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Volume 72, No. 06 September 2013

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Editorial

Driving automotive renewal

Now that the Canadian Auto Workers and Communications, Energy and Paperworkers Union have officially merged under the Unifor banner, the new entity will be looking at expanding its membership in non-union industries as their traditional bailiwicks continue to shrink.

This is particularly true in the automotive sector, where from 2000 to 2009, 55,000 jobs disappeared. To date, only 4,000 jobs have been recovered.

Of great concern to industry watchers is the changing dynamics of the North American and global markets. What does this mean to a sector that's responsible for 1.5% of the nation's GDP (without taking into account the spin-off benefits)?

So far it's a portent of decline that will not be easy to reverse. Unifor is looking at challenging times ahead.

Trouble is Canada has lost its competitive edge, which included a low dollar (now near par with the US buck), the advantage of publicly funded health care (healthcare costs offloaded in the US to the United Auto Workers) and low corporate tax structure (now outgunned in the US and Mexico by generous state incentives).

This has been a good year for the North American industry but Canadian production is down 7% so far.

Canada's share of automotive investment is also plunging. Last year automakers laid down just \$767 million, 9% of what they spend between the US and Canada, according to Statistics Canada data. Automotive analyst Dennis DesRosiers observes that's the first time it has been in single digits since 1990.

Right to work laws are creating a more compliant labour environment in several southern states, with Michigan, a major competitor of Canada's for automotive investment, joining the club. Coincidentally, Ford and Chrysler have announced about \$1 billion worth of investments in the state.

And there are some lavish incentive packages on the go, such as the \$146.5 million for Toyota to produce a Lexus in Georgetown, Ky.

Meanwhile, Mexico is in ascendance as it picks up a bigger portion of the export market for parts to the US at \$33 billion, more than double Canada's \$13.8 billion share. Key competitive advantages include wages of \$40 a day compared to \$32 an hour in Canada and more trade deals, particularly in the growing South American market, making it a key entry point to both continents and the EU.

Canada has high quality plants, but GM has demonstrated how much it cares about that by closing one of its top-ranked Oshawa facilities to move production of the Camaro to Michigan in 2015.

What does the industry need to do to persuade the automakers not to burn rubber in their haste to leave town for more lucrative jurisdictions?

DesRosiers in his report, *Why the canaries are chirping*, describes several of the issues that are driving the decline. Among them, he identifies a need for significant research and the development of locally produced products. The Canadian industry spent just 0.42% of the \$68 billion in shipments generated in 2011. Tens of billions of dollars are spent in North America every year, "and we're winning barely a sliver of that pie."

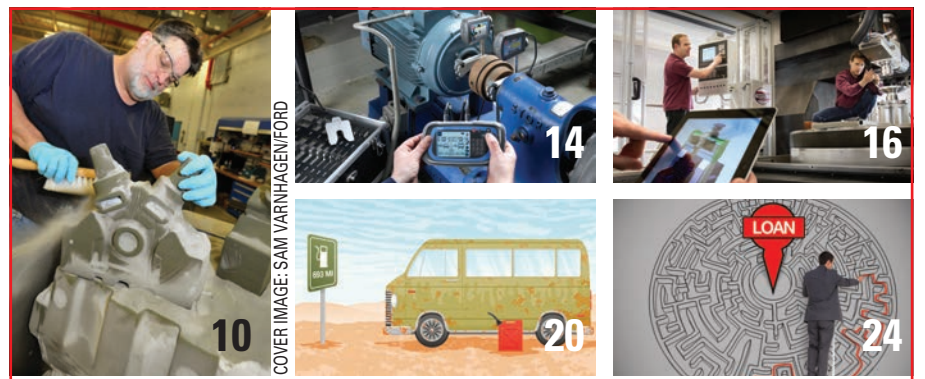
The Canadian industry used to have champions, now he wonders if there's representation at international investment tables.

Incentives from governments are now a competitive reality. Ford is angling for cash to help with a \$1.2 billion rejuvenation of its Oakville, Ont. plant. Governments must be prepared to play. But DesRosiers warns incentives won't nurture the core competencies needed to build the industry.

The old CAW has for some time called for an automotive industrial strategy. The time has come for stakeholders to come up with a viable national vision while there is an industry to preserve.

Joe Terrett, Editor

Comments? E-mail jterrett@plant.ca.



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» Bulletins

Comet Solar in Anguilla will use solar modules made by **Canadian Solar Inc.** for a 600-kilowatt commercial project. The Guelph, Ont. manufacturer said the installation will span eight buildings and various businesses, including supermarkets, which have a high refrigeration load.

The federal government is providing \$4.2-million for the Winnipeg-based non-profit **Composites Innovation Centre (CIC)** for the purchase of composites equipment and the hiring of specialized staff. The CIC facilitates industry-driven applied research and the development of bio-composite materials.

ProSep Inc. has been awarded a \$1.2 million deal by an unidentified customer that includes a purchase order for the supply of a ProScav scavenging unit, a system for injecting and mixing scavenger chemicals directly in a pipeline to remove moderate amounts of gas or liquids. The result is a 30% to 40% reduction in chemical consumption. The Montreal company's technologies separate oil, water and gas generated by oil and gas production.

Reko International Group Inc. has completed the final step of its business transformation project announced in 2011. The Windsor, Ont. manufacturer of machining and engineering products planned to sell seven local plants and consolidate operations in two buildings. Sale of the last piece of property will close at the end of September.

Cascades' Moka 100% recycled, unbleached bathroom tissue won a bronze Stevie in the "Best New Product or Service of the Year – Business-to-Business Products" category at the International Business Awards. The tissue, made of 80% of post-consumer material and 20% recovered corrugated boxes at the company's Candiak, Que. plant, was praised for its "uncompromised softness and hygiene qualities."

TransCanada Corp. is proceeding with its \$12 billion Energy East pipeline with firm commitments for 900,000 bbl/d of the project's 1.1-million bbl/d capacity. The project will include 3,000 kilometres of existing and 1,400 kilometres of new pipeline that will transport crude oil from points in Alberta and Saskatchewan to delivery points in Montréal, the Québec City region and Saint John, NB by 2018.

Avro Arrow replica lands at CMTS

Get a photo of the historic 1950s warrior interceptor

TORONTO: The Avro Arrow, perhaps Canada's greatest aerospace achievement, famously brought down by budgets and politics in 1959, will make an appearance at the Canadian Manufacturing Technology Show (CMTS) from Sept. 30 to Oct. 3 at the International Centre in Mississauga, Ont.

The RL-203 is the only full-size replica of the twin-engine supersonic interceptor built in the late 1950s, and designed to defend against enemy Soviet Union bombers that might threaten North American cities should the Cold War were to heat up. At the time, it was the most advanced aircraft produced in Canada, and perhaps in the world.

The 28-ton jet was designed to stow all missiles internally to reduce drag and fly a 650 nauti-



The RL-203 stands on guard at CMTS.

PHOTO: CMTS

cal mile radius, breaking the speed of sound, and eventually hitting Mach 1.98.

In 1959, production of the Arrow was abruptly cancelled and all plans and working aircraft

were destroyed.

However, CMTS visitors can get up close enough for a photo for the duration of the show.

For more on CMTS see the **PLANT** preview on page 34.

\$250M financing for Chinese NG supplier

OTTAWA: Export Development Canada (EDC) has signed a US\$250 million financing agreement with Hong Kong-based China Gas Holdings (CGH), one of mainland China's largest natural gas suppliers, for a purchasing deal with a Canadian supplier.

EDC, Canada's export credit agency, said the financing agreement will facilitate a planned procurement from long-standing Canadian supplier, Chilliwack, BC-based IMW, a subsidiary of Clean Energy Fuels Corp.

IMW is a supplier of natural gas equipment for vehicle fuelling and industry.

China Gas said it's expanding its city gas project portfolio and compressed natural gas refuelling station strategies.

Quebec firms win service deal for federal fleet

MIRABEL, Que.: A pair of Quebec firms have been awarded a massive multi-year contract from the Department of National Defence (DND) for service of the federal Airbus CC-150 Polaris fleet.

L-3 MAS and partner Avianor Inc. announced a new follow-on contract worth as much as \$683-million to provide in-service support (ISS) for the Royal Canadian Air Force fleet of the converted civilian jets.

L-3 MAS, a division of L-3 Integrated Systems Group, was awarded the CC-150 interim ISS contract in June 2012.

The CC-150 Polaris fleet is used by the government for missions such as VIP transportation and strategic air-to-air refuelling, as well as passenger, freight and medical evacuation transportation.

Headquartered in Mirabel, Que., L-3 MAS will act as prime contractor, providing program management, material management and engineering support services, as well as line maintenance support at Canadian Forces Base Trenton, located approximately 175 kilometres east of Toronto.

Avianor will provide heavy maintenance and component maintenance, repair and overhaul services from its Mirabel, Que. facility northwest of Montreal, the company says.

The initial deal runs until 2018, followed by two additional five-year option periods.

CanadianManufacturing.com

Ford detection technology catches dirt particles

Spotting surface imperfections early cuts customer complaints 82%

DEARBORN, Mich.: New Ford F-Series trucks will benefit from the company's dirt detection technology to ensure the best paint and surface quality.

The system uses high-resolution cameras and reflected light to digitally identify surface imperfections finer than a grain of salt in final vehicle assembly, and to cue operators where to polish and buff out these imperfections.

The technology helped Ford improve paint quality and reduce customer complaints by 82% within one year, as measured by customer warranty data for F-Series models produced at the company's Dearborn Truck Plant in Michigan.

In the past, paint and surface inspections were based on human-eye examination.

The 3D imaging system takes microscopic scans applying varying degrees and angles of light to painted surfaces, and then cues final assembly operators to address repairs where necessary. High-resolution images – 3,150 captured in 15 seconds for every vehicle made – are stitched together for a full 3D image that is digitally compared to a perfect computer model.

Dirt particles in paint are difficult to man-



A F150 undergoes dirt inspection at Ford's Dearborn truck plant.

PHOTO: FORD

age with conventional quality control methods. Minute particles enter a shop floor from many environmental sources, machinery or workers, which makes paint quality one of the toughest variables to control in production. Along with the Dearborn Truck Plant, the system is also used at Ford's Kentucky Truck Plant.

In addition to the other US locations, the technology comes to Ford's assembly plant in Oakville, Ont. (where the Ford Edge and Flex are made) later this year.

Kroger automates dairy ops with RMT system

GRIMSBY, Ont.: RMT Robotics has sold an automated storage and picking system to The Kroger Co., a Cincinnati-based food retailer.

The system will be installed in a new dairy facility in Denver, Colo. and will be operational in 2014.

RMT Robotics, a Grimsby, Ont.-based robotics company

(part of Cimcorp Oy), says the system is designed to store up to 36,000 crates and process more than 30,000 per day.

Crates are stacked, accumulated and conveyed to four MultiPick Gantry robots. The robots then move the inventory to storage positions on the floor until order fulfilment. Order

pallets are picked by the robots, palletized and banded before being loaded onto a route truck.

No financial details were provided.

Cimcorp Oy is a Finnish company specializing in material handling and intralogistics automation using robotics and advanced software.

Tesla Model S is NA's safest vehicle

Electric vehicle sweeps NHTSA subcategories for top marks

PALO ALTO, Calif.: The Tesla Model S sedan may be one of the priciest electric vehicles (EV) starting at just under \$72,000, but it is surely one of the safest with a just-awarded National Highway Traffic Safety Administration (NHTSA) five-star safety rating in the US.

The Palo Alto, Calif. designer and assembler of the vehicle is crowing about the overall rating, and the sweep of all the sub-categories putting the vehicle ahead of all SUVs and minivans and among the 1% of all cars tested by the US federal government to achieve the across the board rating.

Noting the NHTSA does not publish a star rating



Tesla's ultra-safe Model S sedan.

PHOTO: CRIXXOR

above 5, Tesla brags that the overall Vehicle Safety Score (VSS) provided to manufacturers gives the Model S a new combined record of 5.4 stars.

This score gauges the probability of injury from front, side, rear and rollover accidents.

For those interested in fuel

economy, since it doesn't use gasoline, Tesla says owners will save about \$8,000 over five years compared to a vehicle such as the BMW 535i.

Tesla will be producing 20,000 Model S sedans this year, and Canadian buyers can check one out at the company's Toronto dealership.

CO2 Solutions' technology hits its second milestone

QUEBEC CITY: CO2 Solutions Inc. says it has met and exceeded the first two technical performance milestones for its Alberta oil sands carbon capture project.

The Quebec City-based developer of enzyme-enabled carbon capture, has demonstrated its patented technology's energy consumption is at least one-third less expensive than other technologies, and withstands the rigors of industrial applications.

The project will now proceed to the large-bench scale (0.5 tonnes/day CO2 capture) testing phase for the remainder of 2013 where the same performance metrics will be validated under flue gas conditions.

Following a successful large-bench validation, the project will move to field pilot-scale (approximately 15 tonnes/day CO2 capture) testing in of 2014.

The technology uses carbonic anhydrase to dramatically accelerate the capture of CO2 with energy-efficient solvents and convert it to bicarbonate and protons.

No steel wire dumping: CITT

OTTAWA: The Canadian International Trade Tribunal (CITT) has ruled that the subsidizing of galvanized steel wire from China, Israel and Spain has not harmed the domestic industry and therefore should not be subject to countervailing duties.

Tree Island Steel Ltd. of Richmond, BC had initiated the complaint, alleging the dumping and subsidizing of cold-drawn carbon or alloy steel wire resulted in the loss of market share, price erosion and jobs losses.

Next up is an inquiry into the alleged dumping of circular copper tube from Brazil, Greece, China, South Korea and Mexico, and subsidizing from China, and whether this has caused injury to the domestic industry.

A decision is expected Dec. 18.

Frigates get \$15M chilled-water upgrade

Part of the federal modernization, life extension program

BROSSARD, Que.: A \$15 million federal contract has been awarded to Bronswerk Marine Inc. for the replacement of the ships' chilled-water systems as part of the modernization program for 12 Halifax-class frigates.

Chilled-water systems provide the cooling capacity needed to operate onboard systems.

The contract going to the Brossard, Que. company covers the purchase of 50 chilled-water plants and pumps, with four units allocated to each frigate, and one training unit for sailors on each coast.

The units will be delivered



Canadian frigate HMCS Regina.

PHOTO: US NAVY

between 2014 and 2018, before Canada's Federal Halocarbon Regulations bring into force a ban in 2020 on R22 coolant, which is used in the existing systems on the Halifax-class fleet. The new chilled-water

systems will use a compliant coolant.

Chilled-water system replacement is a sub-project under the \$3.1 billion Halifax-class Modernization/Frigate Life Extension project.

» Careers

Catalyst Paper is adding **Joe Nemeth** to the executive management team as president and CEO. Nemeth has held executive positions in sales, marketing and operations and most recently was president and CEO of Canfor Pulp. Catalyst Paper, based in Richmond, BC, manufactures specialty mechanical printing papers, newsprint and pulp.

Orbite Aluminae Inc. has abolished two positions: vice-president corporate development, which was held by **Marc Johnson** and the vice-president sustainability, held by **Guy-Louis Boucher**. Orbite COO **Glenn Kelly** said the changes were part of the company's focus on a more capital-efficient Orbite and its short term goals, such as finalizing the HPA facility. Orbite, based in Montreal, is a developer of lower-cost rare earth and rare metal oxides.

Westport Innovations, a Vancouver-based developer and manufacturer of engines that use fuels such as compressed natural gas, liquefied natural gas, hydrogen and renewable natural gas fuels, has appointed **Nancy Gougarty** as its president and COO. She comes from automotive parts maker TRW Automotive Corp. where she was

vice-president for the Asia-Pacific region from January 2008 until last year.

Bruce Rintoul, COO of Empire Iron Works Ltd., has left the subsidiary of Empire Industries Ltd. in Winnipeg. **Guy Nelson**, CEO, has assumed the duties of the COO and will delegate specific responsibilities to key members of the operational management team.

Eric Toews joins MEG Energy Corp. in Calgary as CFO. He comes to the in-situ oil sands developer from BMO Capital Markets where he was managing director and provided strategic financial and capital raising advice to Calgary-based oil and gas companies.

Cambridge Elevating Inc. has made three appointments: **Ken Cook** as president, **Derek Morse** as vice-president sales and marketing, and **Richard Wright** as controller. The company, based in Cambridge, Ont., makes and installs residential and commercial elevators and lifting devices.

Energy distribution company EPCOR Utilities Inc. in Edmonton has added **Vito Culmone** to its board. The chartered accountant is CFO and executive vice-president at WestJet. He also held senior management positions at Molson Inc.

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Bombardier suppliers win BASE awards

MONTREAL: Bombardier Aerospace has recognized four of its top suppliers with BASE awards.

The 2012 winners of the Bombardier Achieving Supplier Excellence program deemed the best performers in terms of quality and delivery are:

- Pratt & Whitney Canada Corp., an aerospace engine manufacturer based in Longueuil, Que.
- Rockwell Collins Aerospace & Electronics Inc., a supplier of aviation electronics in Wilsonville, Ore.
- RTI Claro Inc., a Laval, Que. supplier of telecom components.
- Thales Canada Inc., a supplier of flight control technology based in St-Laurent, Que.

BASE was launched in 2011 and has honoured the performance of 26 suppliers.

Lignol increases share of TBF

Owns the largest biodiesel plant in Australia

VANCOUVER: Lignol Energy Corp., an advanced biofuels and renewable chemicals company, is investing up to an additional \$950,000 in Territory Biofuels Ltd. (TBF), the owner of the largest biodiesel plant in Australia.

This will increase Vancouver-based Lignol's majority holding to about 66% of the issued and outstanding shares of TBF.

"Our goal remains to work with TBF with a view to restarting the plant in late 2013 with an appropriate project funding package in place. Once operational, we plan to incorporate plant upgrades to process lower cost feed-

stocks that should further enhance margins in 2014," said Ross MacLachlan, CEO and chairman of Lignol.

The transaction is subject to regulatory approval.

TBF owns a large-scale bio-refining facility in Darwin, Northern Territory that includes a Lurgi-designed biodiesel plant and the largest glycerine refinery in Australia.

The \$76 million plant, originally built to run on palm oil and food-grade vegetable oil, was commissioned in 2008, along with 38 million litres of related tankage now leased by TBF. It's the largest in Australia with a capacity of



Biodiesel processing equipment. PHOTO: LIGNOL

140 million litres per year.

It was shut down in 2009 because of economic and market conditions. TBF is now raising funds to restart the plant using an environmentally certified refined bleached and deodorized (RBD) palm oil.



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» Events

NDT in Canada 2013 CINDE/CANSMART/IZFP

Oct. 7-10, Calgary

Presented by the Canadian Institute for NDE (CINDE), The Cansmart Group (CANSMART), and the Fraunhofer Institute for Nondestructive Testing (IZFP). The latest developments in NDT, smart materials, and structural health monitoring will be discussed with a special emphasis on topics relating to the energy industry. Visit <http://events.cinde.ca>.

25th National Robot Safety Conference RIA

Oct. 14-16, Indianapolis

The Robotic Industries Association's (RIA's) conference will focus on the new American National Robot Safety Standard (ANSI/RIA R15.06-2012), which now harmonizes with the International ISO 10218:2011 standard for robot manufacturers and integrators. Visit www.robotics.org/safety13.

PTDA Industry Summit

PTDA

Oct. 18-20, Dallas

The Power Transmission Distributors Association (PTDA) hosts a networking event with educational sessions on economic trends and market opportunities. Visit www.ptda.org/IndustrySummit.

AME Toronto 2013

AME

Oct. 21-25, Toronto

Association for Manufacturing Excellence (AME) presents the Breakthrough to Your Leading Edge lean conference. Four of the world's leading lean thought leaders are featured: Jim Womack, Dan Jones, John Shook and Mike Rother, plus best practices sessions and plant tours. Visit <http://www.ameconference.org/2013-toronto>.

Physical Asset Management Certificate Program

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This eight-day course presented by the University of Toronto's School of Continuing Studies will help you manage your assets efficiently and effectively through sound and timely decision-making. Visit <http://learn.utoronto.ca>.

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For pressure fed applications with independent air and liquid control.



Internal mix nozzles mix the liquid and water inside the air cap and produce the finest atomization. Both air and liquid sides are pressure fed. Internal mix nozzles can be used on liquids with a viscosity up to 300 cp.



Siphon fed nozzles require no liquid pressure and can be used with gravity fed liquids or lift liquids from a siphon height as much as 36 inches (91 cm). Siphon fed nozzles can be used on liquids with a viscosity up to 200 cp.



External mix nozzles have the highest flow rates and allow the air and liquid flows to be adjusted independently and precisely. External mix nozzles are also the best choice for liquids with a viscosity over 200 cp.

Applications

- Washing
- Rinsing
- Coating
- Cooling
- Quenching
- Wetting (moistening)
- Humidification
- Dust Control

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All Liquid Atomizing Nozzles are now available in No Drip configurations. No Drip models have the added benefit of positively stopping liquid flow when compressed air is shut off, eliminating the problem of unwanted drips.



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Making manufacturing work for workers

BY KEN NEUMANN

Manufacturers employ 600,000 fewer Canadians today than a decade ago, yet the sector continues to represent a significant share of the workforce and is key to rebuilding our job market. Policy changes regarding the exchange rate, training, renewable power and trade would help to renew it.

Employment peaked at more than 2.3 million in November 2002 and by 2008 the workforce was cut to just below 2 million – before the financial crisis hit.

“Having employment growth stall in such a large and relatively well-paid sector has been a drag on the economy...”

It then collapsed to between 1.7 million and 1.8 million in 2009 and is stuck there.

Even at this reduced level, manufacturing remains Canada’s third-largest employer, behind retail/wholesale trade (2.7 million) and healthcare/social assistance (2.1 million), with average weekly earnings of \$1,008 compared to \$915 across the whole economy. Having employment growth stall in such a large and relatively well-paid sector has been a drag on the economy.

Attaining higher productivity does mean fewer workers per units of output; however, high-wage countries such as Germany and Japan have maintained a much larger share of manufacturing employment than Canada by boosting output.

Both countries have benefited from exchange rates that make their manufactured exports competitive in world markets. Germany uses the euro, which has been held down by turmoil in other EU

countries, and Japan’s central bank has intervened in foreign-exchange markets to lower the yen.

Canada has allowed the loonie to rise with the price of oil, making exports more expensive, which has contributed to a trade deficit. The Bank of Canada can and should act to moderate the rate to a more competitive level.

Trade union economists are not alone in making this point. Peter Spiro, a former senior Ontario finance official, wrote in *The Financial Post* last year, “...If the Bank of Canada is willing to take a more interventionist approach, it is likely that it would be able to assert greater control over the dollar, and steer onto a path that is less damaging to the growth of Canada’s exports of non-oil goods and services.”

