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Confocal measurement system

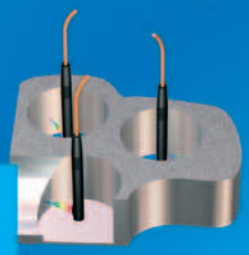
- Measuring ranges from 0.12 to 24mm
- Nanometre resolution
- Tiny, constant measuring spot 7µm
- Measure any target diffuse, specular and liquid

Typical applications:

Measuring of glass and mirrored surfaces

Measurements inside bores and holes

One-sided thickness measurement of transparent materials (e.g. glass)



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The world's first miniature sensor with just a 4mm outside diameter

Laser profile sensors

- Measuring ranges from 25 to 245mm
- Lightweight and compact sensors
- Very high measuring rate of 256kHz
- 3D view of the target
- Micrometre resolution

Typical applications:

Position and contour measurement, edge detection, web width, groove width / depth, welding seam inspection, welding robot control

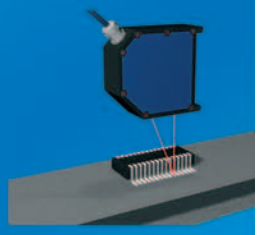
scanCONTROL 2700
Most compact design with integral controller

Laser triangulation sensors

- Measuring ranges from 2 to 1000mm
- Models with integrated controller
- From low-cost entry level models up to highest precision in class
- Analogue and digital interface
- In built synchronisation for thickness measurement

Typical applications:

High precision measurements in automation, positioningand in-process quality control



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Micro-Epsilon UK Ltd. • info@micro-epsilon.co.uk

Editor
Paul Fanning
pfanning@findlay.co.uk

Group Technical Editor
Dr Tom Shelley (PhD, CEng)

Group Editor
Graham Pitcher
gpitcher@findlay.co.uk

Art Editor
Martin Cherry

Technical Illustrator
Phil Holmes

Advertising sales
01322 221144

Sales Manager
Luke Webster
lwebster@findlay.co.uk

Account Managers
Tricia Bodsworth
tbodsworth@findlay.co.uk

Classified Sales Executive
James Slade
jslade@findlay.co.uk

Production Manager
Heather Upton
hupton@findlay.co.uk

Circulation Manager
Chris Jones
cjones@findlay.co.uk

Publisher
Ed Tranter
etranter@findlay.co.uk

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Dyson doesn't exist in a vacuum

Paul Fanning, Editor (pfanning@findlay.co.uk)

As this issue goes to press, the news has emerged that Sir James Dyson is seeking to double the number of scientists and engineers employed at his UK site in Malmesbury, Wiltshire.

Clearly, this is to be welcomed. The news that the company is seeking to recruit 350 new engineers to work on research and development projects, taking its specialist engineering staff to 700 suggests that Sir James is serious in his commitment to transform Britain into Europe's leading hi-tech exporter.

For many, Dyson as a company offers the perfect example of where the UK's industrial future lies: cutting edge; innovative; and with products that are desirable (even glamorous) and capture the imagination. Critics, of course, will with some justification point out that this is a bit rich when talking about a company that transferred its manufacturing arm from the UK to the Far East, but proponents might point out this expansion and the company's record as the country's second biggest filer of patents after Rolls-Royce and say the strategy has allowed the company to do exactly what it promised and invest in R&D in this country.

The fact remains that the image projected by a company like Dyson is precisely the one that UK engineering needs to promote if it is going to attract the people it so desperately needs over the next few years. After all, if the possibility of working for a company like Dyson is what helps a young person choose engineering as a career path, then engineering as a profession has cause to be grateful.

As Sir James himself puts it in a quote that could apply to the country as a whole rather than just his company: "We're creating a lot of new technology that we need to incorporate into products and we need engineers to do that."

Got a story? Then drop us a line at eurekanews@findlay.co.uk or call us on 01322 221144

Briefs

YOUNG ENGINEER HAS A GRAND IDEA

A young entrepreneur has scooped a national award after creating an innovative steering design for wheeled vehicles. AAAS Steering (Annularly Arranged Articulating Segments) promises improved manoeuvrability combined with reduced wear and tear on tyres, which means a longer tyre life, decreased fuel consumption and a reduction in toxic fumes created by disposing of old tyres. James Martin, aged 25, impressed the panel of judges in the Shell LiveWIRE Grand Ideas Awards with his business idea and has been awarded £1,000 to develop AAAS Steering. Martin won an Engineering Leadership Award in 2007.

RENEWABLES FOCUS AT ALL-ENERGY

All-Energy 2010, the UK's largest renewable energy exhibition and conference, is being held 19th-20th May at Aberdeen Exhibition and Conference Centre. New features of this year's show, the tenth in the annual series, include a growing programme of 'side events', such as a series of free market briefings and business meetings throughout the show's duration.
www.all-energy.co.uk

DESIGN WORKSHOPS AT SHEETMETAL SPECIALIST

KMF (Precision Sheet Metal) Limited is hosting a series of Design Engineering Workshops, supported by four of its key technology partners: Wilson Tool International; Trumpf; Salvagnini UK & Ireland; and Amada UK. Those interested in attending the next Design Engineering Day, to be held at KMF's training centre, located next to its Newcastle under Lyme manufacturing facility, on 29 September 2010 should contact Graham Leese on 01782 569060 or e-mail g.leese@kmf.co.uk

Queen's Awards honour UK manufacturing excellence

UK industry has been celebrated with the announcement of the Queen's Awards for Enterprise winners for 2010.

The awards are the UK's most prestigious awards for business performance and are announced to coincide with Her Majesty's birthday on 21st April. The awards are given annually to companies selected by The Queen, on the advice of the Prime Minister, who is assisted by an advisory committee that includes representatives of Government, industry and commerce, and the trade unions.

Dynex Semiconductor received the Queen's Award for Enterprise in the International Trade category, as did Shropshire based Proto Labs.

Metering technology specialist, Sentec was also honoured in the International Trade category in recognition of the company's growth over the last three years, over which the company more than trebled its overseas earnings to £4.3million.

Parker domnick hunter, a division of Parker Hannifin, also triumphed in this category in recognition of the company's success in developing new export markets for its ranges of gas separation technologies, including the MAXIGAS nitrogen generation systems.

Delcam has been presented with the Queen's Award for Enterprise in the Innovation category in recognition of the continuous development of its

software for the design and manufacture of dental restorations (pictured). This latest recognition for the company follows the receipt of Queen's Awards in 2003 for the development of ArtCAM and for PowerINSPECT in 2004.

Another company to receive an award in this category is DuPont for its continuous development of DuPont Solamet photovoltaic metallisation paste – a key component in increasing the energy efficiency of solar cells.

An Innovation Award was also made to Douglas Equipment Limited for the design and manufacture of equipment for manoeuvring helicopters onboard ships. The equipment, a flight-deck handler, is lower in profile, lighter and more mobile than traditional cable and winch, "embedded", systems. It also wins the Award for International Trade.

