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PLANT

INSIGHTS AND STRATEGIES FOR INDUSTRY LEADERS

Volume 70, No. 03 May/June 2011

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SLAPSHOT SHOWDOWN

Robot shoots, scores and tests composite hockey sticks for fractures

HIGHLIGHTS

Kevlar for combat canines

Power Pipe innovates energy recycling

Conveyor provides lift-off for F-35 wings

China is losing its labour edge



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Clarity on climate change

We've had 20 years of global environmental finger wagging, scientific bunking and debunking, high-minded government rhetoric, pledges and policies: let's take stock of the climate change file.

So, how are we doing? Not so good.

Despite years of effort, a new report from the International Energy Agency (IEA) reveals greenhouse gas emissions at a record high. The Paris-based agency reports energy-related carbon emissions have reached a worldwide total of 30 gigatons, 5% more than the previous record set in 2008.

This shouldn't be surprising. Despite an interruption during the recession and a global embrace of renewable energy options, economies are growing with populations that are affluent or working on it and drawing on energy from an infrastructure based on fossil fuels; a fact on the ground that isn't going to change overnight.

It also highlights the futility of government efforts to set carbon reduction targets that are unattainable without specific and coordinated measures that ensure they'll be met, which is the gist of a Conference Board of Canada report.

The federal target is a 17% reduction by 2020 (from a 2005 baseline) and the Ottawa-based think-tank says individual provincial targets are being addressed through a complex, diverse, and opaque mix of instruments and programs.

An annual federal progress report on emissions reductions shows a four-megatonne cut in 2009 on a total of 694 megatonnes. That means federal efforts are responsible for a measly 0.5% reduction.

The Conservative regime in Ottawa contends any structure that's put in place must be in sync with a US strategy (which is proving to be a long-time coming) and the result has been a hodgepodge of policies at the provincial and federal levels. Cap-and-trade mechanisms or carbon taxes have not been broadly implemented. Quebec and BC have adopted carbon taxes, and Alberta has an intensity cap on large final emitters.

Environment Minister Peter Kent insists the federal government does have a plan and the big moves are coming. They'll include regulations for coal-fired power plants and the oil sands over the next couple of years: a slow ramp up, he says, until emissions are under control by 2020. Really.

But unless the pace picks up, Canadian governments are unlikely to meet their targets.

What's the answer? Let's start with a co-ordinated effort involving the provinces, which the Conference Board contends will be more likely to reduce emissions at a lower cost, while helping the governments learn from the experience of others. It says Alberta's intensity cap is one policy instrument that, as part of a coordinated approach, may produce more efficient results.

Some of the big energy players, tired of guessing what kind of regulatory framework they'll be working with to reduce emissions, are calling on Ottawa to work with them to establish some across-the-board regulations that meet targets but don't place an onerous burden on industry.

Bart Demosky, CFO of Suncor Energy Inc., wants to see everyone working to the same standards. Target the end user, he says, not just the producer, "and we'll see real traction and real reductions if that's what people want from a societal point of view. But that's going to take federal leadership, not local leadership."

The Conservative government has a majority. Business wants clarity. The people want action. It's time to demonstrate Ottawa intends to do more than talk about climate change measures.

Joe Terrett, Editor

Comments? E-mail JTterrett@plant.ca.



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» Bulletins

Velan Inc. has acquired a 70% stake in ABV Energy S.p.A., an Italian manufacturer of engineered valves, actuators and control systems for the energy market. Velan, a Montreal-based manufacturer of industrial valves with plants in eight countries, said the “strategic acquisition” broadens the scope of its product lines to the energy markets.

Medical device company **Baxter Canada** will close its Sherbrooke, Que. plant on Dec. 9, putting 135 people out of work. The company plans to relocate production to other plants in the US, Costa Rica and Singapore that are already making its products. The Sherbrooke plant made medical devices for intravenous interventions.

Innovative Composites International (ICI) Inc. has an option to purchase **Eleison Composites LLC**, based in Grandville, Mich., a manufacturer of fibre-reinforced thermoplastic skin, for \$2 million and three years of royalties. ICI, a Toronto-based advanced materials innovator and manufacturer, said the deal would secure supply of the material and reduce raw materials costs.

W2 Energy Inc. has purchased a seven-acre property in Guelph, Ont. with a 30,000 square-foot, single floor office/factory space for \$1.15 million. The green energy firm intends to create a showcase pilot plant as well as greenhouses for algae bioreactors on the site.

CO2 Solution Inc. has been granted new patents for its carbon dioxide recycling and absorption technologies that will broaden the Quebec City innovator’s global reach. The Canadian patent provides for exclusivity using the enzyme carbonic anhydrase for the capture of CO2 from any fossil-fuel power plant. The Australian patent covers exclusivity for carbonic anhydrase used in the capture of carbon dioxide with low-energy amine solvents.

Air pollution control firm **Turbo-sonic Technologies Inc.** in Waterloo, Ont. has won a US\$1.25 million contract to install its clean air technology at a Portland, Ore. cement plant. The installation contract is in addition Turbo equipment that abates sulphur dioxide (SO2) and nitrogen oxide (NOx) emissions.

IBC STRIKES \$12M SUPPLY DEAL

VANCOUVER: IBC Advanced Alloys Corp. has signed an exclusive supply contract potentially worth \$4 million per year to provide investment-cast engineered components to a global manufacturer of high-technology assembly equipment.

IBC, a Vancouver-based manufacturer of beryllium-based alloys and related products, said the one to three-year deal with the unidentified customer has the potential to generate a minimum of \$4 million a year for its Engineered Materials division (formerly Beralcast Corp.)

Beralcast alloys are used to manufacture specific components of semiconductor assembly equipment and other high tech industrial applications. The company claims its primary alloy is more than three times stiffer than aluminum with 22% less weight.

IBC has production facilities in Indiana, Massachusetts, Pennsylvania and Missouri.

CONNECT CANADA FUNDS RESEARCH INTERNS

WINDSOR, ONT.: Companies across a range of economic sectors will have access to some R&D assistance through a new federally funded internship program.

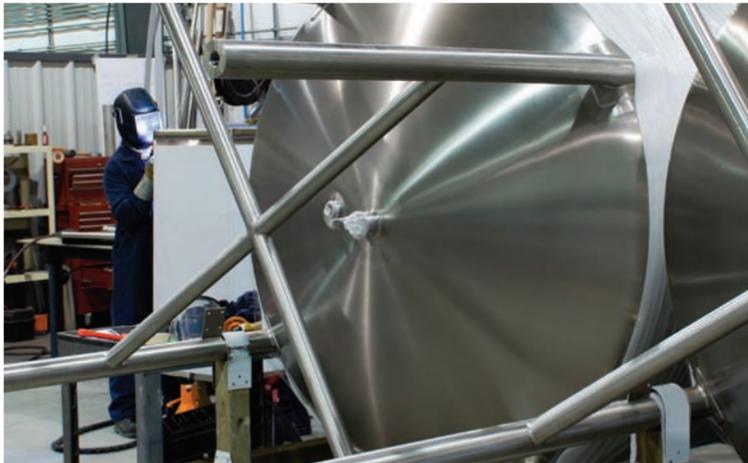
The five-year, \$5-million Connect Canada program aims to hookup 750 graduate students with companies across Canada to investigate research issues related to their businesses.

The company kicks in \$5,000 matched by the Connect Canada, which is funded through the federal Industrial Research and Development Internship (IRDI) program. Interns spend half their time with the company and half on campus.

So far, 50 companies have pledged support for nearly 500 placements, including Chrysler Canada, which will hire Connect Canada interns to complete automotive research placements.

“Thanks to Connect Canada, graduate students who do an internship at the University of Windsor-Chrysler Canada Automotive Research and Development Centre (ARDC) will be gaining valuable experience at the forefront of technical innovations that aim to improve quality, cost and the environment,” said Reid Bigland, president and CEO of Chrysler Canada in Windsor, Ont.

AUTO21 Inc., which oversees Canada’s automotive R&D program, will operate Connect Canada with the University of Windsor’s Centre for Career Education.



Fabricated metals is looking at modest profit growth because of rising metal prices.

PHOTO: ISTOCKPHOTO

MORE PRODUCTION AND PROFIT FOR MANUFACTURERS

OTTAWA: The strong Canadian dollar isn’t slowing down some manufacturers too much, particularly those making electrical equipment, fabricated metals products and machinery.

The Spring 2011 edition of the *Canadian Industrial Profile* from the Conference Board of Canada, in association with the Business Development Bank of Canada, says these manufacturers can look forward to continued growth in production and profits this year.

The Ottawa-based think tank says a rebound in construction demand and in the broader manufacturing sector, plus a revival in US, European and Asian export markets will drive their businesses. But on the downside, a strong dollar poses a threat to industries that depend on exports for growth.

Here are some highlights:

- **Electrical equipment.** Profits for products ranging from lighting equipment to electric motors and batteries are expected to more than quadruple to \$223 million this year, but will be well below the pre-recession peak of \$577 million in 2007. The surge in business is attributed to rising non-residential construction activity and strong telecom

investments, which support demand for wiring.

- **Fabricated metals.** Improving prospects in the automotive industry and rising investment in the oil patch is driving double-digit growth in sales, but profits will experience a more modest 6.9% growth to \$1.4 billion in 2011 because of surging metal prices.

- **Machinery manufacturing.** Recovering global demand will boost exports and benefit domestic sales of machinery and equipment, but the strong dollar will also affect the price of Canadian products in global markets. Nevertheless, profits are forecast to rise almost 40% this year to \$920 million, up from just \$261 million three years ago.

- **Textiles and apparel.** After two years of losses, the textiles and apparel industry is expected to post a modest profit of \$13 million in 2011. Production, which grew last year for the first time since 2000, will increase again in 2011.

- **Oil and gas support activity.** Although weak natural gas prices are detracting from growth, high oil prices are encouraging new drilling activity. Industry profits are to increase – from a low of \$45 million in 2009 – to \$225 million in 2011.

PLANT GOES BIG

TORONTO: There are plenty of mergers and acquisitions going on out there and **Canadian PLANT** has been one of them.

We are now part of the Business Information Group (BIG), a leading operator of Canadian trade magazines and industry-focused web sites, which acquired the Industrial Group of trade publications and directories from Rogers Publishing Ltd., part of the Rogers cable, wireless, media and entertainment empire.

The deal includes Canadian Manufacturing.com, Canadian Metalworking, Canadian Packaging, **Canadian PLANT** and **PLANT West**, Design Engineering, Food in Canada, MM&D, Plastics in Canada, Purchasingb2b, the FRASERS Industrial Directory, plus some other properties.

This is a positive change for **PLANT**. BIG has several industrial titles and it cares about publishing magazines. Most importantly, it cares about its brands.

Indeed, as part of the Glacier Media Group in Vancouver, BIG is one of Canada’s largest publishers of business and trade magazines, and has the resources, market coverage and expertise to allow **PLANT** to thrive and continue engaging readers on matters of business and commerce in the world of manufacturing.

Bigger things to come. Stay tuned. **Joe Terrett**

NEW R&D CENTRE FOR UNDERWATER WARFARE

HALIFAX: General Dynamics Canada is accelerating its research and product development efforts in underwater submarine warfare capabilities with a new centre of excellence in Halifax.

The Ottawa-based developer and manufacturer of electronic defence systems said the Underwater Intelligence, Surveillance and Reconnaissance (UW ISR) Centre of Excellence will expand its development of anti-submarine warfare, mine avoidance and mine counter measures as naval fleets around the world establish effective deterrence measures.

The R&D facility will be located close to key Canadian military naval and air bases at General Dynamics Canada’s 46,000 square-foot Halifax facility, built in 2008.

The company said it will leverage its collaborative relationship with Defence Research and Development Canada – Atlantic, a defence research centre with expertise in anti-submarine warfare and mine and torpedo defence systems, and build on a partnership agreement with Marport C-Tech Ltd., a sonar manufacturer based in St. John’s, NL. That 2009 deal involves jointly developing and marketing a suite of next-generation underwater acoustic products to support underwater military ISR missions.

PHOTOWATT LANDS PV SUPPLY GIG FOR ONTARIO MARKET

CAMBRIDGE, Ont.: Photowatt Ontario Inc., a subsidiary of ATS Automation Tooling Systems Inc. will be supplying photovoltaic modules for a solar power company serving the Ontario market.

The supply agreement with Hanwha SolarOne (Qidong) Co. Ltd., a subsidiary of Hanwha SolarOne Co. Ltd., will involve the production of 160 megawatts of Hanwha SolarOne photovoltaic modules for the Ontario marketplace over four years. Photowatt will be using Hanwha SolarOne cells for the modules.

The agreement allows for the potential of both parties to increase volumes by up to another 160 megawatts over the four-year period.

The modules, to be produced at Photowatt’s module facility in the Green Wing of the ATS campus in Cambridge, Ont. will be fully compliant with FIT and Micro FIT Program domestic content requirements.

Shipments are to begin in October.

How To Keep Your Electronics Cool

When hot weather causes the electronics inside a control cabinet to fail, there is a panic to get the machinery up and running again. There are several cooling options out there and it's important to know the facts.