Manufacturing in Germany and Japan has been well served by the participation of business and labour in effective training programs. Unfortunately, our federal government has moved in the opposite direction by cutting funding for joint union-management sector councils and provincial training initiatives. It has instead proposed a Canada Jobs Grant for employers that may end up subsidizing existing training rather than providing new opportunities.

Sustainable economy

Renewable energy is a huge opportunity for manufacturers, but the federal government remains fixated on extracting and exporting oil rather than transitioning to a more sustainable economy.

Meanwhile, Canadian trade has fallen far behind Germany and Japan. In the first half of 2013, Canada exported only \$1.5 billion of manufactured goods to Germany, but imported \$7.4 billion worth. Exports to Japan were \$2.2 billion compared to imports of \$6.9 billion. Meanwhile, the Canadian government is reportedly close to concluding a free trade agreement with the EU and has allowed Japan to join the Trans-Pacific Partnership negotiations.

There’s no reason to believe these deals will produce more balanced trade. They would take away policy tools such as local procurement preferences for the development of manufacturing capacity. If trade deals simply amplify existing flows, they’ll deepen the deficit.

We should be negotiating agreements that balance trade, while protecting labour and environmental standards. At a minimum, manufacturers should be on a competitive footing before giving up the few remaining tariff protections.

Manufacturing has been stuck in a rut since the financial crisis. We can get back on track by learning from Germany and Japan, while rebalancing our trade with them and others.

Ken Neumann is national director for Canada of the United Steelworkers Union.

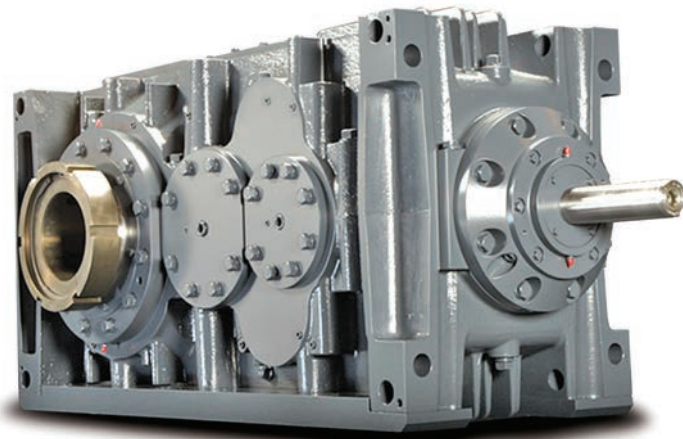
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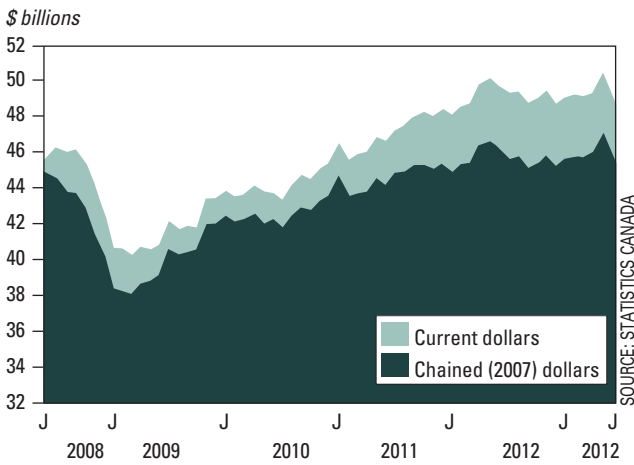
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Sales erosion continues

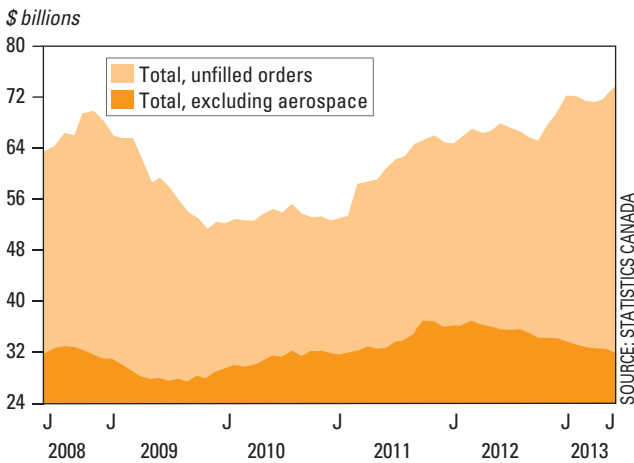
Look for improvements as the US economy picks up

WHOLESALE SALES DOWN IN JUNE



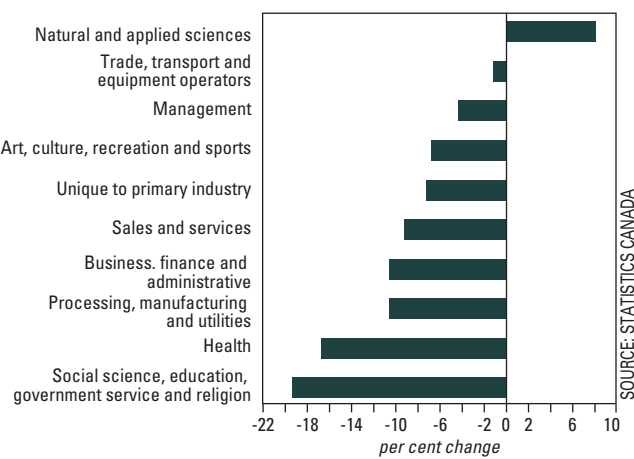
Wholesale sales dropped 2.8% to \$48.8 billion in June. Machinery, equipment and supplies were down 1.8%, while motor vehicle and parts declined 2.2%. Food and beverage products were down 1.9%. The biggest drop was miscellaneous at 8%.

AEROSPACE DRIVES UNFULFILLED ORDERS



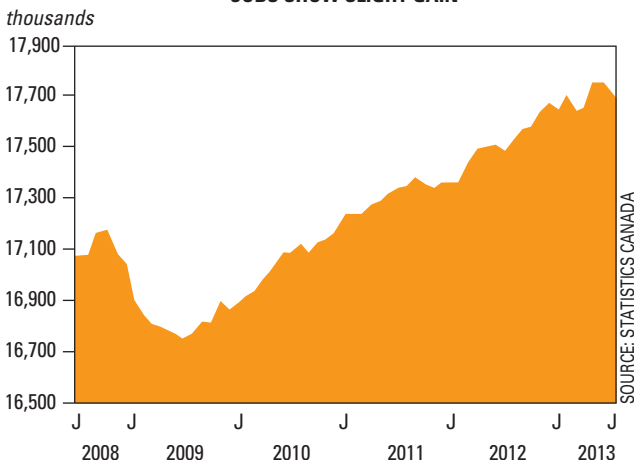
Manufacturing sales were down 0.5% to \$48.2 billion in June, the fourth decrease in six months. However, unfilled orders were up 2.7% to \$73.2 billion, thanks to a 6.5% rise in aerospace products and parts, which hit a high of \$41.6 billion.

EI BENEFICIARIES DECLINE



Year-over-year, there were fewer employment insurance beneficiaries in all but one group in June. Processing, manufacturing and utilities saw a 10.6% drop. The biggest drop at 19.4% was social science, education, government service and religion.

JOBS SHOW SLIGHT GAIN



Employment decreased by 39,000 in July, while unemployment rose 0.1% to 7.2%. Gains averaged 11,000 per month over Q1 and Q2, slower than the preceding period's 27,000. Manufacturing employment grew 0.8%, but is down 3.3% since July 2012.

Manufacturing sales continued to decline in June, slipping 0.5% to \$48.2 billion, the fourth decrease in six months and part of a slow erosion since the spring of 2012, reports Statistics Canada.

The decline was widespread, occurring across 16 of 21 industries, but the big losers were miscellaneous manufacturing (down 20.2% mostly because of lower sales in the jewellery and silverware manufacturing sub-industry), wood products (7.7% to \$1.9 billion) and fabricated metal products (6.5% to \$2.6 billion), in part because of lower sales in the architectural and structural metals sub-industry.

Petroleum and coal product sales offset some of the losses, rising 7.4% to \$6.7 billion. The Ottawa-based federal agency attributed most of this gain to refineries ramping up production and sales following slowdowns for maintenance and retooling. Transportation equipment sales rose 0.7% to \$8.6 billion thanks to higher production in the aerospace product and parts sub-industry.

Inventories were down 0.2% to \$68.6 billion. Transportation equipment was down 2.5% and primary metals by 3.7%, but they were offset by increases in petroleum and coal products (4.3%) and wood products (3%).

Unfilled orders advanced 2.7% to \$73.2 billion, the sixth gain in eight months and attributed to a 6.5% rise in the aerospace product and parts industry for a record high of \$41.6 billion.

New orders were up 2.5% to \$50.1 billion, mostly as a result of higher orders in the aerospace industry.

This month's sales level is 9.5% below the pre-recession peak of July 2008 and the decline in volumes does not bode well for June GDP, observed Jonathan Ben-

diner, an economist with TD Economics. "Economic activity is already expected to be held back due to the flooding in Alberta and construction strike in Québec," he said in a bulletin.

Conditions are looking better for the future, though. A modest second quarter US real GDP estimate confirms an accelerated growth from the final quarter of 2012 through the first half of 2013. Economic activity in the US is expected to continue improving over the second half of the year and into 2014, which should translate into increased demand for Canadian-manufactured goods. However, he warned the auto sector is facing "more significant headwinds," partly reflecting the winding down of production in one of GM's two Oshawa plants.

Despite June's disappointing sales numbers, small businesses, particularly manufacturers, were feeling confident about their prospects in August.

The monthly Business Barometer published by the Canadian Federation of Independent Business (CFIB) shows a 1.7-point advance to 65.9 (50 being the midpoint between positive and negative), its highest mark since February.

Manufacturing (68.5) was just behind retail (68.6) while professional and enterprise services led both at 70.2.

CFIB chief economist and vice-president Ted Mallett notes improving outlooks among Ontario business owners has powered the national average, though sentiment is stronger in seven of the 10 provinces. Saskatchewan businesses are still the most optimistic, followed by Newfoundland and Labrador, Alberta, Ontario and BC. However, confidence levels in the Maritimes, Manitoba and Quebec remain below 60.

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3D printing

ADDING ANOTHER DIMENSION TO PRODUCTION

Digital technology is influencing the way things are being made, from prototyping to the creation of parts and components.

BY MATT POWELL, ASSISTANT EDITOR

3D printers are responsible for making some pretty cool stuff these days.

The process produces three-dimensional objects from virtually any shape derived from a computer aided design (CAD) model using additive processes such as selective laser sintering (SLS), fused deposition modeling (FDM) or stereolithography (SLA) to lay down successive layers of material. It's a significant departure from traditional machining that relies on the removal of material by cutting or drilling, and it's being used in innovative ways.

Buttercup, a duck born with a backwards foot, now walks properly after being fitted with a 3D printed prosthetic foot thanks to a Tennessee-based manufacturer, while doctors are fitting patients with web-like casts to mend broken bones. There's even a working prosthetic human ear, produced by researchers at Princeton University. It's made from 3D-printed cells and nanoparticles combined with a coil antenna with cartilage using a \$1,000, off-the-shelf 3D printer. And researchers at China's Hangzhou Dianzi University went authentic with a printed ear cartilage sample using real human tissue. The university says about 90% of the printed cells survive for as long as four months.

Some dubious innovators have also produced 3D printed guns, including a Canadian (authorities are investigating), and some students at the University of Toronto who wanted to prove how easy it was to do and demonstrate the need

3D PRINTED PARTS TAKE TO THE SKIES

GE is using metal systems to make stronger, lighter fuel injectors for its LEAP jet engines. Using 3D printing, the company was able to consolidate 20 parts into one to produce the redesigned components.

for greater regulatory oversight.

And NASA is sending a 3D printer into space next year. It will be the first machine to make parts onboard the International Space Station.

3D printing, or additive manufacturing, is presently a \$2.2 billion global industry, a jump of more than 28% from 2011, according to data from research firm Wohlers Associates. But will these Star Trek-like replicators be responsible for a third industrial revolution?

Such a claim is perhaps premature, but the technology does have the potential to alter the industrial landscape.

"We do know manufacturing is continuing to go digital and the speed of these technologies is increasing; the variety of materials is expanding, which leads us to believe the potential of micro-manufacturing presents great opportunity for manufacturing overall," says Harold Sears, an additive manufacturing specialist at Ford Motor Co.

Finding its fit

Engineers at Ford, led by Sears and Paul Sussalla, section supervisor of rapid manufacturing, are convinced they've uncovered a way to make it practical.

When the automaker tasked its engineers to develop a more fuel-efficient engine, they turned to the nondescript Beech Daly Technical Centre in suburban Detroit where 3D rapid manufacturing was deployed to quickly produce prototype parts for what would become the EcoBoost engine. This shaved months off overall development time.

"Engineers who wanted to test metal parts had to wait weeks for a pattern shop to create the tools, send it to the foundry, make the piece and deliver it to the lab," says Sussalla. "If it didn't work, the whole process started over again. Now an engineer in the prototype facility checks the casting patterns and cores as they come out of the printer."

Rapid prototyping saves Ford millions of dollars a year by enabling engineers to test more part variations in less time without having to invest in tooling for parts that are likely to change. For the customer, this means better quality, weight-optimized products that improve fuel efficiency.

"There's such a focus on weight and fuel economy in the automotive industry that 3D printing provides us with an op-





(Top) Ford technologist Dennis Dubay removes sand cast moulds for EcoBoost engine components.

(Left) A number of components, including filtration adaptors, exhaust manifolds, brake rotors and rear axles were developed using 3D printing for Ford's TransitVan.

(Right) Ford technologist Mark Smith cleans a 3D printed part at Ford's 3D printing facility in Dearborn Heights, Mich., which allows engineers to quickly create a series of evolving testable pieces with slight variations.

PHOTOS: SAM VARNHAGEN/FORD

timal tool to meet those requirements," says Sears.

Despite the obvious benefits it offers by streamlining design and prototyping, additive manufacturing continues to look for its place in the industrial space.

"3D printing isn't the next face of manufacturing, it's more of a complementary technology because there's no economies of scale with it," says Reuben Menezes, a marketing manager at Proto 3000, a Woodbridge, Ont.-based supplier of 3D printers. "It's still confined to small-run production, but it's cost effective and will become more prominent as materials develop."

Huge strides in the industry, led by a push in materials research, including the ability to print metals in 3D, will make the technology more useful to manufacturers, he adds.

GROWTH POTENTIAL

Low-volume manufacturing will grow to \$1.1 billion in 2025, a significant jump from a niche market of only \$1 million in 2012, thanks to significant adoption of the technology into the production of parts for aerospace engines and automotive components.

Source: Lux Research

"The adoption of 3D printing has been slower than expected," says Doug Lee, 3D printer product manager at Oakville, Ont.-based Javelin Technologies, one of Canada's largest 3D players. "It's become key to being competitive in a global economy. The only way to be better is to design better products and get them to market quicker. The tools are there. But it amazes me the number of companies that aren't adopting it."

Mass customization

Advances in rapid prototyping have introduced the use of materials suitable for final manufacture, suggesting the possibility of directly manufacturing finished components, ideal for small-batch, inexpensive production. Rapid prototyping works by printing a part one thin layer at a time, gradually building up the finished piece – like assembling a spool of CDs. When the first CD is placed down, the spool is a fraction of the entire cylinder. Once the final CD is placed on top of the pile, a 3D object has been created.

But rapid manufacturing is a new method, many of its processes unproven, and mass production capabilities are limited because of the printer's slow speed.

"It's hard for us to consider using these technologies in a production setting unless its low volume," says Sears. "It gives us the option to optimize those tools further, and it's ideal for test parts that go through frequent changes during development."

The technology offers potential for mass customization using simple web-based software. For example, consumers are able to custom design a smartphone case and have it printed in 3D. Virtual CAD blueprints or animation modelling software "slice" them into sections as a guideline during the printing process.

The 3D process isn't new. It has been around for a quarter century but is gain-

Continued on page 12

Model partnership U of W teams up with 3D printing firm

A partnership between the University of Waterloo and Hyphen, a rapid prototyping and environmental testing centre, gives students and staff access to the company's additive manufacturing testing facilities to design and refine products and parts.

Hyphen, a spinoff of Christie Digital in Kitchener, Ont., was launched last year. The company saw an opportunity to partner with the university when Mark Barfoot, Hyphen's managing director, was reviewing some of the fourth year engineering design projects and observed the students were struggling to make models.

Peter Teertstra, director of the student design centre, says a non-profit 3D printing service was launched at the university in January with a grant from the Denso North America Foundation.

Located at Christie Digital Systems Canada Inc.'s worldwide engineering and manufacturing centre, Hyphen's testing laboratory features top-of-the-line technologies such as testing (vibration, thermal, tensile and compression, sound, drop testing and electromagnetic compatibility) and fused deposition modelling (FDM), selective laser sintering (SLS), Polyjet, stereolithography (SLA) 3D printing and CNC machining equipment.

The partnership is also allowing students to leverage Hyphen's knowledge in.

Although the students and professors pay for the service, the university has been overwhelmed by the demand for its 3D printer. It's been used to make objects for about 120 projects and printed 780 parts.

"We've gone through about \$8,000 worth of materials," says Teertstra. "The machine is running 24 hours a day, seven days a week. We have orders for as fast as we can make the parts."

Under the agreement, Hyphen takes student designs on software files and creates the objects on its machines at a discounted rate. Its different types of 3D printers produce more complicated objects out of types of rigid and flexible plastics that are different from what the university is able to produce with its sole Denso fused deposition modeling (FDS) printer.

Hyphen is also looking to add a 3D printer to its fleet that prints metal parts.

This arrangement is ideal for engineering students involved in competition projects such as the Formula SAE race car or Midnight Sun solar car contest that may require redesign and rebuilds under tight deadlines.

Hyphen also takes on summer students and co-op students, who need this type of "experiential learning" to become innovative entrepreneurs, Teertstra says.

The university will collaborate with Hyphen on workshops and information sessions to make more people aware of the technology and the partnership.

— PLANT staff



This is only the beginning

Continued from page 11

ing traction as the technology advances and the price of equipment drops. So cheap in fact that consumer versions are available for less than \$1,000. Commercial versions, however, can cost hundreds of thousands of dollars.

Moving ahead, the additive manufacturing market will be worth \$8.4 billion by 2025, according to a study from Boston-based research firm Lux Research. That's up from its current value of \$2.2 billion, and its expected that much of the customer base will be industrial, with big adopters in automotive and aerospace.

The report, *Building the future: Assessing 3D printing's opportunities and challenges*, suggests the technology will help manufacturers reduce raw materials costs. The actual amount of 3D printable material sold is expected to top 9,700 tons by 2025, up from 880 tons in 2012.

At Ford, 3D rapid manufacturing produces prototypes for everything from air vents to cylinder heads, allowing engineers to quickly create a series of evolving testable pieces with slight variations, while considering how the piece will affect mass production abilities.

Ford has also invested in one of the newest variations of this technology: 3D printing with sand.

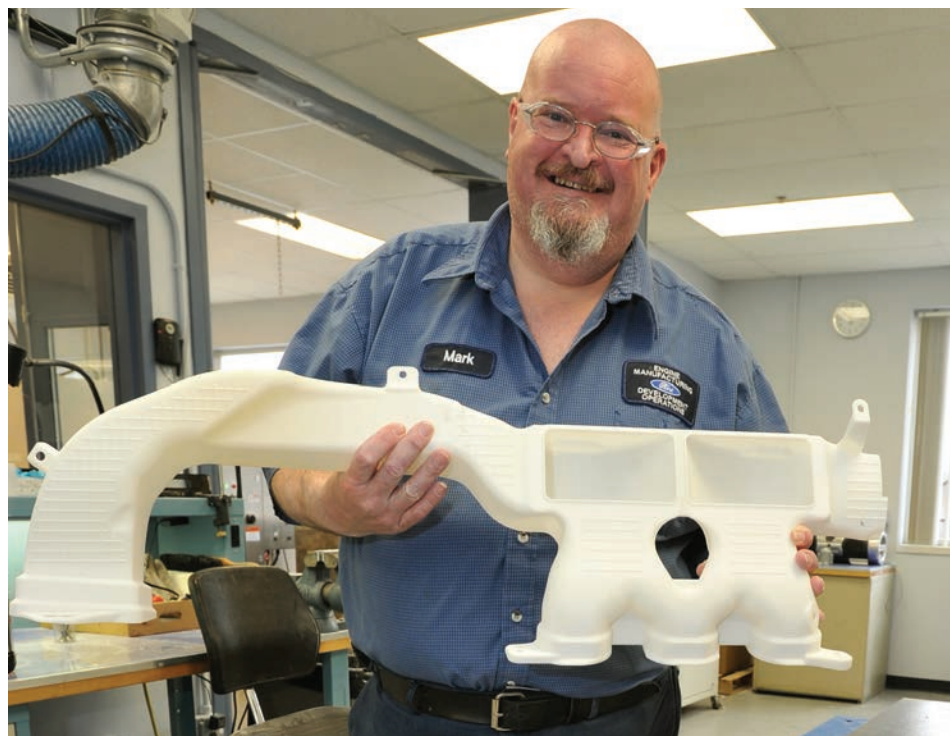
Most recently, it produced many of the components for the 3.5-L EcoBoost engine in its Transit Van. Cast aluminum oil filtration adaptors, exhaust manifolds, differential carrier, brake rotors, oil pan, differential case casting and even rear axles were prototyped with the technology, specifically utilizing selective laser sintering (SLS), stereolithography (SLA) and 3D sand casting.

SLS applies a high-powered laser to fuse small particles or glass powders into a 3D mass. It's used mostly in low-volume production of prototype models and functional components.

Fused deposition modelling (FDM) adds material in layers. A plastic filament or metal wire is unwound from a coil and supplies materials to an extrusion nozzle, which is heated to melt the material so it moves both horizontally and vertically by a numerically controlled mechanism. A model is produced by extruding small beads of thermoplastic to form layers, which hardens almost immediately.

SLA involves a vat of liquid ultraviolet curable polymer resin and an ultraviolet laser to build parts one layer at a time.

The laser beam traces a cross-section of the part pattern of each layer. The laser cures and solidifies the pattern traced on



The EcoBoost engine was initially developed with 3D sand prototyping.

PHOTO: SAM VARNHAGEN/FORD

the resin, joining the layer underneath.

SLS and SLA are good for producing trim and body parts for prototype vehicles and wind tunnel models, but SLA plastic parts won't endure the high stress and temperatures of engine blocks and cylinder heads.

SLS parts are used for engine parts such as intake manifolds.

3D sand printing was also used to pro-

duce rotor supports, transmission cases, damper housings and end covers for HF35 hybrid transmissions used in the Ford C-MAX and Fusion hybrid sedan; four cylinder EcoBoost engines for the Ford Escape; brake rotors for the 2011 Explorer (modified late in the development process to address a brake noise issue discovered during durability testing), and exhaust manifolds for F150 pickups outfitted with 3.5-L EcoBoost engines.

