE 519 harmonics; IEC 61000-4-15, IEEE 1453:2011 voltage flicker; energy and demand monitoring; and ethernet, USB and Motor Analysis AnswerModule.

The Guide adds IEEE 1459; AnswerModules identify sag/dip directivity, capacitor switching and motor analysis; and Wi-Fi, Bluetooth.

The Xplorer has all the Guide features plus one µs transient capture.

Dranetz is a supplier of intelligent monitoring solutions based in Edison, NJ.

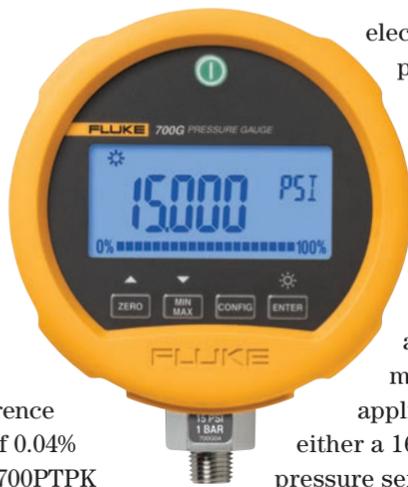
www.dranetz.com

NEW 700G PRESSURE GAUGES

Fluke Corp. has broadened its line of precision pressure calibration products with the addition of 14 new 700G Series pressure gauges and two new models of pressure calibrators: the 719Pro and 721 dual range pressure calibrator.

The 700G gauges cover from 10 inH₂O/20 mbar to 10,000 psi/690 bar and 0.05% accuracy, with new absolute pressure measurement ranges and reference class accuracy gauges and accuracies of 0.04% of reading. Combine 700G gauges with 700PTPK or 700HTPK pump kits for complete pressure testing up to 600 psi (40 bar) with the PTP-1 pneumatic pump, and up to 10,000 psi (690 bar) with the HTP-2 hydraulic pump.

The 719Pro calibrates high accuracy transmitters, pressure switches and pressure gauges. An onboard



Accuracy of 0.04%.

electric pressure pump generates up to 300 psi (20 bar), eliminating the external hand pump. It also measures, simulates and sources 4-20 mA loop current signals and measures up to 30 VDC. Its internal 24 loop supply powers a transmitter under test. The 721 with dual isolated pressure sensors takes simultaneous static and differential pressure measurements for gas custody and transfer applications. It's configured by selecting either a 16 psi (1.1 bar) or 36 psi (2.48 bar) low pressure sensor and adding any of seven high pressure ranges including 100, 300, 500, 1,000, 1500, 3,000 or 5,000 psi (6.9, 20, 24.5, 69, 103.4, 200, 345 bar).

Fluke Corp. manufactures electronic test tools. Fluke Canada is based in Mississauga, Ont.

www.flukecanada.ca

MEASURE HARSH LIQUIDS IN VENTED TANKS

The AST 4530 liquid level transmitter from American Sensor Technologies Inc. (AST) measures the level of harsh liquids such as slurries, salt water and oil in vented tanks or containers.

It's made of PVDF material with a PTFE diaphragm, has a submersible PVDF cable, cord grip and housing as well as a conduit connection for turbulent installations in process plants, salt water holding tanks, on-board ships, turbulent tanks and rail cars.

Sensors are certified to Class I Div 1, Groups C and D for use in intrinsically safe areas with an approved barrier.

Compared to ultrasonic and radar sensor technologies, it will not have an offset in output due to foaming, reflectivity and lid angle or proximity to the tank wall.

Submersible pressure sensor.



In plastic tanks, there's no need to install a metal plate under the transmitter. It's vented through the cable to the outside of the tank or container so vapour and condensation will not affect the reading or its survivability. And when it's used for marine and water processing applications, it doesn't require a sacrificial anode to reduce corrosion over time. It will also survive longer than standard submersible transmitters in applications where bacteria attack metal.

Voltage and 4-20mA output signals allow interfacing for low current consumption or long distance transmission applications.

AST manufactures pressure sensors, transducers, transmitters and switches for pressure and level measurement in Mount Olive, NJ.

www.astensors.com

BORE GAUGE FOR ENERGY COMPONENTS

Sunnen GR-2245/2241 bore gauges provide precise, reliable measurement to 0.0001 of an inch for heavy-duty large-part machining.

Standard models are capable of checking bore diameters from 2 in. (50.8 mm) to 12 in. (300 mm) and bore lengths up to 24 in. (600 mm) with appropriate attachments, while special order models measure bores up to 65 in. (1,650 mm) long.

They come with analogue dial readout or electronic indicators and are used for energy industry components such as flow meter tubes, liner hangers, drill pipe, mud pump liners and sucker rod pump barrels.

The replaceable carbide gauging points withstand extreme wear conditions with rough workpieces or abrasive materials. A patented wear-proof ball cranks for long-term repeatability and retractable or non-retractable gauging points.

Dust/water protection level is IP42 or IP53, and a specially designed shock-shield protects the dial from hand heat and jarring to ensure reliable readings.

Adjustable centralizers ensure proper positioning over the entire diameter range for accurate centring action, even if the gauge is tilted off the bore axis. A simple twist adjusts tension, allowing the head to go smoothly in and out of any size bore.

A right angle attachment is available for conditions where the gauge is difficult to read or total gauge height is an issue. Blind-hole probes allow measurements to within 0.5 in. (13 mm) of the bottom of the blind bore.

Standard dial-equipped gauges read out in tenths (0.0001 in./0.002 mm), but models with five-tenths read outs (0.0005 in./0.010 mm) are also available.

Gauges with electronic indicators are accurate to



Precise measurements.

±0.00012 in. (±0.003 mm) with 0.00005 in. (0.001 mm) resolution, and provide the ability to perform scaling calculations, judge tolerance, hold data and perform general comparison measurements.