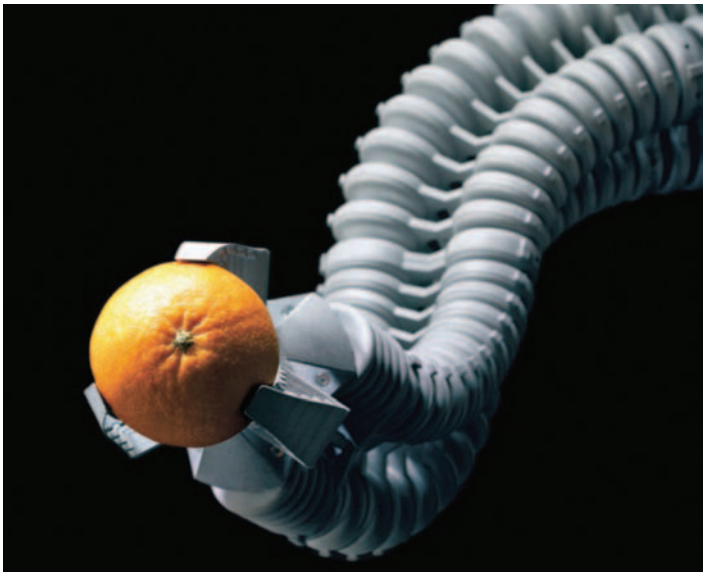
UK company to lower cost of solar power

Solar Press has announced its plans to commercialise low-cost photovoltaic modules at a fraction of the cost of the current state of the art and which can be easily integrated into everyday products.

The obstacle to successful photovoltaics has always been the high capital cost of installing and producing photovoltaic power using currently available technologies. Less than 1% of the world's photovoltaic production capacity is currently installed in the world's underdeveloped regions where it is needed the most. Even in industrialised affluent economies, photovoltaics has required government subsidies to become economically viable. Solar Press's innovations in photovoltaic module design and processing techniques are intended make solar electricity products affordable in all markets without the need for subsidies.

"Our module designs and processing technology make use of readily available industrial infrastructure that does not require massive capital investment and long payback periods. In addition, no scarce minerals are needed. As a result, we can offer solar modules at prices which are affordable everywhere. Our first target is integrating solar power into off-grid applications for the billions of people who do not have any access to or lack reliable grid electricity", explains the founder CEO Omar Cheema.

The company has been seed funded by and created with the strategic support of Carbon Trust Enterprises. An international group of scientific innovators, with world-leading R & D capabilities, is strengthening the company's product development roadmap with new technology innovations.
www.solar-press.com



Bionic assistant may revolutionise handling

Festo has launched its latest bionic concept project, known as the Bionic Handling Assistant, which offers a completely flexible and safe means of moving objects from one position to another.

According to Festo, it could revolutionise the design of materials handling systems and, potentially, opens up a host of new application areas involving direct, non-hazardous contact between humans and robots. These include equipment for use in hospitals, rehabilitation and care homes for the elderly, as well as agricultural machinery and even domestic appliances – anything, in fact, that requires risk-free mechanical assistance.

The Bionic Handling Assistant is the latest innovation to spring from Festo's Bionic Learning Network, which is an alliance of educational establishments and specialist companies tasked with exploring bionic solutions for automation applications of the future. The inspiration for the Bionic Handling Assistant comes from elephants' trunks.

The Bionic Handling Assistant employs innovative biomechatronics technology and introduces a new concept, whereby direct contact between machines and their human operators – whether accidental or intentional – is no longer hazardous. In the event of a collision with a human, the Bionic Handling Assistant yields immediately, without modifying its desired overall dynamic behaviour, then resumes its operation. Unlike heavy industrial robots, the Bionic Handling Assistant is characterised by an excellent mass-payload ratio, provides smooth operating motion with more degrees of freedom, and makes very efficient use of resources.

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Lenze ready for IE2 efficiency

Lenze is ready to meet the efficiency level IE2 with a range of L-force geared motors that meet the efficiency levels and also give many standard options. The L-force range covers helical, shaft mounted helical, bevel, helical bevel and helical worm design in powers up to 45kW. A range of modular options such as brakes, blowers and encoders is available. Many thousands of models with output torques from 2 to 14000 Nm are ready for orders, and an easy changeover from IE1 to IE2 motor is possible.

The new efficiency level IE2 (roughly corresponding to the old Eff. 1) represents an efficiency gain of 2 to 3% over the lower level of IE1. These Lenze motors have efficiencies in a band from 80 to 92%. Costs are inevitably higher, as the motor construction requires more copper, but on a 2.2kW geared motor the extra cost for IE2 represents typically an increase of less than 10%.

For reasons of compact dimensions and low costs, Lenze use AC motors that are integrated into the gearbox casing. Output torques and speeds are offered at 50Hz, 60Hz for America and 87Hz, a frequency that gives increased power and dynamics with the possibility of purchase cost reductions. Changing to IE2 causes small changes in the electrical data (lower running currents and higher starting currents) and also the rated motor speed.

Filter improves safety and performance

Parker Hannifin has developed an innovative duplex filter system designed to improve both safety and filtration performance in a range of industrial applications. The EADPF iprotect filter incorporates Parker's hydraulic solenoid valve technology, making it possible to switch between filters remotely, and optimising productivity as a result.

While conventional duplex filters require the main duplex valve and equalizing line to be manually operated, the Parker EADPF iprotect filter improves safety and efficiency by making remote operation possible. Furthermore, this process can be fully automated, cutting maintenance requirements and minimising machine downtime as a result.

When one filter element becomes contaminated, the in-built filter condition indicator sends a signal to the duplex valve unit, telling it to switch to the other filter with a clean element. This enables effective filtration to continue without the need for manual intervention. At the same time, a warning signal is provided to the local overall system controller, informing the operator that the contaminated filter element requires replacement. Routine maintenance can then be carried out when convenient.

Sensor measures tensile forces

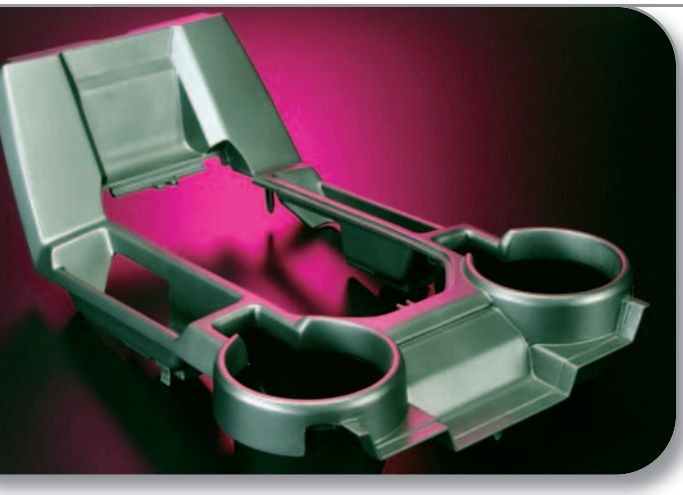
Kistler's Type 9217A sensor uses an ultra-sensitive PiezoStar element to provide precise measurement of compression and tensile forces under the toughest industrial conditions in production process monitoring systems.

With a measuring range of ±500 Newtons and sensitivity of a few millinewtons, the Type 9217A force sensor is equally suitable for use in both production and laboratory applications. The rigid construction ensures that the sensor is resistant to lateral forces and has a high tolerance to bending moments, thus minimizing interference effects. The sensor weighs only 16g, has an outer diameter of 8.5mm, overall length of 28.5 mm and an operating temperature range from -80 to +205°C.