It involves packing sand around the pattern of a 3D object, then removing the pattern to fill the mould with a liquid metal. As the metal solidifies, the cast object is formed.

Combining old and new

Ford is still using traditional casting, one of the oldest metal processes. By combining it with 3D printing, engineers have a cutting-edge method to quickly produce production-representative parts.

Conventional methods of producing the moulds for patterns take weeks or months, an expensive process. Each time a change is made to the prototype design, moulds have to be altered or new ones created, increasing costs. 3D printing with sand prints patterns and cores that are on their way to the foundry in a matter of days.

Ford may also eventually produce replacement parts for cars that have been years out of production. Currently, when a vehicle needs to be serviced, a dealer orders a replacement part from a warehouse and has it shipped. With 3D printing, dealers simply scan a barcode or print an order for the part on the internet, take it to a local supplier and have the part within hours, or even a few minutes.

"This is an amazing concept, and we're excited to see how far we can take it," says Sears.

Like the fictionalized replicators onboard the original USS Enterprise, the technology is boldly going where no printer has gone before.

Comments? E-mail mpowell@plant.ca.

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COBRA GOLF GOES 3D

Golf club design has come a long way. Today it's rare for a golf club not to be designed by CAD tools. Most craftsmen no longer grind clubheads by hand.

There is one problem, though. CAD tools create in 3D, but the visuals are strictly two-dimensional when viewed on a computer screen, making it difficult to visualize how the complex curvatures and surfaces of a clubhead will look in real life.

So club designers at Carlsbad, Calif.-based Cobra Golf turned to 3D printing.

Engineers use a photopolymerization machine that applies a stereolithography process to print 3D parts. A special software program divides the part into a number of thin horizontal 2D sections. Starting with the bottom section, each one is projected onto a vat of liquid polymer with a special light source that solidifies it onto a platform.

Once the first layer has solidified, the next layer is projected and the process is repeated until the part is completed. The end result is a 3D part that designers use to visualize exactly what was built in the CAD model, and then make the necessary tweaks.

The company's additive manufacturing process was used to develop the AMP Cell driver, which is currently used by PGA Tour professionals Rickie Fowler and Ian Poulter.

Check out a video of Cobra's 3D printing process at www.cobragolf.ca/tour-blog/according-to-rd-3d-printing.



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AUTO21 researchers are developing smarter SMAs to replace multi-component devices in vehicles and other applications

BY IBRAHEEM KHAN AND NORMAN ZHOU

Tougher corporate average fuel economy (CAFE) regulations are driving automotive manufacturers to reduce the weight of their vehicles and the use of advanced materials is helping them do so.

Highly engineered alloys that are much lighter and stronger are already replacing conventional structural components, but the application of advanced materials has taken a step forward by replacing complex multi-component devices, such as actuators, with a single piece metal called a shape memory alloy (SMA).

These “smart materials” respond dynamically to external stimuli such as heat, humidity, ultraviolet light or pressure. Although many different SMA alloys exist, the most common, composed of nearly equal parts of nickel and titanium, is commercially known as Nitinol.

SMAs are trained to remember a shape at a high temperature, then they're cooled to a state where they're easily unformed, but will return to the trained shape when heated. They respond passively to ambient temperature, but can be electrically controlled to activate when heated by a current.

With more than 200 motorized parts in the average vehicle, SMAs have the potential to greatly reduce weight and improve efficiency. General Motors has incorporated one in the 2014 Corvette hatch vent – a single wire actuator that replaces a heavy motorized part, reducing weight by more than a pound (0.5 kilograms).

It opens the hatch vent when the deck lid is opened using heat from an electrical current. The wire contracts and moves a lever arm to open a vent allowing the trunk lid to close. The electrical current then switches off, the wire cools and returns to its original shape.

Existing SMAs are ideal for replacing



The 2014 Corvette uses a single wire actuator to open a vent hatch when the trunk lid is popped, eliminating a motorized part.

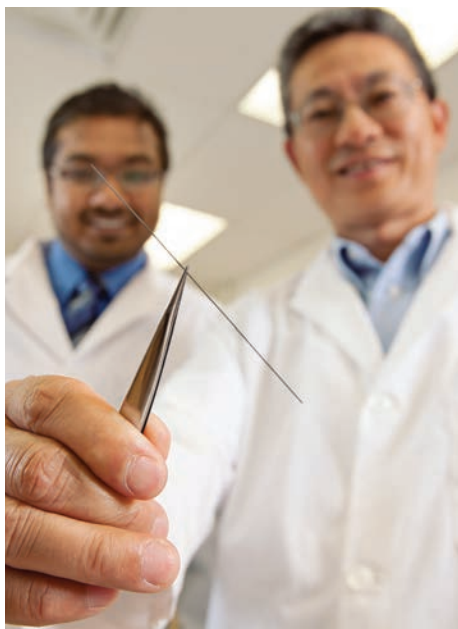
PHOTO: GM

The product development team is working closely with Tier 1 and Tier 2 automotive companies to design, fabricate and evaluate SMA actuators using the MMM technology.

And there is potential beyond automotive components. New frontiers for Smarter Alloys, supported by the Ontario Centres of Excellence (OCE) and National Research Council (NRC), include orthodontic, implantable medical devices, aerospace and portable electronics.

Ibraheem Khan is a former AUTO21 student researcher and president of Smarter Alloys Inc. (www.smarteralloys.com). Norman Zhou is a professor at the University of Waterloo and a project leader with the AUTO21 Network of Centres of Excellence. Visit www.auto21.ca.

Comments? E-mail jterrett@plant.ca.



Ibraheem Khan and Norman Zhou present a simple, yet very smart wire. PHOTO: AUTO21

single function actuators (on/off), but remember just one shape, making them ill-suited to replace multi-position actuators.

However, researchers at the University of Waterloo, supported by the AUTO21 Network of Centres of Excellence, have developed a breakthrough technology that makes smart materials smarter. It applies a high dose of energy to precisely adjust the temperature at which a local zone in a single SMA piece responds. The zone's area can be as small as a few microns in width with multiple zones having discrete response temperatures. Multiple memory material (MMM) technology gives functionality to a single SMA material to make it function like a machine.

Commercializing MMM

This development will greatly aid the integration of SMAs into automotive applications, replacing complex and heavy actuating systems prone to failure with a highly reliable single piece of material.

Commercialization of the MMM technology is being actively pursued

by Smarter Alloys Inc., a University of Waterloo spin-off company. The company's engineers have already fabricated more than a dozen multi-position actuators that operate with both ambient temperatures or by electronic control.

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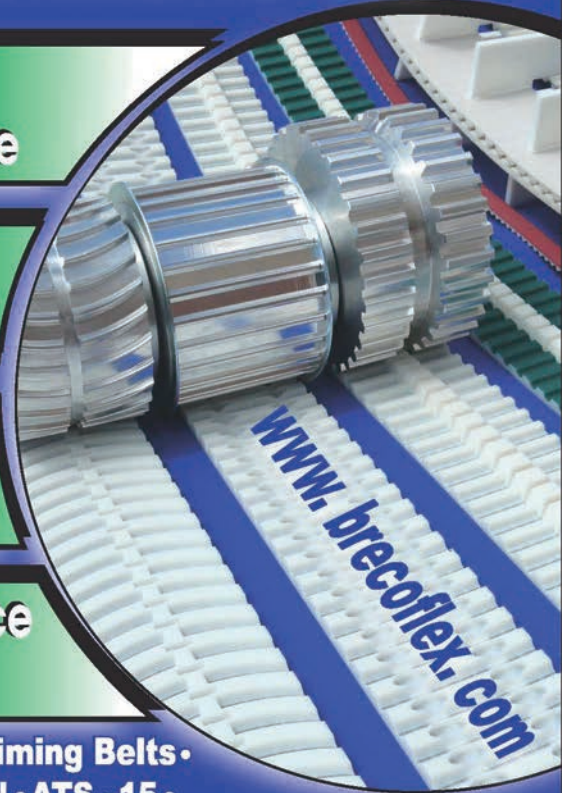
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Upgrading practices saves energy, cuts waste and does a better job of meeting environmental standards.

BY PAUL MICHALICKA

Many manufacturers will observe progress made towards improving sustainability varies between their plants and – more surprisingly – across departments and operations within the same facility.

Take the case of rotating equipment operation and maintenance, a critical part of most industrial activities. Inefficient maintenance practices and outdated tools produce excessive waste and fritter away energy resources, offsetting gains made in other areas. Here are five quick improvements that will save you money:

1. Use energy-efficient mounting methods. Some older methods for mounting mid-size and larger components are proven energy drains, yet they're still widely used. Open flames not only waste energy, they easily damage bearing components during heating. Oil baths are a safer method, but they're hard to control and take too much time to reach a desired temperature.

Advanced installation technologies such as modern induction heaters generally have built-in energy saving features and simplify mounting.

2. Upgrade shaft/belt alignment practices. Even tiny amounts of misalignment in coupled machines decrease bearing life and waste energy. For every additional degree of vertical or horizontal misalignment, energy use rises exponentially.

Plants relying on straightedges and visual inspection to align coupled shafts should be aware that this method is not especially accurate and permits small amounts of misalignment. New systems equipped with laser sighting offer a better option.

In a recent case, a European beer



Shaft alignment systems with laser sighting reduce energy use.

PHOTO: SKF

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producer experienced rising energy costs because 75 pumps were affected by misalignment. To correct the problem, the company acquired two shaft alignment systems with built-in laser sighting. The systems each consisted of a hand-held display unit and dual measuring units designed for positioning a few feet apart on opposing shafts. During operation, each measuring unit projects a laser line toward the opposing unit's detector. While viewing "live" dimensions on the display unit's screen, the operator adjusts the shafts until they are correctly aligned. The systems required little training and included a "soft foot"

function that verifies rotating machines are standing evenly on all feet.

The new alignment method lowered energy consumption by nearly \$40,000 annually, and total investment in new equipment was recouped in about four months.

Belt alignment systems have been developed for pulley- and belt-driven applications. The most accurate systems align the grooves of pulleys instead of their faces, enabling alignment of pulleys with unequal widths or dissimilar faces.

3. Use low-torque greases. New-generation low-torque greases developed for use with high-efficiency, energy conserving bearings minimize

friction-related energy loss. One new grease combines fully synthetic base oil with a lithium soap thickener to promote quiet running and oxidation stability.

Biodegradable greases are also available for applications where contamination is a concern, and they reduce lube disposal costs.

4. Remove human error from lubricant delivery. Maintenance departments sometimes overlubricate rotating machines believing that more lubricant is always better. But overlubrication causes churning, which results in higher operating temperatures, energy loss and eventual bearing failure. It also increases grease and oil disposal costs.

The best practice from a sustainability and operational standpoint is to use the minimum lubricant necessary.

Using automatic lubricators are an effective way to eliminate human error and conserve lubricant, as a food manufacturer that installed single-point lubricators on a number of production lines discovered.

The lubricators use electromechanical force and a piston mechanism to deliver a consistent flow of grease directly to machine points. They fill to 250 millilitres of grease and operate for weeks without replenishment.

The lubricators gauged flow precisely, reducing consumption by more than \$120,000 over a year, and the plant eliminated more than 62,000 manual lubrication tasks, cutting labour costs dramatically.

Multipoint lubricators also reduce labour requirements. They dispense grease or oil from a central canister through feed lines to as many as 20 lubrication points.

5. Monitor energy losses with advanced instruments. Newly developed monitoring instruments reveal energy losses and machine problems that might otherwise go undetected. Helpful technologies include ultrasonic detection, thermography and electrical discharge monitoring.

Ultrasonic instruments identify leaks in heat exchangers, boilers and condensers by detecting the high-frequency sounds made by leak turbulence. They convert the sounds to audible signals, alerting operators to leak locations. Hand-held thermal cameras detect energy in the spectrum's infrared band to identify "hot spots" in all types of operating machinery. Portable electrical discharge detectors identify erosion in electric motors, preventing bearing damage and they conserve energy.

Assessing the impact of your plant's maintenance practices on energy use, production efficiency, waste and disposal costs, then applying these practices will pay off with savings while improving sustainability and compliance with environmental standards.

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» Green Manufacturing Raising standards Tips for choosing the right ones

BY BRETT WILLS

Manufacturers that are ramping up sustainability efforts are aligning themselves with recognized standards to meet increasing customer expectations, enhance their current efforts and validate performance. When deciding on standards, pick ones that are internationally recognized, adopted by your industry and supported by reputable organizations, such as the following:

ISO 14001. This internationally recognized Environmental Management System standard embeds sustainability into daily activities, including procurement practices and carbon footprinting requirements, and acts as a catalyst for reducing waste, energy use, water consumption and materials.

ISO 50001. This energy management system is based on the "plan, do, check and act" continuous improvement cycle. There are guidelines and requirements for developing everything from an energy policy and baseline, to key performance indicators and training programs.

ISO 26000. This Guidance Standard (no certification available) helps to develop and manage corporate social responsibility. It's driven by

principles of transparency, ethical behaviour and respect for human rights, and based on core subjects that include labour practices, consumer issues and community involvement.

UL Environment. One of many "Eco-Certifications," it's quickly becoming a go-to for manufacturers looking to validate green claims.

GRI 4.0. This is the newest iteration of the protocol for sustainability reporting. It focuses more on materiality, expanded boundary considerations, new governance, ethics indicators and integrating sustainability into the supply chain.

Greenhouse Gas (GHG) Protocol. It looks at carbon generated across the value chain from extraction of raw materials through end-of-life, but it also calculates the carbon embedded across a product's life cycle.

ISO 14064. A new addition to the ISO 14000 series, this Quality Management System for carbon footprinting is used in tandem with the GHG Protocol to ensure accuracy and continuous improvement.

Adherence to certain sustainability standards will soon become expected and a pre-requisite for bidding on future business. Early adoption will go a long way to establishing your company as a sustainability leader.

Brett Wills is the director of the Green Enterprise Movement and a senior consultant with High Performance Solutions in Cambridge, Ont. E-mail bwills@hpsinc.ca.

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Standards, studies, systems and software are available to eliminate wasted energy and inefficient maintenance practices.

BY STEVE GAHBAUER

One way to improve maintenance practices is to look for energy savings. Knowledgeable and properly trained maintenance crews now have a host of new technologies available to monitor power systems that support manual load curtailment.

Automated systems are also an option with greater analytics and output controls. ISO 50001 energy management systems, retro-commissioning programs, and “RetScreen” life cycle software offer renewable and energy efficiency feasibility studies that recognize maintenance costs in the reduction or elimination of wasted energy and inefficient practices.

At the 10th Reinventing Maintenance conference, convened by Federated Press earlier this year in Mississauga, Ont., Leon Wasser, president of facility optimization firm Wasser Resources in Toronto, delivered an overview of the latest technologies and programs for sustainable resources management.

He said major changes in gas and electricity markets have made the costing of maintenance and equipment operations more complex. Methodology for true energy cost has both supply and demand side implications, requiring an integrated approach.

In Ontario, programs by the Ontario Power Authority (OPA) and 74 local distribution companies provide incentives for both energy savings and peak reduction. Indeed, most Canadian utilities have similar programs. The Smart Grid is being developed and there will be more two-way transactional energy programs and rate structures.

Natural Resources Canada’s Office of Energy Efficiency offers many education and training programs in energy management that complement key maintenance objectives: lowering costs while providing reliable production.

The National Research Council has a Digital Technology Adoption Pilot Program (DTAPP) for SMEs that contributes to implementing both hardware and software to increase productivity and profits. These include energy management technologies that increase productivity; energy management information systems, such as ISO 50001; computerized maintenance management systems; e-procurement and other supply chain software; and greenhouse gas software.

Here’s how it works: for each unique DTAPP engagement, a team is formed to provide advisory services and financial assistance to help a plant through all phases of the technology adoption process such as cost, benefit and risk analysis, organizational changes, training, technology acquisition, adaptation and implementation.

To be considered for DTAPP, firms from any business sector must have 500

Reducing the LOAD

TECHNOLOGIES AND STANDARDS THAT LOWER POWER USE



Monitoring power systems to support energy saving initiatives.

PHOTO: FLUKE

employees or fewer; operate in Canada, and demonstrate plans to carry out a project designed to adopt digital technologies.

Financing programs

In Ontario, there are programs available, such as a new High Performance Construction Program by the Ontario Power Authority (OPA) that pays for energy modelling and offers financial incentives for choosing better energy performance options; Demand Response 3, a contractual agreement for 100 or 200 hours paid to schedule by term and amounts; and Saveoenergy.ca – local distribution company programs that are funded by OPA.

Other initiatives include: renewable feed-in-tariff programs; an OPA program for chiller plant commissioning; OPA building operator training; and tax credits and Class 43 accelerated depreciation on qualified equipment.

There are several ways to finance such programs: self-pay, financing, or your cost of money. These options are available: Toronto Atmospheric Fund, providing financing; lease or rent through private funder options; low-interest loans from banks and credit unions; and carbon credits or other trading schemes.

For more details visit www.sustainable.on.ca which provides information in association with www.energymanagementtoronto.com.

Upcoming international standards will also benefit plants that are looking for energy savings. The launch of a set of three ISO standards for asset management in 2014 represents an important change for the maintenance community.

The ISO 55001 standard seeks to be applicable to all equipment owners and operators and will be used for certification. With more than 25 participating countries, a large number of organizations, regulators and governments will look to these standards for asset management and certification guidance.

The ISO 55001 standard is related to the other two new standards in the set and will identify differences to the PAS 55 Specification, which preceded it.

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

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» ISO 15001

Saving with certification

Broan-NuTone reduces energy use by 45%

Many companies have discovered that the new ISO 50001 certification drives bottom line savings. A case in point is Broan-NuTone Canada Inc., a Mississauga, Ont. manufacturer of residential ventilation products that employs about 150 people.

It started on its journey to energy savings in 2007 and through numerous measures has reduced energy consumption by 45% over five years.

Broan-NuTone’s road to ISO 50001 certification was a logical extension of the work the company had done in integrating sustainability.

“The ISO 50001 Energy Management Systems standard provides us with a set of procedures that outline the who, what, when and why of energy savings initiatives, which allows the company to achieve the best possible results,” says John Martinovic, the firm’s director of operations.

Broan-NuTone is now the third company in Canada to be ISO 50001 certified.

Exchanging ideas

Perhaps the greatest benefit, according to Martinovic, is the relationships that the company was able to build with industry peers, such as 3M Canada and St. Marys Cement – both ISO 50001 certified. He says, “We have exchanged many ideas and supported each other in making the business case for energy management.”

Implementing the ISO 50001 standard also ties many pieces together, such as operating procedures, total cost of ownership, and legal requirements. “Now the roles and responsibilities are connected across the company. It also formalizes our annual energy consumption review process and identifies energy saving opportunities,” Martinovic says.

Seven new projects have already been identified and are en route to implementation. Two of these are a destratification project that will recirculate heat from the ceiling; and the installation of a heat exchanger for the paint line that will use waste heat from the ovens.

Source: National Resources Canada

A revamped Sinumerik CNC portfolio introduces integrated solutions to enhance machine tool building.

Manufacturers are facing deep-rooted changes, most of which involve the ways product development and production processes are integrated by increasingly advanced software.

Siemens intends to lead that journey with its revamped line of Sinumerik CNC controllers, announced during the company's annual EMO 2013 Press Conference for the Americas in early August.

The Munich-based engineering and electronics conglomerate says the controllers enhance machine tool integration to handle standardized machine concepts and modular solutions for making high-end workpieces. The line focuses on smart function improvements for greater precision and safety across every category of production.

The new controllers include:

Sinumerik 808D. This panel-based CNC design requires only a few interfaces and an operator panel with IP65 protection for use by entry level CNC users in harsh environments. It has a small footprint for use on compact machines that range across standardized milling and machining centres to cycle-controlled turning machines and full-CNC lathes.

Sinumerik 828D. Also for harsh environments, the operator panel front made of protective magnesium die cast requires fewer interfaces. The controller is maintenance free with a hard disk free, fanless configuration and NV-RAM storage that doesn't require a buffer battery.

A QWERTY CNC keyboard with short-stroke keys is coupled with a high-resolution 8.4 in. /10.4 in. TFT colour display. USB, CF card and RJ45 interfaces on the operator panel front allow CNC data to be transferred quickly.

The 828D and 828D Basic models combine CNC, PLC and operator axis control functions. They're used in gear cutting thanks to a slave axis that's connected to up to three master axes.

Using the Manual Machine function, the 828D and 828D Basic permit use of up to three hand wheels on standard milling machines.

Sinumerik 840D sl. Typical applications include high-performance milling and turning. The controller opens up an expansive technology range that includes grinding and laser machining to gearwheel machining and multitasking machining in 3- and 5-axis high-speed milling applications to increase machine efficiency.

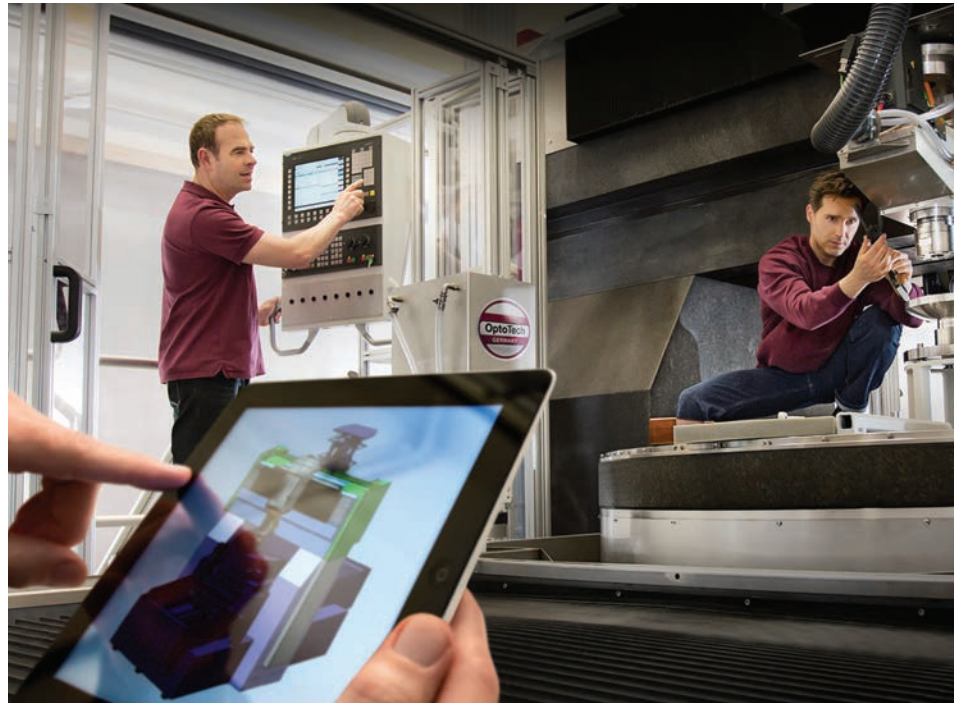
The drive-based modular CNC handles up to 93 axes/spindles and up to 30 machining channels through a 19-in. colour display and SIMATIC S7-300 PLC.

