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DESIGN PRODUCT NEWS

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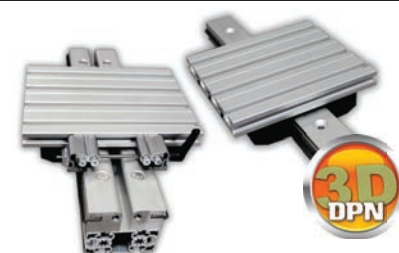
AWARD NOMINATIONS NOW OPEN

see page 21

2013
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INSIDE: Adhesives & Fasteners | Motion Control | Power Transmission | CAD



Modular linear guide kit

Bishop-Wisecarver has announced the QuickTrak line of modular linear guide components and sub-assemblies. The T-nut and T-slot based kit of parts is said to reduce downtime and total cost of ownership.

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www.omega.ca

Mechatronics team preps for WorldSkills with Americas gold

Humber students work with Festo to achieve success

By Mike Edwards

In the lead-up to the WorldSkills Competition in Leipzig, Germany this summer, a team from Toronto's Humber Institute of Technology and Advanced Learning won gold for mechatronics at the 2012 WorldSkills Americas event in Brazil.

Representing Canada, the Humber (www.humber.ca) team tied with Brazil and Colombia for the first place spot. Zachary Piskun (left above), a graduate of the school's Electromechanical Engineering Automation & Robotics program and David Da Costa (right), who's in his final year of the program, were coached by Neal Mohammed, the program's coordinator and Diogo Barco, one of the program's faculty members.

Piskun and Da Costa have won a number of other provincial and national contests in addition to the 2012 WorldSkills Americas, and Mohammed said he feels a sense of pride

Continued on page 7

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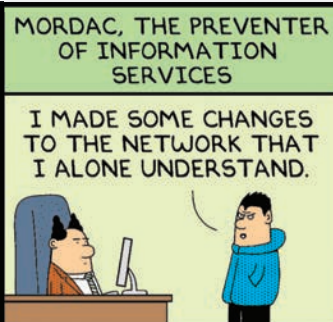
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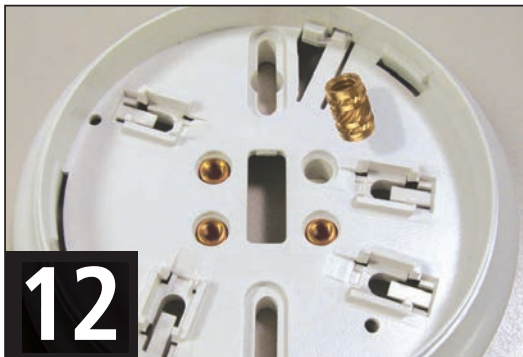
Harting names Jon DeSouza Canadian president and CEO



8

Senior vice president Philip Harting (left) of Harting Inc. passes the Harting Canada president and CEO baton to Jon DeSouza.

How to fasten metal, plastic materials together



12

Metal threaded inserts from Spirol embedded in plastic solve this fastening challenge in the base of a consumer fire detection product.

Stingray hits 7th generation with massive makeover



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Bill Vance of Automotive Scene takes a close look at the 2014 Chevrolet Corvette Stingray's complete makeover.

Robotics taking over the operating theatre



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The Ottawa Hospital has acquired the da Vinci Surgical System – a robotic device that can be used from cardiothoracic to general surgeries.

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THIS MONTH ON dpnCanada.com

EXCLUSIVE ONLINE BLOGS

Renderings Blog

Economists at The Conference Board of Canada aren't fooled by Alberta's booming energy sector, finds Editorial Director Mike Edwards. CBOC's Alicia Macdonald and Todd Crawford look at the \$4 billion provincial deficit and say "that now is the time to rethink Alberta's fiscal framework."



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Celebrate your best young performers

Looming skilled labor shortage cuts across many industries

Want to inspire the next generation of skilled workers? Or maybe you are inspired by one that you already know, or work with?

DPN is launching its first annual Top 20 Under 40 initiative to actively promote top performers under the age of 40 doing design engineering, machine design and engineering customer support and sales. Turn to page 21 in this issue to read how you can nominate someone that you know in your ranks or even a candidate outside of your organization. We will recognize them in our September issue later this year.

That Canada is facing a looming skilled labor shortage is hardly a secret: engineers, technologists and technicians are becoming increasingly the in-demand staff employers are crying out for and desperately hanging on to. Even businesses that rely on occupations such as truck drivers and construction trades, are looking at many of their own reaching retirement age.

Around the world, many countries – even manufacturing powerhouses Germany and Japan – are encountering the double whammy of greying skilled workers and dropping birthrates. Here, it was only 50 years ago that Canada bolstered its post-war appetite for machinists and engineers with an influx of talent from Great Britain.

Clearly, though, Canada can't rely on the "old countries" to restock our skilled trades. The best solution is a home-grown solution.

Competition for qualified workers has become a global issue

Robotics program.

This issue's cover story about Humber students winning gold medals at SkillsCanada and WorldSkills competitions – mechatronics category – is a great example of how there is hope for our next generation. The key to equipping young people just entering the workforce is to give them the right tools, environment and mentorship at a time when they can soak up knowledge and knock off challenges with equal gusto.

With the help of Humber educator/coaches, SkillsCanada's experience and Festo equipment and mentorship, the mechatronics team representing Canada at WorldSkills in Leipzig, Germany this summer couldn't be better prepared. **DPN**

Mike Edwards



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NOMINATE YOUR

TOP 20 UNDER 40

CANDIDATE TODAY

See page 21

WATCH the latest technical innovations at **dpncanada.com**

Video highlights from SolidWorks World 2013 international user conference illustrate how the software platform is evolving and how design engineers are innovating with the application.

SolidWorks World 2013: Spotlight falls on SolidWorks Electrical and Plastics



Craig Therrien, Product Manager, SolidWorks, talks about improvements to core functionality such as section views, as well as the benefits of two major recent additions – SolidWorks Electrical and SolidWorks Plastics.
<http://ow.ly/hVUCH>

SolidWorks Mechanical Conceptual preview unveils way to kick-start designs



In May of this year, SolidWorks will be working with select customers to validate the principles of conceptual design in their production environments with SolidWorks Mechanical Conceptual software.
<http://ow.ly/hVV70>

Festo Bionics Learning Network robotic bird soars over SolidWorks World crowd



Festo demonstrates the company's robotic research with a mechatronic bird that soared over the crowd. The company makes extensive use of SolidWorks CAD software to design, develop and simulate new products.
<http://ow.ly/hVV0C>

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Humber students ready to take on the world

continued from Front Cover

in the fact that his students are able to keep winning competitions.

The skills competitions, which feature other disciplines besides mechatronics – such as construction trades, culinary arts and hairdressing – are coordinated by Skills Canada (www.skillscanada.com) and supported by industry partners such as Festo (www.festo.ca).

In the competitions, mechatronics refers to a combination of specialties, including automation, robotics, programming and mechanics. One of its most common applications entails designing, building and maintaining automation systems for the manufacturing sector, such as automobile assembly lines.

As an official WorldSkills International Global Industry Partner (www.worldskills.org), Festo – a multinational company that specializes in making mechatronics products for factory and process automation applications – donates both staff time and equipment to teams all around the world.

Greg James, Festo National Didactic Manager, said, “the competitions try to expose the students to as many pieces of equipment as possible,” during the three-year build up between WorldSkills finals. Didactic is the educational arm of Festo that provides training and training equipment to industry and academia.

James will be accompanying Da Costa and Piskun with Team Canada at WorldSkills in Leipzig, as will a Festo Canada expert assigned to the mechatronics team. He explained that the support of Toronto-based Humber’s management is important in the skills competition process.

Representing management, Eileen De Courcy, Humber associate VP, Teaching and Learning, says it is striving to make sure that faculty



stays current with technology so it “can support students to reach the pinnacle of success” once they graduate. “Festo has been spectacular in its support” in helping Humber to accomplish this goal.

Da Costa is also thrilled with the company’s support. “Festo is always supporting us with training and equipment – we started with nothing two years ago – and it keeps upping the ante” in terms of component and technology sophistication.

The role of Humber teachers such as Neal Mohammed, says De Courcy, is changing. “Neal is a coach, a mentor and a guide. He’s a great example of what can be accomplished.”

Mohammed is only too happy to expand his role outside the classroom when faced with such enthusiastic and competitive pupils. “To find two students that you know have a chance to lead you to an international stage, it’s not easy,” Mohammed said.

He said the win in Brazil was surprising given the fact that they were the first Skills Canada mechatronics team to win gold at an international competition and that this was his



first time coaching a team at an international level.

Mohammed noted, “it’s important for students to compete in competitions like this because they help to improve students’ understanding of technologies they’ll be using in the field.

“To have an appreciation of what the level of technology is around the world, you have to compete in it. So it’s really essential for us, for the college, as well as the program, to maintain the status at competitions.”

Mohammed said participating in the competitions keeps Humber current and up-to-date with technology and also helps management to decide on appropriate capital investment.