Sunnen is a manufacturer of bore sizing and finishing equipment, engine rebuilding equipment, tooling and abrasives based in St. Louis. Canadian sales are handled by Guspro Inc. in Chatham, Ont.

www.sunnen.com/gages



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TEST & MEASUREMENT



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ROUGHNESS TESTING IN THE SHOP OR LAB

Taylor Hobson has developed a new series of portable roughness testers robust enough for the shop floor, but flexible enough for any inspection room.

The Surtronic S-100 series meet the roughness requirements of a host of surface measurement applications with a 50 mm stylus lift, a right-angle attachment and a more than 70 mm stylus reach that allows even the most challenging surface measurements without expensive risers, blocks, stands or fixtures. The stylus even measures upside down.

When equipped with the stand and printer, the device becomes a fully integrated roughness measurement solution.

Industry-standard USB and USB mini-ports provide a range of connectivity options. Roughness measurements for multiple parts are stored either internally or saved to a standard USB memory device. The USB port is also used to attach a portable printer for data to accompany a part to the next stage of manufacture or end use. The miniport charges the device with any standard USB charger or connects to a PC for data analysis and reporting.

Its rubberized, impact-resistant body provides protection and an improved comfort grip. It surrounds a recessed, Mylar-protected high-durability touch screen and a solid stainless steel drive mechanism with anti-wear gears and bearings. The device is powered by a 3,000 mAh heavy-duty Li-Poly battery that provides up to 2,000 measurements from a single charge.

Three versions of the software are available. Lite has all of the functions typically used for shop floor inspection; Silver has enhanced features and a full report printing capability; and Gold has complete laboratory analysis functions.

Taylor Hobson Precision is a manufacturer of measurement instrumentation and is a unit of AMETEK, Inc. based in Leicester, UK.

www.taylor-hobson.com

MONITOR INERT GASES

The DualAir Check O₂-CO₂ compact dual monitor from Air Liquide continuously monitors O₂ and CO₂ gases simultaneously to alert and protect personnel from potentially hazardous situations where inert gases can accumulate. This includes nitrogen gas storage areas, CO₂ beverage gas distribution areas, confined spaces and other locations where low oxygen or elevated carbon dioxide levels may pose a health hazard.

Zirconium and NDIR cells provide stable readings, even in areas where temperature, barometric pressure and humidity levels are continually changing. The O₂ sensor requires no quarterly calibration or annual maintenance, while the CO₂ sensor automatically adjusts to ambient levels. The monitor automatically adjusts to ambient CO₂ levels on a weekly basis, or on-demand if desired.



No annual maintenance.

There are no zero or span adjustments to make. Simply plug Dual Air Check into any standard AC outlet.

Dual Air Check has individual dedicated user-selectable relays to operate on-off valves for the control of CO₂ injection in grow rooms while simultaneously activating alarms when O₂ levels get too low. The O₂ sensor also controls nitrogen generators for hypobaric rooms while using the CO₂ sensor to alarm to TLV levels of CO₂.

A built-in CPU provides an inexpensive monitor with local display, safety alarms and control for both O₂ and CO₂ simultaneously.

Air Liquide America Specialty Gases LLC is a supplier of gas for industrial and other uses based in Houston.

www.ALspecialtygases.com

PUMPS

VCI PROVIDES IMMERSSED PUMPING ACTION

KSB Pumps Inc. has added to its Movitec high-pressure pumps line. Elements (including intake) on the VCI models are immersed in a tank, reservoir or well. The motor and discharge nozzle remain dry and accessible for use in the circulation of cooling or lubricating fluids for machine tools, industrial washing and cleaning processes, condensate recirculation systems, and pressure boosting in general process applications.

The 3-mm mesh strainers over the intake nozzle protect internal components from large solid particles while stainless steel stage casings and impellers reduce energy use. Maintenance is simplified with easy-to-replace cartridge-type mechanical seals that extend service life.

The pumps come in five sizes, with different numbers of stages. The maximum flow rate is 27 m³/hr and the maximum discharge head is 250 m. Fluid temperature ranges between -10 and 120 degrees C.

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



Motor remains dry.

You can buy pipe...