LINE UP OF COOLERS THAT ARE PRONE TO BAD BEHAVIOR



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Refrigerant Panel Air Conditioners

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Heat Exchangers and Heat Pipes

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"Plastic Box" Cooler

37-364 45876219 1653487596321

Opening the panel door and aiming a fan at the circuit boards is a bad idea.

- It is an OSHA violation that presents a shock hazard to personnel
- The fan blows hot, humid, dirty air at the electronics
- The cooling effect is minimal
- It is likely to fail again since the environment is still hot

These coolers are prone to failure in dirty, industrial environments when dust and dirt clogs the filter.

- It takes almost a day to install
- Vibration from machinery causes refrigerant leaks and component failures
- Compressor life expectancy is typically 2.5 years of continuous operation
- It requires a floor drain for the condensation
- Average cost to replace a bad compressor is \$750

These have serious limitations. On hot summer days when the temperatures of the room and inside of the enclosure are about equal, there's not enough difference for effective heat exchange.

- They fail when dust and dirt clogs the filter
- The cooling capacity is limited due to ambient conditions

The "plastic box cooler" from a competitor uses an inaccurate mechanical thermostat that's designed for liquids. This thermostat has a poor ability to react quickly to changes in air temperature. **It costs up to 85% more to operate than EXAIR's ETC Cabinet Cooler® System with the same SCFM rating and Btu/hr. output.**

- Electronics can overheat before it turns on
- It runs far longer than necessary before shutting off
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If you would like to discuss an application, contact an Application Engineer at:

NOVELIS ATTACKS ITS CARBON FOOTPRINT

TORONTO: Novelis Inc. plans to significantly reduce its carbon footprint and help its customers do so as well by expanding the use of recycled aluminum, increasing post-consumer recycling of aluminum products and developing new alloys with high recycled content.

The aluminum rolling and beverage can recycler, with global operations that include five plants in Canada, is committing to producing 80% of its products using recycled content by 2020. It said the use of recycled metals will be increased from 34% to 80%, a change that will remove 10 million tonnes of greenhouse gas emissions from the aluminum product value chain annually.

Novelis's global sustainability commitment is focusing on three areas.

Major expansions of its recycling and remelting capacity around the world will increase



Bales of used cans on their way to a Novelis shredder.

PHOTO: NOVELIS

the amount of recycled content in its raw materials. Recycling uses 95% less energy and produces 95% fewer greenhouse gas emissions. Currently, half of aluminum auto sheet shipped to companies becomes scrap so Novelis is also expanding buyback opportunities to its customers.

Post-consumer recycling will be advanced through R&D in post-consumer recycling

technology, collaborating with stakeholders to expand existing recycling programs and by educating consumers.

And R&D is being accelerated as Novelis collaborates with its customers on next generation aluminum alloys that use more post-consumer recycled metal in products such as electronics.

Novelis operates in 11 countries, and has six Canadian facilities.

MARTINREA AND PARTNER BUY INSOLVENT HONSEL

TORONTO: Martinrea International Inc. partnered with a US investment firm to purchase the assets of insolvent Honsel AG, a Germany-based supplier of aluminum components for the automotive and industrial sectors, for \$179 million.

Honsel has seven global production sites employing approximately 4,000 people, including four in Germany, and one in Spain, Mexico and Brazil, where it manufactures complex aluminum and magnesium products for automotive and industrial markets.

Toronto-based Martinrea, which produces metal parts, assemblies, modules and fluid systems for the automotive sector, said it and US investment firm Anchorage Capital Group LLC was selected by the administrator in the insolvency proceedings to finalize a purchase agreement.

Martinrea will have 55% of the company and Anchorage will own the remaining 45%.

Honsel's state-of-the-art production technologies include high-pressure die-casting, permanent mold and sand casting, extruding and rolling.

Its four major product lines are engine products such as blocks, cylinder heads and oil pans; transmission products, such as housings and control parts; suspension products, such as engine cradles; and body parts, such as front boards and extrusion profiles.

HÉROUX-DEVTEK BUILDS IN MEXICO

LONGUEUIL, Que.: Héroux-Devtek Inc. is building a plant in Mexico to be near Bombardier and other aerospace OEMs.

The aerospace and industrial products company based in Longueuil, Que. is constructing a 47,200 square-foot facility in the Querétaro Aerospace Park in Mexico that will be equipped with state-of-the-art machinery for the production of aerospace components.

Construction is to begin during the second quarter of the year, and Héroux-Devtek said the plant should be ready to produce its first components early in 2012.

This first phase involves a \$20 million investment over the next three years, but the company expects to eventually expand to 150,000 square feet, allowing additional production of landing gear systems.

The plant will produce detailed parts for Bombardier's commercial and business aircraft in line with a contract announced in February, but the company said it will also be providing components to other aerospace OEMs located in the park.

MANITOBA INVESTING \$1M IN ELECTRIC BUSES

WINNIPEG: The Manitoba government is getting into the electric bus business. The province is investing \$1 million in the development of an all-electric transit bus and charging system that it says could be used in cities all over North America.

It's also putting \$100,000 into a new electric-vehicle learning and demonstration centre at Red River College in Winnipeg.

The new Electric Vehicle Technology and Education Centre (EV-TEC) is to be a demonstration site for vehicles and their recharging equipment.

The \$3-million, three-year project brings together Mitsubishi Heavy Industries, Winnipeg-based bus manufacturer New Flyer Industries, Manitoba

Hydro and Red River College. Development of the bus is to be completed in the first year followed by two years of testing, with activities focused at New Flyer Industries' Winnipeg plant and Red River College.

New Flyer brings its expertise in building hybrid and hydrogen fuel-cell buses to the project, Mitsubishi will contribute its advanced lithium-ion battery technologies, Manitoba Hydro will provide grid-management knowledge and Red River College's instructors and students will help solve technological challenges arising from the project.

Manitoba announced its Electric Vehicle Road Map, which involves adopting electric and hybrid vehicles and creating economic opportunities involving electric transportation.

» Careers

Professional Engineers Ontario (PEO), the province's licensing body for professional engineers, has appointed **J. David Adams** its 92nd president. This is a second run for Adams, one of just four engineers since the association's inception in 1922 to be twice elected president. His previous term was 2008-2009. He's president of Maple Leaf Engineering, a consulting firm specializing in lean design and manufacturing, building renewal, wood processing facilities, sawmill and dry kiln design.



J. David Adams

Tom Velan adds CEO to his president title at Velan Inc., a Montreal-based manufacturer of industrial valves. He succeeds his father, **A.K. Velan**, founder and CEO, who has been appointed chairman. Ivan Velan, who previously held the chairman's position, continues on the board and as executive vice-president.

Pierre Cousin has resigned as CEO of Atlantic Wind & Solar. No reason was given for his departure from the Toronto-based renewable energy firm, but **Gilles Trahan**, the company chairman, will replace Cousin as president and CEO.

Newcon International Ltd. has a new president and CEO. **Peter Biro**, previously a partner of WeirFoulds LLP in Toronto, will be leading the Toronto manufacturer of electro-optical products in its next phase of development and expansion.

Luc Langevin has been appointed president and COO of the Cascades Specialty Products Group (SPG), a Kingsey, Que.-based paper products manufacturer. The former plant manager was most recently SPG's general manager of the industrial packaging sector.

David Slomka has resigned his position as a director of Toronto-based OPEL Solar International Inc. for personal reasons. His replacement is currently being sought. The company designs, manufactures and markets high-concentration photovoltaic panels and dual- and single-axis trackers for related CPV and PV systems. Its US company, ODIS Inc., designs III-V semiconductor devices for military, industrial and commercial applications.

John Wright, chairman of Calgary energy company PetroBakken Energy Ltd., is assuming the role of president and CEO. **Gregg Smith** continues as COO. Wright will resign as chairman but will continue to serve as a board member. **Kenneth McKinnon** will assume the chairman's position.

» Events

Troubleshooting PLCs Business Industrial Network
July 19-21, Atlanta

A maintenance and engineering training seminar covering PLC basics to troubleshooting and programming. Visit www.bin95.com.

Richlu Manufacturing Best Practices Tour Innovation Insights
Aug. 20, Winnipeg

A tour of Richlu Manufacturing, a manufacturer of durable work wear, makes continuous improvement part of its culture. Presented by Canadian Manufacturers & Exporters (CME) and the National Research Council - Industrial Research Assistance Program (NRC-IRAP). Visit www.tvp-ii.org.

MainTrain Edmonton 2011 PEMAC
Sept. 19-21, Edmonton

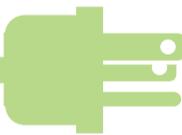
The western maintenance, reliability and asset management conference hosted by the Plant Engineering and Maintenance Association of Canada (PEMAC). Learn global best practices. Visit www.pemac.org.

Canadian Manufacturing Technology Show 2011 SME
Oct. 17- 20, Toronto

CMTS (the Canadian Manufacturing Technology Show) features live demonstrations of the latest machine tools, automation technologies and production methods. Presented by the Society of Manufacturing Engineers (SME). Visit www.sme.org.



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- Energy-efficient lighting
- Shifting energy use
- Equipment upgrades
- Energy audits

» Labour

SKILLED IMMIGRANTS BOOST PLANTS' FORTUNES

TORONTO: The results of a recent survey in the Greater Toronto Area (GTA) shows there are benefits to hiring skilled immigrants for manufacturers that do business abroad.

Toronto Region Immigrant Employment Council (TRIEC), which advocates better integration of skilled immigrants into the local labour market, engaged research company EKOS to ask 461 Toronto area companies, mostly small and medium enterprises from a range of sectors, about their employment practices.

The results show 20% of GTA employers hired skilled immigrants to help expand globally and locally. Of these, 93% feel the skilled immigrants hired have been effective doing so globally and 83% locally.

One in 10 have hired a skilled immigrant because they discovered that competitors were benefiting from hiring skilled immigrants. Of those employers, 81% feel those hired have been effective.

Phoenix Geophysics Ltd., a geophysical manufacturing and contracting company in Toronto that exports to more than 80 countries, does more than half its business in China and about 20% in Russia. It hires "market makers" who can help the company open up new opportunities in their home countries. The company has 51 employees from 20 countries who speak 15 languages.

Almost all (99%) of Toronto-based George Kelk Corp.'s sensor sales to steel rolling mills are international. More than 80% of its employees are immigrants, hired in engineering, technology and sales roles. The Toronto employer says customers can call and expect to speak to someone who knows their language.

Thales Canada makes what it calls "brains for trains" technology that allows trains to run without operators. With 90% of its business in the global marketplace, Toronto-based Thales systematically targets and cultivates internationally trained professionals.

Samtack, a computer manufacturing and distribution company in Markham, Ont., has a 100-person workforce, more than 90% of which are immigrants. It has leveraged this talent to respond to the changing needs of mass merchant customers; to increase market share with smaller, local and diverse retailers; and to purchase parts from overseas suppliers, mainly from China.

Close to 40% of the businesses surveyed had more than 100 employees, 30% between one and four; and close to 30% between five and 100.

PLANT PULSE

ECONOMIC DEVELOPMENTS AND TRENDS

Demand revs up for heavy trucks

The Japanese earthquake and tsunami continue to impact the automobile industry and the global economy, but demand for heavy trucks is driving up production in North America, according to the latest Global Auto Report by Scotia Economics.

The report shows global vehicle sales softening in May, with purchases roughly unchanged from a year ago – a significant slowdown from a 6% increase during the previous four months. A downturn in global output resulting from the disasters in Japan further dampened sales. US sales slumped to an annualized 12 million units, compared to 13 million units during the previous four months.

Vehicle sales also weakened in Canada last month, with volumes slumping to an annualized 1.4 million units from an average of 1.67 million in March and April. Japanese automakers accounted for most of the decline.

Scotia Economics notes the slowdown is temporary, and it has raised third-quarter production to 18% above a year earlier. It says Canadian plants will benefit most from higher output in the July-September period, with production expected to jump 21% year over year, compared to only 3% in the first half of the year.

Meanwhile, heavy trucks are in great demand across North America since bottoming out in early 2010, with production recently climbing to a four-year high. The report says further gains are ahead as the trucking industry heads into its replacement cycle. Despite slower economic growth in the US, the North American trucking market can expect to see further double-digit gains next year.

The three largest global heavy truck manufacturers now expect to produce roughly 300,000 vehicles in North America this year – a level more in line with output over the past decade, and up from only 202,000 in 2010. However, demand is outstripping supply, lifting the industry's order backlog to its highest level since late 2006.

"The sharp increase in heavy truck assemblies reflects a rush of new orders placed by fleet owners attempting to respond to rising freight demand by upgrading and increasing the size of their vehicle fleet," said Carlos Gomes, senior economist and auto industry specialist at Scotia Economics. "This represents a sharp reversal from recent years, when the trucking industry underwent a sharp downturn with more than 6,000 trucking companies – mainly smaller carriers – going bankrupt during the 2007-2009 global economic downturn."