“For us, learning what’s being used at various institutions, countries and industries will help us to plan ahead to provide our students with relevant, quality, job ready educa-

Zachary Piskun (left) and David Da Costa in mechatronics competition. The student lab below: Greg James (left) of Festo Didactic with Neal Mohammed of Humber’s Electromechanical Engineering Automation & Robotics. Humber has invested \$80,000 in competition equipment from Festo and other suppliers.

tion,” he said.

Piskun, who now works as an automation technician at car parts manufacturer Magna, said his participation in these competitions has been an enlightening experience.

“These competitions open your eyes so much more to even the potentials of mechatronics – what you can do. It’s rather amazing,” Piskun said. He added competing has also helped him stand out in the job market.

“I had no problem transitioning into the workforce because of a lot of the experience I had with these (competitions),” Piskun

said. “It just gives you that extra little bit of experience that you need,” he said.

Da Costa said he feels the Skills Americas competitions are important because they focus on people in hands-on lines of work, which are sometimes underrated.

“The hardest thing honestly is the preparation, it’s not actually being there,” he said.

De Courcy has observed that since Mohammed has lead his mechatronics team, other faculty have taken note. “The Spa Management program has looked to Neal and entered competition. The process at Humber has now taken on a life of its own with staff from the Electrical trades wanting to set up a ‘train the trainer’ program,” she said. **DPN**

Alex Lambert, Senior Reporter at *Humber Et Cetera*, also contributed to this report.



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Jon DeSouza appointed president, CEO of HARTING Canada

MONTREAL – Jon DeSouza has been named president and CEO of Harting Canada, Inc. DeSouza, who retains his existing responsibilities as executive vice-president of Sales for Harting, Inc. of North America, says the company's intention is



Jon DeSouza, president and CEO of Harting Canada.

to build a local sales and support structure to support the Canadian market. In Harting Technology Group's 2012 fiscal year that ended September 30, 2012, the Americas enjoyed the largest revenue growth of any region – 13.6% to more than \$65 million – with Canada contributing to a significant portion of that growth.

“Our North America strategy is focused on proximity to our customers and distributor base where both the US and Canada play very important, but distinguished roles” says DeSouza. “The first step was to establish Harting Canada, Inc. with headquarters in Montreal and Claude Gravel as our Canadian regional sales manager. Now we're ready for the next step in building our sales team: the appointment of an area sales manager to focus on Ontario.”

www.harting.ca

Eaton names Perry D'Ortenzio VP & GM, Power Distribution Organization, Canada

Perry D'Ortenzio has been named vice president and general manager, Eaton's Power Distribution Organization – Can-



Perry D'Ortenzio

ada. D'Ortenzio will be responsible for the Power Quality Operations, Electrical Components Organization, and Electrical Engineering Services and Systems. D'Ortenzio joined Eaton in 1980 and has held multiple

roles of increasing responsibility within sales and marketing, including satellite manager, district sales manager, national marketing manager and national sales manager.

www.eatoncanada.ca

Advisory Board Directions | By Caleb Funk



What's #trending in design technology

Real-time error-checking, cloud services and design automation stepping up to the plate

While not necessarily new, there are some technology trends I see heating up in 2013.

Just like spell check in Microsoft Word, real-time error checking notifies engineers to manufacturability issues as a design evolves. Increasingly, software development houses are offering plug-ins and add-ons for the major design applications.

Technologies that may impact the way you do business

The Canadian company Validus has an application that works with Autodesk Inventor, and the PDQWorks for SolidWorks application allows designers to determine if a product is machinable as the design develops. (Autodesk purchased Validus in January 2013, so

perhaps future releases will include auto check functionality.)

Whether integrated into the main design interface, or as a third-party tool, error-checking programs produce real-time feedback to highlight potential conflicts, machining problems and internal inconsistencies with design rules. For example, if your shop cannot produce radiuses of less than 2 mm, then the error checker will prevent a designer from specifying that dimension.

Cloud-based software-as-a-service (SaaS) allows designers to access a central model stored remotely on the cloud and manipulate it locally. Besides not having to own the hardware, benefits of this approach include increased collaboration across distance, time and disciplines. The single central model remains up to date and anyone can work on a part anytime, promoting simultaneous processes as opposed to traditional sequential workflows.

In 2013, SaaS has shown through 'the cloud' that engineering design will continue to evolve. Security and network availability issues that have slowed adoption rates will be addressed while costs for design firms will shift from increasing CPU power to increasing bandwidth.

Autodesk will release Fusion 360, its cloud solution for engineering design, in the coming months. Fusion 360 uses a thin client on a user's laptop or workstation, connected to a multi-tenant cloud back end run by Autodesk. The Fusion 360 offering will make it easier to integrate parts specified in a variety of different data formats into a new model.

Dassault Systèmes' cloud-based Version 6 open platform was announced almost two years ago and has steadily added features that make it a robust collaboration platform that also permits offline design. Its cloud infrastructure is being run by a third-party infrastructure as a

service partner.

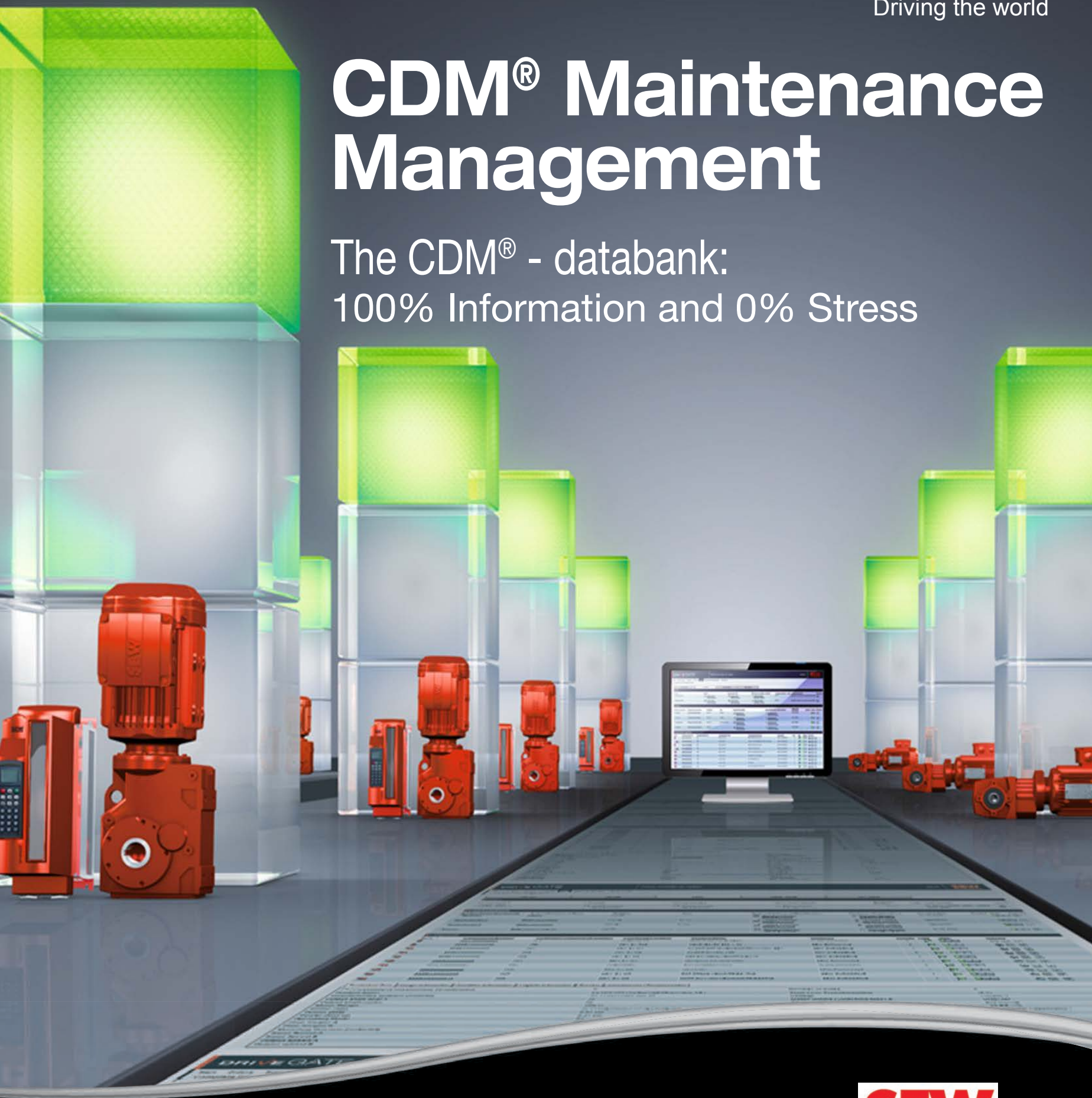
Rules-based design can improve efficiencies at manufacturers that make similar products with custom specifications. If your parts are essentially the same, but their sizes are different, you can create an interface that prompts users for dimensions, material options and other design rules to support hundreds of configurations.

For example, when using iLogic for Inventor or DriveWorks for Solidworks, a development team can quickly automate product configuration through a rules-based system, allowing sales to enter common parameters such as bolt sizes, customer information, hole locations, fillet tolerances, etc. that then automate drawings for validation by engineering. **DPN**

Caleb Funk is Solutions Team Manager, Manufacturing Solutions Group, IMAGINiT Technologies (www.imaginit.com).