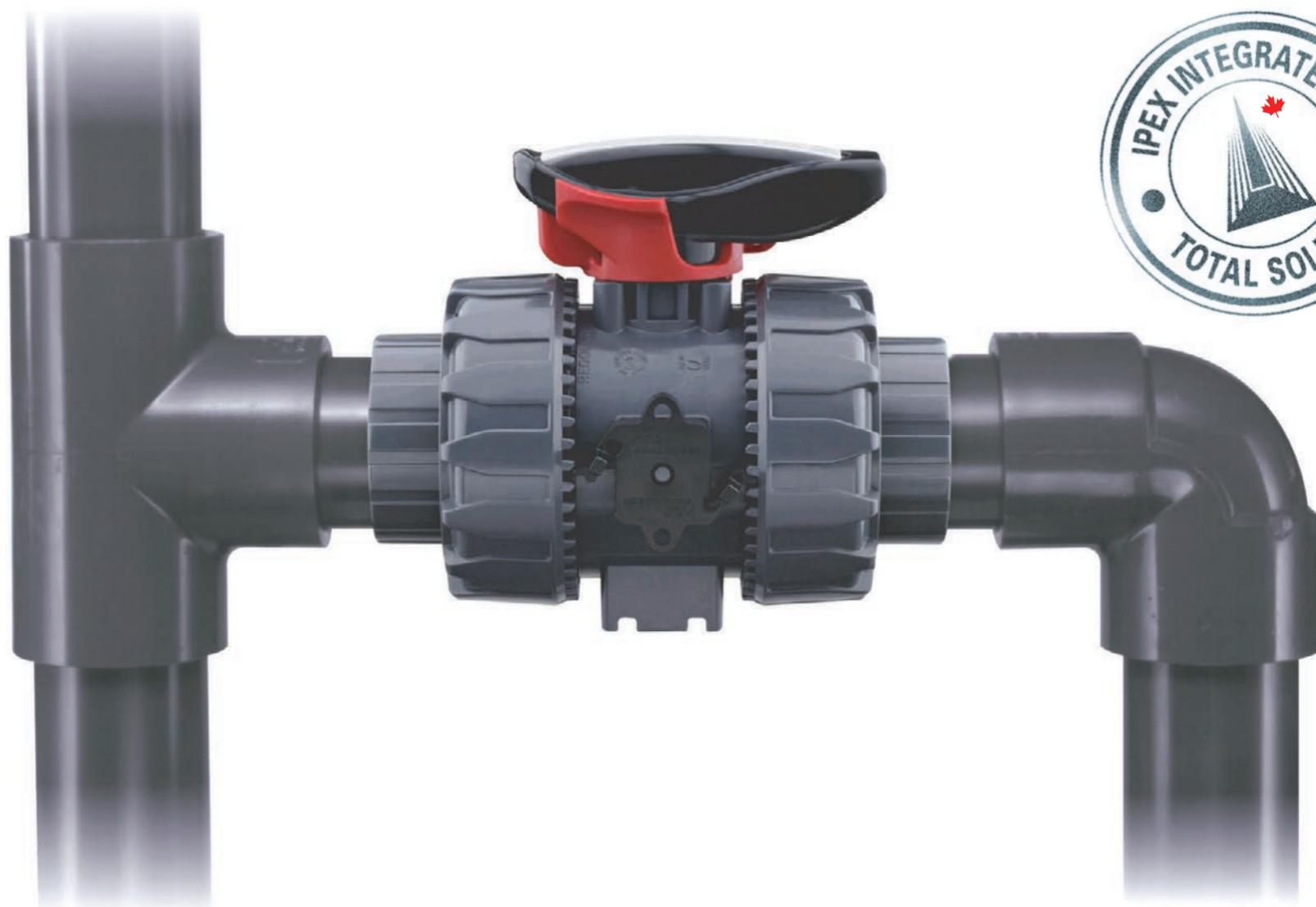
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Actuated Valves



Industrial Piping Systems

Tough Products for Tough Environments®

» IMTS PREVIEW

What you need to know about North America's largest manufacturing trade show.

The International Manufacturing Technology Show (IMTS) returns to Chicago's McCormick Place in September bringing together more than 100,000 manufacturing professionals featuring the industry's latest technologies while sharing ideas and finding answers to manufacturing challenges.

North America's largest and longest running manufacturing technology trade show is held every other year and is owned and managed by the Association for Manufacturing Technology (AMT). This year's show runs Sept. 8-13 and is expected to attract visitors and exhibitors from more than 112 countries.

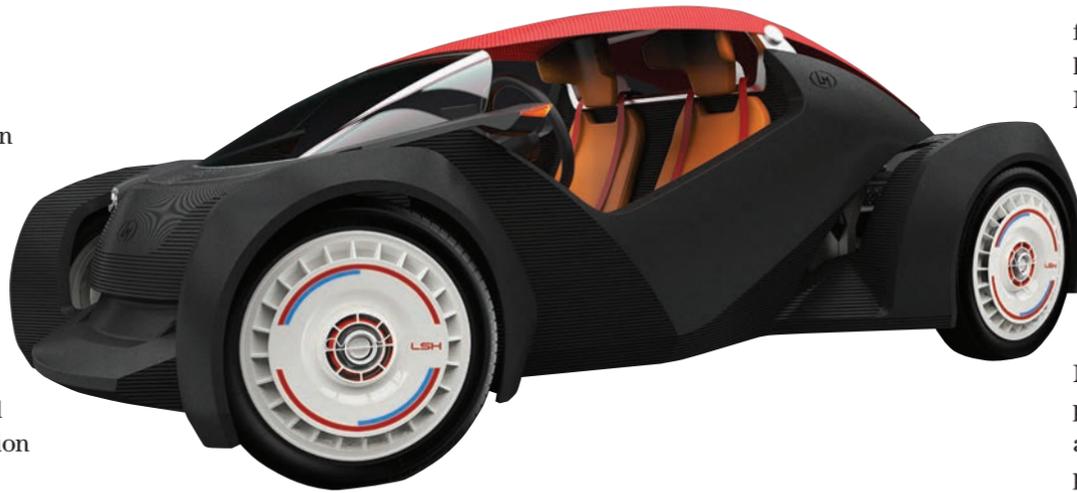
"There is nothing like IMTS. It's an entire industry of manufacturing professionals in one place, at the same time, with one focus – advanced manufacturing," said Peter Eelman, vice-president exhibitions and communications at AMT.

The 30th edition of the show features more than 1,900 exhibiting companies across more than 1.2 million square feet. Visitors will see more than 15,000 new machine tools, controls, computers, software components and processes.

Product pavilions will include:

It's SHOW time!

MANUFACTURERS URGED TO "COME TOGETHER"



Italy's Michele Anoe designed the Strati 3D car concept that will be manufactured live at IMTS by Local Motors.

PHOTO: LOCAL MOTORS

- **Metal cutting** – everything from machining centres and assembly automation to flexible manufacturing systems and lathes;
- **Tooling and workholding systems** – jigs, fixtures and cutting tools;
- **Metal forming and fabricating/laser processes** – home to waterjet, plasma-arc and laser systems, welding equipment, and heat treating.

Other pavilions will feature abrasive machining, sawing, finishing controls and CAD-CAM; EDM; gear generation,

machine components; cleaning, environmental and quality assurance.

There will also be two co-located shows: Industrial Automation North America and Motion, Drive & Automation North America, both developed by show partner, Hannover Fairs USA.

Industrial Automation North America debuted in 2012 and returns to showcase the best in process, factory, and building automation.

The 2014 introduction of Motion, Drives & Automation North America (MDA NA) brings together the power transmission, motion control and fluid technology sectors.