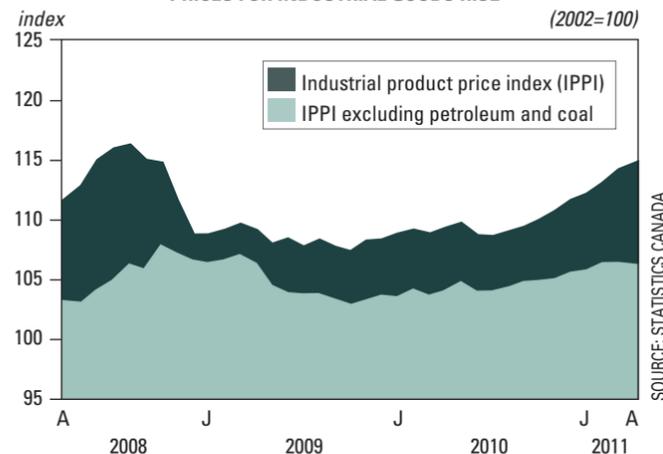
He says the industry's rationalization is estimated to have reduced North American trucking capacity by roughly 13%.

Now heavy truck manufacturers are adding capacity across North America, including Paccar Du Canada Ltee, which has ramped up assembly at its Sainte-Thérèse, Que. plant to more than 600 units per month from 470 last year.

And Navistar will decide by the summer whether it will re-open its heavy-duty truck plant in Chatham, Ont. Production at the facility ceased in June 2009 in the midst of slumping demand for commercial trucks.

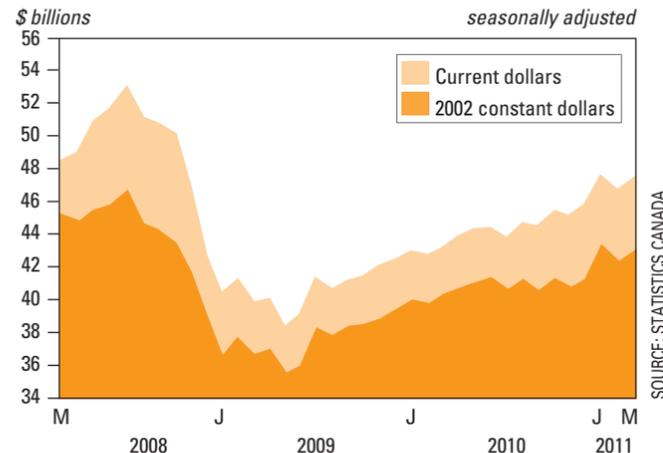
The report notes Canadian heavy truck output has dropped from 74,000 units in 2006, to only 5,600 vehicles in 2010, giving Canada just 2% of North American heavy truck assemblies, down from 10% in 2008.

PRICES FOR INDUSTRIAL GOODS RISE



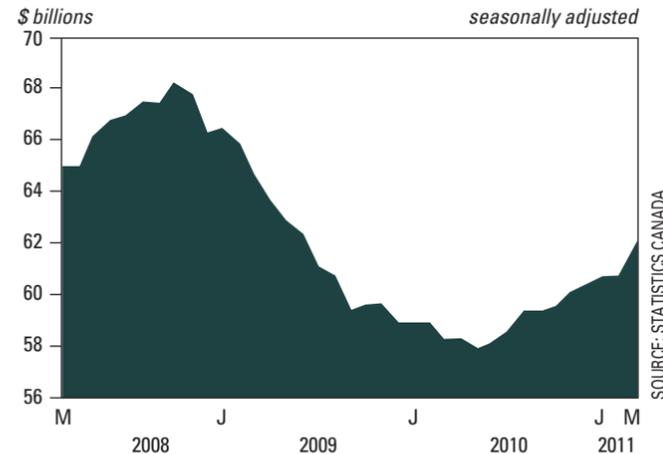
April's Industrial Product Price Index (IPPI) increased 0.5% from March, driven by a 4.2% rise in prices for petroleum and coal products, and a 1.9% increase in primary metals. Other contributors were chemicals (0.7%) and meat, fish and dairy products (0.6%). Prices for motor vehicles and other transport equipment declined 1%, largely as a result of a 1.9 cent increase in the loonie's value in relation to the US dollar.

MANUFACTURING SALES ARE UP



March manufacturing sales were up 1.9% to \$47.5 billion, for a Q1 increase of 4% over the same period in 2010. Sales for the quarter were the highest since Q3 of 2008. Aerospace, parts included, saw a 20.6% rise, while machinery increased 4.2% and automotive followed with a gain of 4.1%. Paper (4%), food (0.8%), furniture (5.7%) and computers and electronics (3.9%) added to the advance.

INVENTORY LEVELS INCREASE



Fifteen of 21 industries posted higher inventory levels in March for a sixth monthly increase of 2.1% to \$62 billion. Much of the increase (21.3%) came from petroleum and coal products, with higher volumes of raw materials and finished product inventories reported by some refineries. The inventory to sales ratio was unchanged for the month at 1.3. The ratio has been in a gradual decline over the past year.

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Facing off with the slap-shot robot built by Team Hockey Robotics at the University of Waterloo are (L-R): Prof. John McPhee, J.S. Rancourt, Tristan Lehari, Matthew Hanselman and Chris Goodine.

PHOTOS: STEPHEN UHRANEY

ROBOT stick-handler

TECHNOLOGY SEEKS A SOLUTION FOR COMPOSITE FRACTURES AND WEAK SPOTS

Engineering students at the University of Waterloo and their prof have developed a robot that replicates the perfect slapshot to test composite hockey sticks for fractures and breaking points

BY MATT POWELL

A group of University of Waterloo engineering students are using a robot they developed that accurately mimics a slap-shot to uncover the mystery behind the constant breaking of composite hockey sticks.

The project started five years ago when engineering professor John McPhee realized a robot could test hockey sticks the same way golf manufacturers test golf clubs.

“Professor McPhee realized there was a pretty significant issue with stick breakage, especially surrounding these new composite sticks four or five years ago,” says Jean-Samuel Rancourt, 22, a mechanical engineering student at the Waterloo, Ont. university and the business brain of the operation. “He had worked with golf companies before and thought ‘why not use the same technology?’”

You won’t find many wooden hockey sticks today. Now they’re made of composite materials such as graphite, glass

and Kevlar that are layered according to desired stiffness (most have 15 layers) and held together with a resin. These sticks are much lighter than wood ones and generate more power, allowing players to shoot a puck harder, but durability is a major issue. It’s common for NHL players to snap sticks in two after winding up for a one-timer or taking a slash from an opposing player.

The Waterloo engineering students estimate that college and professional hockey players go through 24 to 36 sticks a year. At about \$250 a pop, teams are spending thousands of dollars a year per player to replace them.

To solve the problem, the team at Hockey Robotics, a start-up of five mechanical and mechatronics engineering students, developed the SlapshotXT

with the help of \$100,000 in funding from private and federal government sources. This prototype generates enough power to shoot a puck at 110 miles per hour.

But what differentiates this robot from its golf counterparts are the two synchronized arms that replicate the perfect slap-shot.

“It was fairly tricky to coordinate the arms because if they weren’t perfectly synched, they’d go in opposite directions,” says McPhee.

The robot is a lefty, so the arm drives the motion and does most of the work, while the right arm is synchronized to follow the trajectory of what the left arm should be doing. Six-axis adjustability properly simulates shots in different scenarios and the robot also adjusts the lie angle of the stick’s blade.

NHL All Star

A brushless DC servomotor (generating about four horsepower, driving at a continuous rate of 12 amps) powers a sophisticated gear, sprocket and belt system and communicates with a real-time controller that sends data to a National Instruments LabView application software suite that generates the motion profile.

“The robot has topped out at 60 miles per hour right now, but it’s because the battery requires 240 volts, and we’ve only been able to test with 120 volts,” says Rancourt. “Our goal is to eventually break the NHL record.”

That’s currently held by Boston Bruins defenceman Zdeno Chara, who fired a 105.9 miles per hour shot at this year’s NHL all-star game.

The robot’s body is made of steel framing with aluminum arms to simulate the average body weight of a grown man while minimizing the weight from the machine’s central axis.

The team employed a number of local Waterloo machines shops and metal manufacturers for the parts and sub-assemblies, including Dun Rite Manufacturing Ltd., J.A. Machining and AHBM Systems.

Initial testing procedures were similar to those used by video game companies.

The team used OptoTrak technology to create 3D images and gathered data that explains necessary movements, how energy was being dispersed and the amount of torque the mechanism would need to make testing as realistic as possible.

Shooters were outfitted with motion markers tracked by the system’s OptoTrak motion capture cameras (in some cases, as many as 12 were used) to replicate realistic human movement.

With the prototype complete and initial testing underway, the team is already thinking about potential upgrades, which

Continued on page 10

Improving performance

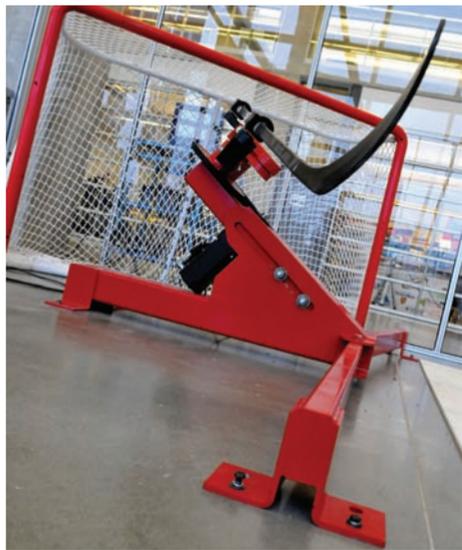
Continued from page 9

will be easy to go after, says Tristan Lehari, 22, who is the project's mechanical structure and design lead. "The robot is built on a number of sub-assemblies so taking it apart to make the upgrade won't be overly difficult."

Going forward, the team is looking to place sensors along the length of a hockey stick and use the SlapshotXT to identify its weakest areas.

"We'll be able to identify where the most stress is, where the stress fractures are and where the sticks are breaking," says Chris Goodine, 22, who is the electrical and data acquisition lead.

Much effort has gone into making sticks light, so the team also plans to coat them in a nanomaterial that would make them stronger.



SlapshotXT robot winds up for a 60 mph shot.

The company is also in the midst of developing a "Stick Impactor" that will replicate surface damage sustained during play, and compare the true durability of materials, design and construction.

"We're noticing a new stick right out of the box probably won't break after a few slashes," says Goodine. "But these lighter sticks are becoming increasingly prone to micro-fractures or weak spots that can severely affect performance."

The team believes it has found a way to fill a void since there are no testing procedures like the SlapshotXT available to hockey stick manufacturers.

Hockey Robotics plans to commercialize its research in July by offering to sell the test data to the world's 40 or so stick makers.

"Our idea is to fill that niche," says McPhee. "This could truly revolutionize the way sticks are manufactured and designed."

If he is correct, the fledging robotics company will have scored a big win for Canadian innovation and the world of hockey.

Matt Powell is an online reporter with CanadianManufacturing.com. E-mail MPowell@canadianmanufacturing.com.

Comments? E-mail JTerrett@plant.ca.

» Safety

KEVLAR for canines

Jim Slater realized something needed to change after a violent prison riot about 15 years ago. He and Olaf, his police service dog, were the first to enter the riot with SWAT officers. But Olaf was the only one on the law enforcement side without sufficient protection.

"All the officers were heavily protected but the dogs weren't at all," says Slater. "I realized protecting these animals was incredibly important too."

So, in 1998 he founded K9 Storm Inc., Canada's first manufacturer and distributor of protective equipment for police service dogs. The Winnipeg-based company sells its custom Kevlar dog-sized vests to some of Canada's leading police and security agencies, including the Canadian Coast Guard and the Royal Canadian Mounted Police (RCMP).

The company also manufactures vests for dogs at 15 agencies around the world, such as the Rotterdam Hodebrigade and Swiss Army. Materials are sourced from Canadian suppliers and the vests are fab-

WINNIPEG FIRM MAKES PROTECTIVE VESTS FOR POLICE DOGS



On the hunt wearing a waterproof tactical vest.

PHOTO: K9 STORM INC.

ricated at K9 Storm's Winnipeg facility.

"We don't believe in outsourcing anything," he says. "To secure contracts, we need to be in complete control of what we make down to the number of stitches and the quality of each design. Every vest is slightly different and needs to

meet specific mission requirements."

Slater says the company uses a customized sizing template to ensure each vest fits its canine client perfectly for top performance.

Its Aerial Insertion Vest integrates a patented load-bearing harness system

» Automotive

Driving in the NANO LANE

NANOCOMPOSITE R&D EXPLORES LIGHTER AND GREENER MATERIALS

BY HANI NAGUIB

The automotive industry is being challenged to deliver high quality, cost-effective – and with escalating gasoline prices – more fuel-efficient vehicles that use lighter materials, while at the same time maintaining the high performance levels drivers expect.

More than ever before, there is also a pressing need to improve automotive recyclability and reduce the energy used in production processes. With the European Union mandating recycling standards in consumer products – including automobiles – manufacturers are looking for cost effective, recyclable materials, such as plastic nanocomposites with enhanced mechanical, impact, barrier and heat resistant properties. With ultra-fine phase dimensions, typically a few nanometres, they can be tailored to possess unique properties.