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Evaluating chemically resistant adhesives

Understand the chemical interactions and exposure variables

Of all the factors that should be considered when selecting adhesive products, chemical exposure too often gets short shrift. A quick peek at a few data sheets or a chemical resistance chart may be all the work that goes into evaluating an adhesive product for use in a specific chemical environment.

Selecting the adhesives, sealants and coatings that can withstand harsh chemical environments

Yet this kind of half-hearted effort simply won't cut it if you want to make sure that adhesives, sealants and encapsulants will withstand the chemicals found in so many industrial, medical, automotive and aerospace applications.

All polymers, including adhesives, have potential chemical vulnerabilities that can result in a loss of physical properties. The challenge is

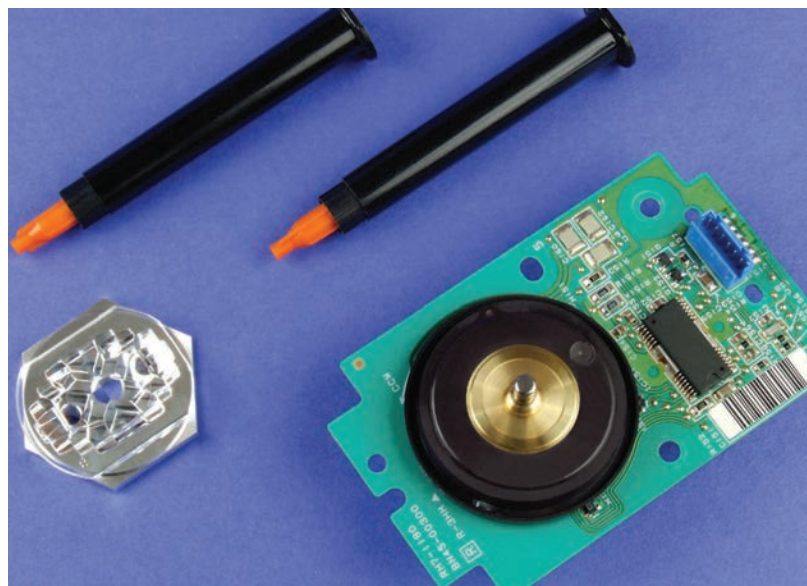
knowing exactly how those vulnerabilities will come into play given all the variables that govern the effects of chemical exposures.

These variables start with the interaction of material systems with specific chemicals. The challenge here is that there are literally thousands of combinations of substrate materials, adhesives and chemical agents to consider. The variables also include the type of exposure, which can range from a splash to continuous immersion. Finally, chemical resistance can vary substantially under different mechanical and thermal loads.

Getting a handle on how all these variables interact can be difficult and time-consuming. This article is intended to provide a head start in picking adhesives that will hold fast against any chemical onslaught.

Individual grades of adhesives can have different functional additives and curing reactions that will affect their ability to withstand chemicals.

Consider epoxies. As a family, they are the most chemically resistant adhesives, encapsulants and coatings available. But individual epoxy formulations do differ in their specific chemical resistance traits.



One part UV curable Master Bond UV185 is said to offer outstanding chemical resistance, easy application and low shrinkage upon cure.

Tables are available that show the relative resistance of epoxy coatings to a lineup of industrial chemicals, solvents and fuels. One mistake would be to assume that all epoxies will resist ethyl alcohol just because some grades resist ethyl alcohol.

So it's always important to consider the resistance of individual grades to specific chemical exposures.

This strategy applies not just to epoxies but also to any other adhesives.

On the most basic level, exposures should be characterized by the intensity of contact with a chemical agent. Low intensity exposures are best thought of as a splash. Higher intensity exposures would involve immersion that could be intermittent or continuous. Note that exposures can involve gases, not just liquids.

Chemical exposures should be considered in the context of the application's thermal and mechanical loads. Many adhesives can experience an incremental loss of chemical resistance at elevated temperatures – especially above the Tg. High stresses also exacerbate any adverse effects that a chemical agent has on adhesive or cohesive strength.

Adhesive and chemical combinations that make the grade under one set of loading conditions won't necessarily make it in others.

All these of variables may sound straightforward, but mischaracterizing the type of exposure is a surprisingly common mistake. And it's a mistake with potentially serious ramifications. Understating the intensity of exposure or the severity of the loads can obviously result in adhesive products that don't perform as well as expected, perhaps even to the point of failure. **DPN**

This article was excerpted from the Master Bond white paper, *How To Evaluate Chemically Resistant Adhesives* (<http://ow.ly/i90tb>).

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How to maintain joint assembly integrity

Deciding whether threaded inserts are plastic or metal a challenge

By Christie Jones

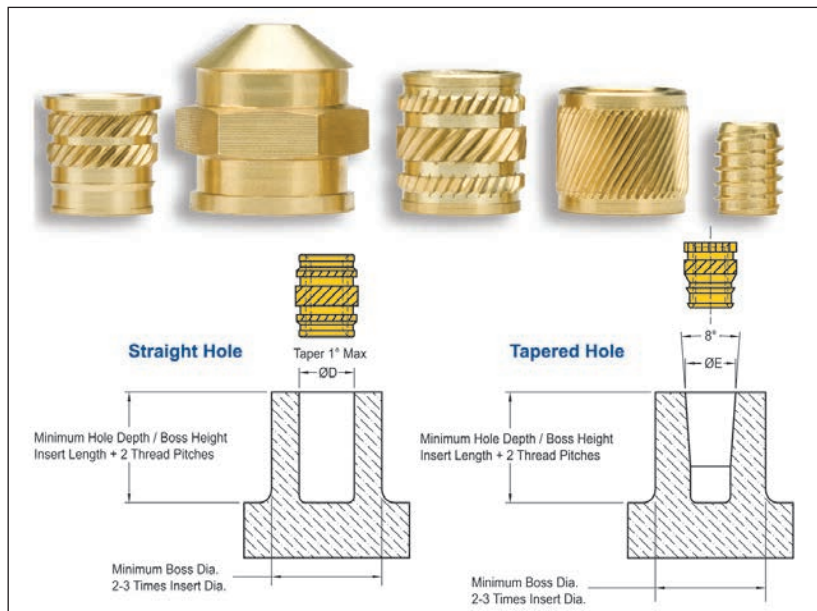
The weakest sections of many plastic part designs are the joints and assembly points.

During screw assembly of mating components, the screw has to be tightened with sufficient torque to produce the recommended axial tension load between the host component and the threads of the screw in order to prevent loosening.

A common problem with bolted joints is that plastics are susceptible to creep or stress relaxation. Under loads well below the elastic limit, plastics will lose their ability to maintain a load. When this occurs, the threaded connection becomes loose.

Metal threaded inserts significantly improve joint strength in plastic parts and are not themselves susceptible to creep. The larger body diameter and body design of the insert allow the appropriate installation torque to be applied to the screw. These joints do not become loose over time since the brass provides permanent creep resistance for the entire load path of the thread.

Additionally, the inserts enable



Design considerations comparing installation of inserts for straight holes versus tapered holes.

unlimited assembly/disassembly of the components without compromising the integrity of the threads. Ultimately, it is often the metal insert that allows designers to replace cast or machined metal components with less expensive plastic without sacrificing performance.

Typical performance requirements for assemblies using inserts

involve tensile strength, rotational torque, and pull-through strength. The following factors affect Insert performance:

- Insert type, design, and quality of insert features.
- Plastic specifications.
- Design and quality of the plastic components.
- The installation process.

There are many different styles of inserts designed to accommodate various performance requirements and installation methods. The installation method must be considered, as this will affect the type of insert that can be used as well as the overall cost of the assembly. The two primary types of inserts are those that are molded in and those installed after the molding process (post-mold).

Molded-in inserts usually yield the highest performance, yet this form of installation is by far the most expensive. In addition, you run the risk of damaging the mold if the insert is not properly positioned during the molding process.

Inserts installed with heat or ultrasonics after molding yield good performance at a fraction of the assembled cost of the molded-in inserts. Post-mold installation is very efficient and eliminates the requirement of properly loading inserts into a mold during the mold cycle. **DPN**

Christie Jones is Market Development Manager at Spirol International Corp. Her complete white paper is at <http://ow.ly/i90Q4>. **www.spirol.com**

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Reducing hardware in sub-compact electronic assemblies

Unique features engineered into the fastener often become both critical and essential

By Jay McKenna

Sub-compact electronic assemblies can present big attachment challenges, both in the amount of required hardware and in associated production issues. As an example, miniature threaded screws historically have served by default in many applications, but they can turn out to be problematic on several levels.

Case in point: A keyboard-assembly application required more than 100 M1.2 screws and tapped holes. Handling of dozens of tiny screws for each unit without the benefit of automation proved time-consuming and tedious and threads or drives would strip when the screws were not properly driven.