The unit is also outfitted with a collision avoidance system to prevent machine components from colliding during machine setup or during an interruption.

The 3D real-time collision monitoring function is active with machining opera-

Industry 4.0

CONNECTING CYBER AND PHYSICAL MACHINE PROCESSES



Siemens is integrating product and production in parallel design to simulate machining and production time.

PHOTO: SIEMENS

tions such as 5-axis simultaneous milling or turning with B axis to ensure static and mobile machine components, and the tool cutting edge.

For each Sinumerik application, coordinated system components such as high-powered sinamics drives and simotics motors work alongside horizontal drive trains with Sinumerik Integrate for Production software, which allows vertical integration within the control architecture. This speeds up the series start for a new product by up to 50%.

Integration across the entire product life cycle is implemented using product lifecycle management (PLM) software,

which is being implemented by metals processing industries such as the automotive, aerospace and medical technology sectors to do more product development and production planning onscreen before a single machine tool has been installed.

"These enhancements are allowing us to integrate product and production in parallel design," says Rajas Sukthankar, general manager of Siemens Industry, Inc.'s machine tool systems business. "We're essentially creating a 'digital twin' that simulates the machining of a workpiece and evaluates production time, which could increase a manufacturer's productivity by 10% or more."

Time savings of up to 40% are achievable if a modular machine is developed on a virtual basis from the outset. Siemens latest Integrate for Production software incorporates scalability for component production and improved IT integration from the workpiece through to the machine tool. The product suite provides answers to concerns relating to the availability of machinery, maintenance intervals, the timeliness of the processing program or the access to geographically distributed machines.

The suite also makes the machine's energy consumption and stock of materials and tools transparent.

Flatter integration

Siemens has also updated its Sinumerik Operate program, which simulates workpiece programs and location-independent monitoring via mobile devices to failsafe user programming, and monitor new functions independently via a wireless internet network.

"By flattening integration and connecting all machines horizontally, we've created a paperless manufacturing environment," says Sukthankar. "This kind of integration has resulted in product start-ups that are 50% faster because we've developed a metric-based approach to optimization and product development."

For the program management operator area, Sinumerik Operate allows essentially paperless manufacturing. Htm. files are displayed and stored in directories on USB and network drives.

Many Sinumerik Integrate functions can be used on non-networked single machines. When using several machine tools and aiming at implementing overall optimizations, further functions are supported through networking.

Siemens is offering Sinumerik training software through its website. A smartphone-based application is available at www.cnc4you.siemens.com.

Comments? E-mail mpowell@plant.ca.

» Safety

Return to work

Making the process safe and prompt

The human and financial costs resulting from workers who are injured on the job or become ill are high.

For an employer, the cost of one injured employee is about \$5,000 in lost workdays.

Costs are high for employees, too. A serious injury may result in anxiety or depression, reduced income and long wait times for compensation payments.

Studies show early intervention is critical to reducing emotional and financial burdens. At six months, an injured person's likelihood of returning to work falls below 50%. At one year, the rate is 20% and at two years, less than 2%.

Employers, employees and their compensation boards all have certain legal obligations that support a safe and early return to work. An employer is required to contact the worker as soon as possible after the injury and maintain communication during recovery. Suitable employ-



Make sure all the bases are covered.

PHOTO: THINKSTOCK

ment must also be provided and restore, if possible, the worker's pre-injury earnings. And all this information has to go to the compensation board. Meanwhile, the employee is to maintain contact with the employer, assist with identifying suitable employment, and keep the compensation board informed.

After an injury, the employer completes a Physical Demands form, with input from the employee and those familiar and what it entails, which goes to the employee's doctor. The doctor then completes a Functional Abilities form to state exactly what tasks can or cannot be performed. At this stage, it's time to establish a Return to Work Plan to outline the individual's goals, timelines, and clearly defined responsibilities. Monitoring of the worker's progress follows to promptly address issues that may arise.

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.

What the pros say about the benefits of evidence-based asset management and operator-driven maintenance.

BY STEVE GAHBAUER

As good as some current maintenance practices are, there is always room for improvement. Evidence-based asset management (EBAM) and operator-driven maintenance (ODM) and other tools fit the bill and are proving to be of much value to advanced plant operations.

Participants in the IMEC-MainTrain sessions and a masters panel noted that maintenance pros have to sift through huge amounts of data. They suggested switching from data-rich but information-poor information to decision-based data.

Information for decision-making must not be based on hunches, guesses, assumptions and so-called expert experience but on facts from properly collected and analyzed data and equipment history, said Dr. Andrew Jardine, author, director of the Centre for Maintenance Optimization and Reliability Engineering (C-MORE) and professor emeritus of the Department of Mechanical and Industrial Engineering at the University of Toronto.

Condition-based monitoring (CBM) is rarely a reliable method at the best of times, he said. It leaves important questions unanswered, such as what is measured, the effect of age, the optimal limits and the consequences of failure. EBAM encourages watching for trends and adding this information to the decision-making process.

Moderator James Reyes-Picknell, a mechanical engineer, author and co-founder of Conscious Group Inc., a management consulting, training and coaching services company with clients around the world, proposed five critical questions to ask before using that evidence:

- What's obvious? Do we indeed always need a lot of evidence?
- Can we find the evidence?
- Can we handle the complexity?
- Are we following the basics?
- Is it really a technical problem?

Ashraf Labib, a professor of operations and decision analysis at the University of Portsmouth Business School in the UK developed a decision-making grid (DMG) that helps determine what needs to be done. DMG is a model for the classification of maintenance approaches. He said most CMMSs don't have decision support but offer other benefits, such as resource control, cost management, scheduling, software integration and reduction of breakdowns.

There are three parts to DMG: it selects strategy, focuses on action and delivers a cost-benefit analysis. As a continuous improvement process, it provides a wider, richer perspective for machine maintenance than Weibull analysis.

Operator-driven maintenance (ODM), also called operator-driven reliability

Practices make PERFECT

GETTING THE MOST OUT OF MAINTENANCE DATA



Turn maintenance into a profit centre with EBAM and ODM. PHOTO: THINKSTOCK

(ODR), is driven by reliability-centred maintenance (RCM) studies.

Hughes Arsenau, account manager and asset management consultant with SKF Canada Ltd. in Toronto, said it represents a new era for maintenance. He described ODM as a process rather than a project, and it's about doing the right task at the right time on the right equipment.

Leveraging resources

ODM centres on equipment operating procedures and operator involvement in maintenance, using newly available technology to automate procedures and checks. It leverages resources that are already in place, and it yields fast results.

The three principal elements are:

- equipment operating procedures (typically recommended by the original equipment manufacturer);
- operator-performed maintenance (maintenance tasks undertaken by operators to decrease downtime); and
- operator-involved maintenance (empowering operators to participate in reliability-related activities).

Start with front line people, said Arsenau. Operators are usually the first to detect even the slightest changes in process conditions and machinery health, including abnormal readings and noises, excessive heat and vibration, and leaks or pressure changes because of their proximity to equipment. By giving them a more proactive role operations teams become integral to the overall reliability-based asset management strategy. Such

a program encourages operations and maintenance departments to communicate more effectively. But these goals take time to achieve so Arsenau recommended that ODM (or ODR) be implemented in stages.

Maintenance is often viewed as a cost centre. Executing these practices demonstrates that managing plant assets more effectively turns maintenance into a profit centre.

Steve Gahbauer, an engineer and Toronto-based freelance writer, is the former engineering editor of PLANT and a regular contributing editor. E-mail gahbauer@rogers.com. Information for this article was adapted from several presentations and a maintenance masters panel discussion at the IMEC and MainTrain conferences in Toronto.

Comments? E-mail jterrett@plant.ca.



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QRQC your problems

MAKE THEM DISAPPEAR FOR GOOD

Quick response quality control drives continuous improvement and management culture.

BY RICHARD KUNST

Ever faced problems you thought were dealt with, but reoccur causing even greater damage or exasperation than they did the first time around?

Quick response quality control (QRQC) is a comprehensive process that ensures problems go away while it establishes the dynamics of continuous improvement and modifies management culture.

It's based on "San Gen Shugi," a Japanese expression meaning "the three reals" (place, part, reality) and it applies to all sorts of problems involving quality, production/operations and maintenance, reducing them by 50% to 80% within a few months. However, it's more than a tool or method.

First, it's a mindset. The idea is to think logically, be thorough and rigorous. Use only real facts and data gathered in the workplace. Everyday improvement is the aim. Deploy immediately what you can without waiting for the perfect solution.

As a management culture, it's about the manager coaching the team on the methodology; managing from the workplace, not from the office; and attacking processes to make them more robust rather than putting pressure on individuals.

It's also an attitude. A problem must be identified. Getting to its core before deciding on action is key. And don't blame the operator. Determine what part of the process led to the mistake.

QRQC is based on six principles:

- **Real place.** Go out and see where the problems are occurring.
- **Real part or case/file.** Analyze the parts (good and bad) or case/file directly.
- **Real data.** Use available data and facts. Make no assumptions and compare to standards.
- **Quick response.** Immediately implement containment action (the same day) or within the next two weeks.
- **Think logically.** This helps find root causes by bypassing assumed causes.

The tools that provide QRQC's power include:

- A description of the problem with the 5WH (what, when, where, who, why and how) approach, is/is not analysis, and available data to guarantee a 50% problem-solving success rate.
- The Ishikawa or 6M model (machine, method, material, man and mind power, measurement and milieu/Mother Nature), which focuses on brainstorming potential causes of the problem, then validating them through a system of logical reasoning.
- Factor tree analysis (displaying causal factors in a tree structure) is similar to 6M but even more powerful as it compares the reality with the standard and challenges the relevance of the standard to improve it.
- The 5 Whys determine the causes by validating each why to get to the root

cause and eliminate it.

- Standards and countermeasures that eliminate the root cause of the problem.

By applying these principles and tools, you'll turn problems into opportunities for improvement.

Richard Kunst is president and CEO of Cambridge, Ont.-based Kunst Solutions Corp., which helps companies implement lean solutions. Visit www.kunstsolutions.com. E-mail rkunst@kunstartofsolutions.com.

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Stick to the facts in the field each day.

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For the last 12 years, the NBSF has been the pre-eminent gathering for energy sector leaders and supply chain management professionals. Given the significant activity, challenges and opportunities ahead for the energy industry, the NSCF is more important than ever.

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WITHOUT MORE INVESTMENT, IT WILL RUN OUT OF GAS

Canada's automotive stakeholders need to focus on how to secure investments for existing plants and mandates for popular vehicles.

BY MATT POWELL, ASSISTANT EDITOR

There's a troubling development in Canada's automotive manufacturing sector that's bringing into question the longer-term health of an industry that Canada (especially Ontario) depends on as a major contributor to overall economic health.

In June, industry analysts presenting at the Automotive Parts Manufacturer's Association (APMA) conference in Windsor, Ont. pleasantly proclaimed it was 'a good time to be in the auto sector.'

Sure, auto sales are booming at record levels and parts manufacturers are working at capacity. Business has certainly picked up post-recession to levels that will sustain jobs and meagre growth in the short-term. But vehicle and parts manufacturing aren't safe, nor is the sector sustainable in its present form, mostly because of Canada's shrinking industry investment, which is quickly eroding Canada's share of North American light vehicle production.

Across the entire industry, investment levels have dropped by more than 50%, according to a report by Richmond Hill, Ont.-based DesRosiers Automotive Consultants, and production is down as vehicle sales are rising.

Statistics Canada data compiled by DesRosiers shows that automakers invested just \$767 million in Canada last year. That's only 9% of their investment between US and Canadian operations, and it's the first time that number has been in the single digits since 1990. As recently as 2007, investment stood at 40%.

"This is the best recovery in the automotive sector in decades, and Canada, from a manufacturing perspective, isn't participating," auto analyst Dennis DesRosiers told the *Globe and Mail* in June.

The sector on a global scale is significantly healthier

than it was a few years ago. The global vehicles sales outlook for 2013 is 85 million units, according to IRN Automotive, an industry research firm based in Grand Rapids, Mich. North American production will top 17.5 million units, of which Canada will be responsible for 2.5 million, while Mexico will build 3 million vehicles this year.

In Canada, vehicle parts manufacturers are expected to post pre-tax profits of \$1.16 billion in 2013, down more than 16% from 2012 levels and production will edge up a meagre 0.1% due to weaker demand, according to the Conference Board of Canada. The ongoing shift to move vehicle assembly away from Ontario and the US Midwest will also continue to threaten the long-term growth and stability of Canada's auto sector.

Light vehicle production, despite rebounding strongly after the recession, fell 7% during the first half of this year, which is a glaring contrast to gains seen by the US (6%) and Mexico (5%), according to a TD Economics note by economist Dina Ignjatovic.

"This puts Canada's auto sector on track to record its largest annual decline outside a recessionary year going back to 1990," she wrote in the Aug. 16 note.

Production is down at GM (-11.5%), Chrysler (-6.1%) and Toyota (-11.2%) over 2012. Only Ford (3.1%) and Honda (0.1%) increased production between January and June 2013. The result is Canada's share of North American production stands at 14.6%, relative to a 16.6% average between 2000 to 2010, according to the TD report.

Toyota is the only automaker that has recently expanded capacity in Canada. Its Cambridge, Ont. assembly plant has produced 178,000 vehicles in 2012, and another investment of \$134 million that brought the company's Lexus RH350 h luxury SUV to the plant will increase capacity to 200,000 in 2013.

Ford is also in the process of completing a proposed \$1.2 billion rejuvenation of its Oakville assembly plant to produce more Edge SUVs, which have seen a 7% sales jump in the US so far this year. The investment, however, hinges on how much help the federal and Ontario governments will commit.

And while GM committed \$250 million to retool its CAMI assembly plant in Ingersoll, Ont. where it produces the Chevrolet Equinox and GMC Terrain SUVs, gains there are expected to be offset by production losses when the automaker shuts its Oshawa 2 plant where it makes the Camaro. Production will move to Michigan when it introduces an updated model in 2015. Some of its Impala and Equinox production is also moving south.

"This bodes very poorly for the ability of the Canadian auto sector to improve its performance as it is impossible to increase manufacturing output without first making capital investments," writes Dennis DesRosiers in his latest report, *The Canaries are Chirping*. "Growing our share...requires a wholesale rethink of our automotive investment strategy...and even then, it is questionable whether this is possible."

Once the recession released its phantom brake pedal, global automakers invested \$42.3 billion in North American operations between 2010 and 2012, according to data from the Centre for Automotive Research, an au-



North America's automotive market is becoming more competitive but Canada's industry is showing some wear.

PHOTO: THINKSTOCK

tomotive industry forecaster based in Ann Arbor, Mich.

How much was spent in Canada? A mere \$2.3 billion, or 5.4%.

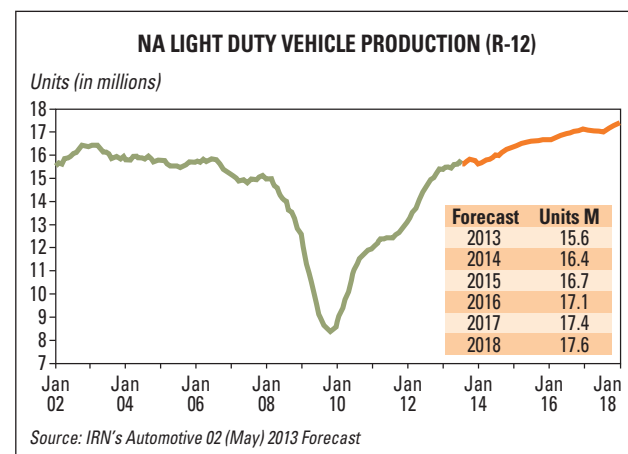
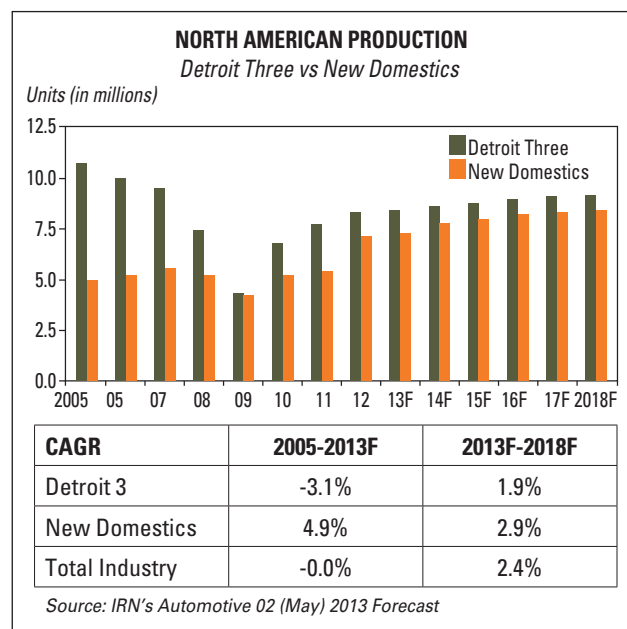
Where the money is going

According to Statistics Canada, automotive businesses invested \$1.6 billion in structures, and machinery and equipment in 2012, which is a 7.1% increase over 2011, but it was the first increase in capital spending since 2007, and the latest data from the Ottawa agency already points to a 1.2% reduction in 2013.

Automotive investment peaked in 2007 at \$4.2 billion, only to plunge to a low of \$1.5 billion in 2011, while other manufacturing industries increased capital spending by 15.4% last year. In fact, Statistics Canada data suggests investment levels in manufacturing were higher in 2012 than any year during the 2000s.

Jobs also play a critical role in all of this. The auto sector employed 115,000 people in Canada last year, 7.7% of all manufacturing jobs in the country and 81.9% of these jobs are located in Ontario – Canada's manufacturing's heartland. However, the sector lost 30% of its workforce during the recession, and has yet to refill those positions despite record sales years and peaked capacities. The number of automotive jobs in 2012 was still 24.6% lower than pre-recession levels and 33.1% lower than in 2000, according to Statistics Canada.

Happily, manufacturing sales in automotive industries increased 19.1% to reach \$82.6 billion – a third consecutive annual increase. Between 2009 to 2012, sales increased by 54.4%.





The Canadian automotive landscape is undoubtedly changing. Automakers are diversifying production to cheaper labour markets such as China, India and particularly Mexico, where the Detroit Three, Mazda and Nissan are either setting up shop or expanding existing facilities. Parts makers, including Denso and Magna, are also beefing up their Mexican operations. Employment there has ballooned to 500,000 jobs, and as local suppliers pop-up, OEMs will use them to cut costs.

Mexico's parts exports to the US have grown to more than \$33 billion, compared to \$14 billion in 2000, according to DesRosiers. Canadian parts exports to the US now represent less than 50% of that, at \$14 billion. And the other NAFTA partner's labour costs are too attractive for automakers to not invest there and quality has improved significantly.

"Mexico is a bigger threat than any of the BRIC countries right now," says Jim Stanford, chief economist at Canadian Auto Workers (CAW). "We sell less auto products to Mexico than we did in 2005, and that's a huge issue as they continue to take a larger share of the global market."

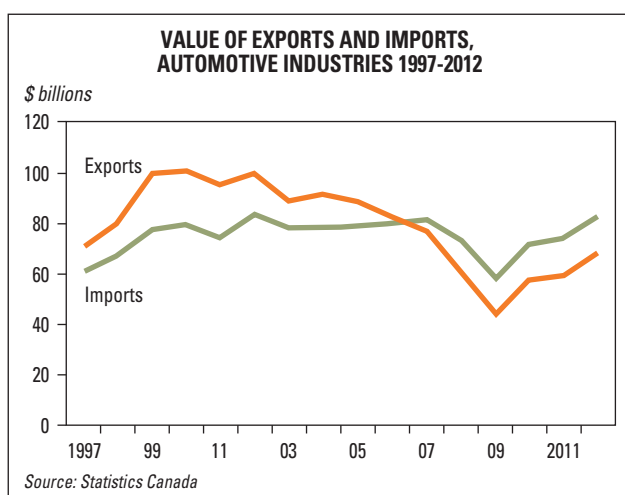
Canadian auto parts content per vehicle built in North America dropped to 7.5% last year from 9.9% in 2007, according to DesRosiers.

The US is also creating striking financial incentives in 'right-to-work' non-union states, which now includes Michigan, in an effort to draw investment. For instance, Kentucky has approved more than \$146 million in tax incentives for Toyota to expand its Georgetown plant, already its largest operation in North America. The Japanese automaker will spend \$531 million and create 570 jobs to receive the full value of the benefits.

"While part of Canada's decline comes down to increased growth of vehicle manufacturing in Mexico, where cost structure is lower and there's greater access to Latin American markets, the US is seeing increased investment activity thanks in large part to government incentives," writes Ignjatovic.

Automakers have taken steps to close the cost gap in Canada, including the latest labour contract signed with the CAW, and past cuts in corporate income taxes, adds Ignjatovic.

Also, publicly funded health-care is no longer a key contributor to Canada's value proposition because



those costs have been offloaded to unions in the US.

The investments Canada needs, however, aren't necessarily new plants, although that would seem to make sense since existing plants are operating at capacity and adding new shifts to meet demand.

The road ahead

Rather than worrying about a lack of new facilities, Canadian spending needs to be focused on improving plants currently operating at full bore, according to Stanford.

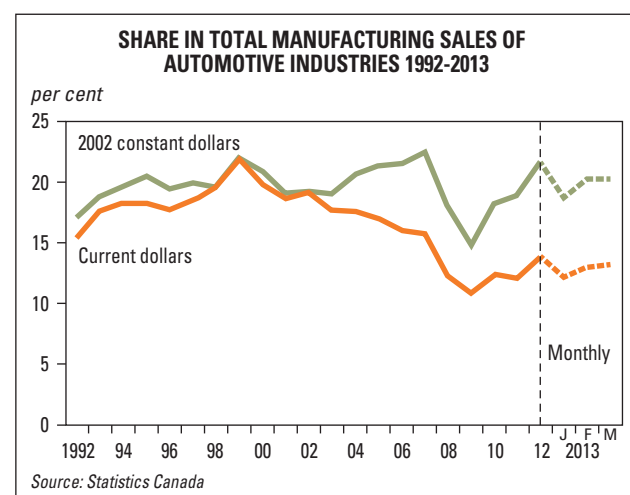
"The plants that are left are good plants, and they're highly utilized, but several of them are coming up to decision points on investment in capital and new products, and it's going to be important for all stakeholders to be focused on doing whatever we can to cement new investments mandates for the plants that we do have," he says.