Meanwhile, the Advanced Manufacturing Centre will explore new trends and technologies adopted by leading manu-

facturers. Also featured in the will be highlights from the Trends in Advanced Manufacturing Conference (TRAM), which is sponsored by Boeing and the Advanced Manufacturing Research Center.

The Emerging Technology Center (ETC) returns featuring a step forward in the production of energy efficient vehicles. Show partner Local Motors will use a new manufacturing process known as additive-subtractive, a 3D technology, to produce major components for a 3D-printed car that will be completed and ready to drive out of McCormick Place by the end of the show.

Local Motors is an automotive manufacturer focused on low-volume manufacturing of open-source vehicles using multiple microfactories based in Phoenix, Ariz.

Hot wheels

Its first 3D-printed car design challenge launched in April attracted more than 200 entries from 30 countries. The winner, Michele Anoe of Italy, will be on hand see his Strati concept manufactured live. And he will receive a \$5,000 cash award for the winning submission.

The two-seat Strati, a collaboration between Local Motors (www.localmotors.com), industrial parts shaping specialist Cincinnati Inc. and the Oak Ridge National Laboratory (where a custom printer was created for the car), will

PRODUCT HIGHLIGHTS



Reduce coolant use by 60%.

FOAM-FREE METAL FLUIDS IMPROVE SURFACE FINISH

QualiChem's XTREME metalworking fluids overcome the problems that often occur with high-pressure fluid delivery systems. They eliminate foaming to improve surface finish and part quality.

The fluids reduce coolant use by up to 60%, minimize downtime and maximize productivity while extending tool life.

The semi-synthetic fluid cuts and grinds a variety of ferrous and non-ferrous applications. A tight emulsion promotes tramp oil rejection and hard water stability up to 35 grains of hardness. The fluid runs clean with a high bioresistance.

QualiChem is a producer of metalworking fluids based in Phoenix, Ariz.

www.qualichem.com

Booth N-7227

SIMPLIFY QUICK-CHANGE TOOLING

EXSYS Tool Inc.'s PRECI-FLEX makes tool changes quick and easy.

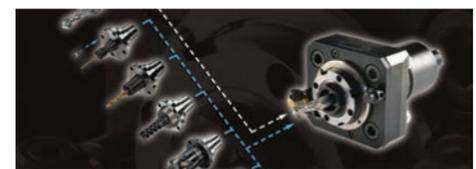
The manufacturer of rotary and static-fixed tool holders for CNC turning centres based in San Antonio, Fla. has included a selection of adapters that hold different cutting tool and shank designs.

The adapter's common connecting feature locks into a standard base unit on the machine turret to preset tool/adaptor assemblies offline and quickly switch them in and out of the base unit. Tool positions repeat within +/- 3 µm, eliminating the need to re-centre, touch off or make test cuts.

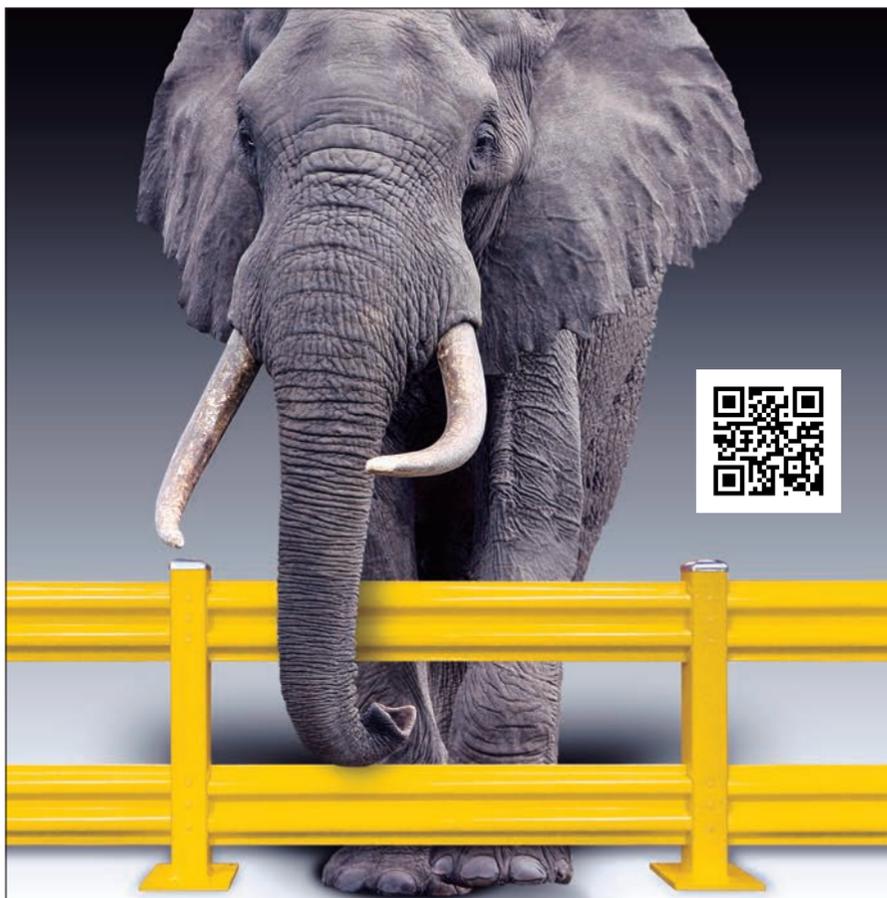
Operated at the front face of the turret, the connector provides two tons of clamping force. Its compact size maximizes torque transmission and rigidity to increase accuracy and productivity.

www.exsys.com

Booth W-1671



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have a convertible roof and an electric engine.

"[Anoe's] design provides an excellent balance between innovation, complexity and practicality. It has good 3D lines and the retractable roof is really cool," says Lonnie Love, group leader, robotics and manufacturing systems research at Oak Ridge National Laboratory.