Mounting is via an M10 external thread with a front-end hole tapped M3 to provide simple and flexible adaptation for testing switches, push buttons, plugs, springs, etc, and for highly sensitive force measurement in research and development applications. The sensor is supplied with calibrated measuring ranges of 100% and 10%.

30th anniversary

Prototype Projects celebrate 30 years of providing protoyping and model making solutions



Prototype Projects are experts in providing rapid prototyping and model making services to product designers, engineers and manufacturers throughout the UK and Europe. Established for 30 years with a long-standing reputation, Prototype Projects employs the latest technology and skills to answer the most demanding prototyping and modelling requirements.

We service many industries and currently supply the Automotive, Pharmaceutical, Medical, Computer, Industrial Engineering and Consumer products markets.

Prototype Projects was founded in 1980 to provide a full prototyping service. Following continued investment in technology and skills we provide the most up to date service for rapid prototyping from concept models through to fully functional pre-production prototypes.

We have a passion for providing results to prototyping requirements and deliver customer service with high integrity to an industry where you need more than just technology to supply a solution.

This strategy of continual review and investment in both people and technology has enabled us to provide customer satisfaction for over 25 years. Our service is quality led, working to certified ISO 9001-2000 and beyond.

RP SYSTEMS

We have the latest RP machines and materials allowing us to produce for you highly complex, 3-dimensional parts direct from your CAD data. These can be turned around in a very short time at low cost. The parts produced are of the highest quality and accuracy. These can be finished in our model shop and are excellent for functional testing, product simulation or for casting masters.

STEREOLITHOGRAPHY (SLA)

The Viper SLA enables customers to choose between standard resolution mode for the best balance of build speed and part resolution, and high-resolution (HR) mode for ultra-detailed small parts and features. In addition, the system builds parts with a smooth surface finish, excellent optical clarity, high accuracy, and thin, straight, vertical walls - ideal for a wide range of solid imaging applications.

RIM AND VACUUM CASTING

By creating cost effective soft tooling, usually via a master, we can produce Polyurethane (PU) parts to mimic production materials with the properties you require, from flexible to rigid, clear to coloured and heat and flame retardant. Tooling can be from Silicon, GRP or CNC'd from resin board for longer tool life. Parts can range in size from buttons to bumpers.

RAPID TOOLING

For rapid tooling, we can replicate a component using aluminium, resin which is poured around a master and post cured at high temperature, it can be polished and cored to suit. This can generally be done in approximately 5 working days from master approval.

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As specialists in fast accurate high tolerance machining, we know that you and your products are unique. Because of the special way in which we are structured we can give you a fast a bespoke solution to your CNC requirements. If you need a one off or a batch of parts, we are able to supply what you want from the material you want the time you want!

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Injection Moulding & Tooling

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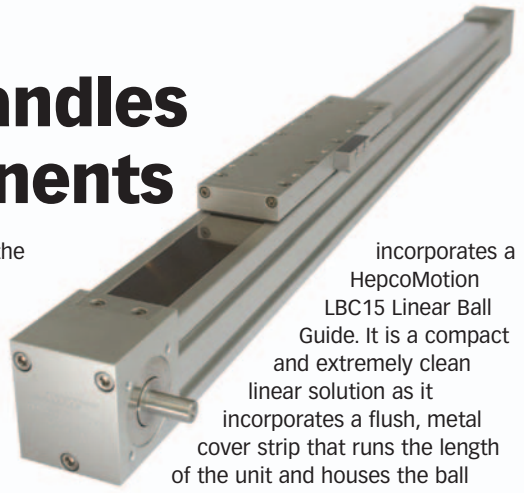
New drive handles small components



With the introduction of a new addition to the SBD Sealed Belt Drive, HepcoMotion is now able to provide performance advantages at an attractive cost to a wider range of automation systems.

It is ideal for inclusion in high-volume and high-speed systems that manufacture or handle small components.

The new SBD 15-60 extends the HepcoMotion range to three sizes and has been developed at customer request. The company has secured significant export business with the SBD product and the new smaller sized addition is expected to prove particularly popular in the Far East.

The new product shares the key features and benefits of the existing SBD range but incorporates a HepcoMotion LBC15 Linear Ball Guide. It is a compact and extremely clean linear solution as it incorporates a flush, metal cover strip that runs the length of the unit and houses the ball guide. This prevents the ingress of dirt and debris, preserving the longevity of the product.

Units are supplied in increments of 60mm up to 6000mm in one piece and unlimited lengths can be achieved by joining the beams. The SBD 15-60 is also available with a long carriage.

Contactless sensor gives rotary measurement

Penny + Giles has introduced the SRH220DR, a new dual redundant output contactless rotary position sensor. The SRH220DR uses proven, non-contact programmable Hall-effect technology to provide OEMs with highly reliable and accurate rotary measurement in extreme industrial and off-highway environments.

This new sensor, with a choice of integrated six-way connectors, provides numerous programmable options. Designed for operation in extreme temperatures, the SRH220DR enables system designers to quickly and easily improve the safety and integrity of their control systems by using the dual independent power supply and output signals, allowing compliance with SIL-2 requirements for systematic safety as defined in IEC 61508.

Designed for use in arduous operating environments, the SRH220DR is suitable for diverse applications, including cold planing machines (tracked steering control), garbage collection vehicles (bin lift control), road sweeping vehicles (4-wheel steering), and combine harvesters (header position control). The SRH220DR provides OEMs with a wide selection of parameter options including measurement range, and clockwise or anticlockwise direction output.

Solution to last month's Coffee Time Challenge

The solution to last month's challenge comes from Jenton International, which makes, among other things, food packaging machinery. The 'Loose pack fruit bag' was originally conceived for cherries, and is made up from two pieces of plastic bag material. These are folded inwards at what is to be the top of the bag, and then sealed together in such a way as to leave an aperture sufficiently large for the hand. If the bag is turned on its side or inverted, anything inside tends to get caught by the plastic flaps that have been turned inside and then secured by the sealing.

Jenton director Richard Little says: "There are lots of things you can do with it". He told us how his child took some Lego with him on a ferry, and how it proved invaluable in retaining those Lego bricks that were not required for the model, and how the bag could also be used to carry coins, spare parts, and screws and nails in such a way that they do not get dropped on the floor or factory car park. He also added that if you pour some beer in it and hang it upside down, the retained beer turns it into an effective wasp trap.

The design is protected by patent.

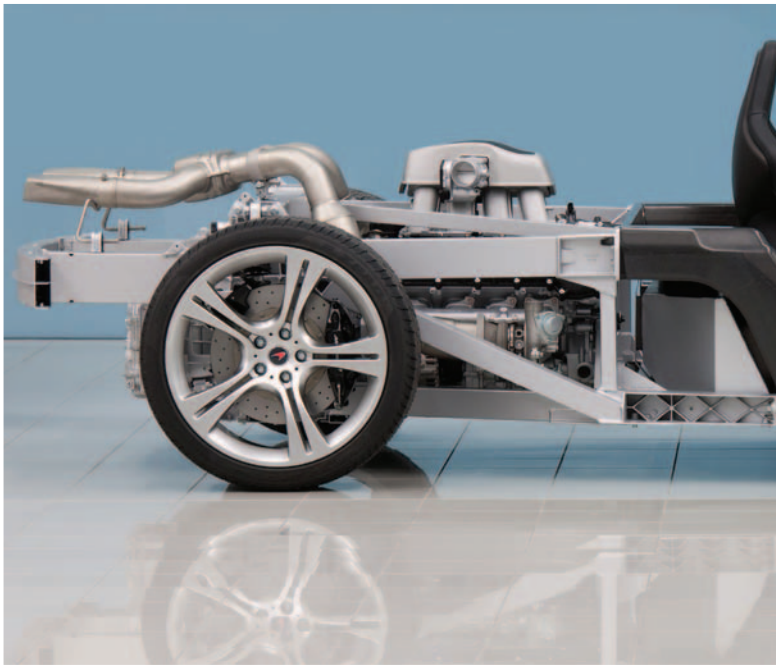
www.jenton.co.uk

Designing to win

An automotive company makes a materials breakthrough and transforms itself from a craft to a mass production business, while still making sports cars with world beating performance; an aero engine maker embraces a new software technology to manage increasingly complex design problems; while offshore and military suppliers tackle constantly changing requirements in exceptionally unforgiving environments.