Auto investment is typically cyclical, explains Stanford. An investment cycle usually lasts two model cycles before new tooling is required, and a number of Canadian plants are coming to the end of those periods.

"Chrysler spent more than \$1 billion on its Canadian production facilities before the meltdown, so they don't necessarily need to invest right now. It's those investments three or four years down the road that need to be secured," he says.

"It's always nice to dream about Volkswagen or some other Greenfield plant coming here, but that's like winning the lottery..."

The auto industry's performance on the trade front is



even worse. In 2001, its contribution was a trade surplus of \$11.6-billion. By last year, there was a \$17.3-billion deficit.

The federal government, currently negotiating trade deals with Japan and the EU, is seeking new automotive investments from Japanese automakers in exchange for dropping a 6.1% tariff on imported vehicles.

The *Canadian Press* also reported in June that Canada would get expanded automotive quotas in its free-trade deal with the EU. Car sales to Europe would increase eight-fold to 100,000 units in exchange for eliminating foreign ownership rules on uranium mining and liberalized ownership rules in the telecom sector.

In the meantime, much will depend on demand for vehicles built at Canadian plants. In the US where sales are expected to top 16 million units, demand is high for vehicles such as Ford's Edge, a fact the automaker will leverage for government funding to modernize the Oakville plant. Yet auto production in Canada is likely to underperform compared to its counterparts in the US and Mexico. TD estimates a 4% to 5% per year slide over the next few years, compared to gains south of the border.

Whether or not Canada's industry ultimately runs out of gas will depend on how OEMs, parts makers, the province and the federal government respond to competition for investment in North America and the growing markets of the developing world.

Comments? E-mail mpowell@plant.ca.

Leveraging CHANGE

HOW TO POSITION YOUR COMPANY FOR SUCCESS

Manufacturers must adjust to new global business conditions by developing new skills, valued products and technologies.

BY EBEN LOUW

Manufacturers are inundated with signals of change. External and local environments, the role of the local and federal governments, global protectionism and changing demographics are all factors contributing to a new normal. In the future, you'll be competing against companies that are not visible from the local level and global competitors supported by government agencies.

Unfair as this may be, your company has no choice but to adapt.

How did we arrive at this new normal?

A major repositioning of local and global stakeholders and role players driven by technology allows international manufacturers of any size to extend their global reach.

The way that stakeholders relate to each other has also changed. For manufacturers in some countries (such as China) this may mean increased support from governments while European manufacturers may experience less assistance.

In broad terms, Canadian manufacturers will experience the following long-term impacts:

- Increased strain on the ability of companies to compete locally and abroad. Changes in technology will continue to fragment marketplaces and bring about new products and services and new applications for existing products at an accelerated pace.
- On-shoring by low-cost manufacturers that can now compete against the companies that initially fed them business.
- Customers are becoming increasingly global and willing to source value-for-money globally.
- Technology and online 'meetings of the tribe' around common interests will continue to test the current security found in long-standing relationships.
- Greater need for product differentiation in a global, stratified marketplace.
- A return of economic strength to the North American market, but with the addition of new competitors that were not present before the recession, and the aggressive pricing offered by local

competitors within a restricted geographical market.

Over the medium term, manufacturers will see the successful transition of corporations to new family or management ownership. This includes the transition of skills, relevant experience and the ability to embrace new ways of doing business.

Although economic conditions are improving, North American markets will continue to be soft. It will be a while before the benefits have worked their way through to all industries and sectors.

And be aware that manufacturing efficiency through programs such as lean is not the competitive advantage it used to be. You must provide customers with new, innovative products.

Develop a plan

How do you address these changes? Follow these steps:

Develop a contextual framework of understanding. With so many disparate sources of information, it's critical to develop a structure in which data is understood and filtered to evaluate patterns of change, challenges, opportunities and threats. This connects the dots between bits of incomplete information that appear to have little correlation, yet

are indicators of change.

Become a learning organization.

Using multiple sources, connect with what's happening in your marketplace, with your customers and their customers, industries and the segments within. You'll need a long-term plan for gathering information about distant markets, cultural nuances and opportunities. If you want to know about these markets in the future, plan time and resources now for building this knowledge.

Define the sea in which you want to swim and your position in it. It may be different from one than the one you're in. You'll need new skills, products and technologies. Consider the lifecycles of

each main product line; will they be relevant in two, five and 10 years? What must be done now to prepare? Also determine whether you will be a small or large fish.

Believe in a future of your choosing. You have a say in where your company ends up, which is not entirely determined by running perceived future events through a probability filter. You may desire to end up in a very different world. This will require courage and leadership, involve some risk, and there must be a process in place that clearly defines and finds new opportunities.

Develop an early warning system. Create a structure for analysing warning signals and bring it back to your planning framework to evaluate the validity of your assumptions and the potential for new opportunities or threats. Identify



Planning for your company's future will involve some risks. PHOTO: THINKSTOCK

» Training

So you have a new staff person

How to make supervisors effective trainers

BY HUGH ALLEY

It seems silly to install a million dollar piece of machinery, ask someone from the floor to "figure it out," yet I once saw a milling machine worth \$500,000 being used as not much more than a router. The company had decided it didn't need to buy training from the manufacturer.

Indeed, we don't think anything of turning over new staff to supervisors who are left to figure out how to train them. But a worker that isn't properly trained will be easily 33% less productive, and will cost \$500,000 to \$1 million over 10 years. That's a lot of production to leave on the table.

So what should we do?

First, make it clear to supervisors they have two parallel responsibilities: meeting production targets and handling the training and development of their people.

You'd never accept a supervisor saying, "I

was working on skill development this month so we only got half the production out," yet many supervisors and managers will allow production deadlines to trump training. They'll have no hope of achieving lasting gains in productivity, delivery or quality by ignoring the training and development of the people who are responsible for meeting production goals.

Second, provide supervisors with practical, how-to instructing skills.

One of the best methods is the Job Instruction approach from the Training Within Industry program (download the original documents at www.trainingwithinindustry.net/JI.html). There are four steps:

- 1. Prepare the worker.** Make sure the worker is at ease and ready to learn.
- 2. Present the operation.** Show how the task is to be done, focusing on important steps, key points and reasons for each part of the task.
- 3. Try out the operation.** Have the learner



do the task and explain it, demonstrating an understanding of the important steps, key points and reasons.

4. Follow up. Send the learners out solo and follow up, tapering off until the task is mastered.

The operation is presented four times, and the learner is asked to do it under close supervision four times, ensuring he/she has the basics down correctly.

Expect your total instruction time to go down by 25% – more of it up front but with far less corrective instruction later. Once learned,

signals that will be pro-active indicators of change.

Continue to think long-term even though uncertainty is high. When uncertainty hits, focus on efficiency, but look ahead, even though it feels strange or out of place. A multiple time-scaled strategic planning framework connects activities across timelines.

Identify the stakeholders who influence the future of your company. Accept that the world is changing and the actors are mostly invisible, but are gradually bringing competitors into your marketplace.

Identify false certainties. Accept that your existing strategic and operational plan may be built on old assumptions. Evaluate these assumptions and validate the assumed certainties. It may appear events are proving the strategies you are following over the short to medium term are correct, but the long-term impact may require the courage to also focus on what your product or service will need to be in five to 10 years.

Never disconnect short-term and long-term thinking. Recognize that the perfection of existing skills, product types and approaches will always be valuable as operational metrics. However, to what degree are they tied into the strategic plan and visionary focus? They must secure short-term profitability and long-term survival.

Despite the uncertainties you encounter, by assessing the right inputs along all planning time frames, your ability to compete locally and abroad will be greatly enhanced.

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Comments? E-mail jterrett@plant.ca.



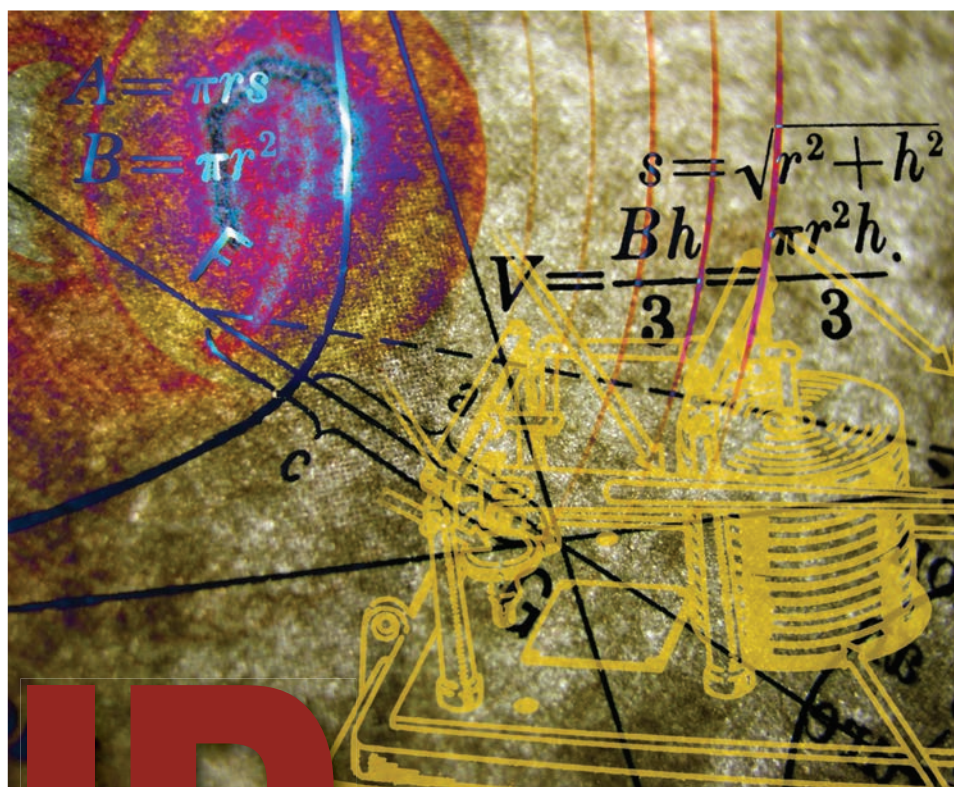
Train supervisors for training.

PHOTO: THINKSTOCK

a supervisor can prepare for instruction in about half the time.

Don't not send supervisors into the fray untrained for training. Give them the tools that will properly prepare new recruits to handle their jobs.

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



IP protection

WHAT YOU NEED TO KNOW ABOUT SAFEGUARDING YOUR INNOVATIONS

It's important to have a pro-active IP strategy, to understand the risks and costs of litigation, and to insure against claims of infringement.

BY MARK DRAKE

Build a better mousetrap, so the saying goes, and the world will beat a path to your door, and so might competitors planning to copy the new invention unless it's properly protected. Most organizations protect their physical assets with locks, guards, and security cameras. Why not the intangibles, of which the most important is likely to be intellectual property (IP)?

IP includes patents, trademarks, trade names and copyrights. Patents cover inventions related to products, such as a lock, which could cover the lock, related compositions (lubricants), and the apparatus and/or the process for making it. Patents provide 20 years of protection, after which the invention is considered to be in the public domain.

Some companies choose not to protect their inventions in this way, preferring to keep them secret (Coca-Cola is a classic example), a significant advantage being the absence of a time limit. Once a provisional patent is obtained and published, anyone can see the invention and try to get around it, or copy it without detection, so patent holders should be prepared to go after infringers, or the patent is arguably worthless.

On the other hand, good patents provide significant competitive advantage. Pilkington Brothers, the well-known British flat glass company, invented the "float" process in 1959 and this was such a huge technical step forward that the company earned massive royalties by licensing the extensively patented process to major glass manufacturers all over the world.

Registered trade names and trademarks are also a key part of IP. Think of those we see everyday such as Nike, IBM, BMO, Bell and how important they are for brand identification. Corporations will certainly fight to protect them and before trying to register a new name or mark, a search should be carried out to make sure the name is available. This minimizes the risk of a subsequent lawsuit from a competitor whose name has been inadvertently "borrowed."

Copyright covers original literary, dramatic, musical and artistic material, which is why we pay rights to perform a play (unless like Shakespeare it's in the public domain), why film credits show the well-known songs the director may have used, and books and articles usually bear the copyright sign. At least Canada's Bill C 11 (Copyright Modernization Act) signed into law in November 2012 brings the country into line with the World IP Organisation treaties (see www.mondaq.com and www.wipo.int).

IP protection is expensive and can be complicated, particularly for those operating internationally. For example, which markets should be covered, apart from the domestic one? If exports go to the EU, getting patent recognition in 27 countries could cost more than \$45,000 (60% of which are translation

Good patents provide a significant competitive advantage.

PHOTO: THINKSTOCK

costs), although this should drop when the latest European Patent Agreement (signed in fact by 38 countries) comes into force, and inventors no longer have to get individual country approval. In the US it costs about \$2,000. In Canada the various fees (and much other useful information) can be found at the Canadian IP Office www.cipo.gc.ca. The site includes an excellent 40-page guide to the whole patent process. There is also a book in the "dummies" series on Canadian IP Law.

Proactive strategy

The basic criteria for obtaining a patent are that the invention be genuinely innovative, that the organization plans to make it and sell it at a profit, and that there's no other identical product out there. The application should be prepared professionally, ideally by the inventor working with a registered patent agent or specialized lawyer. Organizations often have their own IP department to deal with routine matters, calling in the professionals as required.

It's important to have a pro-active IP strategy, to understand the risks and costs of litigation and to insure against claims of infringement. Information is available at www.insurecast.com and www.insurenwmedia.com. Explanations are provided about why and when you might need such insurance, and the types of products available. Parasite organizations that don't make anything (often referred to as patent trolls) are out there looking for companies to sue just to obtain royalties, and litigation can be very expensive. The *Insurance Journal* reckons legal costs to be as much as \$2.8 million for the average suit involving up to \$25 million. This can apply whether one is dealing with abatement (going after an infringer of your IP) or defence (because you have inadvertently infringed someone else's IP).

Another aspect of IP is the challenge posed by counterfeiting and piracy, which is believed to cost Canada billions of dollars. Sometimes the fakes are recognizable, such as the cashmere sweater that says "Made in Scotland," but if undetected they can significantly damage retailers' margins, and indeed cause health and safety concerns if the counterfeited product is of a technical nature (like the counterfeit Chinese chips recently found in Canadian Hercules Aircraft). The Canadian IP Council (www.ipcouncil.ca) has a detailed manual on IP enforcement.

Mousetraps developed with blood, sweat and tears should be protected, especially when international operations are involved.

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

Comments? E-mail jterrett@plant.ca.



Thanks to scam artists, the path to financing for your business has become even more complicated.

PHOTO: THINKSTOCK

Waiting for FINANCING?

BLAME FRAUDSTERS FOR DELAYS

BY MARK BORKOWSKI

Industry has seen its fair share of fraud from scam artists who deal in everything from phoney leases, security pledged for loans not owned by the company, same security pledged for loans in different companies, false financial statements and purposefully inaccurate descriptions of assets.

Some folks have little sympathy for the bank or lender

who has to deal with the ramifications of these types of criminal acts, and more than likely, a significant loss. But one of the ramifications you'll experience is a longer wait for answers from lenders who have implemented more aggressive steps to guard against chicanery.

Banks have a "know your client" policy that impacts everyone. Identification has to be presented including copies of your passport, driver's licence or other recognizable and approved documents. And you may be

asked to present your documents again for follow-up to ensure there has been no change, especially if additional loans are requested.

An interesting side note: Banks no longer treat bank drafts or certified cheques as cash. Thanks to fraudsters, they now wait five business days before crediting an account with the funds.

Lenders are now contacting accountants to verify financial information outlined in loan applications. This includes revenues, profit and balance sheet items, plus information on notes.

Additional checks

In addition to completing a signed personal net worth statement, credit checks – corporate and personal – look closely at what's outstanding and that it corresponds with the statement of personal net worth. There are also criminal background checks of all shareholders.

Visits to sites and pictures of the assets with dates are needed, plus checks of serial numbers to verify equipment being pledged for security matches the bill of sale. Checks are also made with the landlord and leases reviewed to ensure they're valid. Indeed, there have been industrial park store fronts set up with equipment in wrapped condition in, and when the account officer follows up with a visit after disbursement, the premises is vacant and equipment gone.

Real estate agents, lawyers, accountants and others in the chain have responsibility to carry out the same type of due diligence, which lengthens the time it takes for a deal to complete. And time is money, so the costs increase!

All these procedures are over and above the standard due diligence required including evaluating financial capability, performance, environmental compliance and source deduction verification checks.

As fraudsters become more sophisticated, so will lenders, and that means greater scrutiny of honest business people who will spend more time waiting for financing matters to be addressed.

Mark Borkowski is president of Toronto-based Mercantile Mergers & Acquisitions Corp. Visit mercantilemergersacquisitions.com.

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C I E N

CANADIAN INDUSTRIAL EQUIPMENT NEWS



Doug Hutchison (left), sheet metal fabrication manager, and Ken Lennox, president of ETSM Technical Services, with the company's first laser cutting system, a Cincinnati CL-7 built in 1987 and acquired used in 2000. ETSM updated the machine with a new Fanuc control and servomechanisms. PHOTO: ETSM

STILL FAB!

OLDER MACHINES CONTINUE TO BE PRODUCTIVE

Keeping them in play is crucial to maintaining ETSM's competitive advantage.

Ken Lennox thinks there's plenty of value in having machines that are decades old occupying valuable floor space in a modern fabrication shop, as long as they serve a purpose and were originally built with "the right stuff."

Lennox, the president of ETSM Technical Services Ltd., a Guelph, Ont.-based manufacturer of equipment and components for utilities, is certainly not ageist. His fabrication operation still uses a mechanical brake from the 1950s, a shear from the 1970s, and a mid-1980s laser-cutting system, all built by Cincinnati Inc., share the floor with state-of-the-art equipment, including another brake and laser system circa 2011.

ETSM makes coil winding systems, enclosures and other related equipment. It also produces custom fabrications, machine guarding, automotive fixturing and replacement parts for the energy, automotive and mining industries.

About 50 people work out of two production facilities across 50,000 square feet, and there's an engineering and controls department.

Lennox started the business in 1985 with used fabrication equipment that included a 125-ton mechanical press brake made in 1954, followed shortly by a used shear built in 1974. The company's first commercial laser cutting system was a used Cincinnati CL-7 built in 1987.

Modernizing machines

"We have the technical resources in house to modernize these machines with current safety systems and guarding," says Lennox. "We installed a CNC backgauge on the press brake, and a new Fanuc control and servos on the laser system."

He keeps the older equipment around because ETSM often gets work the older machines do a better job of completing.

"We use the mechanical brake for lighter duty work that does not require its full capacity, such as straightening. We've got a tough, fast and durable machine, and on a high-production run, it's faster than a hydraulic brake, which gives us a time advantage. There's worn components, sure, but it still does what it's supposed to do."

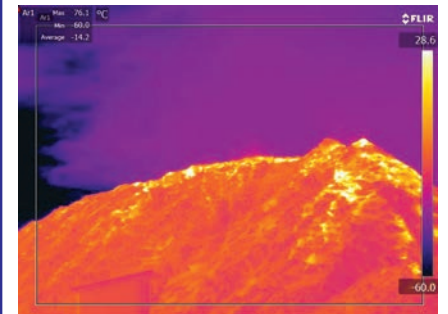
Lennox says ETSM planned to retire its 1,200-watt CL-7 laser because it has a newer 4,000-watt model, but never got around to it.

"The older machine fills a niche for us. We do a lot of quick one-off pieces, and by keeping it, we don't have to interrupt production on our higher-end laser. We can do switch-outs a lot faster on the old machine because it's lower level technology."

Admittedly, the older machine is slower with ballscrew drives and it doesn't produce the same edge quality or accuracy as the new laser, but Lennox says this isn't an issue for a segment of his business. In fact, having the ability to

Continued on page 26

» Supply Lines



FLIR's thermal imaging of a woodchip. PHOTO: FLIR

SPECIALTY OPTICS BUY FOR FLIR

FLIR Systems Inc. has acquired assets of DigitalOptics Corp.'s micro-optics business for \$14.9 million.

The purchase includes fabrication equipment and more than 200 patents and pending applications associated with the design and production of complex optical surfaces, substrates and low-cost components.

DigitalOptics' micro-optics business, based in Charlotte, NC, is a fabricator of wafer-scale specialty optics products, including lenses, lens arrays, optical receivers and transceivers, and various infrared optical components.

FLIR Systems is a manufacturer of sensor systems (for advanced thermal imaging and threat detection) based in Portland, Ore. It has a Canadian office in Burlington, Ont.

5ME PROBES FOR PROFITS

Something new for manufacturers looking for help with the harvesting of hidden profits.

5ME, a newly developed business comprised of the non-machinery units of the former MAG IAS (www.5me.com/AS), will focus on what it calls the five Ms: man, material, machines, methods and metrics, to improve the efficiency of any sized company.

The company, staffed by managers, engineers and employees from MAG IAS's tooling, services and software businesses, operates out of Cincinnati and Detroit. A new tech centre in Detroit showcases 5ME's capabilities in cryogenic machining, tooling/fixturing, process development, asset monitoring and enterprise software.

Likely customers will be those working with: expensive or difficult-to-machine materials; a large number of assets; high costs for consumables and energy; and who are committed to cultural/organizational change.

RIA AWARDS LINCOLN A CRI

The Lincoln Electric Co. is now a Certified Robot Integrator (CRI), a designation from the Robotic Industries Association (RIA) awarded following an on-site audit, safety training and hands-on testing of personnel.

The association's program allows system integrators to compare existing processes to industry best practices.

New jobs for older machines

Continued from page 25

get one part made in a few minutes without interrupting the new machines is a competitive advantage for some jobs.

The newer CL-840 laser uses linear motor drives combined with a 4,000-watt resonator for up to 1,000 ipm cutting of 20 gauge steel with ± 0.001 inch accuracy.

Cincinnati Ltd., a machine tool builder based in the Ohio city of the same name, was founded in 1889 and built the new machine like the old one – its frame is constructed with heavyweight 0.75 to 1.5-in. steel plate. At double the weight of other lasers, it resists the G-forces of linear motor acceleration and deceleration to withstand tough shop conditions.

ETSM uses the new laser for the manufacture of electrical enclosures that house phone and cable TV lines. It produces about 5,000 of these kits every year using satin galvanized steel, aluminum and stainless steel.

“We outsourced everything but the mild steel before we got the new laser,” says Lennox. “The new laser brings all this work in house, particularly the lighter gauge aluminum and stainless.”

ETSM’s ancient Cincinnati 18 Series shear was built in Cincinnati’s former manufacturing plant in Scotland, sold to a customer in Israel, and then went to a brake pad manufacturer in Montreal before winding up in Guelph. It continues to perform every day.

“These older machines still work, they rarely need maintenance, and there’s no cost to keep them on the floor. In fact, the older equipment is often easier to maintain because it’s simpler,” says Lennox.