It will be produced from a new fibre-reinforced thermoplastic. The chassis and body without powertrain, wheels and brakes will weigh just 450 pounds. The finished car will be comprised of just 40 components and powered by an electric powertrain from a Renault Twizy.

"There are three major challenges facing the auto industry today; part count, weight, and the initial cost of tooling when creating and iterating on vehicles. The hybrid Direct Digital Manufacturing process stands to address all three of these," said Jay Rogers, CEO of Local Motors. "When these [obstacles] are removed, we open the door to an exciting new era in automotive design and manufacturing possibilities."

The final prototype will be printed as one piece, including the seats, dashboard, hood and trunk.

The ETC will also present interactive kiosks to highlight the new National Network for Manufacturing Innovation (NNMI). These regional hubs are being funded by US private-public partnerships to accelerate development and adoption of cutting-edge manufacturing technologies for making new, globally competitive products.

Manufacturing pros from the executive offices to job shop workers are invited to "come together," the show's theme, for the four-day IMTS 2014 Conference.

It will present 69 sessions that explore topics including materials engineering, manufacturing technology and trends, alternative manufacturing processes, metrology/quality and plant operations.

Visit www.imts.com or follow the show on Twitter @IMTS_2014.

PRECISION MILLING FOR TOUGH MATERIALS

Niagara Cutter's S738 and S938 multi-flute solid carbide end mills handle titanium and other challenging materials in applications including peripheral finish milling that require long axial engagement.

The seven-flute S738/S738R cutters come in diameters ranging from 0.25 to 0.5 in., while the nine-flute S938/S938R cutters are between 0.625 and 1 in. in diameter. Aerospace corner radii and AlTiN coating are standard. Specially engineered flute spacing reduces vibration and improves surface finish.

The solid carbide end mills provide high-feed machining capability to reduce cycle times in moldmaking operations on hardened steels, cast irons and super alloys. The tools transfer cutting forces axially into the machine tool spindle, allowing mould shops to use lighter-duty machines for results comparable to larger machines.

Standard 5xD cut depth reduces cycle time by allowing one-pass machining in square-shoulder milling operations in applications include peripheral finish milling of aerospace.

Niagara Cutter is a manufacturer of metal cutting tools based in Reynoldsville, Penn.

www.niagaracutter.com

Booth W-1564



High-feed machining capability.

WHAT'S ON

The following are some of the sessions featured over the four-day IMTS Conference.

Sept. 8

Alternative manufacturing processes

The impact of 3D printing on industrial automation – internal and external implications – *IHS Motor Driven Equipment*

Production throughput for additive manufacturing – *RTI Directed Manufacturing*.

Plant operations

Transform your manufacturing with process control – *Renishaw Inc.*

Beyond lean: unleashing the power of Smart Pull – *Dassault Systèmes*

Sept. 9

Systems integration

iPads in the machining workplace – *GTI Spindle Technology*

Automation for lower volume parts – *Methods Machine Tools Inc.*

Quality/metrology

Measurement systems to optimize automation processes – *Hexagon Metrology Inc.*

Sept. 10

Plant operations

Implementing an effective inventory management solution: it starts with software – *CribMaster*

Program empowerment for 21st century aerospace projects – *Base2 Solutions*

Process innovations

Reduce cost and increase throughput for large parts with multi-tasking universal machines – *Fives Group*

6-side flexible machining – a new approach – *Quicksilver Industries*

Sept. 11

Alternative manufacturing processes

The laser revolution in the tooling industry – *EWAG (United Grinding Group)*

How to determine if laser hot wire cladding is right for your application – *Lincoln Electric Co.*

Process innovations

Productivity and quality improvements for tape laying machines – *Fives Machining Systems Inc.*

Demands placed upon machine tools for processing difficult to machine materials – *Niles-Simmons-Hegenscheidt*



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PACKAGING



Changeover is quick and easy.

SUCTION CUPS GETS A GRIP

Piab's F26 and F33 suction cups provide a strong, secure grip when handling difficult materials such as plastic film for horizontal and vertical form, fill and seal machines that open bags in the packaging processes.

The cups, available in diameters of 26 and 33 mm, are flat with a thin conformable lip and a unique cleat design that prevents plastic films or sheets from being sucked in to prevent damage and enhance lifting force.

Piab, a manufacturer of industrial vacuum technologies based in Sweden, says the cups' sealing properties compensate for leakage to avoid unopened

bags that prevent machine slowdowns. Other applications include handling thin and sensitive sheets, such as paper and plastic films.

They're available in a push-on mounting style that eases changeover to increase uptime and productivity.

Made of silicone that complies with FDA standards, the suction cups have a temperature range of -40 to 200 degrees C.

www.piab.com

SENSORS

SENSORS PREDICT PROBLEMS EARLY

Parker Hannifin Corp.'s wireless sensor platform monitors pressure, temperature, and humidity in liquid and gas applications, while its SensoNODE mobile iOS application puts data in the user's hands to predict problems and prevent equipment downtime.

The low-energy sensors eliminate the constraints of traditional wired sensors in everyday applications. Small in size, a sealed housing facilitates easy installa-



Control sensors with free mobile app.

tion in challenging environments where a wired sensor platform is not practical in analytical, hydraulic and pneumatic equipment, and industrial manufacturing processes.

The sensors attach to equipment via standard pipe thread (NPT) ports or quick connect coupling and operate on a common coin cell battery.

The SensoNODE mobile app works in concert with the sensor and is available as a free download from the Apple App Store. With a maximum range of up to 150 ft., the app connects an iOS device (iPhone, iPad, or iPod touch) wirelessly to one or more sensors using auto-recognition. Live data is displayed, and the app's diagnostic tools allow for the creation and display of trending graphs or user-defined alert notifications. Up to five discrete sensor inputs are monitored.