What all these applications have in common is the problem of managing increasing complexity in a competitive environment. This requires a combination of innovative technologies, careful management and advanced software to help manage processes, keep track of everything and ensure everyone appropriate has access to the same data.

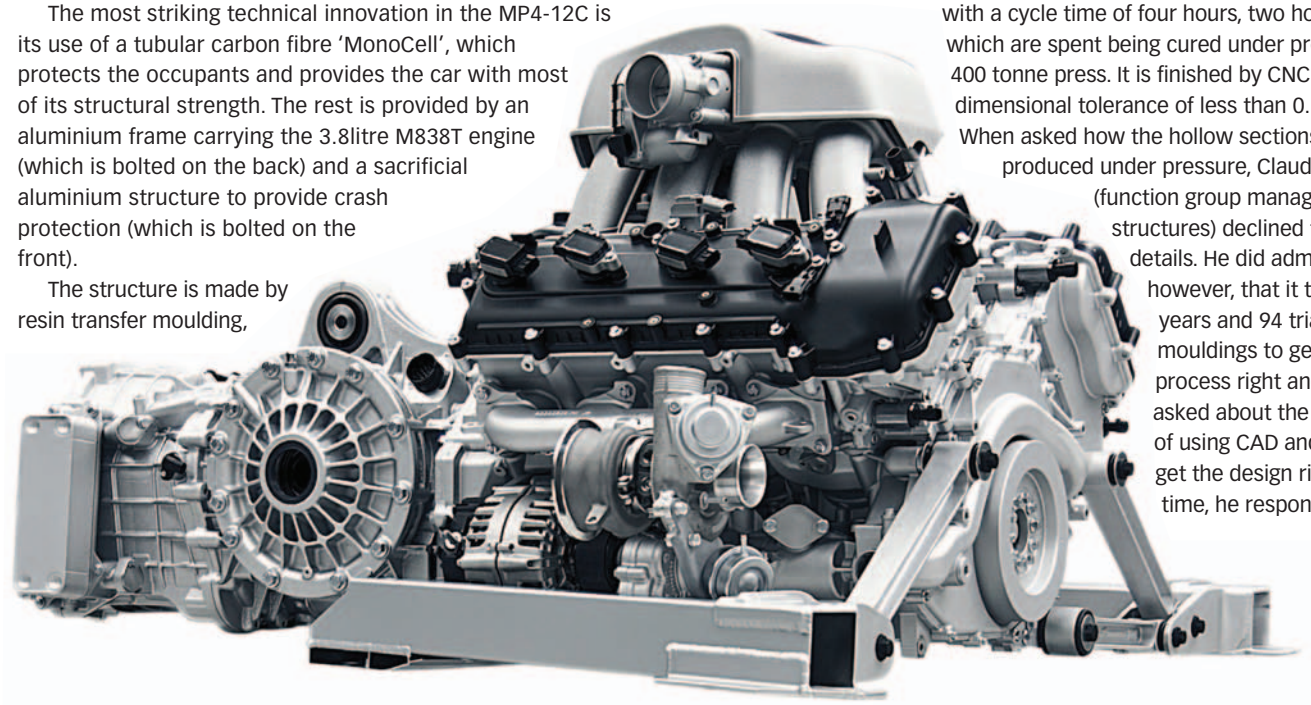
A classic example of this combination was to be found at McLaren Automotive's recent, high-profile press conference to launch the MP4-12C road car, Ron Dennis, the executive chairman of McLaren Automotive, explained that, having made the decision to move into production car manufacturing, the key to giving the new cars their edge were to combine technical innovation with a process that made use of the company's F1 technology. This is complicated enough in itself, one might have thought, but to adapt it to volume manufacturing adds a range of additional complications.



The most striking technical innovation in the MP4-12C is its use of a tubular carbon fibre 'MonoCell', which protects the occupants and provides the car with most of its structural strength. The rest is provided by an aluminium frame carrying the 3.8litre M838T engine (which is bolted on the back) and a sacrificial aluminium structure to provide crash protection (which is bolted on the front).

The structure is made by resin transfer moulding, with a cycle time of four hours, two hours of which are spent being cured under pressure in a 400 tonne press. It is finished by CNC milling to a dimensional tolerance of less than 0.5mm.

When asked how the hollow sections were produced under pressure, Claudio Santoni (function group manager – body structures) declined to reveal details. He did admit, however, that it took four years and 94 trial mouldings to get the process right and, when asked about the possibility of using CAD and FEA to get the design right first time, he responded with a



Tom Shelley finds out what it takes to overcome complex design problems to build world-beating products.

The development of McLaren's new MP4-12C road car involved the overcoming of a range of highly complex design problems

wry smile that this only applied to products based on tried and tested processes.

As regards the task of achieving relative mass production – the plan is to manufacture 1,000 cars per year in a completely new factory – operations director Alan Foster said: "My challenge has been to combine traditional Formula One craftsmanship with more mass production car building techniques."

What this meant instituting formal methods of supply chain management and component traceability, modelling the production process using Dassault's Delmia suite and using 3DCS for dimensional analysis. Catia V5 was the CAD package used and, according to head of engineering Neil Patterson, PDM was undertaken using a combination of its in-house 'Maxim' ERP system as master for Bill of Material and configuration management, in combination with Enovia 3DComm, which is updated as an ongoing process.

The car was driven virtually for 300,000 miles on McLaren's simulator to tweak the design, while some 20 physical prototypes have been built and road tested in various parts of the globe at ambient temperatures from -50 to 50ºC. Test mileage is said to be around 1million miles, including prototypes being driven 24hours at a time by relays of drivers. There have also been around 100 crash tests.

McLaren is not alone in pursuing perfection in this way, however. The same, almost obsessive, attention to technical innovation, management of the design and production process is to be found at the equivalent market leader in aerospace engines Rolls-Royce.

The complexity of the engine-building process is put in context by Jan Larsson, EMEA marketing manager for CAD and PLM supplier Siemens PLM. He points out that, while a typical jet engine in 1960 had

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Maurizio Giovannelli, SKF

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3,000 parts, by the 1990s, this had risen to 20,000, while the lifespan of such an engine is typically around 30 years and data on it needs to be accessed for around 50 years.

Given that Rolls-Royce has to cope with what Larsson describes as 'terabytes of data', it is clear that a product of this complexity requires highly-sophisticated information management.