Buying equipment

Early machine shop experiences shaped Lennox’s views on equipment. He learned his craft working under the hood repairing machine tools, upgrading them and adding accessories.

“I know what to look for and it has made me a discriminating equipment buyer,” he explains.

In one case, he built a feeder for a large press brake that was going to be used for curving multi-plate tunnel liner. In another case, he had to repair the back gauge on a 3/8 inch x 16 foot shear.

“There is something to be said for having lots of mass in a machine that’s going to be heavily used – and often abused – in a North American fab shop. Within any group of machine tools rated the same, there will be some that weigh a fraction of what others weigh. In my experience, the heavyweights survive longer.”

Those survivors will also outlive their controls, so Lennox stresses an upgrade path is important, as are current safety systems.

As a builder of machine guarding, ETSM also has the resources to keep its machines current with safety standards. The company has in-house capabilities for fabricating enclosures and perimeter guarding, and integrating sensors with machine control systems. It also works with a safety consultant to ensure its shop and the equipment meet current standards.

“There’s no capital cost to keep these older machines,” Lennox stresses. “As long as they stay healthy, we’ll continue to use them because they fill an important tactical role in our business plan.”

This application story was contributed on behalf of Cincinnati Inc.

Power Transmission

ER-STYLE BEARING COVERS A RANGE OF APPLICATIONS

Use Baldor Electric Co.’s Dodge ER-Style ball bearings for a range of applications such as material and unit handling, conveying equipment, and agricultural, paper, packaging and printing machinery.

They’re available in two shaft attachment methods. The setscrew has a 65-degree angle for maximum shaft grip. The D-Lok product offers a clamp collar grip for maximum concentricity to minimize vibration.

Snap-ring retention securely fits the cylindrical outer diameter into equipment and the Dodge ProGuard seal and flinger package prevent contamination.

The setscrew ranges from 3/4-in. bore size (204 series) to 3-7/16 in. (218 series). The D-Lok style comes in a



Two shaft attachment methods.

3/4-in. bore size (204 series) to 2-7/16 in. (212 series).

Baldor, a member of the ABB group, is based in Fort Smith, Ark.

www.baldor.com

www.plantmagazine.ca/rsc/1

SPEED REDUCERS HANDLE HEAVY DUTIES

A new line of Boston Gear 752 size worm gear speed reducers meet the demands of heavy-duty conveyor systems or any large shaft mount applications.

These new models have hollow output shafts in 5.25-in. centre distance and output torque ranging up to 12,250 lb.-ft., more than double when compared to 738 centre distance. Six new bore sizes range from 2- to 3-7/16 in. Double reduction ratios are also available.

Housings for all 700 Series reducers are rugged cast iron with high-strength bronze worm gears mounted between heavy-duty tapered roller bearings.

The 752 models are backwards compatible with all 700 industry-standard mounting dimensions.

Boston Gear, based in Charlotte, NC, is a global supplier of power transmission products.

www.bostongear.com

www.plantmagazine.ca/rsc/2



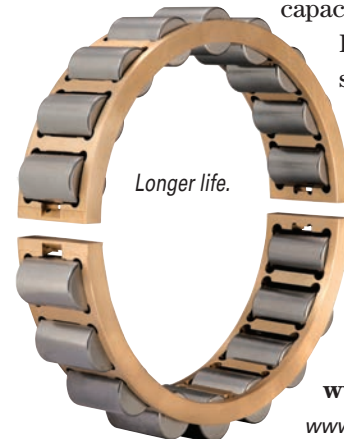
For large shaft-mount applications.

BEARINGS HANDLE HIGHER LOADS

Cooper Roller Bearings has increased the load capacities of many of its split roller bearings to levels it claims are higher than bearings of similar size, with L10 life that’s 23% to 135% longer (depending on size).

The 01E (medium-duty) and 02E (heavy-duty) bearings are interchangeable with the Cooper 01 and 02 Series, yet provide up to 29% more radial capacity and 16% to 90% more axial load capacity.

They’re completely split to the shaft to eliminate disassembling during service or replacement, which significantly reduces downtime. Sealing and energy efficiency is the same as the 01 and 02 Series, but they also share the same exterior dimensions for more capacity in the same space.



Longer life.

Rugged brass cages make them suitable for underground applications and other challenging environments.

Bore sizes range from 6.5 to 12 in. (160 to 300 mm).

Cooper Roller Bearings is a manufacturer of split-to-the-shaft roller bearings based in Norfolk, Va.

www.cooperbearings.com

www.plantmagazine.ca/rsc/3

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SERVO DRIVES SIMPLIFY MACHINE DESIGN

Kollmorgen has added the scalable AKD PDMM and AKD BASIC to its servo drive family to help OEMs simplify the design, reduce the size and improve the performance of virtually any machine, from simple single axis control up to 128 axes of fully programmable and tightly synchronized motion.

AKD ethernet-based servo drives allow standardizing on a single drive family with a common graphical user interface across the power range (up to 24 Arms continuous and 48 Arms peak).

Connectivity and control options include EtherCAT, EtherNet/IP, CANopen, Profinet as well as analogue, and pulse train command control options.

The AKD PDMM combines a high-performance multi-axis motion controller,



High performance motion.

complete IEC61131-3 soft PLC, EtherCAT master, and AKD servo drive in a single, compact package, which reduces panel space by 50% or more simplifying wiring and integration, while increasing system flexibility, scalability, and motion performance.

AKD BASIC incorporates a programmable single-axis motion controller into the existing drive footprint by eliminating the need for a separate PLC. Registration correction, camming, s-curve and free-form motion profile capabilities from the integrated motion controller, combined with BASIC programming language and a built-in Program Editor, reduces development time by up to 70%.

Kollmorgen is a supplier of motion systems and components for machine builders based in Radford, Va.

www.kollmorgen.com

www.plantmagazine.ca/rsc/4

HARNESS DRIVE.WEB CONTROL

Sprint Electric's digital DC drives harness a new technology (drive.web) that provides control over the ethernet without a PLC or supervisory computer.

The drives, up to 2,250 A, control DC motors used in heavy industry applications such as metal working, steel mills, mining, or the cement, rubber and plastics industries.

PLX drives are available as two quadrant or regenerative four quadrant types. All models ranging from 650 to 2,250 A (980 kw/1,320 hp) feature two AC busbar position options: top or bottom entry, which makes it easier to use the existing cabling. In new designs, the engineer has the choice of wiring options.

This increased drive range is available as high voltage (690 VAC) or standard voltage (480 VAC) models. A 690 VAC supply allows the use of 750 VDC armature motors. Compared to the standard voltage this provides an increase in shaft power, up to 1,500 kw/2,000 hp for the 2,250 A model. That's 50% more power delivered without an increased cable size.

The PLX has an extensive range of software functions and fieldbus communications options such as Profibus, DeviceNet, CC-Link, EtherNet/IP, Modbus and CANopen.



For heavy industry applications.

Drive.web includes graphical configuration tools that provide diagnostics and configurability of all drives on the network, either locally or remotely via the internet.

Sprint Electric Ltd., based in England, is a global supplier of motor control products. Its products are distributed by MDA Controls Inc., in Oakville, Ont.

www.mdacontrols.com

www.plantmagazine.ca/rsc/5

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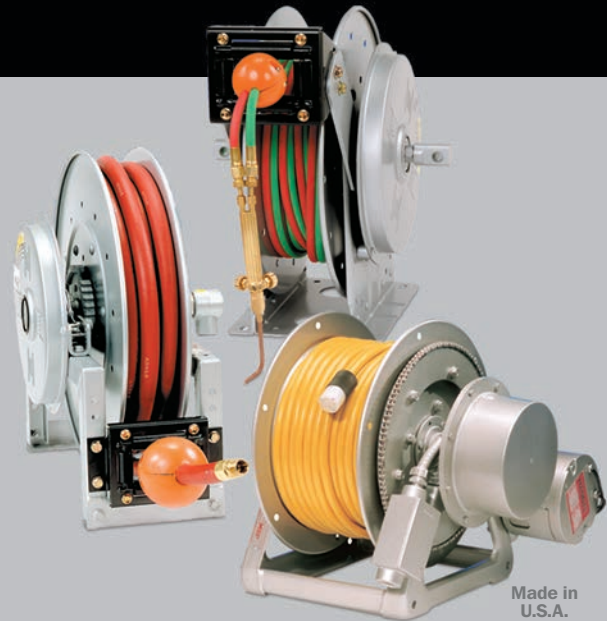
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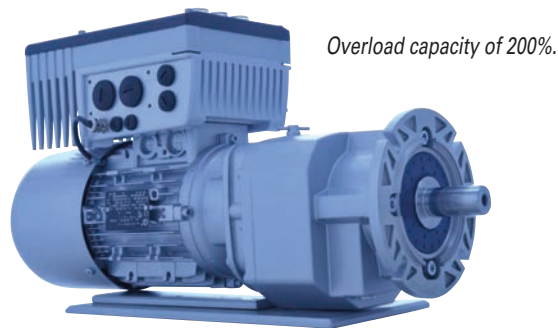
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CIEN

POWER TRANSMISSION



INVERTER IS SMART ON POSITIONING

NORD Drivesystems SK 200E inverters install near the motor or as motor-integrated models, with the same wide functional range as the centralized SK 500E series of cabinet-installed inverters.

The decentralized frequency inverters provide an ample overload capacity of 200%, but also allow high-precision positioning. The relative positions (incremental or endless axes) or absolute values (rotary tables/fixed, repeatable positions) are controlled with binary values through the unit's inputs and are stored within the drive. Alternatively, they set via a fieldbus system.

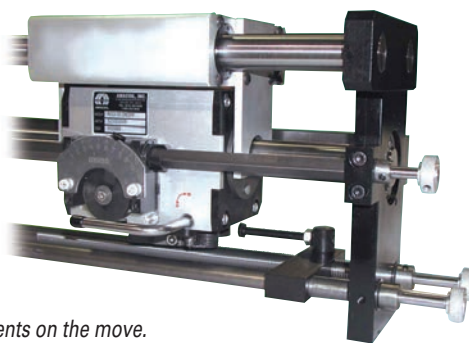
Positions are detected through incremental encoders (an onboard referencing function is included in the inverters' basic equipment), or by directly importing position values provided by a CANopen absolute encoder.

The encoder signals are used for speed control, which is a proven alternative to servo drives used in, for example, palletizers.

Nord Gear Ltd. is a manufacturer of drive technology with a Canadian operation in Brampton, Ont.

www5.nord.com

www.plantmagazine.ca/rsc/ 6



OPTION FOR FINELY TUNING DRIVE PITCH

An option added to the Amacoil/Uhing RG linear drives allows extremely fine adjustment to the pitch that enhances both positioning accuracy and control over speed in linear motion applications.

Using the new control knob, the pitch adjusts while

MAINTENANCE

BIG TIME AIR MOVER

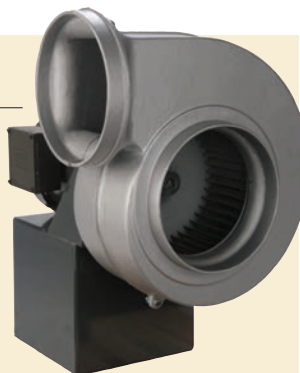
CAB Cast Aluminum Blowers in 4-, 6- or 8-in. diameters with capacities to 1,550 cfm handle industrial and commercial air moving applications such as smoke and fume removal, spot cooling, and electronic equipment cooling.

The spark resistant housings are made from cast aluminum and heavy-duty steel bases rated to temperatures up to 70 degrees C. The blowers also feature circular inlet and outlet collars, single or three-phase TEFC motors and CW rotation, rotatable to four positions.

Continental Fan is a manufacturer of air moving products for industrial, commercial and residential applications based in Buffalo, NY.

www.aeroflo.com

www.plantmagazine.ca/rsc/ 10



the drive is moving without changing motor speed. Nor is there any need for gear reduction.

A lever is manually moved to a notched setting on a scale. Each notch increases or decreases pitch by 0.01. There are 100 discrete notched settings, which enable a 10:1 turndown of the linear pitch.

The pitch control bypasses notched settings by using a worm gear with a threaded rod design. To change pitch, the operator turns a control knob on the end of the threaded rod. This may be done safely while the drive is operating. A pitch indicator moves along the scale as the control knob is turned.

Once pitch is set, it remains constant – regardless of the drive motor speed or other control settings.

Amacoil Inc., based in Aston, Pa., builds linear and traverse drive assemblies for a wide range of positioning and reciprocating motion applications.

www.amacoil.com

www.plantmagazine.ca/rsc/ 7

INDUSTRIAL APPAREL

KEEP WARM WHILE MOBILE

Bosch Power Tools is warming up jobsites with a PSJ120 heated jacket and battery holster/controller with USB power backup. The 12-V Max jacket will keep outdoor mobile technicians warm and protected from the elements, with a built-in battery backup power source – the BHB120 – to keep USB-compatible cell phones and other important electronics charged and ready to go.



The water and wind resistant jacket features three quick warming core heat zones – two chest and one back – that take effect in a matter of minutes and provide up to six hours of heated runtime on low heat level with a 2.0 Ah battery.

A three-level heat controller button on the jacket's chest lights up in red, green and blue to denote high, medium and low heat levels.

The PSJ120 is compatible with all Bosch 12 V Max batteries (available separately), including the 4.0 Ah BAT420.

Bosch Power Tools is a manufacturer of industrial products with Canadian operations in Mississauga, Ont.

www.bosch.ca

www.plantmagazine.ca/rsc/ 8

HEATED JACKET FOR INDUSTRIAL JOBS

Milwaukee Tool Corp. has added warming features to its M12 Heated Gear.

There's a fleece inner liner and durable heating elements in the chest, upper back, and lower pockets. Each element is composed of sewn-in carbon fibre heating zones that set to high, medium, or low with the touch of a button on the lapel.

The jackets are powered by M12 Red Lithium battery technology, good for up to six hours on a single charge.

Hidden in a sleek back pocket is an upgraded battery holder with a gauge and a powered USB port for charging portable electronic devices.

Milwaukee Electric Tool Corp. is a Brookfield, Wis.-based manufacturer of heavy-duty power tools and accessories.

www.milwaukeetool.com

www.plantmagazine.ca/rsc/ 9



THERMAL IMAGING



Small form factor.

TEST KITS COVER R&D AND MACHINE VISION

FLIR Systems Inc.'s A5sc long wave infrared thermal imaging camera kits handle bench top testing in tight machine vision locations.

The cameras provide technicians, researchers and manufacturers with a non-destructive, non-contact T&M tool eliminates temperature measurement guesswork during the product development stage and on the production line by seeing heat patterns and extracting temperature values via live and recorded imagery.

Pixel resolutions include 80x64 and 160x128 up to 320x256, and meet the spatial resolution requirements of most applications.

Standard plug-and-play compatibility through GiGE Vision and GenICam protocols and 60 Hz frame rate for streaming images allows camera control and image capture in real time. The kit also comes with the newest FLIR Tools+ software for easy image analysis, recording and report generation.

FLIR Systems is a manufacturer of thermal systems with Canadian offices in Burlington Ont.

www.flir.com/ax5sckit

www.plantmagazine.ca/rsc/11

SOFT STARTERS

SOFT STARTER PROVIDES MOTOR PROTECTION

Baldor Electric Co.'s MST Soft Starter with six SCR three phase voltage control protects the motor, the soft starter and the load in pumps, compressors, fans, conveyors, mixers and stirrers.

Available in 7.5 to 1,000 hp at 208 to 575 VAC, the MST features programmable torque control for more linear acceleration during start, which reduces wear and tear; and during stop, virtually eliminating pump water hammer.



Programmable torque.

They come in two styles. The open starter has a smaller footprint that makes mounting easy, and is loaded with high-end features that improve performance and save energy. The enclosed combination starter combines over current protection and overload protection.

Baldor Electric is a manufacturer of industrial electric motors, mechanical power transmission products, drives and generator sets based in Fort Smith, Ark.

www.baldor.com

www.plantmagazine.ca/rsc/12

FORKLIFTS

NISSAN LINE TAPS AC POWER

Brushless AC motors power Nissan Forklift's electric rider lift trucks, which incorporate on-board diagnostics and thermal protection.

SCX stand-up, counterbalanced lift trucks with a 3,000-lb. capacity feature a short wheelbase for tighter manoeuvrability and quiet, load-sensing, hydraulic power steering. Other capacities include 3,500- and 4,000-lb.

BX 4-wheel cushion tire models (3,000-, 3,500-, 4,000-, 5,000-, 6,000- and 8,000-lb.) feature efficient regenerative braking, reduced rollback, cushioned stability control and auto mast-lock.

QX 4-wheel 80 v (4,000-, 5,000- and 6,000-lb.) have controlled rollback and restricted truck descent speed on an incline.

TX 3-wheels available in 3,000-, 3,500- and 4,000-lb. capacities feature a Nissan AC TECH controller with built-in test equipment module and dual-steer wheels.

Nissan's electric walkie/rider pallet trucks have standard,



Onboard diagnostics and thermal protection.

sealed switches for operation in wet, colder and freezer applications without heaters or thermostats. They're available for 4,000-lb. capacities.

The RPX 6,000- and 8,000-lb. pallet truck has an efficient controller system with fewer components and sealed switches for use in coolers, wet rooms and freezers.

SPX 6,000- and 8,000-lb. centre-controlled pallet trucks have a frame articulation, designed with a five-point stance for easy travel over dock plates. The WPX has a smart electric brake system that eliminates adjustments.

Nissan Forklift is based in Marengo, Ill.

www.nissanforklift.com

www.plantmagazine.ca/rsc/13

"C'mon, if the spray is off by a little, it's no big deal."

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www.plantmagazine.ca/rsc/120

TEST AND MEASUREMENT



Provides high resolution.

COUNTER MEASURES FUNCTIONS ACCURATELY TO 10 DIGITS

The TF960 6GHz bench/portable frequency counter from the Saelig Co. Inc. has a low ageing rate and is stable to within ± 1 ppm over the full temperature range thanks to a high quality internal frequency reference.

Short warm up time allows accurate measurements to be made under portable battery powered conditions. An external reference input is provided and changeover from the internal time-base is automatic when an external reference standard is connected.

Saelig, a distributor of control and instrumentation products based in Rochester, NY, says the unit measures and counts with high sensitivity between 0.001 Hz and 6,000 MHz, and incorporates a USB control interface to facilitate control and data transfer. It measures frequency, period, pulse width, duty cycle and frequency ratio, and event counting/totalizing.

The TF960 uses a reciprocal counting technique for frequency, period and ratio functions to provide high resolution at all frequencies with up to 10-digit accuracy.

For frequencies up to 125 MHz, the unit's input is configurable as 1 M Ohm or 50 Ohm impedance, AC or DC coupling, and 1:1 or 5:1 attenuation.

The threshold is fully variable, and the active edge can be a positive or negative transition. Two high frequency inputs cover a range of 80 MHz to >3 GHz and 2 GHz to >6 GHz, the latter input being via an N connector.

The TF960, measuring 10.3 x 3.5 x 9.3 in. and weighs less than 2 lb., operates from internal rechargeable NiMH batteries that have battery life of up to 24 hours. A universal AC charger recharges the batteries in less than four hours and provides continuous operation.

www.saelig.com.

www.plantmagazine.ca/rsc/15

METERS MONITOR, CONTROL MATERIAL DURING PRODUCTION

TruFlow meters from Nordson Corp. monitor and control material flow during all phases and line speeds of production for nonwovens, product assembly and packaging applications.

This variation management capability allows manufacturers to measure, understand and improve material delivery and dispensing to reduce waste, improve product quality and enhance production efficiency. Variation management is especially valuable in nonwoven disposable hygiene product manufacturing with demanding, rapidly-changing flow requirements during ramp up and ramp down.



Makes material flow monitoring easy.

The TruFlow consistently measures actual material flow rates. It operates across a broad flow range of 10 to 500 ccs per minute, with a wide spectrum of material viscosities and temperatures.

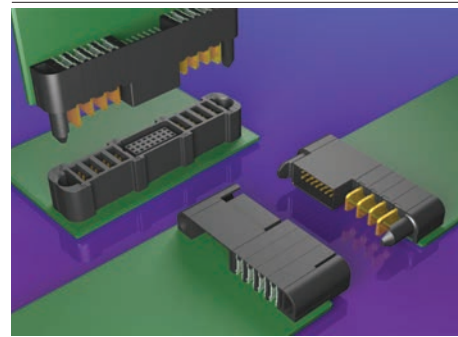
Simple connections and compact size make them adaptable to most production environments.

Nordson Corp. is a manufacturer of precision technology products based in Duluth, Ga.

www.nordson.com

www.plantmagazine.ca/rsc/14

POWER SUPPLY



Handles board-to-board power applications.

INTERCONNECTS DELIVER UP TO 60 A

Samtec's PowerStrip interconnects with EXTreme Ten60Power sockets and a terminal system delivering high current power performance of up to 60 A per power blade with a low 10 mm profile design for enhanced system airflow.

Use the system for board-to-board power applications.

The company, a producer of electronic interconnectors based in New Albany, Ind., makes the interconnects available as power only or signal/power combinations. Symmetrical or asymmetrical configurations of up to 12 total power blades on 5,50 mm (.217 in.) pitch are available on either side of 24 signal pins on .100 in. (2,54 mm) pitch.

The through-hole, right angle terminal and socket are ideal for coplanar applications. The socket is also available in a vertical orientation for perpendicular mating.

The system is rated for resistance to arc for hot-pluggable applications with a maximum voltage rating of 250 V.

Rugged guide-posts are standard and assist in blind mating.

www.samtec.com

www.plantmagazine.ca/rsc/17

PROGRAMMABLE DC COVERS A RANGE OF SOURCES

B&K Precision's MDL Series modular programmable DC electronic load system is comprised of six unique modules that range in power from 200 to 600 W. The system combines any of these modules for multi-channel operation in the four-slot mainframe, which supports up to 2,400 W and up to 4,800 W with a mainframe extension connected.

The system is useful in industries where the electronic load system requires a range of DC power sources, including multi-output AC/DC power supplies, batteries, fuel cells and photovoltaic arrays, such as automotive, solar, and electronics manufacturing.

Depending on the module, users select operating voltage and current ranges up to 500 V and 120 A. A 250 W dual-channel



Supports up to 4,800 W.

module supporting flexible power allocation up to 300 W is also available. Load modules in the mainframe synchronize and connect in parallel for increased current and power.

The system supports features such as adjustable current slew rates in constant current mode, transient mode operation up to 25 kHz, and list mode programming for generating complex sequences of input changes. Up to 101 groups of settings parameters will also be saved for multiple test sequences in automatic production testing.

Standard GPIB, ethernet, USB, and RS232 interfaces support USBTMC and SCPI communication protocols for remote PC control. There's also a built-in eight-pin control terminal for external triggering and synchronous load On/Off functions. Each module includes an analogue current control and monitoring terminal for external programming.