To get a sense of just how miniscule the nano-world is, chitin (a polymer found in insects, crustaceans and plants) has nanowhiskers with a 14-nanometre diameter, which is approximately 10,000 times smaller than a

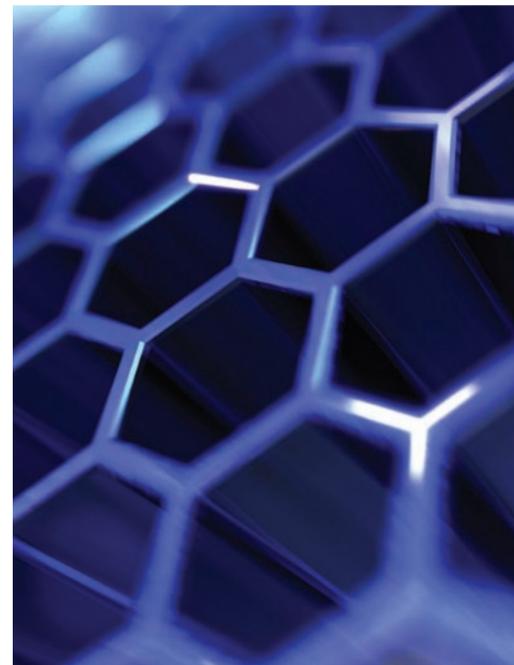
human hair.

Plastic nanocomposites would be alternatives to traditional short-fibre composites such as e-glass and carbon black filled plastics found in the interior trim of an automobile. They impart equal or better mechanical, thermal and electrical properties while using significantly less material. For example, a nanocomposite that's 5% carbon nanotubes improves tensile strength by 40%.

Mechanically, these materials provide excellent vibration damping and impact protection. Since less polymer is used there's less material to recycle or dispose of, and less energy is used to produce a part or component.

The polymer polylactide acid that comes from starch-based plants such as corn is compostable.

Because nanocomposites are thermoplastic, they have very little filler (less than 10%), which makes them attractive for recycling (a potential end use is commodity feed stocks for the construction industry). These materials are also compostable and if the infrastructure exists, they could be converted to smaller mol-



Nano composites can be tailored to possess unique qualities.

PHOTO: ISTOCKPHOTO

ecules and consumed by micro-organisms. Thermally, porous polymer nanocomposites increase stability and the insulation properties of automotive interior panels. Electrically, nanoparticles such as carbon nanotubes enhance electrostatic charge dissipation and electromagnetic shielding. Acoustically, the sound absorption is enhanced at various frequencies for a quieter driving experience.

And when it's possible to mass-produce these materials many other potentially innovative industrial applications will follow in environmental, transportation, construction and other sectors.

Researchers at the University of Toronto, the University of Ontario Institute of Technology, the University of Calgary, and Concordia University are working together through the

rated to 2,500 pounds that allows service dogs to rappel from helicopters, drop into holes and underground tunnels and parachute.

Tools include infrared tracking "Viper-lights" that are visible up to five miles away in the dark and are waterproof down to 300 feet.

The New York Times reports the US Navy SEALs bought four waterproof tactical vests in a deal worth \$86,000 last year. The vests included infrared and night-vision cameras so handlers could see what the dogs were doing up to 1,000 feet away.

Multiple reports suggest dogs used by the SEAL team in the raid on Osama Bin Laden's compound in Pakistan were outfitted in these vests.

And Discovery News recently reported Navy SEAL Mike Forsythe and his dog Cara (wearing a K9 Storm vest) broke the record for man/canine parachute jumping after falling from 30,100 feet.



AUTO21 Network of Centres of Excellence to address these needs. They're partnered with Magna Inc., Nova Chemicals Inc. and Dupont to develop new material that will yield high strength and impact-to-weight ratio components could significantly reduce the number of casualties sustained in crashes. And by reducing the environmental impact of vehicles, materials and manufacturing (which minimizes fuel consumption) the Canadian automotive industry will meet the EU's legislated recycling requirements, thus opening up new markets.

Hani Naguib, University of Toronto, leads the AUTO21 project "Manufacturing and Characterization of Recyclable, Lightweight Polymeric Nanocomposites for Automotive Applications." Visit www.auto21.ca.

Comments? E-mail JTterrett@plant.ca.

» Flow power

MIT DEVELOPS A NEW BATTERY THAT GIVES EV TECH A JOLT

Lowers the cost and improves recharging efficiency

Researchers at the Massachusetts Institute of Technology (MIT) in Cambridge, Mass. have developed a lightweight and inexpensive alternative to existing electric vehicle (EV) batteries that could potentially make refuelling as quick and easy as filling up with gasoline.

The new battery relies on a semi-solid flow cell architecture that involves positive and negative electrodes (cathodes and anodes) composed of solid particles suspended in a liquid electrolyte carrier and pumped through systems separated by a filter.

In a conventional battery, storing and discharging energy takes place in the same structure. The MIT battery separates these functions making the discharge of energy more efficient, while reducing the size and cost of a complete battery system, including all of its structural support and connectors, by half. Researchers say such a reduction would be

key to making electric vehicles fully competitive with conventional gas- or diesel-powered vehicles.

Refuelling would conceivably be as simple as pumping out the depleted slurry and adding a fresh replacement, or by swapping out the tanks, while also having the option of recharging the existing material when time permits.

The battery system could also be scaled up to very large sizes at low cost for large-scale electricity storage, potentially making intermittent, unpredictable sources such as wind and solar energy practical for powering the grid.



Lab version of the new MIT flow battery. PHOTO: DOMINICK REUTER

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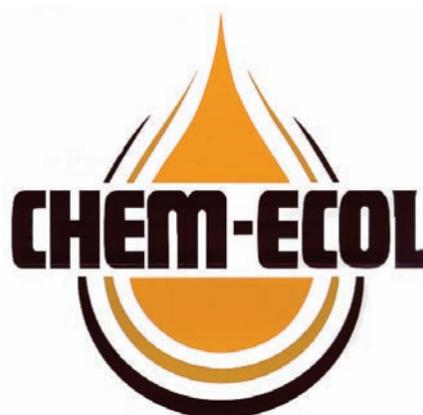
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PIPE dreaming



Multiple copper coils wrapped around an inner copper pipe recycle heat from outgoing hot water to preheat incoming cold water. PHOTO: RENEWABILITY

RENEWABILITY TAPS ENERGY FROM DRAIN WATER

When France gave RenewABILITY Energy its green cred, the Canadian manufacturer gained a foothold in a hot European market for energy-efficient certified buildings

BY KIM LAUDRUM

A simple but brilliant device made in Waterloo, Ont. called the Power Pipe reduces water-heating costs for the typical home by 35%, according to Natural Resources Canada (NRCan). That amounts to a big chunk of change.

Not only does RenewABILITY Energy Inc.'s Power Pipe reduce home energy costs for existing and new single-family homes, it also installs in multi-unit residential, commercial, industrial, and institutional buildings, although residential construction accounts for much of the company's business.

And if recent approvals of the product's green cred are any indication, that market is about to explode in Europe. France is the first country to grant Power Pipe full Title V System approval, meaning the product actually makes existing buildings and homes 5% to 10% more energy efficient.

In many European countries, it's necessary to demonstrate a home or building meets strict energy performance targets before a building and occupancy permit is granted. Contractors look for Title-V-approved building supplies to meet France's mandatory regulation for energy efficiency in new construction. The Power Pipe drain-water heat recovery (DWHR) system, says RenewABILITY, is the only such drain-water heating system so recognized to date.

"There are a lot of Fortune 500 companies that have tried and tried to get this [Title V certification] but haven't been able to," says Gerald Van Decker, CEO of RenewABILITY Energy. He credits his distributor in France, Solénove Énergie, for persevering through the various stages of the French application process.

Solénove Énergie is also RenewABILITY's sole distributor in Quebec, the only region of North America not represented by the manufacturer. The Power Pipe is UL listed in Canada and the US with independent third-party bodies at the University of Waterloo and NRCan having vetted its energy savings claims. In fact, the federal government's new housing

programs allow credits to be claimed for DWHR systems if they meet certain criteria, and some of Power Pipe's systems are on the list of approved products.

The ecoENERGY Retrofit for Homes program provides grants for eligible DWHR systems, and a number of Power Pipe systems are on the eligibility list.

DWHR systems can contribute to a house meeting the performance requirements for R2000 homes and Energuide ratings. Some provinces also provide rebate and incentive programs for installing systems like the Power Pipe.

Momentum is certainly building in Canada and the US, says Van Decker from the Waterloo plant that currently employs 20 people. That's thanks in part to programs delivered by Union Gas, Enbridge and Minnesota Power in the US that provide rebates to encourage new construction home builders to install equipment that will reduce water heating costs.

Water heating accounts for 20% of total home energy costs, the second-most costly energy demand in residences, exceeded only by space heating.

"Water heating has largely been overlooked until now. Even more, the huge energy resource in the outgoing drain water has been largely overlooked in some countries," says Van Decker. "The

Power-Pipe can save up to one tonne or more of CO2 emissions per home and much more in buildings."

Recovering heat

The Power Pipe recovers heat from outgoing warm or hot drain water to heat incoming cold fresh water. In other words, it recycles heat that would otherwise go down the drain.

The patent-pending device is made of an inner copper pipe wrapped by multiple copper coils. It becomes part of the existing drainage plumbing, usually located in the basement. Installation involves cutting into the existing drain pipe and using the supply connectors. The coils become part of the freshwater supply line by diverting water into the power pipe.

As the hot water drains, a thin film of falling water clings to the sides of the pipe and transfers energy from the outgoing warm or hot water into the copper pipe. This heats the temperature of the incoming cold water by 10 to 20 degrees C.

The system works with a heater or a solar water heater in the home.

The Power Pipe, available online through Home Depot and Sears, are priced for residential use between \$460 and \$1,035. The company suggests the return on investment ranges from 15% to

50% per year.

Van Drecker says the potential for energy and cost savings is enormous in industrial applications because of the large volume of heated fluids consumed. The Power Pipe recovers up to 70% of waste fluid heat and uses it to preheat fluids before they enter a primary water heater. Typical payback in industry is between two months and two years.

Industrial applications include pulp and paper; brewing; parts washing; food processing; dairy production; textiles; meat packing; baking; and automotive manufacturing. Indeed, the system can be used for any application where a substantial quantity of hot fluid is disposed of, and with a special coating for hostile and corrosive environments. The Power Pipe scales up to large or down to small plants and because it's a passive system with no moving parts, it requires little to no maintenance.

Would a certification similar to France's Title V be a good idea here in Canada?

"The system for applying for an energy rating is mixed up here in Canada. We should mimic what they do in France where they use an indexing system and a totally independent body," Van Decker says. His preference would be to have products such as Power Pipe receive a stamp of approval, similar to the Energy Star ratings system, mainly because incentives and rebates are temporary.

"It's not about incentives. It's not about money," says Van Decker. It's about being officially recognized for the energy savings.

Kim Laudrum is a Toronto-based writer and editor specializing in sustainability issues. E-mail klaudrum@rogers.com.

Comments? E-mail JTerrett@plant.ca.

» Green Manufacturing

GREEN YOUR SUPPLY CHAIN

BY BRETT WILLS

When seeking cost savings from environmental initiatives, focus on areas that have the greatest impact and one of these is the supply chain. That's where your company is linked to extraction, processing or assembly and transportation of raw materials. Here are some suggestions for greening the supply chain:

1. Leverage learning. Organize monthly/quarterly meetings with suppliers to facilitate the sharing of best green practices. Suppliers will learn from each other, leverage resources and accelerate the reduction of their own footprints. Even small reductions from each supplier add up to significant savings.

2. Source locally. Foreign suppliers pick up a lot of contracts because many purchasing decisions are based mostly on price. Looking at total cost may reveal that local suppliers are actually more economical. Look at inventory carrying costs, material management requirements,

warranty and repair costs. Buying locally also supports the local economy and strengthens brand reputation.

3. Reduce packaging. Much waste is generated from unnecessary packaging. It generates greenhouse gas emissions and adds to the overall cost of the materials. Look for ways to eliminate packaging, transition to re-usable packaging or redesign to use less material. Reducing the thickness of cardboard, for instance, is not a huge change but significant savings quickly add up.

4. Optimize material consumption. There is a huge amount of energy and carbon embedded in a material by the time it arrives at a dock door. Reducing material consumption by even 2% will have a greater impact on your carbon footprint than reducing energy consumption by 20%. Ensure only the required amount of materials are being used and work with suppliers to meet specifications with less.

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.

Conveyor provides lift-off for F35 FIGHTER

FASTPLANT SPEEDS UP PRODUCTION AT A LOCKHEED MARTIN PLANT

BY ERIC HUTCHENREUTHER

Imagine you've just started ramping up your newly remodelled assembly plant when news comes that a current product has been cut 30% and another, completely different version needs to be accommodated. Scenarios like this are common in the automotive industry, and Dürr's FASTplant conveyor was originally conceived to help automotive OEM's cope with changing production demands. However, this reconfigurable material handling system that's independent of the building layout is also adaptable for use in the aerospace industry.