The company uses commercial products NX for CAD and Teamcenter for PLM from Siemens PLM, but, not content with the capabilities of commercially available software, also makes extensive use of DRed (Design Rationale editor), a bespoke programme developed by the University of Cambridge Engineering Design Centre (EDC).

DRed originally came out of two EPSRC 'Grand Challenge' projects: KIM – Knowledge and Information Management; and HIPARSYS – High Performance and Robust Systems. One of the findings of KIM, according to Dr Peter Heisig at the EDC was that the number one knowledge capture need seen by engineering companies was to capture rationale – 'Why did we do it this way and not the other way'. By comparison, design descriptions and changes only came in at second, third and fourth respectively.

The original capability of DRed was to set out complex design problems where lots of functions interact and to show the interactions between different design approaches, as well as pro and con arguments for different possible solutions over multiple pages. Lightbulb symbols represent ideas and plain text blocks facts. Green text is true and red text marks it as false. Lines through text indicate that an argument has been rejected, but it is still retained in case it needs to be revisited.

The product has recently been enhanced by the addition of 'Blocks' that can be used to show the relationship between different parts and functions both inside and outside the machine being studied to create Functional Analysis Diagrams. White blocks represent external parts, while grey blocks represent internal parts. Red-coloured relationships are harmful, such as those that create windage or excess heat, while green ones are beneficial.

This process has been used extensively by Rolls-Royce in the development of a gearbox in the Trent 1000 engine for the Boeing 787 'Dreamliner'. Apart from helping get to the right answers quicker, at the end of each study, a day is saved in not having to write up documentation, since the system records everything considered, including ideas that have been rejected. The EDC has applied to it a number of other engineering design problems, such as optimising hydraulic motors. Because the methodology is completely generic, it has the potential to be applied to management problems, as well as engineering.

Just as complicated as aero engines, if not more so, are some of the pieces of equipment for offshore work, where products are very often one-offs and may be designed and developed by small companies without access to sophisticated big ticket computer systems. In addition, of course, the environment they face is exceptionally hostile.

David Blood, a design engineer with Tech Safe Systems, which makes complicated launch and recovery systems and split-purpose control cabins, relies on Autodesk Inventor. Designs include hydraulics, electrics, electronics and fibre-optic connections to Remotely Operated Vehicles. Asked how he ensured that everything worked, Blood responded: "We do lots of software simulation, mostly using Autodesk Inventor. Part of the simulation involves finite element analysis, for which we used to use ANSYS. Now, we do it all in the Inventor environment."

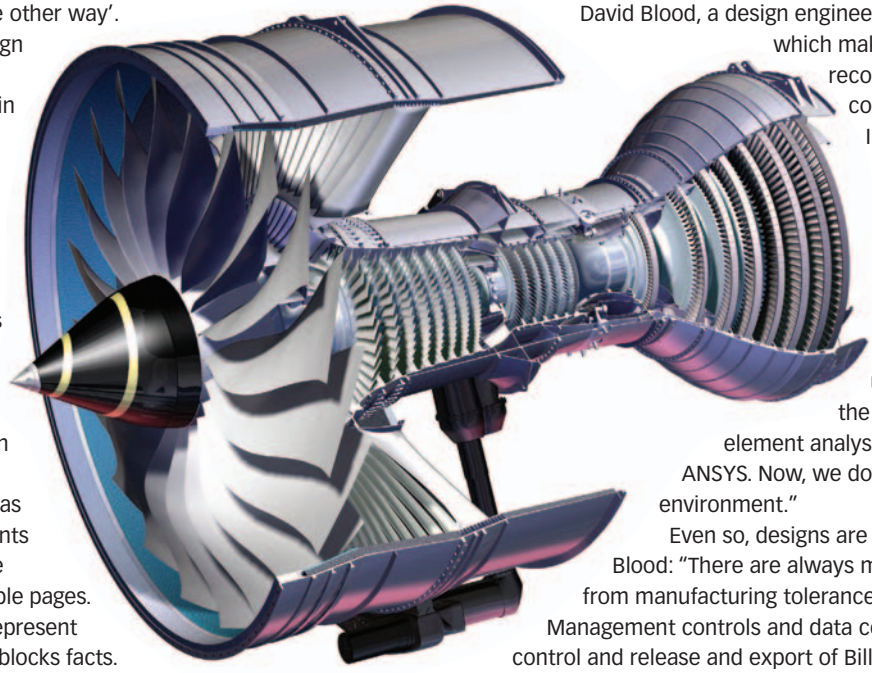
Even so, designs are not always right first time. Says Blood: "There are always minor problems, typically arising from manufacturing tolerances and slight oversights."

Management controls and data control includes full drawing control and release and export of Bills of Materials directly from Inventor to the company's 123 Insight MRP/ERP/CRM system.

www.mclarenautomotive.com
www.3ds.com
www.3dcs.com
www.plm.automation.siemens.com
www.techsafe.co.uk
www.autodesk.com
www.123insight.com

Design Pointers

- Keys to success in major system design are: innovation, to give a competitive leading edge; attention to detail, to ensure nothing is forgotten; and use of whatever software aids are available, to keep track of everything and to ensure that everyone has access to the same data
- These rules have been applied across motorsport and top-end car production, aerospace and offshore engineering, and the design of products for the military



Miguel Fragoso

Miguel Fragoso has spent most of his career in the motor industry worldwide, largely with General Motors, where he held a number of senior engineering, corporate planning and finance positions. Prior to Millbrook, he was director of business planning at GME headquarters in Switzerland, and later project director of sport utility Vehicles at Isuzu Motors, Japan, before becoming Director of Engineering at Vauxhall Motors Ltd, UK.

An engineering graduate from the Madrid Polytechnic and post-graduate of Glasgow University (Stevenson Fellowship), Fragoso also holds an MBA from The University of Chicago. He is a Chartered Engineer and Fellow of the Institution of Mechanical Engineers.

Passing the test of time

The Millbrook testing facility has been involved in the development of most automotive technologies. Paul Fanning asks its managing director about the future.

Covering 700 acres of Bedfordshire countryside, Millbrook Proving Ground is one of Europe's leading locations for the development and demonstration of every type of land vehicle – from motorcycles and passenger cars to heavy commercial, military and off-road vehicles. Factor in the fact that it is also used for film, TV and commercial shoots (including the iconic Aston Martin stunt in 'Casino Royale') and you have a facility that must represent one of the most interesting working environments possible. Little wonder, then, that managing director Miguel Fragoso describes it as 'a wonderful and exciting place to work'.

But, as design analysis software becomes ever more sophisticated, what is the role of a testing facility such as Millbrook to the modern designer? Fragoso acknowledges that technology has undoubtedly changed the role of the facility, but is optimistic for the long term. "Eliminating physical testing is a vision that, as an engineer, it would be wonderful to achieve," he says. "However, I really don't think we'll get there in our lifetimes. There will still be a level of physical testing always required. You're only going to be able to predict so much."

In fact, Fragoso believes the increasing sophistication of virtual analysis may actually increase the level of testing undertaken at the proving ground. "As the technology grows, you are going to be able to do more and more with virtual testing and some elements of physical testing will be eliminated, but I believe there will always be an element of physical testing required. The good news for us is that we will benefit indirectly from the benefits that virtual testing brings in shortening the development cycle and in reducing the cost of developing the vehicle. We will find that, over time, manufacturers take much less time to get a vehicle from design to physical testing, which will actually mean that the volume of physical testing we do will increase – albeit we may be doing less physical testing on each individual vehicle."