Parker Hannifin is a manufacturer of motion control technologies headquartered in Cleveland.

www.parker.com

MATERIAL HANDLING

HIGH POWER HOISTS RELAUNCHED

JD Neuhaus Co. has upgraded its Profi air operated hoists to handle SWL capacities of 75 and 100 tons by incorporating savings in energy requirements and reductions in size and weight to handle heavy engineering working conditions.

A new air motor unit, based on JD Neuhaus' motor-brake concept that incorporates an integrated brake system, is equipped with a stepped brake piston and a self-lubricating rotor.

The motor provides a 9kW power output with an air pressure supply of 6 bar, which the company says is enough to operate the hoists while still providing significant energy reductions.

The hoists meet ISO 4301/FEM 9.5 II, which is good for 400 hours full load operation.



9 kw lifting output.

Although overall air consumption has been reduced significantly, the lift and lower speeds with or without loads have been increased to reduce handling and increase production outputs. The lifting speeds at full load have increased from 0.45 to 0.53m/min (Profi 75 TI) and 0.35 to 0.4m/min (Profi 100 TI). The lowering speeds at full load have increased from 1 to 1.25m/min (Profi 75 TI) and from 0.8 to 0.95m/min (Profi 100 TI).

Size reductions have been achieved, particularly between the load bearing surfaces and suspension hooks.

Lifting and lowering motor limiters that incorporate a pneumatic pin valve are optional extras for both hoists.

JD Neuhaus is a manufacturer of cranes and hoists based in Witten, Germany. www.jdngroup.com

MOTION CONTROL

REINVENTING THE ROTARY ENCODER

Posital-Fraba's IAXRC encoders combine the accuracy of optical encoders with the ruggedness and compact form factor of magnetic encoders to handle dust, moisture and severe shock and vibration loads in motion control position measurement applications.

A four-element Hall-effect magnetic sensor linked to a 32-bit microprocessor running highly-optimized signal processing software provides high levels of accuracy that previously required larger, more mechanically complex encoders.

The microprocessor-centered design means operating parameters such as zero-point, rotational direction and sensitivity are modified through simple software updates.

The IAXRC has a range of packaging and interface options, including a variety of instrument interfaces, mounting arrangements, housing materials and shaft seals. Explosion-proof and safety-rated models are also available.

FRABA Inc. is the North American sister company of the Netherlands-based FRABA N.V., a developer of motion control technologies based in Heerlen, The Netherlands.

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SAFETY

HELMET IMPROVES OPTICAL WELDING CLARITY

Lincoln Electric's 2450D digital auto-darkening helmet provides users with welding, cutting and grinding modes of interaction thanks to an easy-to-use LCD-screen interface.

The hardhat adaptable helmet is powered by solar cells with two replaceable CR2450 lithium batteries.

It produces a full-spectrum shade 4-13 with variable sensitivity, delay and intuitive helmet status information.

Equipped with pivot-style headgear, the helmet improves optical clarity with enhanced colour recognition and protected buttons are easy to use with gloved hands.

Lincoln Electric is a manufacturer of welding products based in Cleveland.

www.lincolnelectric.com



LCD interface.

» Plantware

WIRELESS ACCESS EXTENDS DATA REACH

Rockwell Automation's Allen-Bradley Stratix 5100 wireless access point (WAP) with a work group bridge makes accessing critical production data easier.



Robust mobility.

It connects to as many as 19 IP addresses simultaneously, reducing design time when integrating machines and equipment into the industrial control network.

Enterprise-class silicon and optimized radios provide what Rockwell describes as a "robust mobility experience" that includes 802.11a/b/g/n with 3 by 4 multiple-input multiple-output technology and three spatial streams.

Cisco IOS provides performance and configuration options and the Stratix 5100 WAP integrates with Rockwell's automation architecture system providing detailed network diagnostic information.

Rockwell Automation Inc., based in Milwaukee, Wis., is a developer and manufacturer of automation technology. www.rockwellautomation.com

HIGH VOLTAGE PROTECTION



Guards against line surges.

ACCES I/O Products Inc. has added the PCIe-IDIO-24 to its PCI Express family of I/O cards for high-voltage protection in industrial control and monitoring applications.

This x1 PCI Express device has 24 optically isolated digital inputs and 24 solid state FET relay outputs for use in any available PCI Express slot.

Optocouplers are rated for 2,500 V isolation and help protect systems in industrial environments against high voltages or currents caused by line surges or ground loops. The solid-state outputs switch from 5-34 DC at 2 A continuous and there is change of state detection (COS) on all inputs (including TTL lines) generate an interrupt whenever one or more of the digital inputs changes state. This eliminates constant polling and reduces processor overhead. Configuring a digital change of state will detect rising, falling or both edges.

The company, a supplier of analogue, digital, serial communication and isolated I/O boards based in San Diego, Calif., recommends the unit for use in applications where high common-mode external voltages are present.

www.accesio.com

SOPHISTICATED NETWORK SUPPORT

HARTING's next generation Ha-VIS mCon 3000 ethernet switches are optimized for fast deployment in the harshest industrial environments.



They mount on top-hat rails in control cabinets with a PROFINET I/O stack, and they're compatible with other industrial protocols, including EtherNet/IP.

Configure them using a web interface, command line interface, SNMP or the multifunction button located in front. The switches are equipped with an

SD card slot to store, back up or transfer current configurations to another SD card-equipped Ha-VIS mCon for fast commissioning.

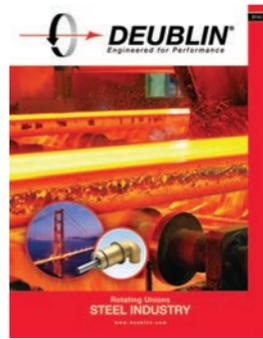
The 3080-A has eight 10/100Base-TX RJ45 ports, while the 3102-AASFP has eight 10/100Base-TX ports and two 10/100/1000Base-TX combo ports with SFP slots for either copper or fibre optic lines.

All ports are managed, non-blocking and support auto-crossing, auto-negotiation and auto-polarity.