During WWII, Lockheed Martin Aeronautics Co. used ideas from the automotive industry to transform the nature of aircraft production. It continues to do so today with its F-35 Joint Strike Fighter aircraft program at its facility in Fort Worth, Tex. An increased emphasis on cost reduction has Lockheed Martin's production engineers taking a renewed interest in using conveyors to optimize material flow through the assembly process. They decided on an overhead conveyor system for transporting partially completed wings between assem-

bly stations in the plant that has been in a constant state of remodelling since it was built nearly 70 years ago.

FASTplant didn't need a lot of infrastructure thanks to its scalability, adaptability to product and process changes, and its TTS belt drive system.

Designed for modularity, FASTplant's layout can be changed easily because of a standardized interface between components. If Lockheed decides at some point to add more work cells or reconfigure the existing process flow, it's a simple matter of moving the existing modules, or adding new ones. Field checks and as-built aren't needed to understand the interface between old and new equipment.

Modular layout

The concept applies on a smaller scale as well. Rather than designing a different detail for every application, there are few unique parts. Although features not used in every application do add some costs, there are also economies of scale and the time spent tracking individual parts is reduced.

There's only one PLC and main control cabinet, but each module is a discrete unit rather than a set of components

and programming is broken into blocks (called tech schemes) for each one. When a new module is added, the tech scheme is pasted into the program and the system is ready to run. Rather than running a cable to each module from the main control panel, the units daisy chain into the adjacent modules. Each motor's VFD and built-in IO for the switches that detect the carrier's position are linked via a Profibus network.

Basic control functionality comes with a pendant for all modules, but more advanced functions are handled through the HMI, and Dürr's EcoScreen software provides intuitive status display and control. As it would for a typical automotive application, the PLC coordinates the synchronous indexing of multiple cells. Carrier speed is fully programmable with ramp-up and ramp-down functions for smooth acceleration and deceleration in the cells where the carrier stops.

In aerospace, takt times (time allowed for each step in an assembly line) are comparatively slower than other types of manufacturing. The old line of reasoning was, give priority to accessibility rather than moving rapidly because of the enormous amount of work that must



be accomplished before a work piece is ready to move to the next station.

Traditionally, transportation of parts was done with a crane or tow dolly along the main pedestrian aisle. Such moves are time consuming and cumbersome, often involving moving crew, spotters and specialized equipment, all of which must be scheduled in advance. Beforehand, any workbenches or toolboxes that need to be reconfigured would be moved to clear the path. But as production rates increase and the impact of pulsing the line becomes more significant, the conveyor needs to be more adaptable.

In other types of manufacturing, cycle times at each assembly station are so short it can be dangerous to walk or drive across the path of the moving product. Since dedicated moving space must be allotted, equipment that occupies part of the floor, or even partly blocks access, may still be acceptable if it simplifies the non-value added task of moving parts in and out. It's possible to mount the conveyor in a pit so workers can walk around the part, but installation costs are quite high. In more cases the part must be mounted on a turntable so all sides can be accessed without stepping across the conveyor.

An overhead conveyor increases accessibility from the floor level, but when the roof has to support a material handling system, the structure of the building must be oversized to handle the weight of the conveyor, plus the hardware.

Roof trusses in auto plants are very heavy with short spans and if any type of modifications were made, it's likely there's an uncharted combination of old and new header steel and partially cut-out or still-live utilities. Though early plants were often fitted with skylights, the light is usually completely obliterated from the floor level.

Aerospace plants with their high clearances for tall assemblies and long spans between building columns would be particularly susceptible to the shortcomings of a roof-supported overhead conveyor. Moreover, it would be hard to give up the versatility of a house crane for moves that can't be accomplished across the floor.

FORKLIFTS MADE FOR NUKE CLEAN-UP

Rush-produced for use at Fukushima Daiichi power plant in Japan

Mitsubishi Forklift Trucks in Houston has developed two special heavy duty forklifts with radiation-shielded cabins to handle contaminated rubble at the Fukushima Daiichi Nuclear Power Station following the March 11 earthquake and tsunami in Japan.

The forklift (weighing 30 tons) is based on Mitsubishi's 15-ton unit and was developed, then manufactured in one month and features a sealed cabin made with 100 millimetre-thick steel plates and 230-millimetre lead glass. All sides are welded to provide maximum shielding.

Special filters remove dust and other radiation-contaminated material and the air-conditioned cabin is pressurized by air purifier to prevent the intrusion of external air.

The 7.3 x 2.5 x 3.9 metre vehicles have a load capacity of 9,000 kilograms and come with hinged forks, bucket, box clamp and pivoting fork that will efficiently transfer low-level radioactive waste into transfer containers.

The first of two units was delivered in the first week of May followed by the second later in the month to a joint venture involving Taisei Corp., Kajima Corp. and Shimizu Corp. that was handling the clean-up.

Because of the project's urgency, MHI says it has not worked out a cost for the trucks yet.



Mitsubishi's radian-shielded forklifts shipped to Japan for work at the Fukushima Daiichi Nuclear Power Station.

PHOTO: MITSUBISHI

Mitsubishi Heavy Industries Ltd. (MHI) is the parent company of Mitsubishi Forklift Trucks. Its forklifts are manufactured and distributed by Mitsubishi Caterpillar Forklift America Inc. www.mit-lift.com



FASTplant provides a compromise between floor and overhead conveyor systems. Most of the equipment for transport and utility supply is supported by its own columns and out of the way of floor-based operations. Other than the area directly under the conveyor, the building crane has access to the entire floor. If that's a problem, special "C" shaped load bars handle loads directly under the conveyor track.

Lockheed chose Dürr's Twin Trolley System (TTS) conveyor for several reasons. Other conveyor types use hardened steel rollers in hot rolled steel beams or channels. TTS has polymer wheels on extruded aluminum track that smooth and quiet motion. Tapered steel wheels on typical conveyors constantly rub the track, causing paint, mill scale and rust to rub off and fall into the work area. Catch pans may be a necessary countermeasure to reduce foreign object damage (FOD). The TTS conveyor doesn't require such protections.

No utilities needed

While it's possible to provide electrical contacts to power the moving carrier, Lockheed did not require any utilities. The TTS drives the carriers via timing belts mounted above the track. Belts are spaced so there's always one of the two spring loaded drive dogs in contact with a belt along any point on the line. This drive system is forgiving enough that slight differences in speeds and tooth synchronizations don't cause any noticeable effect as trolleys get handed off from one belt to the next.

The TTS bearings are sealed and maintenance free, and the belt drive doesn't wear out as quickly as a friction wheel or chain drive. Friction wheels are very sensitive to tension adjustment; too much tension and the wheel breaks down internally, too little and the contact surface rubs away. Chains have to be checked for correct tension and lubrication, and if something breaks it's a big job to get them running again. On TTS conveyors, belt replacement is a simple but rarely needed.

In other applications Dürr has provid-

A partially completed F-35 wing moving to an assembly station. PHOTO: DÜRR

ed FASTplant systems with an electrified monorail system (EMS) conveyor. Electrified monorail also uses an extruded aluminum track, but positions a motor on each carrier. This set-up offers economic and operational benefits for systems with a relatively low count of carriers per length of track.

As the motor requires power, there's some added complexity delivering power to the carrier. On newer systems, Dürr has steered toward inductive power transfer because of the reduced need for maintenance. Typically communication is always through inductive pickup even in cases where the power is delivered via bus bar.

In addition to providing access for the house crane, some parts of the F-35 wing assembly line were adapted to provide a smaller crane that covers each assembly station. The runways mount directly on the top of the structure and steel that supports the conveyor is low enough for the empty crane hook to pass over, allowing the crane to be used on either side of the workstation. In places where the line runs parallel to itself, a small bridge lets one crane move across to the other part of line as a backup.

Reducing or increasing production in an assembly plant on short notice presents a complex challenge. Lockheed's engineers, not wanting a lot of infrastructure commitment, now use Dürr's FASTplant system to reconfigure the existing process flow by either moving existing modules or adding new ones when necessary. Scalability and adaptability to product and process changes makes this system a good fit for Lockheed.

Eric Hutchenreuther is an application engineer for the Aircraft and Technology Systems business unit at Dürr Systems Inc., a manufacturer of paint and assembly systems. The Dürr Group, based in Germany, manufactures equipment for all aspects of production processes. Visit www.durr.com.

» Think Lean

TURN STRATEGY INTO ACTION

Tools that ensure execution and engagement

BY RICHARD KUNST

Many manufacturers invest significant resources in the development of a strategic plan but fail at execution and employee engagement. Here are some tools that will help you win on both counts.

- **The five-year forward view.** Our proprietary STEP diagnostic helps a company map its journey based on data (KPIs) and the kind of enablers needed to meet the numbers. A great by-product of this tool is the ability to define attributes behind definitions, and it quickly breaks big goals into mini accomplishments that are easily measured.

- **This year's plan.** The X-Matrix does so much and it's all on a single piece of paper. It helps you align projects to strategic initiatives and to see your resource load, it contains a mini plan and ultimately aligns everything to your KPIs to ensure the intended results are delivered.

- **This month.** A3 methodology seems to be getting a lot of attention within the lean community. It's a one-page summary of the project's status or problem solving. This does not mitigate the need for more robust tools, but it does help the reviewer see all of your work.

An effective A3 should live for a maximum of one month before being refreshed.

- **What are you doing for me today?** Lean practitioners love the power of daily reports.

This is one of the best ROI lean tools, where productivity improvements of 30% are typical without the deployment of other tools. Why? People like communication and they like to know their targets for the day.

- **Leader standard work (LSW).** Many organizations shun this tool and rely on people to be responsible and complete tasks in a timely manner. Taking the time to develop cadence through LSW improves flow. This allows you to see tasks are being completed on time, or offer assistance as required.

- **Visual standard work instructions.** Now that we know what we want done, how do we do it? Pictures explain from the very basic to the most complex and once mastered, they're completed within minutes. An example: how to keep your meeting room clean and organized.

- **Weekly de-brief.** This tool forces people to reflect on the gift of time devoted to the company during the past week by communicating success and accomplishments.

Using all of these tools in unison aligns your people to strategic initiatives and makes the needles move on your enterprise excellence journey.

Richard Kunst is president and CEO of Kunst Solutions Corp., which publishes the "Lean Thoughts" e-newsletter. E-mail rkunst@kunstartofsolutions.com.



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Maintaining open gear drives

Production equipment using open gear drive units in the mining and aggregate industries, as well as in many large manufacturing and processing plants are generally the most difficult to service, maintain and properly lubricate.

Kevin Ray, sales manager for grease and specialty products for Fuchs Lubricants Canada Ltd. in Cambridge, Ont., addressed open gear issues in a recent presentation to the Hamilton Section of the Society of Tribologists and Lubrication Engineers (STLE).

He said lubricants for open gear drives must exhibit a low wear rate, good spray-

ability and pumpability, low dust attraction, corrosion protection, suitable flushing behaviour, good adhesion to metal surfaces, extreme load carrying capability, good dry running properties and shock absorbing capability: all of that, plus they should have a minimal environmental impact and a high-viscosity range.

To satisfy these many requirements, use grease, oil or graphite. Greases are contained in thickener systems, light-coloured oil is an option, and graphite is a solid lubricant with a certain crystal structure. Your choice depends on the application and on whether the open

gear unit is indoors or outdoors.

Grease is preferred in many cases, but it may build up in gear housings. Light-coloured oil lubes have lower disposal costs, but fluids cannot be filtered again. However, existing spray systems can use sprayable fluids, saving some money.

When selecting an open gear lubricant, consider tooth flank temperature and gear condition, such as pre-damaged gear flanks. Specific loads and circumferential acceleration also play a decisive role. Misalignment can cause a temperature variance of up to 10 degrees C across gear tooth faces.



Choosing a lubricant depends on gear configuration and condition. PHOTO: ISTOCKPHOTO

The amount of lubricant used is important. Of all open gear problems, 18% can be directly attributed to incorrect or insufficient lubrication. And the need to adjust lubricant amounts is directly related to gear wear. Wear begins early and moderate wear occurs all the time. Appropriate quantity and frequency of lubrication must be scheduled to slow down normal gear wear and compensate for it.

Examples of gear damage that can be mitigated by proper lubrication are micropitting, progressive or destructive pitting, severe scoring, and plastic deformation caused by high temperatures.

Smoothing out pitting and grinding rectifies damage. To detect gear damage, monitor vibrations and tooth flank temperatures, and take digital photographs of running conditions.

» Tech Tip

HANDLING GREASE: A NO-MIXER

Keeping grease clean and dry is a no-brainer. And as a general rule, greases should never be mixed; however, sometimes it is unavoidable.

Several types of incompatibilities can occur that are not solely dependent on the thickener system, and they are difficult to predict. Exhaustive testing is recommended to prevent significant cost overruns arising from long-term maintenance problems or equipment damage.

Nicolas Samman, the manager of grease product development for Petro-Canada Lubricants Inc. in Mississauga, Ont., recommends ASTM D6185 as the primary test procedure. It's best performed in service or in a test that simulates field service, and it should be preceded by an ASTM D217 test to determine grease consistency.