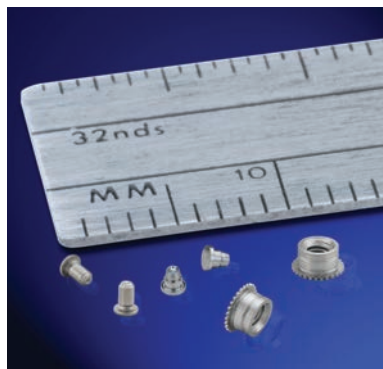
The solution: Switching to self-clinching aluminum "micro" tack pin fasteners ultimately eliminated all tapping operations, the potential for stripped threads or drives, and all other screw-related concerns.

Extremely small "micro" fasteners such as the tack pins have made

significant headway in the global marketplace, especially with the ongoing evolution of smaller, lighter, and thinner sub-compact consumer electronic devices ranging from cell phones to tablet computers and all innovations in between. Most of these applications inherently are characterized by restrictive design envelopes and limited footprints for fastener placement and installation.

Among the first "micro" fastener types to gain a foothold, threaded "micro" screws were developed in a variety of materials, head styles, and driver types. The benefits of all self-clinching fasteners, regardless of size, derive from their design, which features a unique annular recess for locking the fastener in place and an element to prevent fastener rotation in service. The fasteners install permanently in thin ductile metal sheets by pressing them into place in a properly sized hole and applying sufficient squeezing force.

This forces a clinching ring, knurl, ribs, or hex head into the panel sur-



PennEngineering's array of micro fasteners includes the self-clinching microPEM TackPin fastener (by the 5 mm mark on the ruler), which incorporates a tapered tip and tangential interference band (in addition to displacer and undercut).

face, displacing sheet material into a specially designed annular recess in the shank or pilot of the fastener, known as an undercut. The metal forced into the undercut secures the fastener against axial movement, while a non-round displacer secures the fastener against rotation. No secondary operations are necessary.

In the "micro" world, designers should understand that smaller self-clinching fasteners are not simply scaled-down versions of their larger counterparts. When fastener types are downsized to lengths as short as 2 mm, thread sizes as small as M1.0, and diameters of 1 mm, issues relating to tight tolerances and performance values, among others, become magnified.

For example, the self-clinching microPEM TackPin fastener incorporates a tapered tip and tangential interference band (in addition to displacer and undercut). The tip and band work together both to guide the fastener into the small-diameter (and shallow) hole in the panel and to create a slight interference fit between the hole and the fastener at the interference band (creating minimal stress in an aluminum host sheet). **DPN**

Jay McKenna is Global Business Manager – microPEM Fasteners at PennEngineering (jmckenna@pemnet.com). www.pemnet.com

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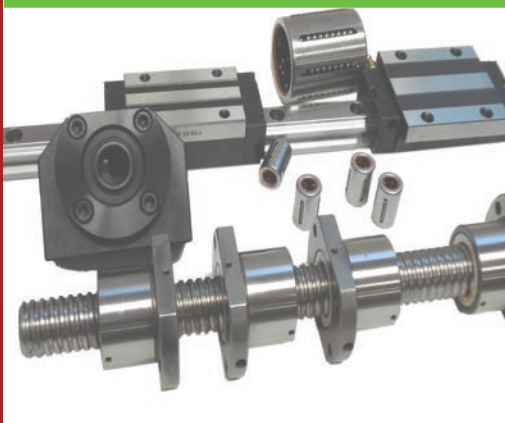
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Calculating scenarios with MapleSim 6

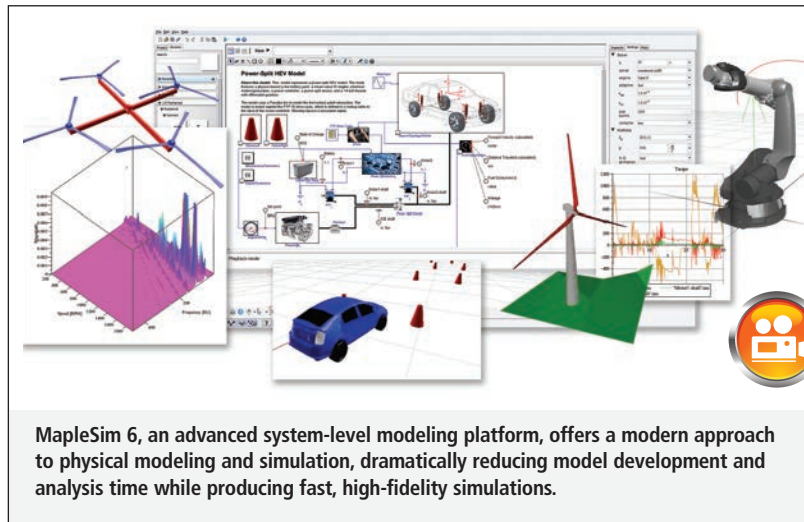
Modelica language for component-oriented modeling of complex systems is supported

When personal computers began to proliferate in the late 1980's, two professors at Waterloo University realized that their number-crunching capabilities were ideally suited to the job of... well, of number crunching.

Processing of complex mathematical analyses including algebraic, differential and simultaneous equations

Accordingly, they formed a company called Waterloo Maple Inc. Its Maple software product became very successful in markets that required the processing of complex mathematical analyses including algebraic, differential, and simultaneous equations. In fact, it now became possible to rapidly perform calculations that were not previously possible because of the geologic time frames required to process things manually.

As Maple evolved, MapleSoft also



MapleSim 6, an advanced system-level modeling platform, offers a modern approach to physical modeling and simulation, dramatically reducing model development and analysis time while producing fast, high-fidelity simulations.

introduced their MapleSim (www.maplesim.com) product. It is used to relatively easily create simulations of mechanical, electrical, hydraulic, magnetic, and thermal systems including some or all of the above in a single simulation by using a building-block approach.

MapleSim produces the necessary equations, passes them to Maple to be crunched, and then displays the results in a variety of graphic and animation formats.

The most prominent feature in their

latest release, MapleSim 6, is greatly increased support for Modelica. In case you hadn't heard about Modelica, here's a bit I cut and pasted directly from <http://en.wikipedia.org/wiki/Modelica>. As I used to tell my students, plagiarism is okay as long as you credit it.

"Modelica is an object-oriented, declarative, multi-domain modeling language for component-oriented modeling of complex systems, e.g., systems containing mechanical, electrical, electronic, hydraulic, thermal, control, electric power or process-oriented

subcomponents. The free Modelica language[1] is developed by the non-profit Modelica Association.[2] The Modelica Association also develops the free Modelica Standard Library[3] that contains about 1280 generic model components and 910 functions in various domains, as of version 3.2."

A major problem with any computer simulation in any field is that they can be a classic case of GIGO (Garbage In, Garbage Out). Feed the wrong information to the wrong formulas and it will happily produce the wrong answer, as long as your syntax is correct. You'd be surprised (and horrified) at how many students think a 3-metre-long beam can deflect 27 million kilometres.

MapleSim 6 goes a long way towards helping engineers and designers offset this problem. For example, it now includes a view that lets engineers instantly see the Modelica code that matches any component or subsystem within their model. Sometimes two wrongs do make a right (usually it takes three or four) and so good input may produce what appears to be good output, but somewhere in between things wander badly off course and then back on. In our earlier example, students were able to produce reasonable stress values because their original error now worked in reverse.

In addition, MapleSim 6 users can now dive in and pick up a simulation at any point instead of having to run the whole thing again, so they can easily fine-tune portions of it.

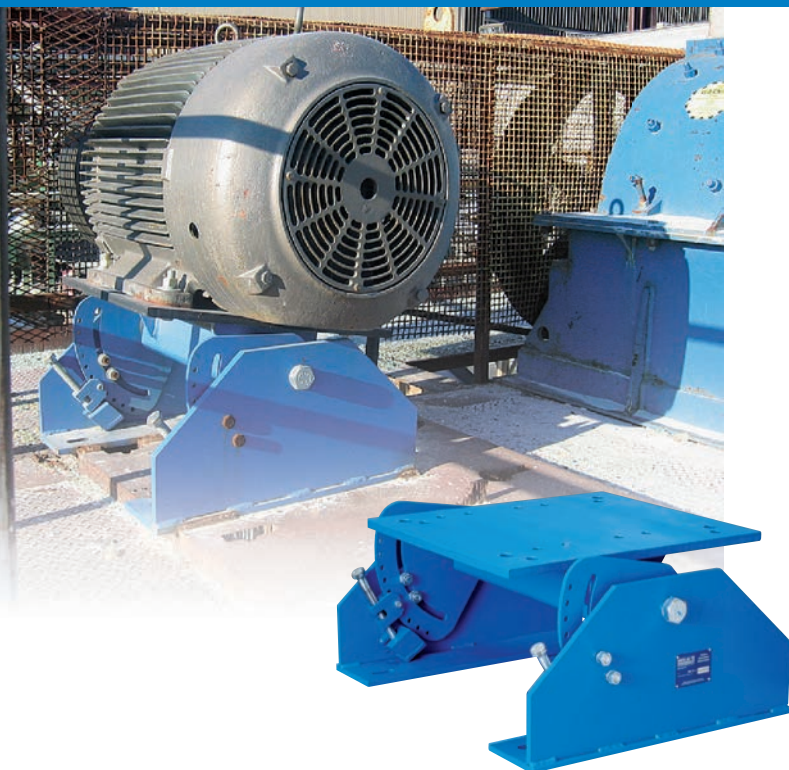
Optimizations and simulations can be run in parallel, taking advantage of multiple CPU's for faster processing.