B&K Precision is a manufacturer of test and measurement equipment based in Yorba Linda, Calif.

www.bkprecision.com

www.plantmagazine.ca/rsc/18

SWITCHES

CONVERTERS ENHANCE OPTICAL BANDWIDTH

Advantech's Industrial has added two media converters to its EKI-3000 family of light industrial unmanaged switches.

The SC Type fibre optic industrial media converters are contained in a compact housing and the units convert Ethernet to fibre networks by transparently converting signals to optical to enhance bandwidth, EMI immunity and long distance transmissions.

The compact plug and

play devices ensure that network administrators get up and running quickly and easily, and in the event of a fault on the device network, administrators are instantly alerted by the use of Link Fault-Pass technology, which sends the error signal through whichever port is still available.

The units are IP40 certified for light industrial use and work from -10 to 60 degrees C. They have an operating voltage range of between 12 to 48 VDC and provide 3,000 VDC surge (EFT) protection against over-voltage so they're suitable for harsh operating climates.

Advantech Corp. is a developer of automated software systems for industrial applications based in Cincinnati.

www.advantech.com

www.plantmagazine.ca/rsc/19



Operates between 12 to 48 VDC.

DATA SECURITY

GIGABIT ROUTER SECURES DATA COMMUNICATIONS

Weidmuller's LAN and wireless 3G/UMTS gigabit routers enhance security and ensure reliable communication between ethernet-based systems and other high-level networks anywhere in the world.

Integrated "stateful inspection" firewall and additional security functions, such as NAT masquerading, ensure the connected machine components are reliably protected against unauthorized access.

Additional features include the prioritization and channeling of network data traffic, IP address mapping to reduce IP addresses and the adjustment of IP address areas.

Integrated VPN remote maintenance functions al-



low secure internet-based remote access to components and systems on the LAN network through wired access via the WAN port or wirelessly via the UMTS/3G interface. "OpenVPN" open source technology and "IPsec" encryption secures VPN connections, for both the client and server function.

Weidmuller's versions come with an integrated digital I/O for alarms and data triggers, as a bonus feature. With a wide operating voltage range of 7 to 36 VDC and low power consumption, the units are suitable for battery/mobile applications.

Weidmuller is a developer of industrial connectivity technologies based Detmold, Germany.

www.weidmuller.ca

Enhance ethernet security, reliability. www.plantmagazine.ca/rsc/14

of liquid nitrogen with little to no variation in temperature or state.

The fully automatic CryoWiz uses a proprietary algorithm, precise pressure and temperature sensors, and dynamic hot-gas bypass to maintain a specified temperature with maximum consumption efficiency. "Keep-full" and "on-demand" operation modes are customizable to specific cryogenic application.

The unit eliminates temperature spikes and low liquid level alarms in freezers, which combined with the ability to determine when the primary supply is truly empty, provides for cost efficiency. It has a 24,000-event log with built-in battery backup and can be ordered with a web server to remotely monitor cryogenic supply and send e-mail notifications of system status.

CONCOA is a manufacturer of pressure gas and flow control equipment based in Virginia Beach, Va.

www.concoa.com

www.plantmagazine.ca/rsc/20

SENSOR HANDLES RAPID CHANGES IN VISCOSITY, FLOW

Dwyer Instruments Inc. EFS2 insertion electromagnetic flow sensor

for pipes between 1 to 12 in. comes in stainless

steel, brass or PVC for applications where there are rapid changes in viscosity and flow.

The manufacturer of control and instrumentation based in Michigan City, Ind. says the EFS2 is useful for applications such as dirty liquids where moving parts are a problem, as well as small pipes and chemical metering pumps.

www.dwyer-inst.com

www.plantmagazine.ca/rsc/21

AUTOMATION



Fit shall enclosures.

480-V AIR CONDITIONERS COOL ENCLOSURES

AutomationDirect has expanded its Stratus line of enclosure air conditioners to include 480 V models, which alleviate excessive heat issues.

Heat inside an enclosure decreases the life expectancy and causes nuisance faults in controlling units such as PLCs, HMI and AC drives.

www.plant.ca

PLANT 31



Eliminates temperature spikes.

Use the closed-loop 2,000 to 8,000 btu/hr free-standing units for harsh environments, washdowns and where heavy dust and debris or airborne chemicals are present.

All units contain an active condensate management system and protective-coated condenser coils.

The units fit enclosures as shallow as 12 in., and include a digital LED temperature controller with visible alarm, and they're pre-wired for external monitoring.

The energy-efficient compressors are charged with CFC-free refrigerant and equipped with anti short-cycle protection.

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

www.automationdirect.com

www.plantmagazine.ca/rsc/22

POWER TRANSFORMER

CAST COIL TRANSFORMERS FIGHT SHORT CIRCUITS

WEG Electric's cast coil transformers handle harsh operating conditions thanks to a cast-resin design and a higher tolerance against short circuits with enhanced overload capacity.

They have ratings through 3,000 kVA and thermal insulation ratings up to class C (220 degrees C), plus lower partial discharges. Oil containment is not required because the transformers are cast-dry type.

A core of grain-oriented magnetic steel reduces losses, excitation current and magnetic noise. The low voltage coils are pre-impregnated with epoxy resin to provide an optimum coil insulation and high mechanical strength.

The coils are made from laminated foils and have a low partial discharge level and provide excellent resistance to axial forces caused by short circuits. The coils also highly resistant to load variations, changes in temperature, corrosive substances and fire.

WEG is a manufacturer of industrial electric motors based in Jaragua do Sul, Brazil.

www.weg.net

www.plantmagazine.ca/rsc/23



Ratings up to 220 degrees C.

Brands YOU Count on People You Trust

The new Baldor • Dodge® Type EXL bearing extends the life of mounted bearings by providing superior sealing, misalignment and expansion capability as well as the highest load ratings in the industry. Plus, the split ductile iron housings are dimensionally interchangeable with all "Type E" dimensioned products. Expect better reliability and reduced downtime with the new line of Type EXL bearings.

And, you can find Baldor • Dodge Type EXL bearings at your local Motion Canada location. Our local sales and service specialists are experts in application and technical support, providing the parts and the know-how you need to stay up and running.

The brands you count on from the people you trust...that's Baldor • Dodge and Motion Canada.



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HVAC

VACUUM WITH COMPRESSED AIR

Piab's piGRIP decentralized vacuum uses an energy efficient ejector technology that's based on a multi-stage concept for creating vacuum with compressed air. Use it where smaller parts need to be moved, such as bag handling, bag opening, and palletizing in the food and consumer pharmaceutical industries.

Piab, a manufacturer of industrial vacuum technologies based in Hingham, Mass., says a range of suction cups for the piGRIP meet specific application needs. The units are mountable on standard extrude profile systems. A low total build-weight and easy manoeuvrability saves space on a lifting device.

Accessories such as vacuum switches and blow-off check valves attach to the auxiliary vacuum ports on the unit to improve system productivity and reliability.

www.piab.com

www.plantmagazine.ca/rsc/24



Mountable on standard systems.

MACHINING

TRUMPF PACKS A PUNCH

TRUMPF has made it possible to punch a large number of holes in thin sheet metal without distorting the panel thanks to integrated flattening installed in TruPunch 5000 punching machines and TruMatic 7000 punch/laser combination machine.

In standard processes, the punch draws material into the hole as it penetrates the sheet, creating compressive stress. As the punch is withdrawn, tensile stress is produced. These forces cause deformation in the material, especially when processing low-gauge sheet metal with many holes.

Integrated flattening introduces opposing stresses to keep the sheet



Cut more holes without panel distortion.

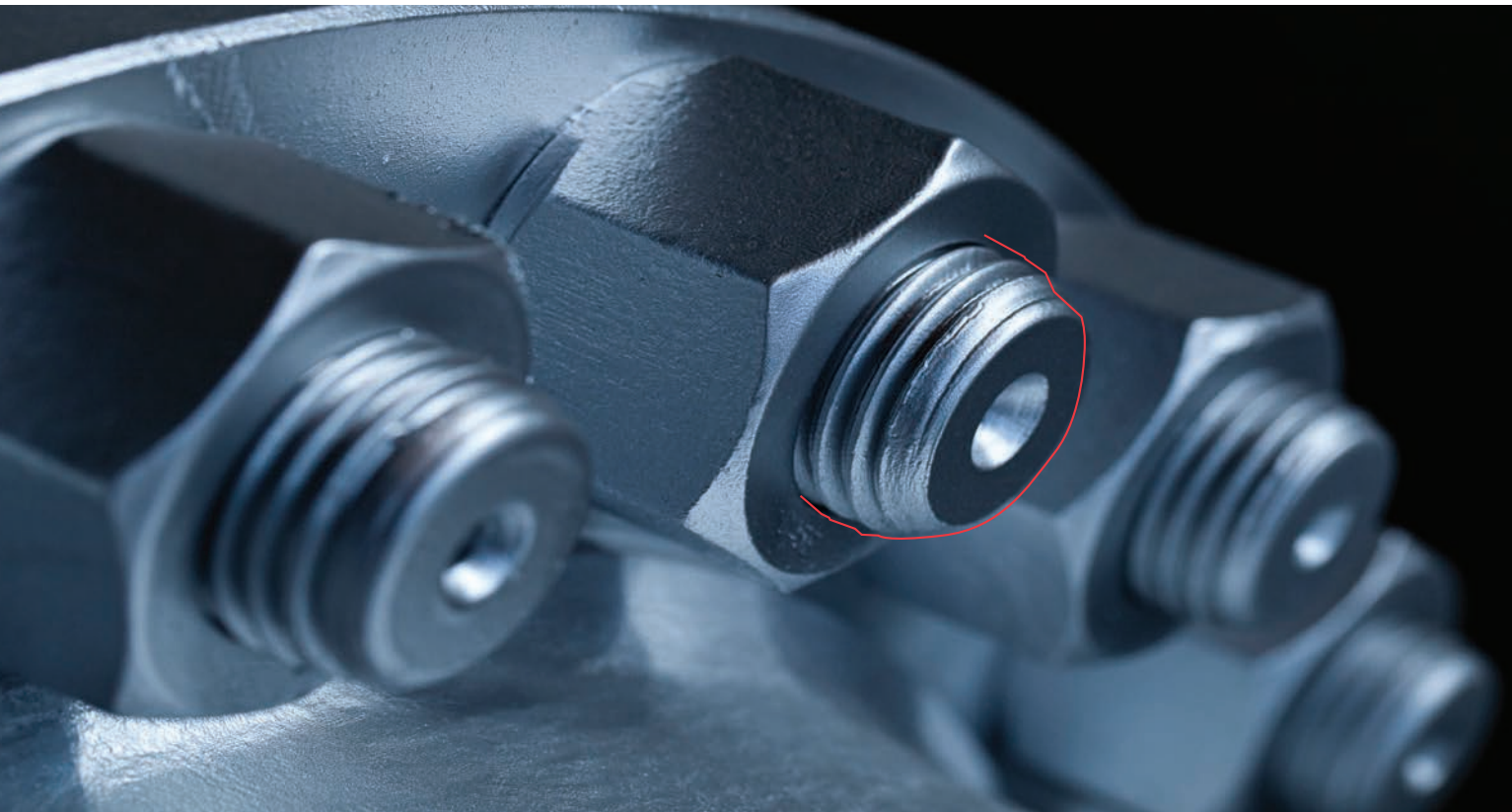
metal panels flat, eliminating the additional step to even out the material.

To keep sheet metal flat, the convex die works in tandem with a stripper featuring a recess and special coating. The convex die presses the sheet metal against the stripper from underneath, which overbends the material. The concave stripper counteracts by pressing the material raised by the convex die back downward at the edge of the die. The overbending creates counter-stresses, which offset the compressive and tensile stresses caused by the punching process.

TRUMPF is a manufacturer of fabricating machines and lasers for industrial production technology based in Farmington, Conn.

www.us.trumph.com

www.plantmagazine.ca/rsc/25



ENCLOSURES

KEEPING ENCLOSURES COOL

EXAIR's new Dual 316 Stainless Steel Cabinet Cooler Systems keep electrical enclosures cool with 20 degree F (-7 degree C) air.

Type 316 stainless steel resists the heat and corrosion that could adversely affect the enclosure's internal components.

High cooling capacity of up to 5,600 btu/hr is suitable for large electrical enclosures and high heat loads, but models with lower cooling capacities for NEMA 12, 4 and 4X enclosures are also available.



Corrosion-resistant stainless steel.

The coolers, which circulate air throughout the enclosure to prevent high temperature malfunctions, mount through a standard electrical knockout while maintaining the NEMA 12, 4 or 4X rating.

An automatic drain filter separator ensures no moisture passes to the inside of the electrical enclosure. An optional thermostat control minimizes compressed air use and keeps the enclosure at ± 2 degrees F of the temperature setting.

Cooling capacities cover 4,000, 4,800 and 5,600 btu/hr, they're UL Listed and CE compliant.

EXAIR is a manufacturer of compressed air products based in Cincinnati. www.exair.com

www.plantmagazine.ca/rsc/26

MAKE WASHDOWNS FAST AND EASY

EIC Solutions's M74 clean out modification option speeds up washdowns of thermoelectric coolers mounted to electronic enclosures in process industries to minimize downtime and boost production rates.

EIC electronic enclosures protect electronics and equipment from liquids/moisture, dust, oils, chemicals, temperature swings, corrosion and vibration. Available in a variety of cabinet styles,

SPEC IN RELIABILITY

Specify Loctite® Anaerobic Threadlockers

By filling the thread roots and preventing side-to-side movement, Loctite® threadlockers have dramatically increased the reliability of threaded assemblies for over 50 years. New advancements provide higher temperature resistance, improved oil tolerance and primerless performance. Don't let your designs fall apart. Specify Loctite®.

For technical assistance, call 1.800.263.5043

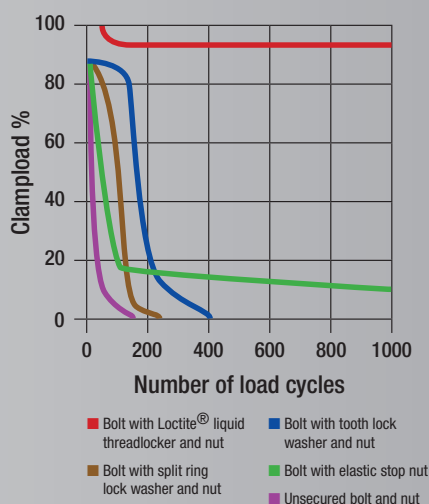


When it comes to:

- resisting vibration
- preventing corrosion and leakage
- improving quality
- reducing weight, size and cost,

mechanical locking devices just don't hold up.

CLAMPLOAD RETENTION COMPARISON



Henkel

Excellence is our Passion



Mounts to electronic enclosures.

they house electrical controls, cameras, telecommunications equipment, surveillance devices and security equipment.

Rack-mount models accommodate single or multiple 19-in. rack-mount gear such as DVRs, servers, routers, modems, switches, amplifiers and network gear.

The enclosures, built to NEMA standards and available in 12/4 configurations, are compatible for indoors and outdoors.

The weather-tight cabinets are made of powder coated steel and fit into thermoelectric air conditioners, heaters, digital temperature controls, rain shrouds and tamper resistant packages.

EIC Solutions Inc. is a manufacturer of cooling and protection technologies for electronics and equipment based in Warm-
inster, Pa.

www.eicsolutions.com

www.plantmagazine.ca/rsc/27

CONNECTORS



For high-production applications.

CRIMP TERMINATIONS BOOST PRODUCTIVITY

Binder-USA's M16 connectors with crimp terminations are simple to assemble and are well suited for high-production industrial and commercial applications.

They're available in straight and right-angle cable connectors and mating front- and rear-mount receptacles. Male and female connectors are offered in five- to eight-pin versions and accept individual contacts for wire sizes of 26-24 AWG or 22-20 AWG and install with standard crimp tooling.

Binder-USA is manufacturer of connectors based in Camarillo, Calif.

www.binder-usa.com

www.plantmagazine.ca/rsc/28

CIRCUIT BOARD CONNECTORS PLUG IN

HARTING's Han-Fast Lock circuit board connector

joins tried and true Han connectors to a circuit board without additional components

or the need to solder connections.

That allows PCB manufacturers to connect up to 60 A to a board and optimize space.

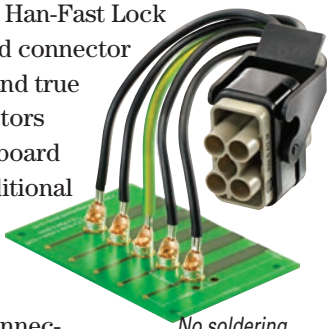
The PCB has one drilled hole and a pad. The inner surface of the plated, drilled contact hole serves as the interface. The Han-Fast Lock is simply inserted into the contact hole. The locking pin is pushed in, securing the contact into position.

Han-Fast also supports SMD assembly of the PCB. It takes up to a 10 mm²/7 AWG wire.

The HARTING Technology Group, a manufacturer of connectivity devices, has a Canadian office in Montreal.

www.HARTING.ca

www.plantmagazine.ca/rsc/29



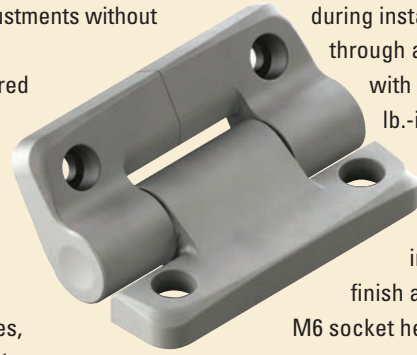
No soldering.

MATERIAL HANDLING

HINGES REDUCE REQUIRED LIFTING FORCE

Reell Precision's PH35 positioning hinges incorporate one-way torque technology to achieve high holding force in the downward direction, while allowing easy upward adjustments without resistance.

The technology reduces required lifting force without compromising holding force for heavy-duty vertical mounting applications, such as industrial enclosures, test chambers with large or heavy access panels, office equipment, medical devices, and large flat-panel monitors and computer peripherals.



Engineered for high holding force.

Reell, a manufacturer of position controls based in St. Paul, Minn., says its clip technology enhances position control without adjustments during installation. Torque is constant through a 270 degree range of motion with one-direction torques from 50 lb.-in. to 100 lb.-in. and are rated to a service life of more than 20,000 cycles.

The hinges are available in a plain zinc or matte black finish and mount easily using a ¼ in./M6 socket head cap screw.

www.Reell.com

www.plantmagazine.ca/rsc/30

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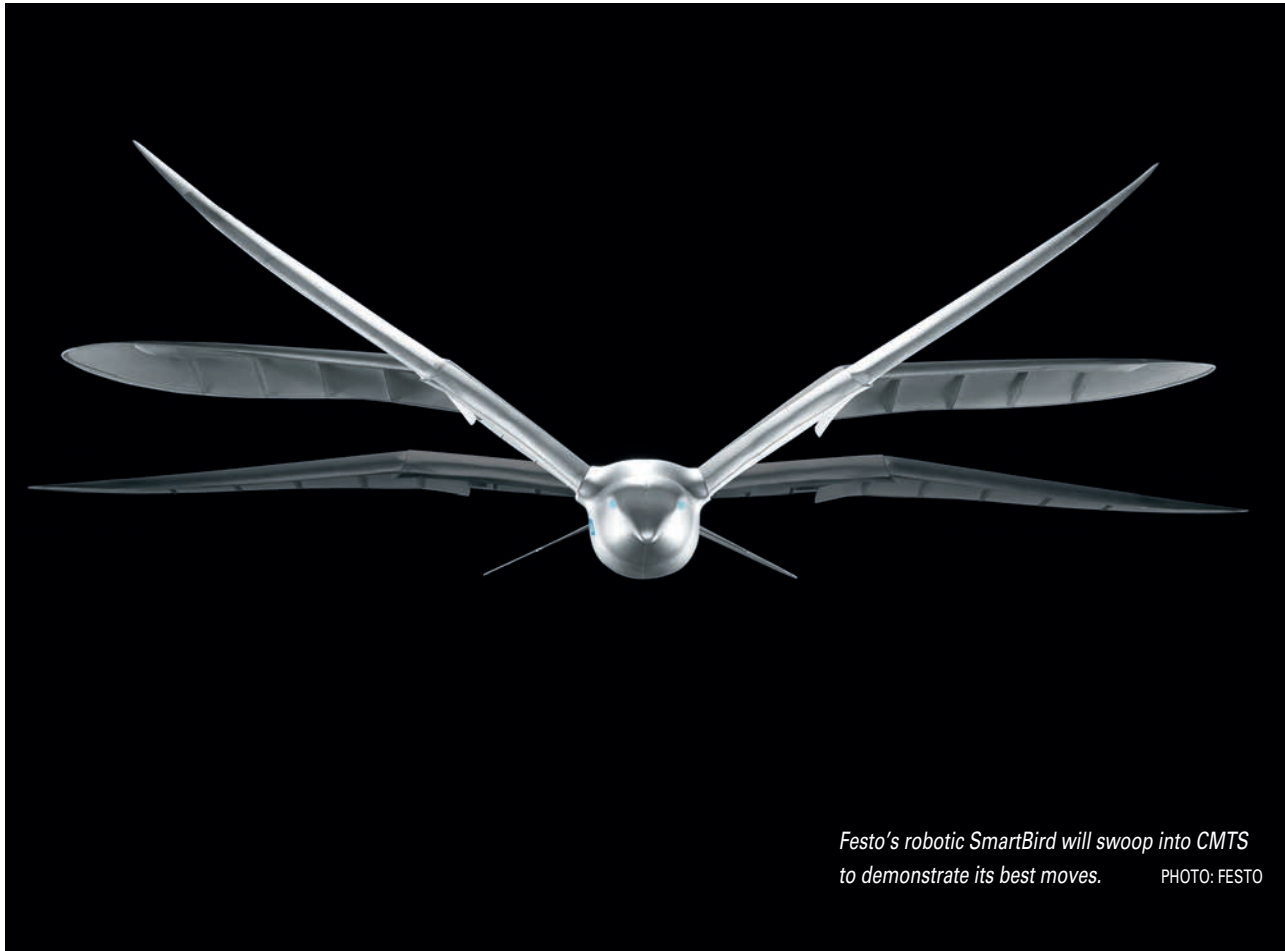
rousseau-metal.com



rousseau

SHOW TIME!

THE LATEST EQUIPMENT AND TECHNOLOGY FOR CANADIAN MANUFACTURERS



Festo's robotic SmartBird will swoop into CMTS to demonstrate its best moves. PHOTO: FESTO

Visitors to the Canadian Manufacturing Technology Show in Mississauga, Ont. Sept. 30 to Oct. 3 can "Expect More."

Canada's national manufacturing event has a new look and a new location where the latest in industrial technologies and solutions will be on display Sept. 30 to Oct. 3.