The switches have an operating temperature range of -40 to 70 degrees C with media redundancy and precision time protocols.

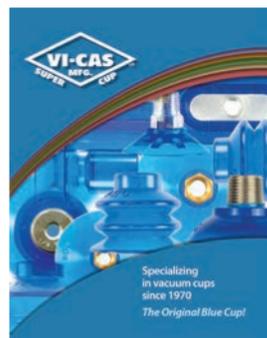
The Harting Technology Group, which manufactures connectivity products, has a Canadian office in Montreal. www.harting.ca

STEEL MANUFACTURING ROTATING UNION



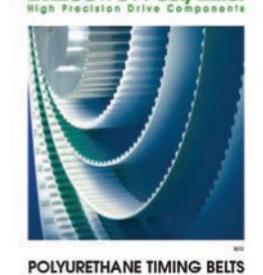
CATALOG AVAILABLE
A new catalogue of rotating unions for steel manufacturing applications is now available from Deublin Company, in both print and electronic versions (see below). The catalogue provides detailed operating information and specifications for several model numbers and sizes, along with installation instructions. www.deublin.com/product-support/request-a-catalog/
Deublin Company

MOST POPULAR VACUUM CUPE



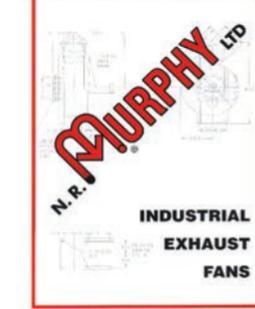
Vi-Cas Manufacturing's new 16-page, full colour brochure details the company's most popular vacuum cups. In addition to dimensional information (including lip diameter, height and mounting holes), the new literature shows photos of each cup to guarantee accuracy. Vacuum cups and accessories are used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

THE MOST COMPREHENSIVE TIMING BELT CATALOGUE



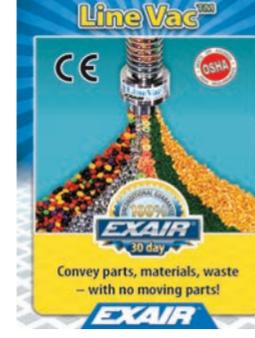
BRECOflex, CO., L.L.C., is proud to offer its 184-page, B212 polyurethane timing belt catalogue. It focuses on the wide range of belting products and gives detailed, technical information including full-scale belt drawings for confirming tooth shape. Also included is a preview of available belt backings, weld-on profiles, pulleys and accessories. www.brecoflex.com
BRECOflex, CO

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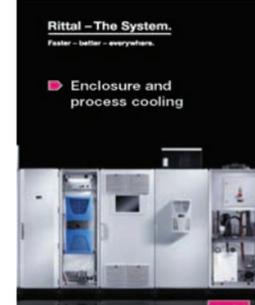
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SCOTT'S
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Focus on careers rather than degrees

BY MATT POWELL, ASSISTANT EDITOR

I belong to the Generation Y (or Millennial) cohort born between the mid-1980s and early 2000s, known mainly for our civic-mindedness, confidence, tolerance, and increasingly liberal outlook on cultural and social issues, with dashes of entitlement and vanity tossed in for good measure.

Unfortunately, those traits don't necessarily translate into economic prosperity. Yet there are good jobs in industry going begging because of a shortage or mismatch

“Young people need the kind of employment opportunities industry provides...”

of skills. As a Millennial, I can say, from experience, that some of the blame lies with our education system from the primary to post-secondary levels, which has focused on preparing students for a job market of the past rather than the future.

In high school, the emphasis was on getting a university degree. In what, it didn't necessarily matter. For some it was professions, but most went for general arts degrees. All that mattered

was \$50,000 for the university of my choice to earn a piece of paper that my parents framed and displayed in their living room.

Because I wasn't streaming through engineering, I heard nothing about the opportunities available in manufacturing, or any of the other heavy industrial sectors.

Too much focus on “degree” instead of “career” is making the job market for

many young people overly competitive and not particularly lucrative. And we are looking at a standard of living that is less than what our parents enjoyed at our age. We have to choose between paying inflated rents on tiny condominiums or living in Mom and Dad's basement. And this is on top of a decade of student loan payments. Forget about owning a house outright before we're 100.

Serving coffee and trying to get by isn't a career. Young people need the kind of employment opportunities industry provides. Generation Y will find its feet. We're a resourceful bunch. But as the Baby Boomers clear out, the workers who take their places will have to be better prepared than we were.

Delivering skills

Canada's education system is consistently ranked one of the world's highest, most recently second only to Finland among 16 peer countries in a Conference Board of Canada *How Canada Performs* report.

But we've dropped out of the top 10 in international mathematics standings, placing 13th. That's down three spots from 2009 in the OECD's *Programme for International Student Assessment* survey. That should raise alarms – most in-demand careers associated with skills shortages, such as engineering and technology applications, are math and science intensive.

The Canadian Chamber of Commerce estimates there will be 1.5 million vacancies for skilled jobs by 2016. Those are jobs for the taking if we're able to deliver the right skills. But a Canadian Council of Executives survey reports 66% of businesses say the shortage of skilled workers has serious implications on major projects and their willingness to make investments. That's a concern for manufacturing, which needs investment if it's to grow and provide the kind of jobs that finance a vibrant middle class.

To fill some of the shortages, manufacturers will be helped along by the recently finalized Canada Job Grant, which brings together the federal and provincial governments with employers and provides funding of \$15,000 per employee for job-specific training.

But schools have some work to do. They need to place even greater emphasis on jobs of the future, which means being more acutely tuned to developments in business and industry, and how they relate to the soft and hard skills students will need in the workforce.

Prime Minister Stephen Harper has called this skills dilemma the biggest challenge our country faces. Meeting the challenge requires collaboration and commitment from governments, schools and businesses to ensure future graduates are better prepared for the careers that raise everyone's standard of living.