MapleSim 6's tighter integration means that it can now open and directly use Modelica files, it can save any MapleSim model as a Modelica file, and it can export MapleSim models as FMI (Functional Mock-up Interface, developed by the Modelica Association) files that are understood by other FMI tools. Also released with MapleSim 6 are several connector tools to export MapleSim files to a number of other products.

Computer simulations are easy to produce. MapleSim 6 makes it much easier to produce GOOD simulations. **DPN**

Bill Fane is (bill_fane@bcit.ca) is a software reviewer and retired mechanical engineering instructor at Burnaby, BC-based BCIT.

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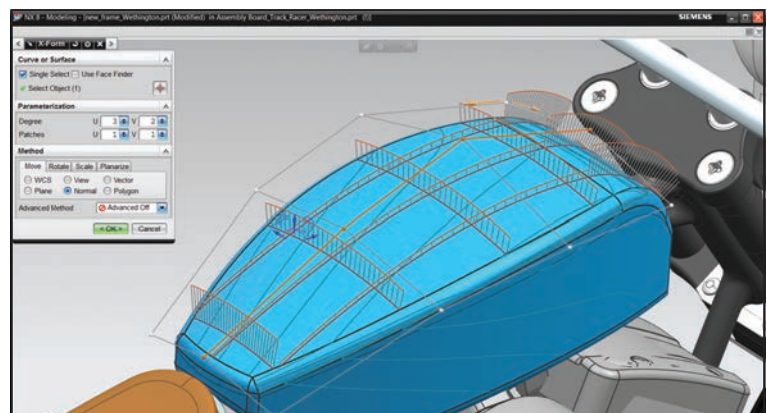
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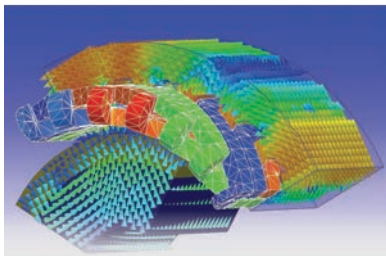
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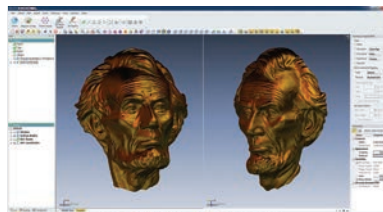
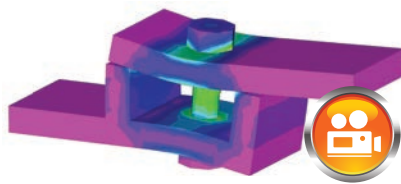
ANSYS has released version 14.5 of its multiphysics software. ANSYS TGrid functionalities are integrated in the ANSYS Fluent environment in version 14.5 to further reduce pre-processing time. CAD file readers and new surface meshing capabilities are also available in a single user environment.

www.ansys.com

FEA software increases engineering productivity

The latest release of Siemens PLM's Femap software is said to increase engineering productivity in product development simulation and analysis due to significant enhancements in data handling and graphic performance. Femap V11 speeds data access by up to twenty five times and reduces memory usage by up to 80%, delivering a smaller more manageable model file. Dynamic rotation of large models is also at least 5x faster than the previous version.

www.siemens.com/plm/femap



3D scanner tool simplifies reverse engineering

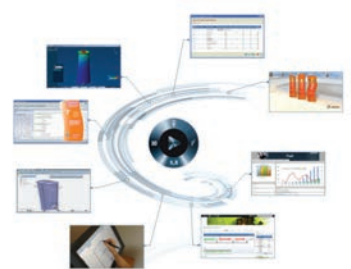
3D Systems has announced the availability of Go!MODEL, a 3D reverse engineering and design tool developed in partnership with Creaform, specifically for its Go!SCAN 3D portable scanner. Using the integrated Go!MODEL and Go!SCAN 3D package, users can capture physical objects and directly model high quality renderings and designs that are suitable for 3D printing.

www.goscan3d.com

Consumer packaged goods design platform

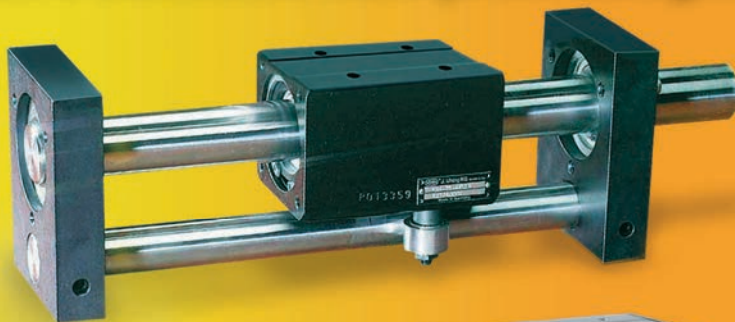
Dassault Systèmes has launched an application design environment for consumer packaged goods companies called "Perfect Package." Based on Dassault Systèmes' 3DEXPERIENCE platform, it helps integrate the fragmented package design process across the entire supply chain to enable winning package designs and faster time to market.

www.3ds.com



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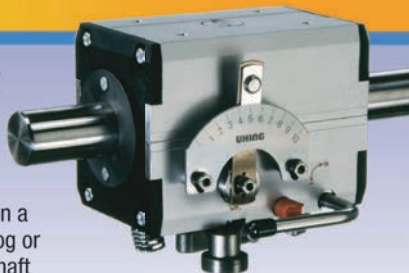


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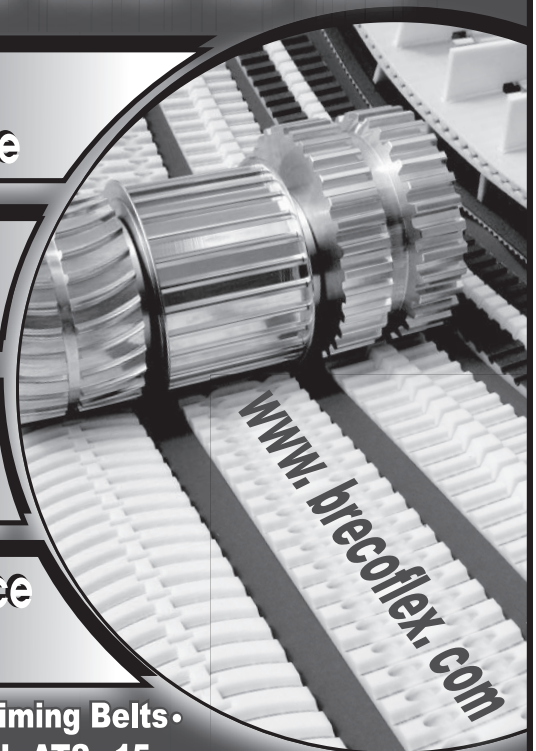
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With the recent additions of the AKD PDM and AKD BASIC to its servo drive line, Kollmorgen now has scalable solutions said to enable machine designers to provide from single axis control up to 128 axes of fully programmable and synchronized motion. AKD PDM combines a multi-axis motion controller, complete IEC61131-3 soft PLC, EtherCAT master, and AKD servo drive. AKD BASIC incorporates a programmable single-axis motion controller into the existing AKD drive footprint, eliminating the need for a separate PLC.

www.kollmorgen.com



Linear motors, actuators, modules and gantries catalog

Dunkermotor, now part of AMETEK Precision Motion Control, has released its first ServoTube linear motors and actuators catalog that cover 1346 standard product configurations of tubular linear motors, actuators, modules, components and gantries. The ServoTube linear motor has a rod filled with rare-earth magnets and a forcer with coils energized as 3-phase windings.

www.dunkermotor.com

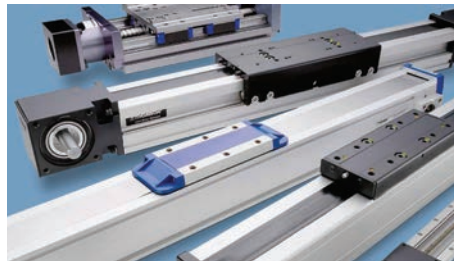
Microstepping drive, accessories

AutomationDirect's SureStep line of motion control products now includes a low cost of entry digital stepper drive in a compact package. The standard stepper drive operates with

high-speed pulse input signals (Step and Direction, or jumper-selectable CW/CCW step) and has

a selectable resolution range of 200 to 20,000 steps per revolution. Additional features include a switch-selectable automatic self-test, digital filters to prevent position error from electrical noise on command signals, and optically isolated I/O.