The Canadian Manufacturing Technology Show (CMTS), presented by SME and partners, including **PLANT** and the Business Information Group, is returning to the International Centre, in Mississauga, Ont., after 14 years in downtown Toronto.

The venue, near the Toronto Pearson International Airport, will accommodate about 10,000 visitors from across Canada representing all areas of industry. They will have access to more than 500 exhibits, new products, live demonstrations and a comprehensive program of educational sessions, keynote speakers and panel discussions, plus plenty of opportunities to network.

In keeping with its proximity to the airport, CMTS has added a Terminal 4 feature, "Where Knowledge Takes Flight," which is upping the service level for attendees.

"It delivers on the event's "Expect More" theme and will rival any feature we've had in the past," says Julie Pike, SME's manager of CMTS.

Sponsored by Sandvik Coromant Canada, Terminal 4 will be located in the central hub of the show, connecting five halls and hundreds of exhibits, and will have its own check-in concierge desk, luggage carousel "stage," duty-free manufacturing shops, VIP lounge and dining areas.

Features include:

- Duty-free manufacturing shops that offer resources from CMTS organizer SME, Tooling U and other industry partners.
- A presentation stage on the luggage carousel.
- A glimpse into the future of the automotive and medical industries, with revolutionary displays and demos.

CONFERENCES

Oct. 1: Medical Manufacturing Innovations

- Workforce Development: CMTS Industry Panel Keynote
- Finding Resources, Representatives of different funding resources will discuss options
- Government Funding – How to Locate Programs and How to Use Them
- Finding the Value and Pitching It – Selling Your Ideas and More
- Finding and Breaking Down Your Assumptions
- Give Us Your Best Pitch

Oct. 2: APMA Automotive Outlook

The Automotive Parts Manufacturers' Association (APMA) presents its 18th annual event, produced in partnership with Export Development Canada (EDC) and SME. Agenda topics include:

- Automotive industry outlook and forecasts
- The connected vehicle
- Key challenges for Canadian automotive suppliers
- Advanced control systems for manufacturing
- Keynote luncheon speaker Jerry Chenkin, president & CEO of Honda Canada

- The only dedicated WiFi zone at CMTS.
- An upscale food court experience with reserved dining options.
- A VIP lounge overlooking the airport tarmac.
- Access to the complimentary CMTS shuttle buses operating between host hotels.
- Access to the complimentary CMTS shuttle bus to Pearson Airport.
- Concierge service desk to assist with questions about everything from CMTS and restaurant referrals to cell phone-charging services.

Taking flight

This year's show will also provide visitors with a bird's eye view of the latest breakthroughs in automation technology, including a "first-of-its-kind" surprise for ornithologists.

Festo's SmartBird, an intelligent robotic device that looks and moves like a herring gull, will make its Canadian debut at CMTS.

First unveiled in Europe in 2011, this ultralight, aerodynamic innovation from Festo, a German manufacturer of automation technology takes off, flies, glides and lands autonomously. Weighing only 450 grams (15.87 ounces) with a wingspan of 1.96 metres (6.4 feet), the bird is extremely agile. Its wings not only beat up and down, they also twist at specific angles in a similar way to a real bird and its tail acts as a rudder, tilting and rotating to initiate turns and produce lift.

The company (with Canadian headquarters in Mississauga, Ont.) says practical applications emerging from this discovery are numerous. For example, the robot's minimal use of materials and lightweight construction help increase efficiencies in resource and energy consumption, while its mechanics can be transferred to the development of hybrid drive technology and the next generation of robotic aircraft. As well, its airflow characteristics will give insight into the development and production of the latest generations of cylinders and valves.

"The SmartBird is part of Festo's ongoing commitment to learn and gain inspiration for industrial applications from nature, and we are thrilled to showcase the SmartBird for the first time in Canada at the upcoming Canadian Manufacturing Technology Show," says Jaclyn Rand, Festo's marketing specialist.

It will take flight during scheduled demonstrations.

Manufacturing pros from the executive offices to job shop workers are also invited to "expect more" from a busy conference program over three days. It will feature seminars, panels and keynotes, plus an APMA Automotive Outlook Conference, an MMI Medical Manufacturing Innovations Conference, and Mazak's Lunch and Learn seminars, which will include a concept presentation followed by interactive live cutting demonstrations in the company's booth.

CMTS's partners include Canadian Machine Tools Distributors' Association, Canadian Tooling and Machining Association, Canadian Manufacturers & Exporters (CME), Automotive Parts Manufacturer's Association (APMA), Canadian Wind Energy Association (CanWEA) and the Business Information Group, and media partners that include **PLANT**.

Link to <http://cmte.ca> for more information.

What's On

The following are some of the CMTS sessions featured over the three-day event.

September 30

ADDITIVE MANUFACTURING OVERVIEW

- Designing for Additive Manufacturing, *Mark Barfoot, managing director, Hyphen Services.*
- Additive Manufacturing DINO: Distinguished INovative Operations, *Richard Smeenk, president, Agile Manufacturing Inc.*
- Shop Floor Management: Best Practices and Lessons Learned at German Manufacturing Industries, *Franz Gruber, founder and CEO, FORCAM.*
- Automated Trackers – The Power of Real Time Scheduling Simulation, *Jose Lima, director of operations, Magellan Aerospace Corp.*
- Dashboards – What You Don't Know Can Hurt You & How You Present What You Know Can Kill You, *Scott Benzie, director of marketing, Dundas Data Visualization Inc.*
- Manufacturing in the Cloud: Is it Right for Your Business? *Gavin Davidson, vertical market expert, manufacturing, NetSuite Inc.*

MANAGEMENT

- Applied Research, A Key to Innovation for Small and Medium Size Business, *Shaun Ghafari, professor, Sheridan College.*
- A New Era – The Role of Marketing for Technical and Industrial Companies, *Lisa Shepherd, president, Mezzanine Group.*
- Canadian Government Funding for Small and Mid-Sized Businesses, *Bernadeen McLeod, president and owner, Mentor Works Ltd.*
- Holy Shift, Your Marketing is Broken! *Brian and Eddie Bluff, founders of Site Seeker Inc.*

PROCESS

- How to get the Maximum Benefit from Solid Carbide Tooling, *Mark Cadogan, vice-president, sales, Delcam.*
- Preformed Emulsion Technology Advances in Metal Working Fluids, *Richard Butler, technical manager, Chemtool Inc.*
- MicroBlasting Technologies: Optimizing Control and Automation, *Colin Weightman, director of technology, Comco Inc.*
- Automated Metrology, *Robert Johnston, product manager, Carl Zeiss.*

October 1

ADDITIVE MANUFACTURING FOR TOOL AND DIE BLOW MOULD APPLICATIONS

- Presentation TBA, *Robert Fazackerley, vice-president of Sales, Garrtech.*
- Laser Additive Manufacturing for Making Net-shape Functional Components and Low-cost High-performance Tooling, *Dr. Lijue*

Xue Ph.D, National Research Council of Canada.

- Presentation TBA, *Mark Barfoot, managing director, Hyphen.*
- Presentation TBA, *Dafydd Williams, director and general manager, Renishaw.*

ENGINEERING

- Technology Advancements in CAD/CAM Nesting Software, *Derek Weston, product marketing manager, Hypertherm Inc.*
- Benefits of Applying "MQL" Minimum Quantity Lube to Machine Tools, *Brian Wilson, regional manager, Canada, Bijur Delimon International.*
- Patents and Canada's Manufacturing Sector, *Andre Theriault, patent agent, Norton Rose Fulbright Canada LLP.*
- Universal Robots, *Mark Schick, president, Advanced Motion Control.*

MANAGEMENT

- Advanced Cutting Strategies, *Chris Renaud, CGS North America.*
- High Speed Machining Versus High Efficiently Machining, *Scott Reiner, sales engineer, CGTech.*
- Advanced Inventory and Optimization (AIO), *Dennis Lord, executive director, IMS Business Academy.*
- Investing in Downtime Protection – Why Lights Out Machining Shouldn't Be the Only Measurement of Efficiency, *Max Leser, director, 3 Axis Corp.*

October 2

DESIGN: PROCESS, COLLABORATION & TECHNOLOGY

- Rise of Open Engineering, *Hardi Myebaum, GrabCad.*
- Why so serious? Understanding the User-Centred Design Process, *Dominira Saul, Akendi.*
- New Trends in Design Data Management for 2014, *Scott Hale, IMAGINIT Technologies.*
- Anatomical Engineering for Medical Device Design, *Crispin Weinberg, Biomedical Modeling.*

QUALITY: PROCESS, COLLABORATION & TECHNOLOGY

- Integrated Medical Production Development, *Justin Paur, NACS.*
- High Precision EFM Micro-Probe System for CNC Machines, *Jerry Mraz, SmalTec.*
- Video-rate 3D Surface Measurements for Industrial Environments, *Erik Novak, 4D Technology.*
- Comparing Metrology Methods: Which is Best for Your Application? *Peter Detmers, Mitutoyo Canada.*



Innovation Alley, a dedicated area at CMTS in Hall 1, will feature cutting-edge technology related to machining and metalworking.

PHOTO: THINKSTOCK

» Products on Display



Automatic or manual cleaning.

NEXT-GEN DUST AND FUME FILTERING

Nederman Filterbox III is the next generation of the Filterbox welding fume and dust extraction line.

Compressed air and mechanical cleaning with operating airflow of up to 900 cfm help to increase the lifespan of the main filter media. Advanced models feature cleaning that's either automatic with the use of pressure sensors or initiated by the user at any time. The control box has an LCD display indicating when it's time to clean or change filter cartridges. An automatic damper prevents dust from leaking out while cleaning. And there are ergonomic features such as the power socket, compressed air outlet and ergonomic handle.

Options include a pneumatic start, and a welding sensor clamp fan start.

Nederman Canada Ltd., based in Mississauga, Ont., is a supplier of products for dust extraction, smoke and exhaust fumes.

Booth 8806



Inside the GVS vacuum pump.

RELIABLE VACUUM PUMPING FOR INDUSTRIAL APPS

Atlas Copco's GVS 630-4800 oil-sealed rotary screw vacuum pump brings reliable, efficient rough vacuum to printing, canning, plastics, electronics, packaging, bottling and similar industrial applications.

Capacity ranges from 365 to 3,000 cfm and the pumps are particularly efficient between 0.7 mbar (a) to 675 mbar (a).

GV 20-300 pumps have a capacity ranging from 12 to 215 cfm with an operating pressure range between 0.5 mbar (a) to 2 mbar (a) packaging, wood working, paper and printing, electronics and material handling applications.

Atlas Copco is a Swedish manufacturer of compressors, expanders and air treatment systems, construction and mining equipment, power tools and assembly systems. It has a Canadian office in Mississauga, Ont.

Booth 8828

TAKE THE HAZARD OUT OF INDUSTRIAL DUST

The SS-IT EX (TC) RE (CFE) HEPA from Tiger Vac International Inc. renders any hazardous dust inert.

Made of SAE 304 stainless steel, this interceptor tank, drain valve and powder



Also recovers fuel, solvents and acids.

coated tilting cart – certified explosion/dust ignition proof – recovers small quantities of material such as metallic, conductive and explosive dusts into an immersion liquid bath such as water, paraffin oil and mineral oil. But it's also convertible for the

recovery of fuel, solvents and acids.

It features less than 10 ohms of resistivity and is equipped with a true HEPA filter (H14) located downstream. Capacity is 1 g (4 l) of dust into 5 g (20 l) of liquid.

When the job is done, the tank tilts backwards to empty the contents into a recovery container for disposal.

Tiger Vac International is a Laval, Que.-based manufacturer of industrial and cleanroom vacuum cleaner systems.

Booth 7118

PRECISION LIFT FOR ASSEMBLY

The CLX electric chain hoist from Konecranes speeds up work cycles in manufacturing applications where high-speed load transfers and precise assembly work are required. Currently in capaci-



Faster movements.

ties of 60 to 2,000 kg (130 to 4,400 lb.), the CLX pairs with workstation, overhead and jib cranes or deploys in an endless variety of fixed configurations.

A new aluminum frame is accompanied by a maintenance-free transmission and patented five-tooth chain sprocket with intermediate teeth. The latest oil lubrication-based transmission lowers operating temperature for increased power. And a speed ratio of 6:1 enables movements that are 25% faster than the model's predecessor.

Safety and maintenance features have

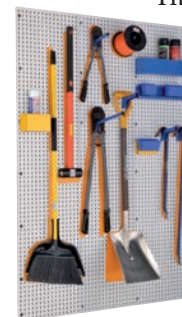
also been improved. All electronics have been placed on compact circuit boards, decreasing internal wiring and limiting the number of parts required for maintenance. Additional safety functions have been integrated into the hoist's construction, such as the standard overload device constructed so the brake holds the load without any interaction with the slipping clutch. Its design is intended to prevent micro-slip and load drops in the unlikely event of a broken clutch.

Konecranes is a global manufacturer of lifting products with a Canadian facility in Niagara Falls, Ont.

Booth 6316

5S PANEL FOR TOOL STORAGE

Rousseau Metal Inc.'s 5S wall panel sorts your tools for easy access and storage.



Every tool has its place.

This multi-functional panel system allows you to identify different shapes, sizes and weights with easy visual identification using photos, p-touch, stickers or WM91 film.

The panels overlap so they can be anchored in the same attachment zones and the hardware is installed between two

panels for quick installation.

Combine round hooks (for small and/or light articles), "spike" hooks (for heavy and/or bulky items), holders for cans and supports for plastic bins to optimize the available space.

Rousseau Metal is a St-Jean-Port-Joli, Que. manufacturer of storage products.

Booth 6505



Precision cutting.

WALTER ADVANCES NEW CUTTING TOOLS

Look for new cutting tools from Walter, a manufacturer based in Waukesha, Wis.

The Blaxx shoulder mill combines precision, high metal removal rates and process reliability in a single tool.

The Tiger-tec Silver delivers what the company describes as "superior resistance" to crater and flank wear, plastic deformation, while reducing machining times.

Titex X-treme Inox solid carbide drills for stainless steel feature a new flute profile, point geometry and TTP coating for reduced cutting force and longer tool life.

Prototype Proto-max Inox solid carbide end mills for stainless steel achieve material removal rates up to 50% greater than standard solid carbide end mills.

The ValCOOL VPLFC heavy-duty, non-chlorinated, semi-synthetic low foaming cutting fluid helps reject tramp oils. It's clean, stable and performs well in high-pressure (1,000 psi) applications.

Booth 4204

FABTECH Canada is BACK!

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fabtechcanada.com

» Plantware



Commands without a keyboard.

MULTI-TOUCH FOR SCADA

InduSoft Inc. adds multi-touch development for touch-screen devices with the first service pack for its Web Studio v7.1. SCADA software. Users navigate screens and issue commands for an entire system without a keyboard or point device and do so three times faster.

Training time is reduced because many gestures, such as zoom and pan, function in the same way as they do on smartphones and tablet devices.

Multi-touch capability also improves safety. Certain actions may require operators to keep their hands away from a machine. The multi-touch screen will configure to require using both hands on the screen before the command is executed.

The service pack also offers an enhanced mobile access client and new language interfaces for the development environment.

Download the free v7.1 at www.indusoft.com/blog/?p=1934.

InduSoft is an Austin, Tex. developer of industrial software.

www.indusoft.com

www.plantmagazine.ca/rsc/31

CONTROL HMI FROM A PHONE OR TABLET

Pro-face America's Remote HMI works with the screen development software GP-Pro EX v3.1 (or later) to monitor and control HMI screens from a smart phone or tablet without special programs.

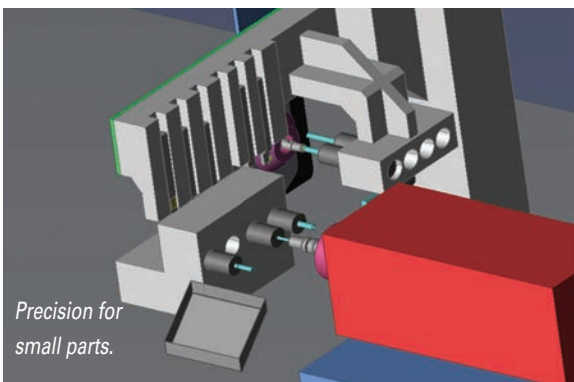
Users check causes of errors and prepare tools for maintenance before dashing off to the source of the issue. Synchronous mode monitors screens that are the same as operators' screens, while asynchronous mode monitors different screens during regular operation.

Setting the monopolize touch function prevents errors caused by redundant operation, which is re-enabled at a preset time after Pro-face Remote HMI or the GP unit on the equipment has been operated.

Pro-face America, based in Ann Arbor, Mich., supplies HMIs, operator interfaces and industrial computers.

<http://www.profaceamerica.com/RemoteHMI>

www.plantmagazine.ca/rsc/32



Precision for small parts.

CNC SWISS-STYLE ACCURACY

CNC Software Inc.'s Mastercam Swiss Expert programs Swiss-style CNC machines used for extremely small but very precise parts.

It supports an unlimited number of axes and channels, and provides realistic simulation of the entire machine and its tools.

CNC Software, a developer of CAD/Cam software based in Tolland, Conn., says Swiss Expert reduces startup time significantly, optimizes cycle times and supports all types of tooling.

www.mastercam.com

www.plantmagazine.ca/rsc/33

CNC PRECISION MACHINE VISES



This new brochure from Carr Lane Roemheld features a wide assortment of machine vises for nearly any application. View specs on each includes sizes, actuation types, part quantity, mounting options and jaw options. Find the best vice for your specific needs. Click on machining

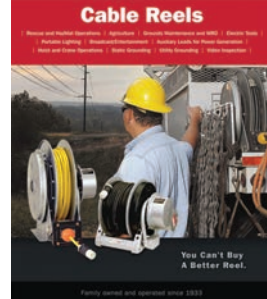
vises at clrh.com to download the brochure.

www.clrh.com

Carr Lane Roemheld Mfg. Co.

www.plantmagazine.ca/rsc/126

HANNAY REELS OFFERS EXTENSIVE CABLE REEL CATALOGUE

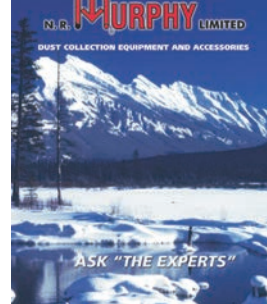


Hannay Reels cable catalogue provides details on manual, spring, and power rewind cable reels including rescue and haz-mat operations, grounds maintenance and repair, video inspection, and portable lighting. There are also handle arc welding cable, static grounding cable, and electrical cable for power tools, lights, machinery, and generators. www.hannay.com

Hannay Reels

www.plantmagazine.ca/rsc/127

DUST COLLECTORS NEW - FULL LINE LITERATURE GUIDE



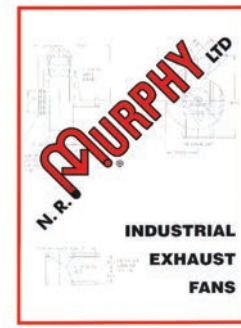
This impressive NEW guide outlines dozens of N.R. Murphy dust collectors, installations, capacities, styles and models. A must for any reference library. N.R. Murphy Limited has been in business over 70 years and has thousands of satisfied customers.

"Dust Collectors are all we do; so get it done right the first time. Just Ask the Experts." www.nrmurphy.com

N.R. Murphy

www.plantmagazine.ca/rsc/128

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

N.R. Murphy

www.plantmagazine.ca/rsc/129

LIND EQUIPMENT LAUNCHES 2012-2013 CATALOGUE



Lind Equipment continues to innovate with portable LED lights by adding the LE970LED 50W LED portable flood light, and Lind's cord reel offering now includes heavy-duty and weatherproof cord reels with up to 12 conductors and 80 ft. of cord.

www.lindequipment.net

Lind Equipment

www.plantmagazine.ca/rsc/130

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

www.plantmagazine.ca/rsc/131

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Get ready for an underperforming economy

BY JOCK FINLAYSON

Canada and the US are now entering the fifth year of economic recovery from the recession that hit both countries over 2008-09.

After enduring its worst slump in 50 years, the economy officially stopped shrinking in June 2009. Since then, the US has enjoyed 15 consecutive quarters of growth in gross domestic product (GDP), although at barely half the pace typical of previous recession-recovery cycles. Moreover, per capita GDP has yet

“Unlike the US, Canada has seen a meaningful increase in the absolute number of jobs, as well as higher real GDP...”

to return to its 2007 level, and employment remains well below its pre-recession peak.

Canada followed a broadly similar economic trajectory, except that the decline in GDP and employment was not as deep, and on most counts the rebound that started in mid-2009 has been more impressive. Unlike the US, Canada has seen a meaningful increase in the absolute number of jobs, as well

as higher real GDP on a per person basis. Canada also avoided the disruptive downturn in housing markets and the sharp drop in household net worth that accompanied America’s recession and persisted through the initial years of weak recovery.

Looking ahead, it’s time for an extended economic role reversal: the US is on course to significantly outperform Canada across a swath of economic

indicators, at least through 2015. The main reason lies in the differing state of housing markets and consumer finances in the two countries.

Household balance sheets have improved stateside, while housing and equity market valuations having climbed – thereby lifting net worth. In Canada, household debt sits at a record high measured against disposable income, whereas the debt-income ratio has fallen appreciably in the US. Canadian households aren’t in a position to drive robust top-line economic growth. Consumption, which constitutes three-fifths of economy-wide spending, will therefore be rising noticeably faster in the US.

Meanwhile homebuilding in Canada has been outpacing underlying demographics for several years, and by 2012 residential investment stood a near record high as a share of GDP. After several years of frenetic activity, our housing markets have cooled, and starts are falling – a trend that’s expected to continue, adding little, if anything, to GDP or job growth in the near term.

A US revival

After an epic, multi-year correction that saw unprecedented declines in home prices key indicators in the US are reviving. Annualized starts should hit 1.3 million to 1.4 million by 2016 – up from 800,000 last year.

Another factor pointing to an uptick in US economic growth is a jump in domestic oil and gas production, and the related reduction in energy costs for industries and households that have access to low-cost, gas-fired electricity – a bigger part of the energy mix than it in Canada. As the US reduces reliance on imported energy, it’s already making advances in manufacturing competitiveness thanks in part to lower electricity costs and abundant cheap natural gas feedstock that’s supporting an expansion of production and new investment across a number of industries. Nothing similar is occurring in Canada.

Finally, Canada’s stock market has missed out on the huge post-2009 gains recorded by the broad US equity market indexes, thus dampening increases in overall wealth here and making it harder for our businesses to raise capital. Going forward, this disparity in equity market performance may further widen the already sizable gap in private sector productivity between the two countries.

While Canada will certainly benefit as the US economy accelerates, our consumer spending and housing investments are largely tapped out.

Jock Finlayson is executive vice-president of the Business Council of British Columbia. This column is distributed by Troy Media in Calgary. Visit www.troymedia.com.

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