Reasons for the incompatibility of greases are base oil differences and oil blends, thickener systems, formulation or additive incompatibilities and incompatibilities resulting from loss of additive synergy. Watch for decreases in physical properties and in heat resistance, changes in product consistency, decrease in shear stability and a general decrease in additive performance. Obviously, incompatibility affects in-service performance. Grease mixtures will often run out of the bearings, the dropping point can be drastically reduced and, at worst, catastrophic losses are possible.

Samman says if grease pairs are compatible or borderline, it's generally safe to proceed. Remember to check other performance factors besides the thickener system. Greases become less compatible with increases in operating temperature.

From a presentation and discussion at the Toronto Section of the Society of Tribologists and Lubrication Engineers (STLE).



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China's eroding ADVANTAGE

LABOUR COSTS TO CONVERGE WITH THE US BY 2015

More localized supply chains is good news for Canadian manufacturers serving the US market

STAFF REPORT

Good news for Canadian and US companies: the sun may not be setting on North American manufacturing after all, according to a new analysis by The Boston Consulting Group (BCG). It forecasts the sector will experience a "renaissance" as the wage gap in China shrinks and certain US states become some of the cheapest locations for manufacturing in the developed world.

It all comes down to the math and the availability of skilled labour. The report, from the consulting group's Chicago office, notes wages in China are rising 17% per year while the value of the yuan continues to increase. Meanwhile in the US, flexible work rules and government incentives are making states such as Mississippi, South Carolina and Alabama increasingly more competitive as low-cost bases for supplying the US market.

"Workers and unions are more willing to accept concessions to bring jobs back to the US," says Michael Zinser, a BCG partner who leads the firm's manufacturing work in the Americas. "Support from state and local governments can tip the balance."

Adjusting for US workers' relatively higher productivity, BCG says wage rates in Chinese cities such as Shanghai and Tianjin will be about 30% cheaper, and since wage rates account for 20% to 30% of a product's total cost, manufacturing in China will only be 10% to 15% cheaper than in the US. The advantage drops to single digits or zero when you factor in inventory and shipping costs.

"We expect net labor costs for manufacturing in China and the US to converge by around 2015," says Harold Sirkin, a BCG senior partner. "As a result of the changing economics, you're going to see a lot more products 'Made in the USA' in the next five years."

That's not to suggest wages in China aren't cheaper on average, but BCG cautions against placing too much emphasis on averages.

"In the US we have highly skilled workers in many of our lower-cost states. By contrast, in China's lower-cost regions it's actually very hard to find the skilled workers you need to run an effective plant," added Doug Hohner, a BCG partner who focuses on manufacturing.

The global consulting company expects products most likely to come back will be those that require less labor and are churned out in modest volumes (such as household appliances and construction equipment). High volume, labour-intensive goods such as textiles, apparel and TVs will likely continue to be made overseas.

This all bodes well for Canadian manufacturers.

"Keep in mind our major customers are US manufacturers, so if US companies are looking at localizing their supply chains, that will be a real benefit to Canadian manufacturers," says Jayson Myers, president and CEO of Canadian Manufacturers & Exporters (CME).

He notes many Canadian companies with operations in China are also experiencing some of the same issues related to escalating costs. And it's not just about la-



Working on circuit boards in a Shanghai computer plant. PHOTO: JOE TERRETT

to Columbus, Ga. to decrease time to market, increase internal collaboration and lower operating costs. And toy manufacturer Wham-O Inc. has brought back half of its Frisbee and Hula Hoop production from China and Mexico.

Yet even as work shifts back to the US, BCG said China will continue to play a major role in global manufacturing. First, investments to supply the huge domestic market in that nation will continue.

Second, in the absence of trade barriers that prevent offshoring, Western Europe will continue to rely on China's relatively lower labor rates since the region lacks the flexibility in wages and benefits that the US enjoys.

Third, even though other low-cost countries—such as Vietnam, Thailand, and Indonesia—will benefit from companies seeking wage rates that are lower than China's, only a portion of the demand for manufacturing will shift to them. Hohner noted smaller low-cost countries simply lack the supply chain, infrastructure and labor skills to absorb all of that production.

Should Canadian governments be handing out the kinds of concessions US states are offering business?

While such incentives are very nice, it's Myers' view companies relying on governments to act on their behalf rather than making decisions for themselves will likely end up going out of business. Higher costs in China may be enticing business back to the US, but he warns it's not going to guarantee success if companies aren't taking that opportunity to innovate, become more specialized and improve products and processes.

As for Canada, it offers some supply chain advantages of its own, such as a competitive tax system that will reduce the corporate levy to 25% next year, a two-year equipment and machinery write-off that made it back into the federal budget, skilled labour and management, a flexible high-tech manufacturing base, close proximity to the US market, and a middle ground for companies from abroad that want a softer entry into North America.

If some cost advantages do shift back to North America, as in the US, we'll be seeing a lot more products stamped "Made in Canada" too.

Comments? E-mail JTterrett@plant.ca.

bour. "The experience of Japan shows the vulnerability of the over-extended global supply chain so for a lot of reasons, Canadian companies must also think about localizing their supply chains, simply to reduce the risk of doing business generally," says Myers.

Cost advantage shifting

Companies must also measure the impact of rising energy costs on freight and logistics, plus the cost of property in China that is "going through the roof."

But he cautions Canadian companies not to ignore the tremendous growth in consumer demand and industry going on in China and India. "Canadian companies have to figure out how they are going to become part of those supply chains, rather than using them as cheap platforms for the North American market."

Sirkin advises executives, who are planning a new factory in China to make exports for sale in the US, should take a hard look at the total costs.

"They're increasingly likely to get a good wage deal and substantial incentives in the US, so the cost advantage of China might not be large enough to bother – and that's before taking into account the added expense, time and complexity of logistics," he says.

BCG notes some US companies have already realigned supply chains that serve the North American market, including Caterpillar Inc., which built a 600,000-square-foot hydraulic excavator manufacturing facility in Victoria, Tex. NCR Corp. is bringing back production of its ATMs

» Trade

EXPORTS SURGING TO PRE-RECESSION LEVELS

Canada's exports are making a comeback thanks to stronger global economic conditions and should be restored to pre-recession levels by next year, according to a forecast by Export Development Canada (EDC).

The Ottawa-based export credit agency has observed "surprising resilience" in the sector over the past 18 months after the recession wiped 25% of Canada's international exports.

EDC's Global Export Forecast shows Canadian exporters rebuilding sales, which grew 10.4% last year and are poised for a 12% increase this year, plus another 7% in 2012. It predicts next year's export growth will be powered by double-digit gains in the forestry, auto and aerospace sectors.

Canada is diversifying its trade relationships by expanding into emerging markets. EDC says these markets are forecast to collectively grow by 6% this year and next, well ahead of the pace in developed markets and a trend that's expected to change the shape of Canada's economic growth profile. They could account for 50% of Canada's total merchandise trade by 2025.

"Under this scenario, Canada's annual export growth could rise to 3.5 times the current pace," says the EDC. "That's a new era of Canadian export growth."



Make international business gaffe-free

BY MARK DRAKE

Which of these four international gifts is probably inappropriate: a handsome carved knife; a purebred dog; a beautiful clock; or a finely made compass? Or when you're invited to dinner and you bring flowers as a gift, should you buy odd or even numbers, and what colours should you avoid? Many cultural differences are small, but failure to appreciate their nuances easily causes offence and could stall a budding international relationship.

“Many cultural differences are small, but failure to appreciate their nuances easily causes offence...”

Cultural approach is all about high and low context. High context, which emphasizes relationships, is strongest in places such as China, Japan, Arab and Mediterranean countries.

Low context, common in Germany, Switzerland, Scandinavia, the US and Canada, attaches less importance to relationship building. The differences are illustrated by the importance attached by traditional cultures to co-operation,

harmony, patience, saving face, avoiding giving offence and decision making by consensus, versus western impatience, a preference for punctuality, moving things along, making practical decisions and saying what is meant.

In both cases success hinges on appropriate non-verbal, verbal and written communication.

Non verbal communication can create many problems. Gestures are particu-

larly tricky (the “OK” or thumbs up sign is highly insulting in some parts of the world), and facial expressions are easily misinterpreted across cultures. Ideas about personal space also vary – when in doubt be reserved rather than intimate. There are unwritten rules about gift giving, which is more important in Japan and many Asian countries than in the West; about the handling of business cards, considered an extension of personality in Japan; and the use of first names, rarely used outside the family in Japan and Germany.

Verbal communication has its own pitfalls. In North America we generally say what we mean, readily accept argument or debate, and are prepared if necessary to say “no.” In Japan, euphemisms like “perhaps” or “we’ll see” are the preference.

In certain cultures participation at meetings or conferences is not common. Different languages make comprehension a major challenge, and learning new languages is a great asset to the international trader – even if it’s just a few sentences.

Language challenges

Avoid slang, acronyms and other colloquialisms. Humour helps develop relationships or relaxes a tense situation, but it’s a two-edged sword and does not translate easily. If visual aids are used, keep text to a minimum.

The same rules apply to written communication, and aim for clarity in translations, especially in contractual agreements.

Other cultural influences include religion (from statutory holidays to dress and gender issues), age or place in the hierarchy (generally respected more in Asia than in North America), basic values (the need for harmony and consensus, avoiding giving offence or losing face), and attitudes to the importance of property and to materialism. Success comes from observing and from adapting to circumstances, with a genuine interest in new cultures and building new relationships.

The answers to the two questions are:

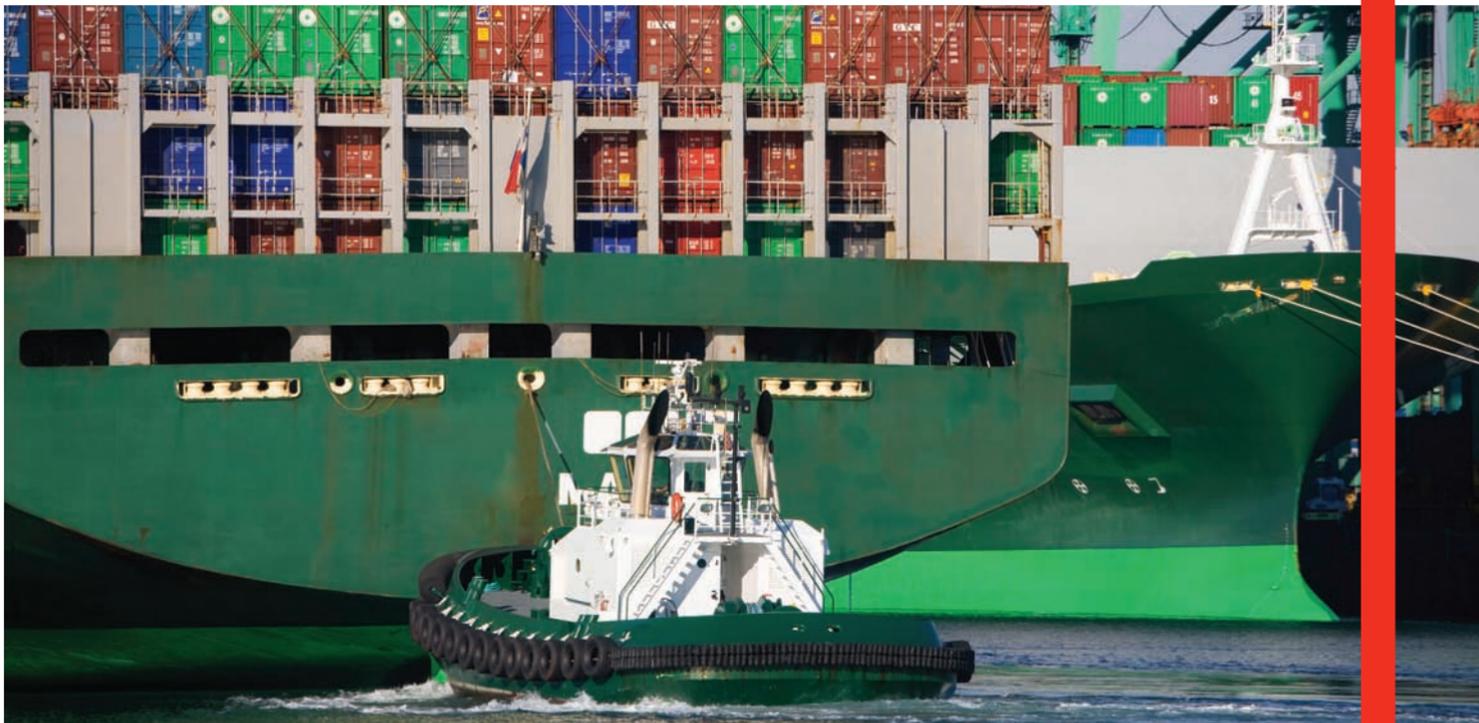
1. A compass is the most appropriate gift, especially for a Muslim: it can be used to check the direction of Mecca.
2. Showing up for dinner with flowers is tricky: they can denote death, or bad luck. Avoid white flowers in El Salvador, yellow ones in Mexico, even numbers in Japan and odd numbers in China.

For more information on culture and related topics visit www.fitt.ca (Going Global – Cultural Aspect of International Trade) and www.intercultures.gc.ca (Centre for Intercultural Learning).

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

Comments? E-mail JTterrett@plant.ca.