www.automationdirect.com/stepper-drives



Guide to linear motion systems

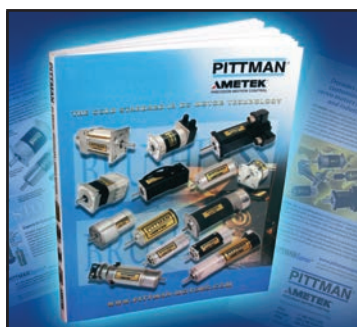
Thomson has introduced the 230+ page Linear Motion Systems catalog. The guide details the features, specifications, dimensions and ordering information for the company's linear units and accessories. Thomson produces linear ball bushing bearings and profile rail bearings, shafting, ground and rolled ball screws, linear actuators, gearheads, clutches, brakes, linear systems, and related accessories.

www.thomsonlinear.com

Brush, brushless DC motor catalog

Pittman Motors has introduced a DC brush and brushless motor catalog, available on request. The new catalog serves as a "starting point" for helping mechatronics and motion control engineers design a DC motor solution suited for a particular application. The catalog also contains detailed sections on readily available options including gearboxes, encoders, and brakes.

www.pittman-motors.com



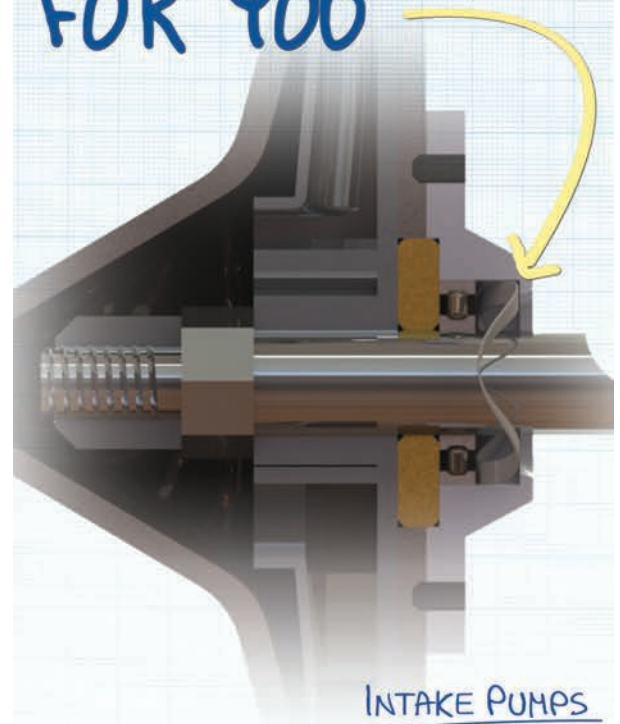
Pocket PLC offers daisy-chaining

Galil Motion Control has announcing the latest product in its RIO Pocket PLC series, the RIO-47300. The unit includes more I/O, screw terminals and two Ethernet ports which allow management of an unlimited number of inputs and outputs without an external Ethernet switch. Digital inputs and outputs on the RIO-47300 are increased from 16 to 24 each for a total of 48 optically isolated digital I/O.

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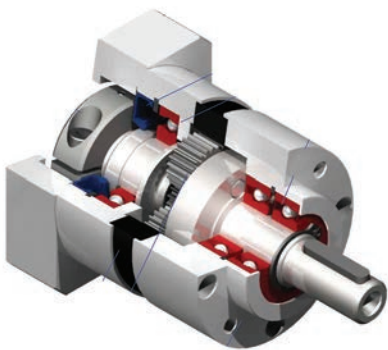
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GAM Gear has announced a two-week standard delivery program for its PE series of inline planetary gear reducers. The series is said to have precision gears and robust dual output bearings making it a suitable option for most servo and stepper motor applications where performance and durability are required.

www.gamweb.com

Slotless brushless DC motors

Nanotec Electronic U.S. Inc. has announced a line of slotless BLDC motors. Two models in NEMA 6 and NEMA 11 sizes are available. Nanotec's slotless BLDC motors offer higher speeds as compared to standard BLDC motors. Since there is no iron core, the inductivity of the motor is very low and the current increases very quickly in the windings. The DS16 slotless BLDC motor offers an output of 24 W at 25,000 rpm, the speed of the DS28 model is 14,000 rpm at 75 W.

www.nanotec.com



Variable speed motors up to 5 hp, 3600 rpm

NovaTorque Inc. has introduced Gen2.0 PremiumPlus+ Electronically Commutated Permanent Magnet (ECPM) motors will be available in high speed 3 and 5 hp 2400 rpm (maximum speed 3600 rpm) models. Also available in 3 and 5 hp 1800 rpm models (maximum speed 2700 rpm). Driven by variable frequency drives, the motors boast motor-only rated point efficiencies of 93 and 92% for 3 and 5 hp versions respectively. Motors are packaged in NEMA frame sizes.

www.novatorque.com

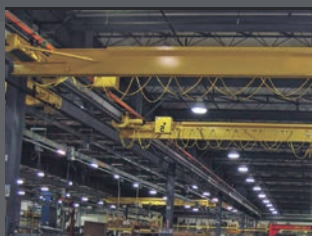
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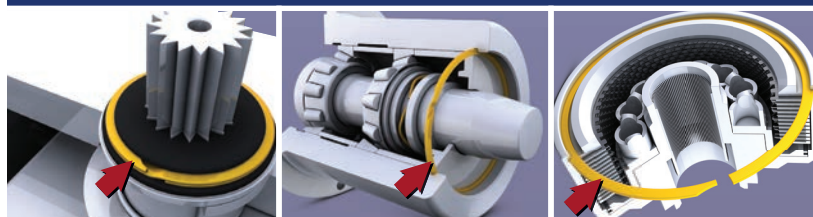
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Adhesive for cold bonding in conveyor technology

Increased reliability and safety despite simplified application is promised by the new adhesive Conti Secur Premium, which is used for a variety of different cold bondings on conveyor belts. The one-component adhesive based on polychloroprene to offer two main advantages – firstly in terms of metering, secondly in terms of application and handling. The product can be used in a range of different applications, including rubber-to-rubber bonds and rubber-to-metal bondings, as well as for cold splicing of fabric ply belts.

www.contitech.de



Weight-saving hollow alignment dowels

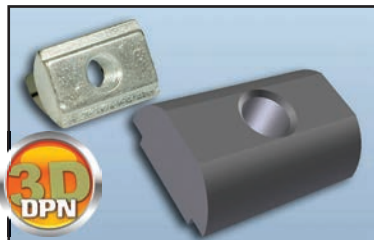
Spirol Series DB100 Dowel Bushings, Series SD200 Spring Alignment Dowels, and Series GD100 Ground Hollow Dowels are used to locate components with respect to each other. For Dowel Bushings applications, the hollow design permits a fastening screw or bolt to pass through the inside diameter eliminating the need to drill a separate hole. Ground Hollow Dowels are used where centerline tolerancing and precision alignment are required. They are designed to be direct replacements for standard Ground Solid Dowels per ISO 8734 for alignment applications. The hollow dowels are 50% lighter and 30% less expensive than solid dowels.

<http://spirol.com/s/dpn-dowel/>

Alternatives to riveting or spot welding join thin metal sheets

PEM SpotFast self-clinching fasteners enable two sheets to be joined permanently in a flush-attachment connection without protrusions on either side. They are suitable for attaching metal sheets too thin to weld, fasten sheets of unequal thicknesses, join dissimilar metals, attach ultra-thin metal sections, or join metal sheets to PCB or plastic panels.

www.pemnet.com



Nut with spring washer prevents movement

J.W. Winco Canada, Inc., announced it now offers GN 506.2 T-Nuts with Spring Washer, in metric sizes. GN 506.2 T-nuts are designed for use with aluminum extrusions. Units can be slid into position, i.e., inserted at any point along the slot. The spring washer prevents an unwanted movement of the nut in the slot, which is highly desirable on a bed with the T-slots in a vertical position. The RoHS compliant T-nuts are made of C45K, zinc plated, blue passivated steel. The spring washers are stainless steel, European Standard No. 1.4310 (American Standard Series 301).

www.jwwinco.ca



Fastener replacement for traditional captive screws

DIRAK has introduced a line of SNAP-LINE fasteners said to securely join two metal panels. Multiple options are available, including a line of SNAP-LINE Captive Fasteners that are suitable replacements for traditional captive screw and nut applications commonly found on 19 in. racks in the telecommunications/computer industries. Installation requires no tools or hardware.

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Corvette: 7th gen of an iconic sports car

The seventh generation (C7) of Chevrolet's iconic two-seater Corvette was unveiled at this

year's North American International Auto Show in Detroit. It's been a long journey for a car that began as a General Motors styling concept created by legendary stylist Harley Earl for their 1953 Motorama show in New York City's famed Waldorf-Astoria hotel.

The vehicle was so enthusiastically received that GM rushed it into production in less than six months, facilitated by a body made of a relatively new material called fibreglass. What began as a temporary time and cost saver became a permanent Corvette hall-mark.

The 2014 Stingray (the first Sting Ray – two words – was launched in 1963) has a little of the old, but mostly it's new. The most

famous old is an engine that traces its roots back to Chevrolet's legendary 1955 "small block" V-8. In an era now dominated by small, high-revving double overhead camshaft, multi-valve masterpieces, the Corvette's five-main-bearing V-8 has the same 90° bank angle and two pushrod-activated valves per cylinder it had 59 years ago. And although it has grown from 4.3 to 6.2 litres and from 195 to 450 hp – without resorting to forced induction – it retains the same 111.8 mm bore spacing.