Clearly, one of the ways in which Millbrook is ensuring its longer-term success is by diversification into areas beyond what one might think of as the purely automotive. As well as its track facilities, Millbrook is home to some highly-sophisticated test laboratories whose expertise, as Fragoso is keen to make clear, can be applied to a range of areas, including emissions and component testing. "Anything on wheels is our core business," he says. "But beyond that, anything without wheels that shares technology with wheeled vehicles is also our technology… I don't want to suggest we have an infinite number of applications, but we are far, far more than just technology on wheels."

Naturally enough, Millbrook is careful to stay a step ahead of the latest automotive developments, with the result that it has recently invested in facilities to test the latest engine technologies. However, this does not represent any move away from conventional technology, as Fragoso points out. "There will be a period during which both technologies will co-exist," he says. "Electric vehicles will be phased in. We at Millbrook will continue in our efforts to make conventional engines smarter and more efficient for many years to come to help manufacturers cut emission levels on conventional technology. But, at the same time, we want to anticipate and be a little bit ahead of the game on new technologies, notably vehicle electrification. And this is because we believe that the future is there. Unquestionably one day all vehicles will be electric, the question is when."

"There will still be a level of physical testing always required. Youre only going to be able to predict so much."

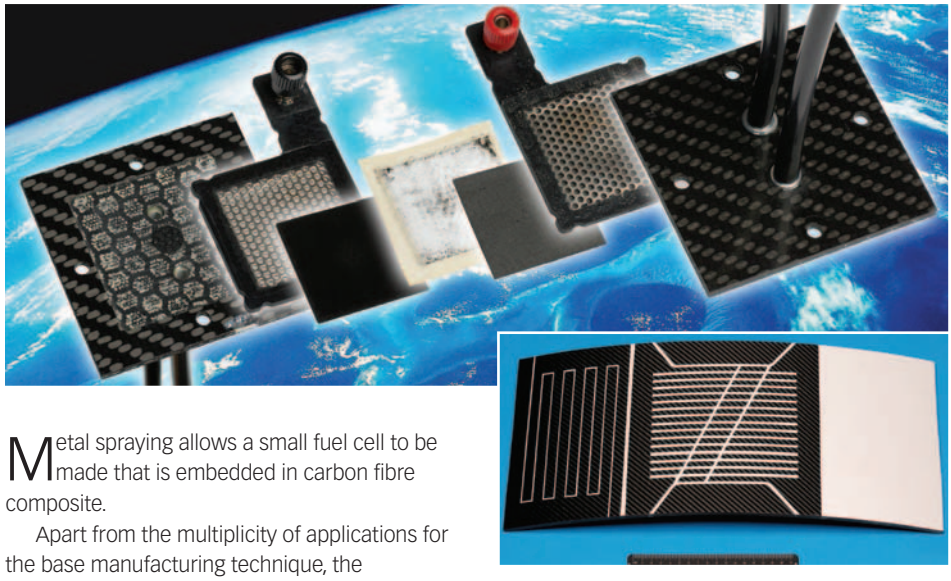
Millbrook's work in testing such vehicles has been ongoing for some time and has thrown up a number of challenges. Says Fragoso: "Throughout 2008 and 2009, we have had manufacturers of electric vehicles consulting with us to create the test and validation cycles of these vehicles. Their behaviour – the fact that you get a completely different layout of component locations throughout the chassis and the body – makes their behaviour in crash testing completely different. The fact that there are components in electric vehicles that you don't find in conventional vehicles has also meant that we've had to develop completely additional and different testing schedules. And this is where we've worked with companies over the last few years to develop specific test and durability schedules to prove the quality, reliability and functionality of electric vehicles."

Millbrook has also undertaken work testing hydrogen fuel cell technology, although Fragoso has more reservations on this score. He says: "In my view, it's a more complex technology. In simple terms, you're mixing an electrical power plant with a chemical power plant in the same vehicle. But the magic that fuel cells offer you is autonomy: you don't have that 'range anxiety' that you have with electric vehicles because, wherever you go, you can refuel with hydrogen. You ask to me choose between the two and the answer has to be between the economics of electric batteries and the economics of storing hydrogen. How these economics mature and how the relative costs materialise will determine which of these technologies win."

www.millbrook.co.uk

Spray-on conductors enable integrated fuel cell

Tom Shelley reports on remarkable things that can be made by thermally spraying metal on to composite.



Metal spraying allows a small fuel cell to be made that is embedded in carbon fibre composite.

Apart from the multiplicity of applications for the base manufacturing technique, the integrated fuel cell has the potential to reduce the weight of kit that has to be borne by infantry soldiers, or, possibly, to allow even more electrically powered equipment to be carried, as well as opening up aerospace and top end automotive applications. It is, however, just one of a family of products being developed that incorporate electrical conductors in composites.

Design Pointers

- Putting down metal conductors on composite by thermal spraying is a well established technology
- It has the potential to give lightning strike protection to carbon fibre wings and tail planes in aircraft, as an alternative to using metal foils and to provide conductor paths in carbon fibre composite cars.
- It has been used to produce a small carbon fibre composite fuel cell that can be incorporated into a carbon fibre composite structure.

Key to the development, which has come from TWI, is its long-established thermal spraying technology. Provided suitable attention is paid to choice of coating material and surface preparation, it possible to achieve bond strengths of up to 11MPa that allow zinc and aluminium alloys coatings to be firmly attached to composites.

The method of attachment is mechanical. As each hot particle impinges on the substrate, it deforms it locally and buries itself in the composite surface. The deformed composite partially wraps itself round the particle, securing it in place. Subsequent metal particles weld to those already there.

The prototype carbon fibre based composite fuel cell delivers 600mW if fed with hydrogen and oxygen and 200mW if fed with hydrogen and air. It weighs 225g. The cell should last, indefinitely, but, says TWI's Lawrence Dingle: "We do expect some degradation over time, but more than five years seems likely." Machined composite plates can be used as bipolar plate electrodes as an alternative to graphite, combining both structural strength and electrical function. Use of a core material such as a gas or liquid transfer mechanism allows composite to be used as membrane material also.

Composite fuel cells are a subject of much research worldwide, not only to integrate them into already existing composite structures – the next generation of airliners will largely be made out of carbon fibre – but also as a way of making fuel cells much less expensive than at present. Furthermore, since hydrogen fuel tanks in experimental fuel cell-powered vehicles are usually made out of composite to save weight, it makes sense to integrate structure, fuel tank and power cell, using the same basic materials.

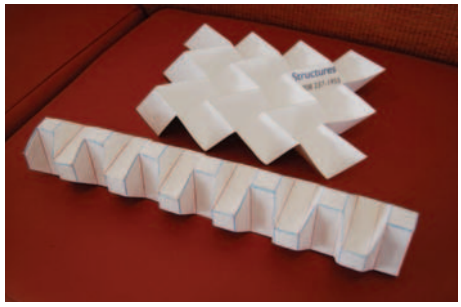
Another more immediate application area for sprayed on metal coatings is to provide lightning protection for carbon composite aircraft wings and fuselages. The current fashion is to use metal foils to protect the wings and embedded wire mesh to protect the fuselage. Sprayed-on metal should be less expensive and interferes less with structural strength. In automotive, sprayed on, thick metal tracks offer an alternative to wire conductors.