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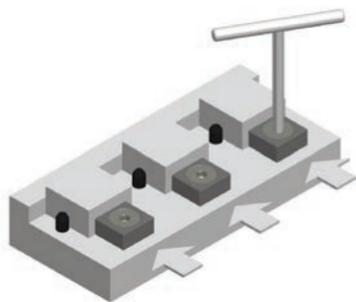
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Tiny Vise™ Edge Clamps Deliver Secure, Compact Clamping



This standard style has one serrated and one smooth side. Force is applied by the turn of a hex wrench.

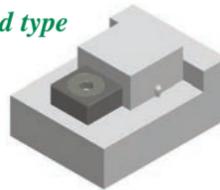
Patented Tiny Vise™ edge clamps from Carr Lane offer strong clamping action in a mini size. These clamps will be featured in applications at Carr Lane's IMTS booth W-1663. Ideal for fixturing small parts, the unique clamps grip the side of a workpiece to keep the top clear for machining.

Tiny Vise edge clamps are available in a wide range of sizes, from a miniature #8-32 thread size up to a powerful 1"-8 thread with 11000 N clamping force. Force is quickly applied by positive screw action with the turn of a hex wrench.

Variations include a double edge version, for clamping two workpieces at the same time, a v jaw version for clamping round workpieces, and a double v jaw style. Visit tiny vises in the Featured Product section at www.carrlane.com/featured.

Variations

standard type



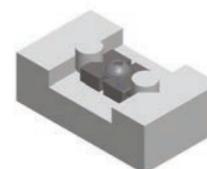
straight double for clamping two workpieces at once



v for clamping round workpieces



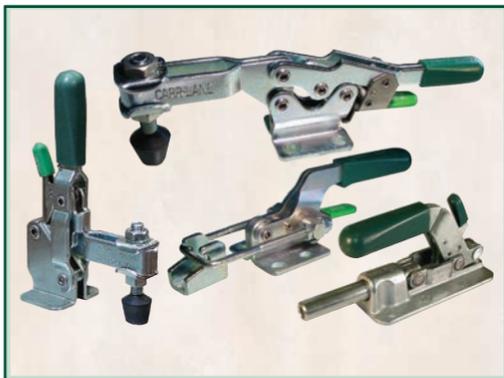
v double for clamping two round workpieces



TOOLING COMPONENTS, CLAMPS

Carr Lane's 680-page catalogue contains alignment pins, hoist rings, plungers, handles and knobs, locators, supports, tooling plates and blocks, jig and fixture bases, and more. Full sections on tooling components, toggle clamps, drill jig bushings, modular fixturing, and power workholding. Send for a copy, or view it online.

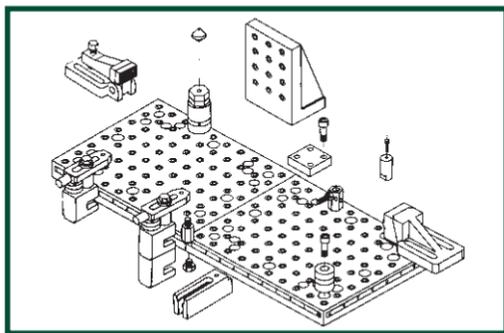
Carr Lane Mfg. Co., www.carrlane.com.



TOGGLE CLAMPS WITH SAFETY LOCKS

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

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

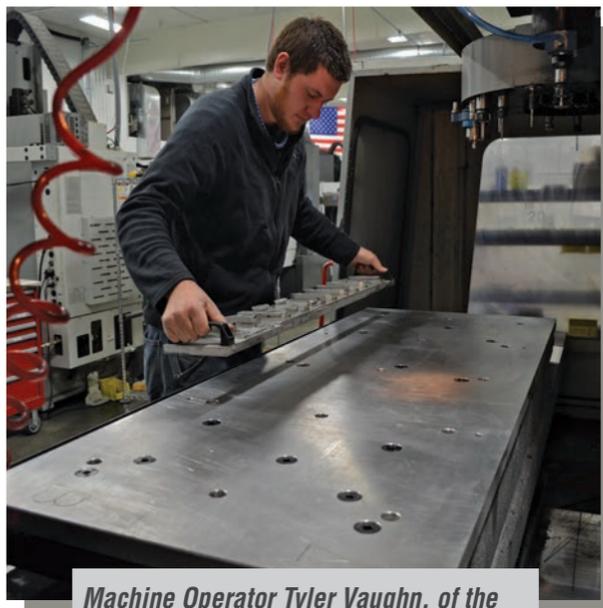


MODULAR FIXTURING

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

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

CarrLock™ SYSTEM



Machine Operator Tyler Vaughn, of the Flying S, places a carbon trim fixture. The Carr Lock™ receiver bushings allow for fixtures in various configurations.



PROBLEM:

"We are an aerospace prototype shop making the transition from prototype to production on an important UAV project. We've developed elaborate fixturing of all shapes and sizes. We found ourselves leaving our trim fixtures set up on a large gantry style table and then having to tear everything down when a large part came along to make way for it.

This tied up one of our most valuable spindles, and dust collection was nearly impossible. Change over and setup times were totally out of control."

SOLUTION:

"I discovered that I could combine 80% of our trim fixtures into just one fixture plate using just two Carr Lock pins, with excellent locating ability and much better clamping than before.

Our setup times have gone from an average of about 25 minutes to literally 30 seconds, thus saving us hundreds of hours."

*Peter Bowman
Production Manager/Mfg Engineer
Flying S Inc.*



www.carrlane.com/carrlock



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Shown actual size

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The CLICK PLC now has more ways to help you with simple control applications. Monitor pressure, level, current, even thermocouples and RTDs directly. Perform simple variable control* with analog outputs connected to devices such as drives. These high-resolution modules offer fast setup (no DIP switches) with software scaling to make your life (and program) easier.

Choose from:

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