GM doesn't apologize for the traditional layout, noting that it produces an engine that is both compact and light – about one pound per horsepower – in spite of such mass-adding technology as variable valve timing and cylinder deactivation. And the small-block has an enviable competition record against the world's best cars, so it's hard to argue with the logic, although in the American way, Chevrolet compensates somewhat for mechanical finesse by using larger displacement.

The cylinder block and heads are aluminum instead of cast iron and fuel is injected directly into the cylinders. As an aid to fuel economy the V-8 has cylinder deactivation (which GM calls "active fuel management") that cuts out half the cylinders by collapsing the



(Above) The all-new 2014 Chevrolet Corvette Stingray's provocative exterior styling is as functional as it is elegant; every line, vent, inlet and surface has been optimized to enhance the car's overall performance.



(Left) The technologically advanced foundation of the 2014 Chevrolet Corvette Stingray is an all-new aluminum frame structure that is 57% stiffer and 45 kg lighter. The greater torsional rigidity reduces unwanted noise and improves ride and handling.



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valve lifters under low-load cruising operation. A variable-displacement vane-type oil pump maintains constant oil pressure under all conditions.

The Corvette has four-wheel independent suspension, but it may come as a surprise that it uses leaf springs. They are not, however, the old multi-leaf bouncers associated with pickup trucks, but a highly engineered, composite single leaf mounted laterally front and rear. Spring configuration, whether coil, air, torsion bar or leaf, isn't really that important, and Corvette engineers say the advantages of its leaf are low mass, compactness for easy to packaging, and a low centre of gravity. It does not perform any wheel location functions.

Transmissions are a 7-speed manual or 6-speed automatic in unit with the differential. The automatic is the traditional torque converter type, not the newer dual-clutch automatic found in other high performance cars because GM says there was no dual-clutch type that would fit, and would cope with the V-8's high fat torque curve. The manual includes a cancellable rev-matching function that anticipates the driver's next upshift and matches engine revolutions to that ratio.

An aluminum frame comprised of five sections, each section manufactured either by hydroforming, casting or extruding, contributes to weight saving. Different gauge wall

thicknesses allow optimized stiffness to meet the various strength requirements at different points in the frame.

Close to 4 kg was saved by hollow cast aluminum arms in the short-and-long-arm suspension. Other low mass contributors are carbon fibre roof and hood panels, but making the whole body of carbon fibre would have been too expensive.

The composite sandwich floor now used is lighter and stiffer than the former balsa wood. New electrically assisted power steering also contributes, and the estimated weight of the 2014 Corvette is 1588 kg.

There will be two levels of Corvette, the base Stingray and the more performance oriented Z51 version aimed at competition work. The latter will have such features as oil coolers for the transmission and differential and larger wheels and disc brakes.

Performance figures are almost academic for public road use, but zero to 100 km/h should come in under four seconds and top speed is expected to easily exceed 300 km/h.

Bill Vance is a founding member of the Automotive Journalists Association of Canada & author (bvance1@cogeco.ca).

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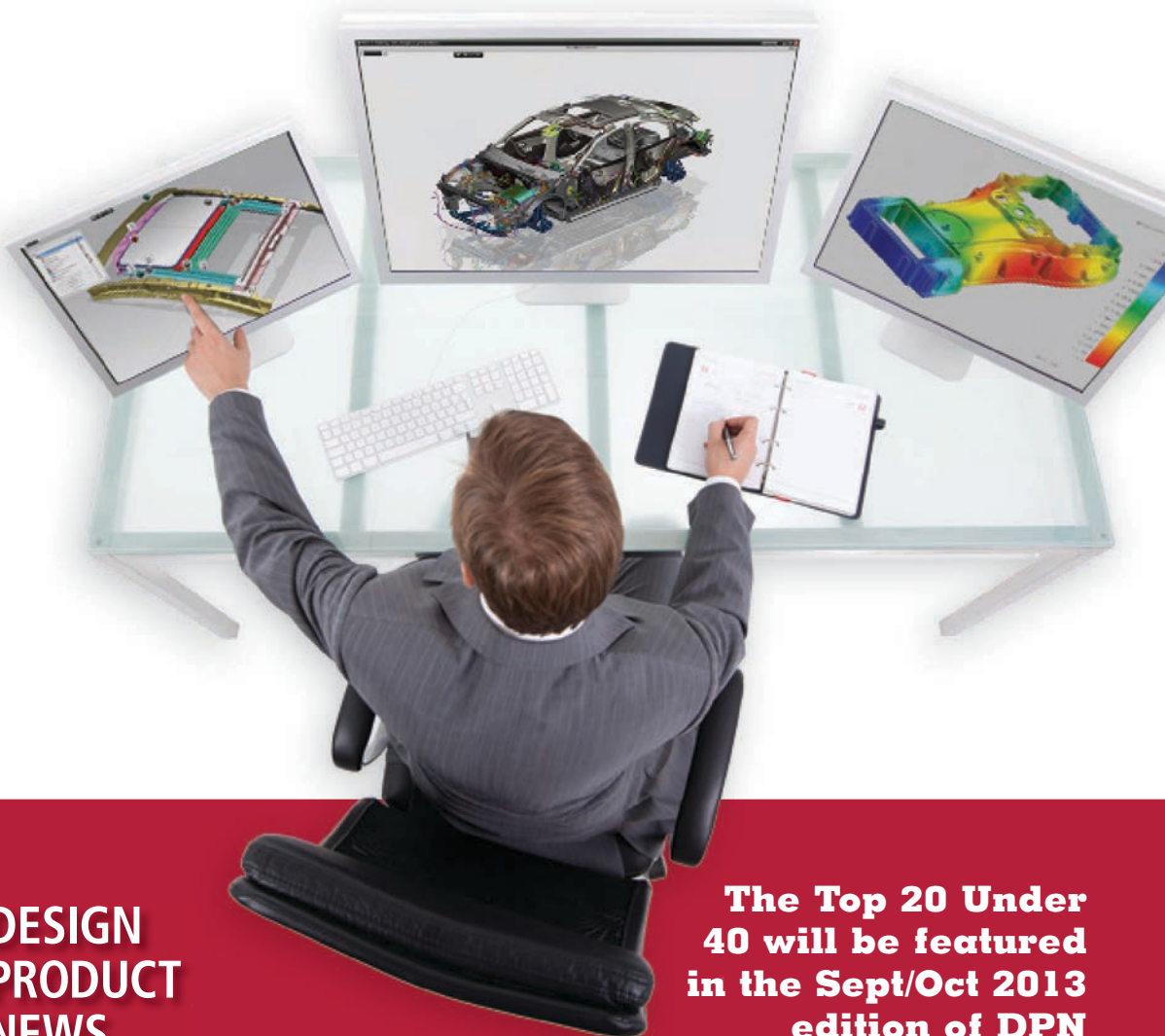
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Minimally invasive surgery speeds recovery

Miniaturization providing more internal body access

An increasing number of hospital procedures are currently undertaken with minimally invasive surgery (MIS). MIS is not entirely new.

Early attempts to avoid the grand incision were attempted more

A surgical encounter as uncomplicated as a trip to the dentist

than 100 years ago, but packing the requisite amount of equipment through a patient's mouth or bottom was often destructive and problems were exacerbated by burning the patients inside when the internal lights were switched on.

Mercifully, this has changed. A laparoscope now consists of a miniature video camera with a powerful light and lenses to magnify internal body structures. The camera sends images of the inside of the body to a monitor in the operating room, enabling the surgeon to

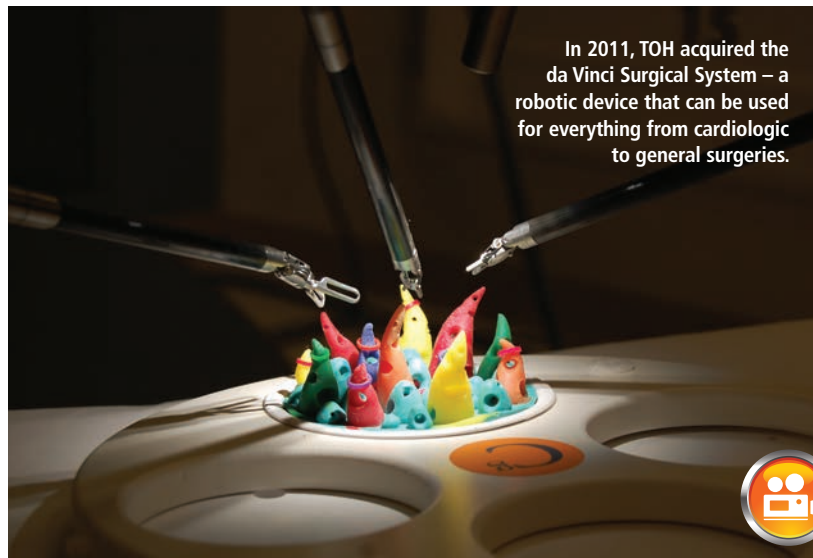
direct the progress of specialized surgical instruments that can be inserted through the laparoscope, and through small incisions nearby.