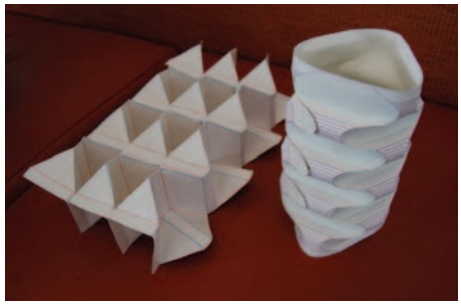
Because TWI has many years experience with thermal spraying metal coatings onto a wide variety of substrates, the base technologies are all well tried and tested. The Institute has four high-velocity oxy fuel spraying systems, as well as air plasma, twin wire arc, flame spraying and cold spraying equipment. Hard coatings, such as tungsten carbide – cobalt – chrome, can be deposited on carbon fibre reinforced plastics following the application of a bond coat.

www.twi.co.uk

Folded sheet outperforms honeycomb

Tom Shelley reports a novel space-filling structure for composite panels that can also be reinforced.





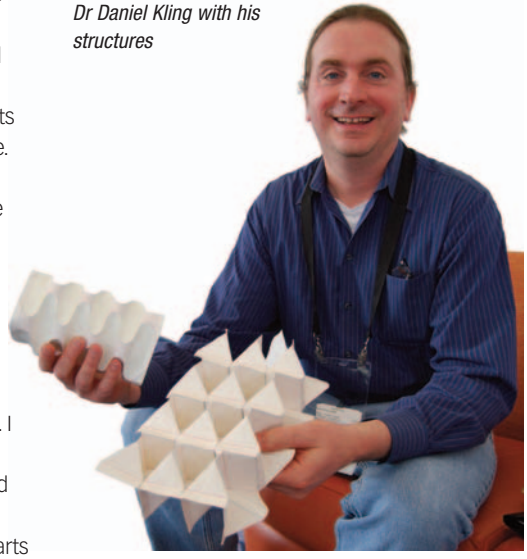
Doubly periodic folded sheet is stronger than corrugated construction and has potential applications in aerospace for structures, cars for impact absorption and lighter weight and more effective packaging.

The technology is the invention of Dr Daniel Kling, proprietor of US company Folded Structures, which has received two NASA grants to develop the technology for use in aerospace. This has enabled the refinement of automated software to generate folding patterns and finite element test and optimise the resulting structures, and also to permit the purchase and adaptation of composite manufacturing equipment to produce parts for test and evaluation.

Says Dr Kling: "I am a former sculptor. Somebody one day gave me a chunk of a door. I looked at the material used for the core and decided I could do better." He particularly noted that structural foams in general are not very efficient compared with structures where all parts are designed to perform load-carrying tasks. Rather than create more optimal constructions by traditional sculpting and model making methods, he immediately set about devising a software algorithm to generate folding patterns.

Called 'Foldstar', the software is fully functional, but is not at the present time being offered commercially to the rest of the engineering world, although it is planned to do this later. Dr Kling did reveal that the software generated a 'triangular wave described by four parameters' and that it was possible to use it to generate curved structures by designing the patterns with a small offset, but was unwilling to reveal further details. It should be pointed out that, at the present time, the patents are still applied for, rather than granted, and, since there have been various other patents applied for and granted for different methods of producing folded structures, it would make no sense to release all details publicly until the Folded Structures patents are finalised, granted and enter the public domain.

Nonetheless, Dr Kling was willing to reveal that he is able to design and manufacture multi-laminate components using a batch press with a die with articulated components, as well as having a roll press to produce folded material continuously.



Dr Daniel Kling with his structures

Design Pointers

- Doubly periodic folded sheet is stronger than corrugated construction
- It is also a more efficient way of absorbing impact energy per unit weight than structural foam
- Mathematical algorithms have been developed to produce the folding patterns
- Parts for test and evaluation can be produced by the company both by using a batch press and roll forming

Applications are seen in paper cores superior to corrugated cardboard, multi-layer blocks to replace Styrofoam for shock absorbing and a replacement for honeycomb in cores in aircraft floors and airframe. Doubly-folded steel sheets are stronger than corrugated structures and it should be possible to use the technique in light weight aluminium and steel truck beds and car floors to add resilient strength to the frame and well as produce novel energy absorbing structures.

Dr Kling believes that blast absorption is another target application. Filled with a suitable cementitious material, one configuration provides a means of reinforcing rubbish bins, so that if a bomb were to be left in one, and the explosion were large enough to burst the containment, the reinforcement would be reduced to powder. If this is the case, it might now be considered safe to once more install litter bins in railway and underground stations and other public places in the UK.

www.foldedstructures.com

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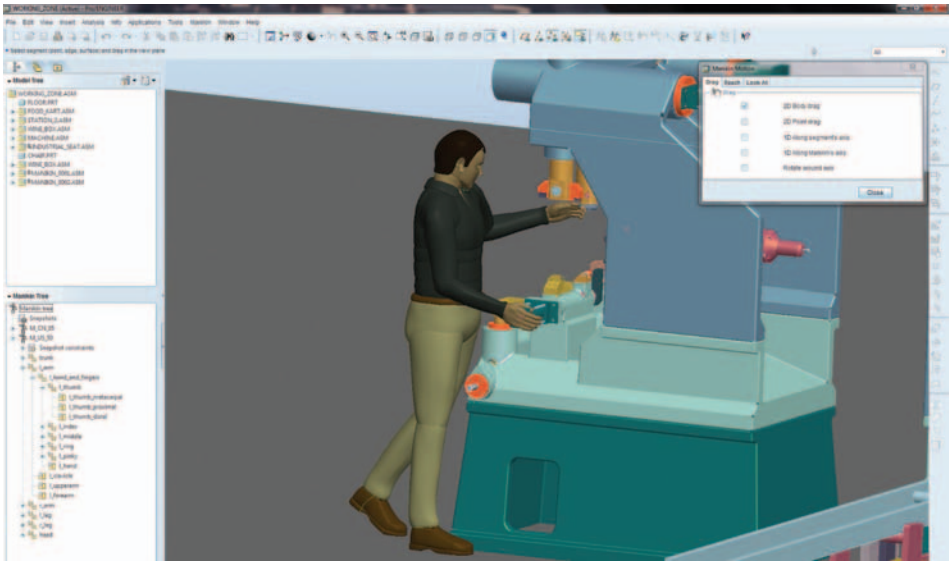
The human face of design

Integrating human factors into design has hitherto proved expensive and complicated. Paul Fanning looks at how software can help.



Many designers only discover the flaws inherent to their designs once they have committed to prototyping or even production. This means the project may require expensive re-engineering or even that it may not be possible to correct it and the product's success may be limited as a consequence.

For this reason, the ability to incorporate human models into design software has been extremely valuable. A number of products exist to model human factors, of which probably the best known is the 'Jack' software application, which is used as part of Siemens PLM's Tecnomatix software family. Equally, Dassault Systèmes offers the 'Human Builder' virtual ergonomics solution, which integrates into its CATIA and DELMIA platforms.