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BY CHRISTOPHER PORTER

Business owners are inherently optimistic. "Our markets will expand. That big order will come in. Our profits will rise," they proclaim, even when the chips are down.

Many of the optimists were proved right following the global recession. Canadian companies with low debt loads and cash on hand quickly bounced back.

Those who didn't recover as quickly may have been unrealistically optimistic about their prospects. Accountants have a term for it: hockey stick projections. Banking on these types of projections may account for some of the 470 bankruptcies and 133 proposals filed by businesses between the end of September 2009 and September 2010.

Liquidating a business is the last option most manufacturers would choose to resolve financial difficulties. Manufacturing assets are not selling at a premium and liquidation typically leaves little or nothing for shareholders.

There are three more palatable solutions, but it's necessary to first identify the source of the difficulties. Two problem areas are the balance sheet and the income statement.

On the balance sheet you'll find over-leveraging or too much debt for the size of business; cost overruns, generally related to an expansion or relocation; and high levels of bad debts that could be caused by the failure of one or more major customers.

Typical problems on the income statement will be declining revenue due to customer attrition or new competition; outdated technology, resulting in lower efficiency than competitors; litigation that's costly and a distraction for management; declining profit margins; loss of favourable customer status, discounts or payment terms; an increase in raw material prices that cannot be passed on; or significant management change, resulting in loss of efficiency.

Finding financing

Can the problems be fixed while maintaining a viable business? If the answer is yes, there are three options:

- **Refinance.** Canada's 22 Schedule 1 banks tend to lend based only on predictable cash flow and extensive security, they charge less than other lenders.

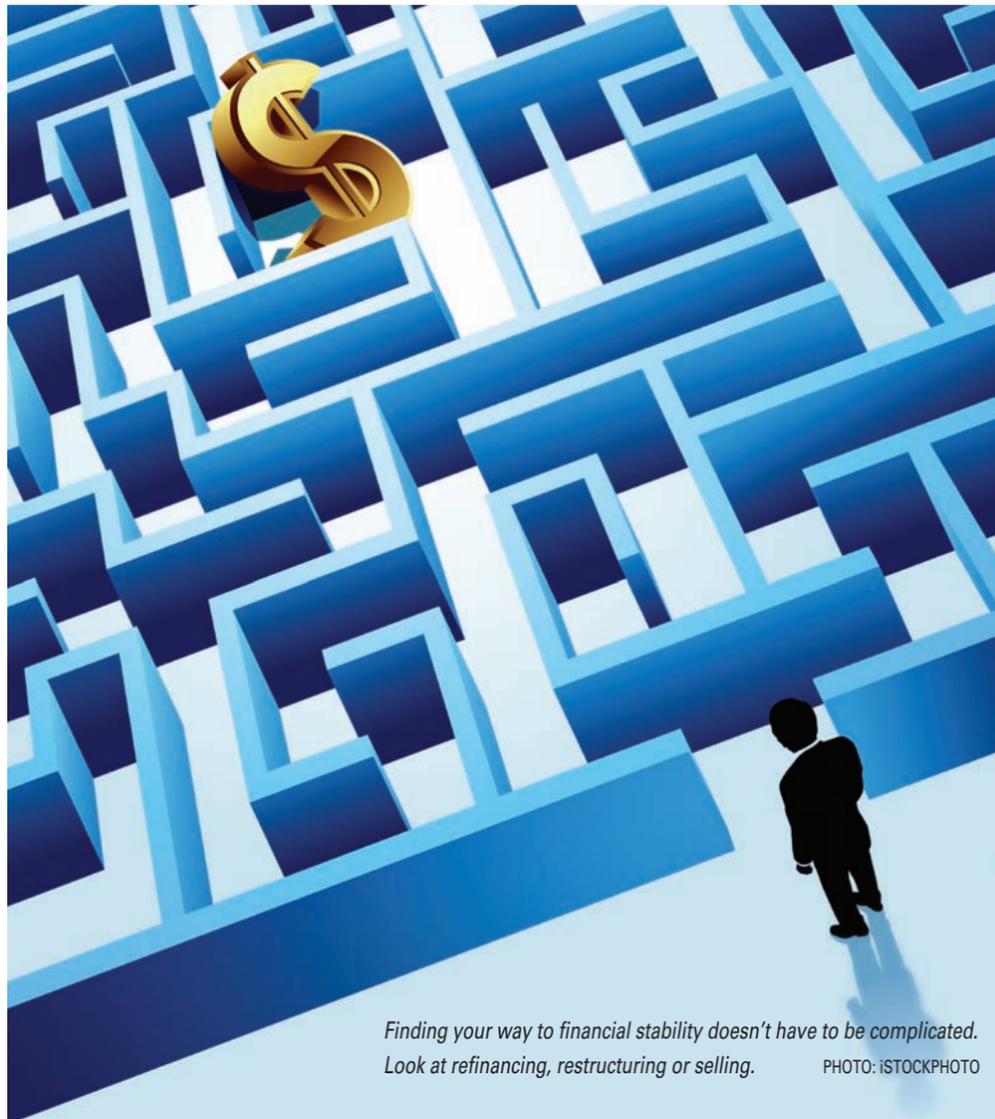
Asset-based lenders will finance a company experiencing financial problems provided it has unencumbered assets and meets reporting requirements. Although these lenders charge higher fees than the banks and have more stringent monitoring requirements, they may advance more funds and be more flexible with companies in transition.

Factoring companies, which lend against accounts receivable, are helpful in situations where smaller amounts are required or an asset-based lender is not practical. While interest charges and fees are higher, they quickly turn accounts receivable into cash and will advance greater amounts than other lenders.

Mezzanine lenders offer a combination of subordinated debt and equity. They typically charge higher interest and incorporate options to convert outstanding debt to equity.

There are also lenders who will provide senior stretch or over-advance loans blending asset-based and cash-flow loans. They tend to support manufacturers with a solid asset base but lack stable or predictable cash flow.

- **Restructure.** Correcting underlying problems may require selling portions of the business, reorganizing or reducing operations. If there is insufficient time or money to complete a struc-



Finding your way to financial stability doesn't have to be complicated. Look at refinancing, restructuring or selling. PHOTO: ISTOCKPHOTO

Financially CHALLENGED?

REAL SOLUTIONS FOR HOCKEY STICK PROJECTIONS

turing and there are many contentious issues or numerous disgruntled creditors, it may be necessary to file a notice of intention to make a proposal (NOI) or make a filing under the Companies' Creditors Arrangements Act (CCAA).

A proposal is akin to a simplified CCAA. Because the rules are more cut and dried, professional fees for a proposal are less than those for a CCAA. Typically, a proposal extends an offer to creditors asking them to accept less than the amount owed to them and/or an extension of time to repay debts.

- **Sell.** All or a portion of the business may have to go before a lender calls in a loan. On the down side, this adds significant time pressure to complete the transaction. As well, prospective buyers will be aware the company is experiencing financial troubles. While these issues will affect the price and the structure of the deal, moving all or part of the business to new ownership preserves value.

The success of these solutions relies on acting quickly and providing management with an opportunity to resolve fundamental issues. Management teams that successfully refinance, restructure or sell use timely, detailed financial information to produce realistically optimistic projections. After all, hockey sticks don't win financial competitions; they only win hockey games.

Christopher Porter is a vice-president in the transaction advisory services and financial restructuring practice of BDO Canada Ltd. (www.bdo.ca). Call (416) 369-3062 or e-mail cporter@bdo.ca.

Comments? E-mail JTterrett@plant.ca.

» Marketing

BE A LEAD GENERATOR

Powerful prospecting for predictable growth

BY ANDREW SHEDDEN

Does your company have revenue peaks and valleys? Is it straining to keep up with the demand one month and laying off workers the next? What you need is a systematic lead generation and qualification system. Follow these steps and you'll even out demand for your products and services in no time.

1. **Create a universal lead definition.** IBM came up with a great acronym, BANT: budget, authority, need and time-frame. Ask prospects about these four key areas before you commit time and salespeople. You do not have a qualified sales lead if: there is no current budget available or one that can be allocated; the person you're dealing with does not have the authority to create a signed deal; your solution doesn't meet a genuine need; and there's no firm purchase or implementation date.

2. **Separate lead generation and qualification from selling.** Qualify potential sales leads and send only the ready to buy prospects to the sales team.

3. **Use effective lead generation techniques.** Apply a two-step approach. First, identify your best prospects with an attractive initial offer of an e-mailed or mailed problem-solving report or a tip sheet. It must not be a sales pitch. Those who respond are prospects. The next step is to have your marketing staff contact and qualify them using your BANT questions.

5. **Use a combination of media.** Combining print advertising with targeted direct mail and outbound follow up calls is very effective. Alternately you could use an e-mail blast to a list of subscribers in an online version of a trade magazine with an education-based e-mail offer, then follow up by phone. Telephone follow up dramatically improves results.

6. **Use a follow up method that works.** Wait two or three business days before a follow-up call so prospects won't feel like they're being stalked or ignored. Establish a 100% follow-up rule. Don't discard a potential sales lead before a minimum of four to six attempts have been made to make contact. And have a plan in place to nurture longer-term opportunities.

Andrew Shedden is the president of Broadfield Communications, an industrial marketing consulting firm. Call (800) 353-4447. Visit www.broadfieldcommunications.com/plant.htm for the Seven Steps to Manufacturing Profits special report.

Comments? E-mail JTterrett@plant.ca.

BAD vibrations

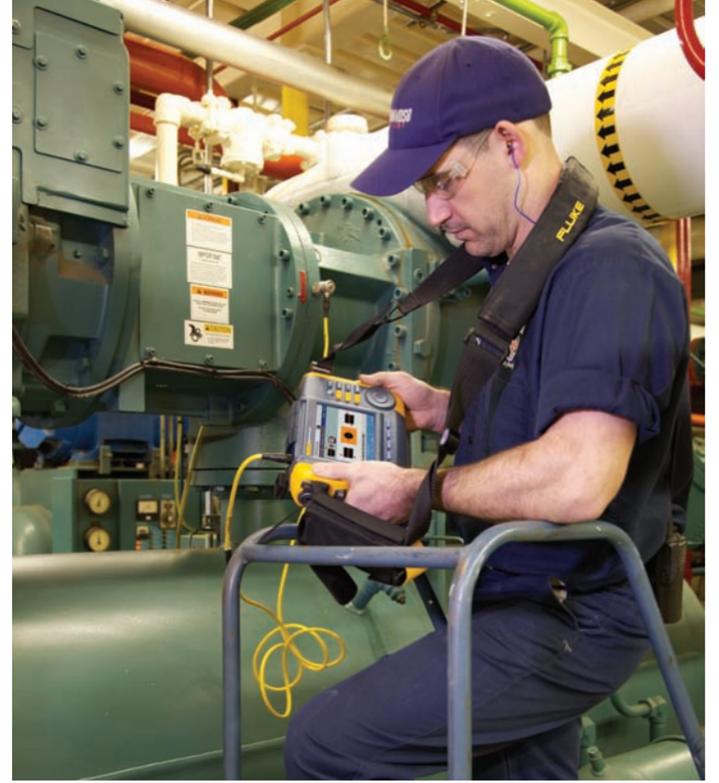
FLUKE 810 SPOTS TROUBLE BEFORE IT BECOMES A PROBLEM

When a mechanical issue arises and maintenance pros are called upon to troubleshoot, tight budgets and time constraints can get in the way of a prompt diagnosis. Now there's an instrument that will help them get to the bottom of problems fast, and they don't have to be experts in vibration analysis to use it.

The 810 Vibration Tester from Fluke Electronics Canada in Mississauga, Ont. diagnoses common mechanical problems in motors, fans, blowers, belts and chain drives, gearboxes, couplings, pumps, compressors, closed coupled machines and spindles related to balance, looseness, misalignment and bearing failures.

The \$9,357 hand-held tester is simple enough to use. Fluke has included onboard help menus with tips to get first-time measurements without a previous history and figure out the root cause of most problems.

The instrument has an "expert system" typically found in much higher-priced equipment, says product manager Colin Plastow. "You tell it what you're looking at, the size of the motor, what it's connected to, etc., and from that information, it can figure out a baseline for what the equipment would look



Fluke 810 vibration tester looking for trouble.

PHOTO: FLUKE

like new. Under test, it compares the results to the baseline and can figure out what, if anything, is wrong," says Plastow.

Evaluating machine condition typically requires readings taken over time that are compared to a baseline to estimate remaining operating life. The 810 compares vibration data to an extensive set of rules that have been developed over years of field experience.

You place the TEDS accelerometer on the machine using the magnetic mount or adhesive pad and connect it by cable to the tester. The accelerometer detects machine vibration along three planes of movement and the 810 applies a set of advanced algorithms, then delivers its diagnosis, rating it on a scale of one to four and offering a recommended repair.

Vibration can come from any number of things that cause problems. For example, bearing issues break down into four parameters: looseness, unbalance, misalignment and bearing failures.

"It will tell you whether the problem is acceptable, moderate, serious or extreme, what to do and how quickly," says Plastow.

The message is in plain text ("moderate wear on bearing") but a techie keen for more detail can dig down to see the actual "spectra."