The Ottawa Hospital, (TOH) is a leading centre for MIS, not only for Canada but increasingly for the world. In 2006, Dr. Éric Poulin, Head of the Department of Surgery, made the statement "We want to make a surgical encounter as uncomplicated as a trip to the dentist. Can you imagine having an operation that lays you up for six weeks or three months, versus an operation where you can go back to work next week?"

Since then, surgical technology has progressed by leaps and bounds, says Dr. Poulin. Long before MIS, a gallbladder operation would result in a hospital stay of nine days. Now, more than 90 per cent of these patients are treated as outpatients with no hospital stay at all.

Based on a strategic plan TOH made minimally invasive surgery a major priority and set about recruiting new physicians, building new facilities, and bringing in some of the best technology in the world.

In February 2007 a young



In 2011, TOH acquired the da Vinci Surgical System – a robotic device that can be used for everything from cardiologic to general surgeries.

patient and his family, were shocked to learn that his blurred vision was the result of a brain tumor. The patient had undergone two surgeries in his home country of India but no significant portion of the tumor was successfully removed in either operation. The tumor was very deep and doctors were unable to access it.

In 2012, the patient came to The Ottawa Hospital to be treated by one of the foremost surgical teams in the world. He was referred to TOH surgeons Dr. Amin Kassam, Head of the Division of Neurosurgery,

and Dr. Martin Corsten, Head of the Department of Otolaryngology (head and neck surgery).

Using the revolutionary NICO Myriad (www.niconeuro.com), a tiny but incredibly precise multi-functional device that acts as scissors, a dissector and suction device in one, the team was able to operate through the patient's nose and sinuses to remove 90% of his tumor with little impact to the surrounding brain tissue. "I feel great," said the patient when he was discharged from the hospital just three days later.

"It's not just about avoiding incisions, because folks can live with incisions," says Dr. Corsten. "Minimally invasive surgery brings a dramatically different hospital stay – it is a tremendous advancement."

In 2011, with the help of community donations, TOH acquired the da Vinci Surgical System – a robotic device that can be used for everything from urologic, gynecologic, and cardiothoracic and general surgeries (www.intuitivesurgical.com). It is not, as some people may think, a robotic surgeon but a system that enables a surgeon to perform every aspect of the surgery through sophisticated controls and a high-definition 3D image – all connected to miniature instruments that operate through tiny cuts the size of a keyhole.

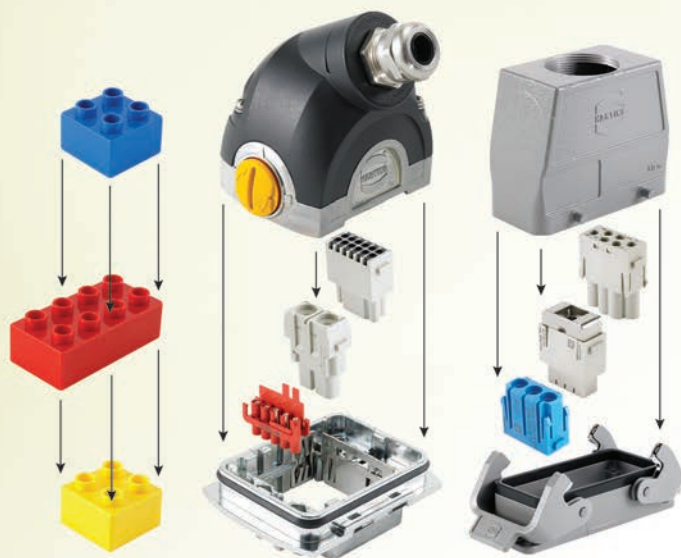
Having the robot at TOH means that patients are experiencing better outcomes following a surgery and a quicker return to daily life. **DPN**

Mark Sunderland is President of Ottawa-based BioMedical Industry Group (mark.sunderland@biomedgroup.com).

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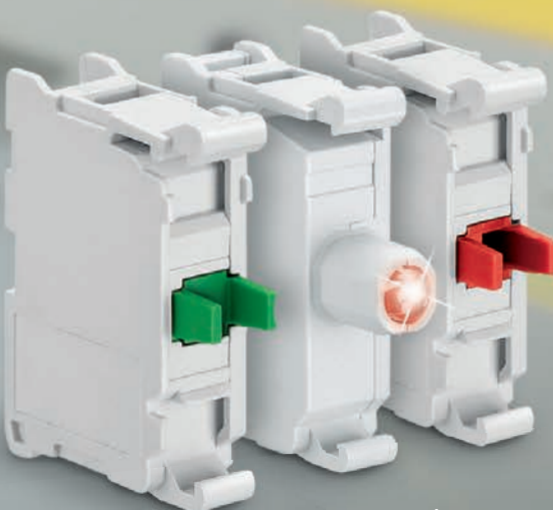
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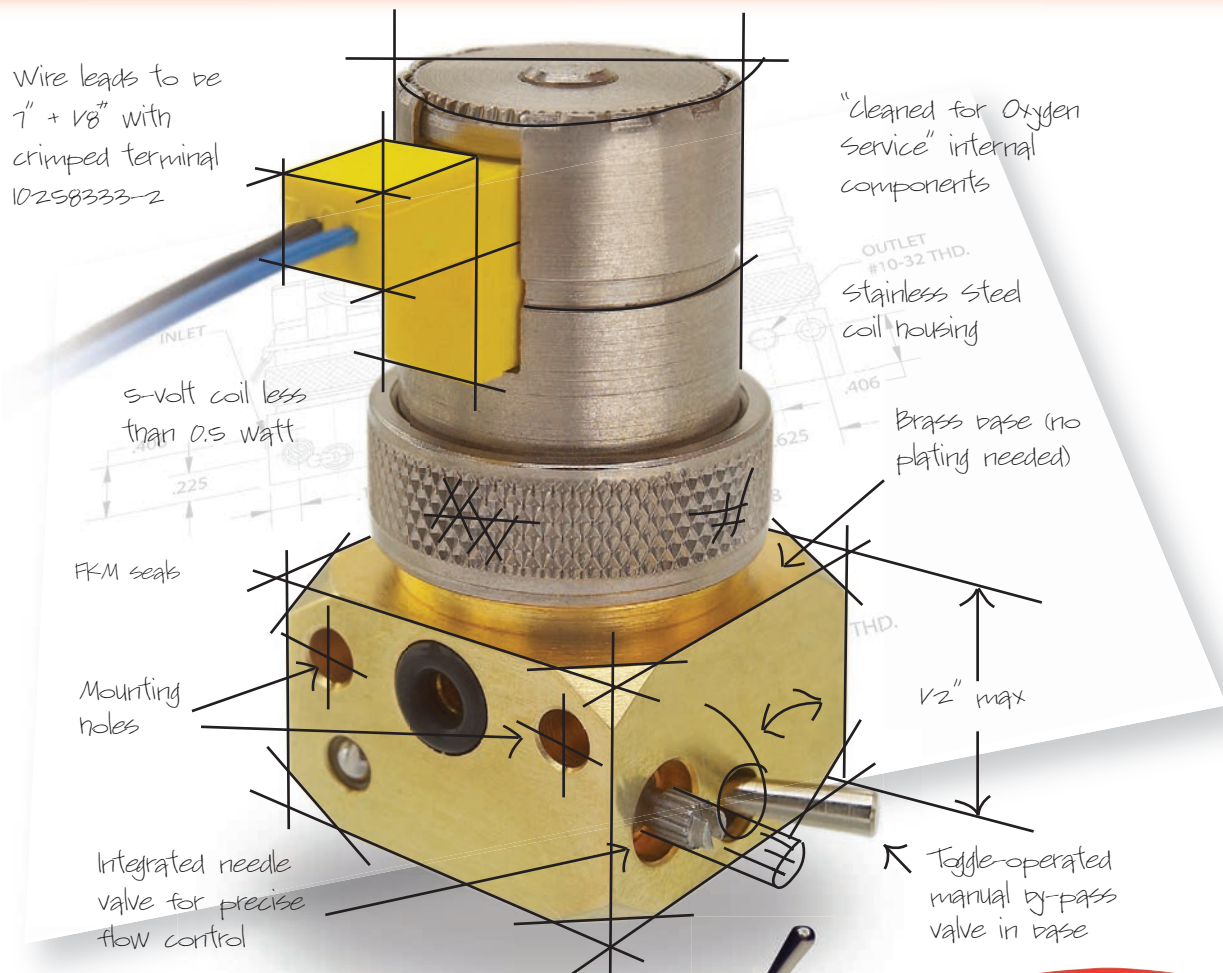
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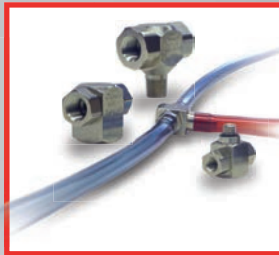
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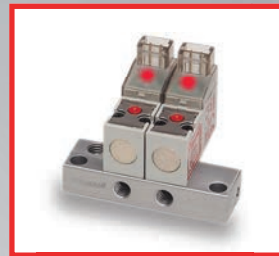
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