The 810's key advantage? It gives non-experts an inexpensive way to spot vibration trouble long before it becomes an issue and fix the problem at a time when production will be least affected.

Software includes Viewer PC, compatible with Windows XP and Vista, that allows you to create machine setups on a computer and transfer them to the device, generate PDF reports, view vibration spectra in greater detail, and import and store jpegs and thermal images.

Visit www.fluke.com, and search "Fluke 810" for specs and additional information.

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PLC MASTERS FLEXIBILITY

The IDEC Corp. has come up with a PLC that does it all: Modbus TCP, e-mail/text messaging, web server and an interactive user web page with dynamic data.

The MicroSmart Pentra PLC's built-in Modbus TCP makes it easy to set up a network for remote maintenance, monitoring and control, and data acquisition with up to 14 simultaneous connections.

Can't be at your computer 24-7? Advanced e-mail keeps you updated in real-time about concerns such as pressure levels, flow rates and temperature. Login authentication lets you use popular providers like Yahoo for instant access to accurate information on the go and if you need to see live updates and make changes to the PLC, find a Wi-Fi hot spot for your laptop and log into an interactive user web page.

Choose a built-in IDEC web page or utilize 1 MB of space to create your own page using simple commands in an HTML editor to embed numerical displays, numerical inputs, pushbuttons, bar graphs and trend charts.

Pentra is available in two CPU models with 12 I/O configurations (eight DC inputs and four transistor-sink or source outputs), plus up to 15 expansion modules.

IDEC is a global manufacturer of automation products based in Sunnyvale, Calif.

Visit www.idec.com and search "Pentra."

Power Transmission

ADAPT ROLLS PAST 1M TON TEST

The Timken Co.'s hybrid ADAPT bearings have passed a rigorous road test, surpassing a critical mark in caster application.

Installed at the LD Steel's 1-strand slab caster CC No. 6 in Linz, Austria, the bearings logged more than one million tons during service without incident. Timken, the Canton, Ohio-based bearing maker, expects the line to roll past the 2.7 million-ton mark.

The bearing consists of a cylindrical inner ring, an outer ring with a proprietary outer race profile, and a roller/



Hybrid ADAPT.

retainer assembly that features specially profiled rollers. A cylindrical raceway on the inner ring allows the shaft to float left or right relative to the outer ring. The proprietary profile of the outer ring and rollers compensates for misalignment related to shaftbending; creates a self-aligning effect with the rollers to minimize skewing; and optimizes contact stress distribution for extended bearing life.

www.timken.com

BEARING UP TO HARSH CONDITIONS

Food-grade FluoroNyliner bushing bearings from Thomson Linear Bearings & Guides are engineered to last in harsh washdown environments.

Use the non-magnetic 303 Stainless Steel corrosion resistant sleeves with a self-lubricating liners for challenging food processing, pharmaceutical and medical applications. Open and closed types with specific machining options satisfy unique application requirements.

The bearings' liner material withstands a maximum continuous PV value of 10,000 psi ft./min., and handles high loads with a maximum static pressure value of 1,000 psifor maximum no-load speeds to 400 ft./min. in temperatures ranging from -240 to 196 degrees C.



Handles harsh washdowns.

They're available in optional stainless steel pillow block assemblies in closed, open, flanged and twin styles that combine with a wide range of corrosion resistant LinearRace shafts, including 440C and 316 Stainless Steel, Ultra Light aluminum and plated 60 Case.

www.thomsonlinear.com

ETHERNET CONTROL MINUS A PLC

Keep track of all ethernet-networked drives with *drive.web*, an ethernet-based control technology for DC drives from UK-based Sprint Electric and US partner Bardac Drives.

Graphic configuration tools provide diagnostics and configurability of all drives on the network, either locally or remotely via the internet, including full documentation and an operator interface for local control, all without the need a PLC or supervisory computer.

An ethernet port and processor take information dynamically from the drive and make it available over the network. Additional hardware includes interfaces

to AC drives and remote I/O modules that provide increased access to the network for other control elements.

Configuration software runs on the platform-independent Java operating system, so the control system will run on PCs, Macs and Linux-based computers. It provides graphical configuration and documentation tools for AC and DC drives, start-up/commissioning assistance with real time information from the drive and dynamic access to machine information.

The Canadian distributor is MDA Controls Inc. (www.mdacontrols.com) in Oakville, Ont.

www.sprint-electric.com

VT DRIVE SAVES ENERGY

The VLT Automation VT Drive from Danfoss VLT Drives saves energy, reduces operating costs and maximizes uptime in industrial variable torque fan, pump, blower and compressor applications.

Use it for 240 and 480 VAC single and three-phase operation, or 575 and 690 VAC three-phase operation with 0.5 to 1,400 hp.

The manufacturer of precision mechanical and electrical components based in Love Park, Ill. claims up to a 30% energy savings from the drive in variable torque applications.

A Smart Logic Controller eliminates ancillary equipment with main disconnects and integral fusing reducing panel space requirements. And an integrated DC link eliminates external filters, while Intelligent Heat Management removes excessive heat.

www.danfossdrives.com



Saves energy.



A KPD202-501 operator panel.

PANEL SIMPLIFIES MC HMI

Baldor Electric Co. has added a compact IP65-rated operator panel with a CANopen interface to its motion control products.

The Fort Smith, Ark.-based manufacturer of motors, drives, power transmission products and generators, describes its KPD202-501 operator panel as a simple human-machine interfaces. It's also scalable with the optional plug-in digital I/O module.

A backlit, four-line x 20-character LCD is surrounded by six programmable function keys for unambiguous and actionable, multiple-choice menus. Another 15 keys are for numeric values, with four pairs of keys handling functions such as jogging individual machine axes.

The only connections needed are a 24 VDC power feed and the desired communications link. A CANopen port offers a choice of D-type and RJ45 plug-in connectors, and a user-selectable RS232/485 serial port is standard.

www.baldor.com

» Plantware



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MCCs GET DOWN TO BUSINESS

Allen-Bradley NEMA and IEC Centerline low-voltage motor control centres (MCCs) from Rockwell Automation seamlessly exchange data between plant-floor devices and business-level systems.

The Milwaukee, Wis. automation company has added EtherNet/IP to the MCCs, which helps predict problems and prevent equipment failures. Leveraging a single, standard network simplifies communication for the entire enterprise and the handling of data from any point in the system.

Premier Integration users can configure and commission their MCC faster with RSLogix 5000 software to eliminate errors associated with redundant programming. The ethernet connection also allows Centerline MCC users to access information remotely for monitoring, troubleshooting and diagnosing.

<http://ab.rockwellautomation.com>

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Time for Canada to lose some weight

BY GWYN MORGAN

Some countries heading towards national insolvency act decisively. David Cameron's government has embarked on the wrenching and politically volatile course of pulling Britain back from the brink. By contrast, the US keeps running multi-trillion dollar deficits that cannot go on forever.

Canada's fiscal house is in much better shape than that of the US, Britain and other OECD countries; but complacency at this juncture would surely destroy our

“Government revenues have not returned to pre-recession levels and spending has grown...”

hard-earned strength.

Government revenues have not returned to pre-recession levels and spending has grown to such an extent that a substantial portion of core program funding is debt financed.

Unfortunately, there's no real chance of revenues catching up, and Canada's greying population is a big reason. Statistics Canada estimates the number of seniors will at least double by 2031,

out-numbering children for the first time in history.

The revived federal budget predicts that spending on senior's benefits will grow by a whopping 30% over the next five years. That doesn't include the promised 6% annual growth rate in federal contributions to the provinces for health care.

The retirement of the baby boomers means not only lower income tax rev-

enues, but lost economic growth due to the already serious inability of employers to replace these skilled workers. Add the unfunded pension liabilities for federal government workers (which the C.D. Howe Institute warns is some \$65 billion higher than noted in the public accounts) and the stark outlook is for fewer working-age taxpayers supporting mushrooming costs.

But the election of Canada's first majority government in seven years provides an opportunity to enact the structural changes needed to prevent Canada from facing a painful and divisive crisis and forced program cuts like those now happening in Britain.

But implementing the changes will still be politically challenging. To lose weight, governments have to be more efficient and smaller.

Well before the election the Harper government, through an on-going strategic review process, required each ministry to achieve a mandatory 5% cost reduction. But we need to do more, including moving towards the more efficient, lower-cost private contractor provision of government services. Following the private sector's lead, public service pensions should be converted from open-ended, unfunded "defined benefit" schemes to continuously funded "defined contribution" plans that include significant employee contributions.

Change of focus

But what about smaller government?

For social programs, that means the current "universality" paradigm must be replaced to focus dollars on those who actually need help. While this logic needs to be applied to all social programs, the first priority should be to amend the Canada Health Act to allow Canadians to purchase insurance and to seek treatment either through the universal publicly funded system or user-pay private clinics, a freedom enjoyed by citizens of every other developed country.

A recent report by the Conference Board of Canada – citing patient care outcome data that ranks Canada's health care system well back of European systems that allow user pay options – provides further justification for this change. Studies show private payments actually reduce waiting lists because they free up dollars for treating those needing access to publicly funded care.

These actions will be controversial. The outcries from vested interest groups will be shrill. But failure to act means that electing a national majority government will have done little to mend the demographic and structural fissures that are making Canada's social programs structurally unsustainable.

Gwyn Morgan is the retired founding CEO of EnCana Corp.

Comments? E-mail JTerrett@plant.ca.

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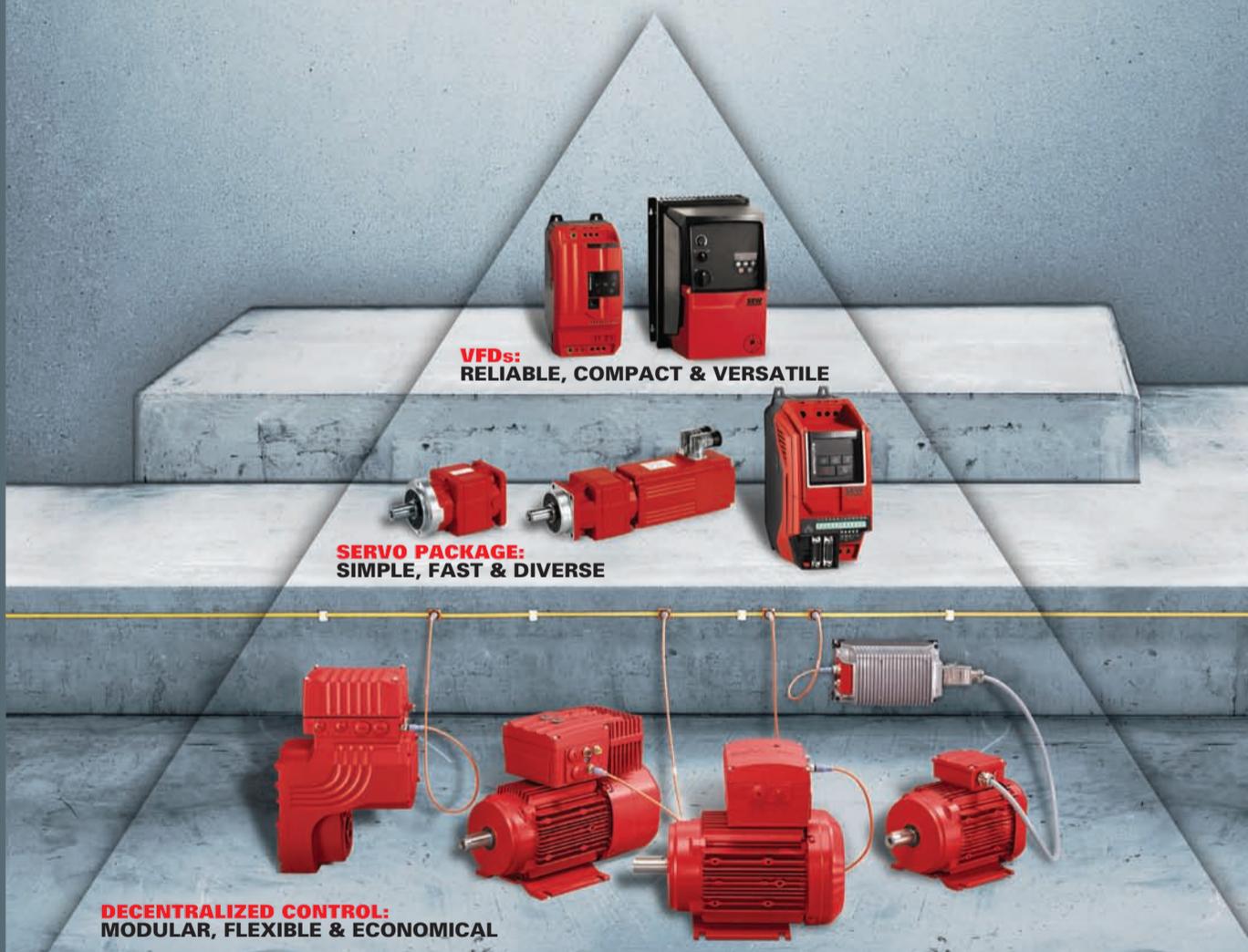
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