Traditionally, however, standalone human factors modelling has tended to be a highly-specialised process requiring considerable expertise on the part of the user. Equally, the software products have been fairly expensive. For this reason, human factors analysis has tended to be a separate process to design, with all the problems that are inherent to such an approach. In an attempt to address this, PTC released the Manikin modules with its Pro/EngineerWildfire 4.0 version. Designed to offer 'a low-cost, affordable and scalable solution for use by the wider community', according to PTC's principal application specialist Iain Lewis, Manikin is integrated into Pro/ENGINEER. Indeed, a free, limited capability version – Manikin Lite – is currently incorporated into all Pro/ENGINEER packages, beginning with Wildfire 4.0.

The scalability comes in the form of additional capabilities. The Manikin Lite capabilities allow the insertion of a single, predetermined manikin into Pro/Engineer and some posturing using a reduced number of manipulation tools. The Manikin extension, however, is a mainstream human modelling solution for first-level checks of human-centric form, fit and function, incorporating comprehensive sets of libraries of manikin data, processes and tools. Manikin Analysis, on the other hand, is aimed at the higher-end user and allows consideration of even more complex ergonomic and human factors.

Fundamentally, says Lewis, the principle behind this is simple. "We're trying to help people to do more of the work up front and save them cost and difficulties later on … before, an engineer would go away and build the environment, then do some FEA and only at the end of that process would you make a human interact with it. People didn't think of human factors because they didn't have the tools to do so."

Although Lewis concedes that it is not designed to be a rival to specialist human factors software, the capabilities of Manikin nonetheless remain impressive. Incorporating a library of a wide demographic of human models, it allows users to undertake functions such as 'reach analysis' and 'view analysis' that also gain a user's perspective of your product and 'see' what the manikin sees.

The model can be fully manipulated in real-time inside a CAD model to better understand the relationship between a product and person interacting with the product. Says Lewis: "It's not just about putting a human into an environment. It's about how an individual interacts with that environment and how that environment affects that individual. It's about having a human-centric approach to design."

Manikin also allows engineers/designers to place 3D human models into product designs in a series of static posture 'snapshots' that might include sitting, standing, kneeling and so on. They can augment these capabilities by using the animation tool to create animations of the manikin performing a workflow. Should the design change in such a way as to create a problem with the manikin (for instance, to require the human to do something physically impossible or dangerous), the software will flag this up.

Designers can even combine animations or their manikin with the Pro/ENGINEER motion envelope to determine the full amount of free space the design will require to allow the manikin to complete the entire motion. For example, if engineers/designers want to test a design for the interior of a car door, they can create an animation where the manikin reaches and activates the handle to raise or lower the window. The volume envelope demonstrates where the elbow will go. This helps determine whether any adjustments to the door design are necessary to eliminate clashes between the elbow and the door controls.

www.siemens.com
www.3ds.com
www.ptc.com

Bridging the dimension gap

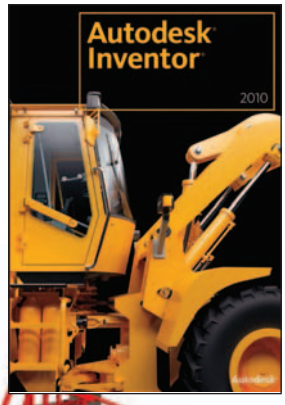
Paul Fanning takes a look at a software package designed to help companies make the leap to 3D design.

For all the advances in design software, 2D software still occupies a significant place in manufacturing industry. Clearly, there are clear productivity and design benefits to be gained by the move over to 3D, but the transition is one that a significant number of companies still have not made.

With this in mind, Autodesk (whose core product AutoCAD is, of course, 2D – albeit with increasing 3D functionality), has introduced its Autodesk Inventor LT suite to bridge the gap. "In today's global marketplace, 2D capability is not sufficient in itself for most manufacturing companies. 3D is no longer a luxury for manufacturers. It has become a necessity," says Jaime Herrero, Autodesk's EMEA retail industry manager.

Effectively a limited version of its Inventor product, Inventor LT provides the same 3D part modeling, import/export, documentation, and rendering capabilities available in the Autodesk Inventor 2008 product line. Since Inventor LT uses similar technology and user interface as Inventor 2008, all the files created and 3D design skills learned in Inventor LT are fully transferable to Inventor.

Inventor LT allows users to import and export 3D part models in common file formats without relying on expensive file translation software and to share 3D design data with customers and suppliers. Its DWG interoperability lets you simply copy and paste your existing 2D design data into Inventor LT as an accurate starting point for new 3D designs.



Inventor LT also includes Autodesk Design Review and can publish 2D and 3D DWF files. Markups made to 2D DWF files can easily be 'round-tripped' back to the original Inventor drawing, thus streamlining the design review process with extended design teams. However capabilities available in other products in the Inventor product family but not in Inventor LT include 3D assembly modelling, specialised design and simulation tools such as sheet metal and dynamic simulation. Equally, it does not include AutoCAD Mechanical or Autodesk Vault for data management.

Despite its inherent limitations, however, one the key benefits of this intermediate technology is its price point. Whereas a full suite of Inventor sells for around €5000, LT is available for €1700, according to the company. Says Herrero: "It represents a lower-risk opportunity for companies to experiment with 3D. Organisations need to start experiencing the power of 3D design today. Yet their current needs may not warrant a full digital prototyping workflow … this allows users to adopt 3D mechanical part design at a pace with which they are comfortable.

"Rather than working with full 3D assemblies, they can design using 3D models of parts, increase their productivity, reduce the risk of errors, and improve communication with customers and partners. In short, they will be able to compete more effectively as they move towards digital prototyping."

www.autodesk.co.uk

Need to know more about these solutions?
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Novel sensor goes the distance

Developments in printed coil technology and new materials have resulted in the development of a high-performance, low-cost sensor.

A range of displacement measurement sensors has been developed that combine robustness and measurement performance with the latest printed coil and permanent magnet technology.

Micro-Epsilon's new mainSENSORs family of Magneto-inductive displacement sensors not only benefit from having an extremely compact design relative to their measuring range, but also offer OEMs an attractive price-performance ratio for mid-to-high volume applications.

According to Chris Jones, managing director of Micro-Epsilon (UK): "This development really has been born out of the demand from high-volume OEM customers for high-accuracy sensors at very low prices…Our engineers were looking at ways they could develop the core technology into a simpler format and this is the latest development along those lines."

Originally developed by Micro-Epsilon as a high-volume, low-cost solution for load detection in washing machines, at the core of the sensor technology is Micro-Epsilon's proven eddy current sensor technology, which provides the new sensor with robustness, high speed and high-resolution measurements. However, it is how Micro-Epsilon has applied and combined this proven technology to the new sensor that provides users with several technical advantages.

The eddy current technology conventionally uses a wound coil and uses very complex electronics to measure distance or the energy loss across the coil. In addition, temperature compensation was complicated by the fact that the coil of wire that changes its output as it heats and cools.

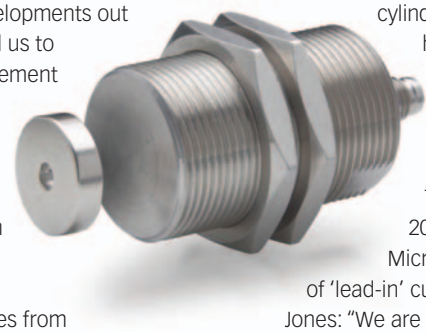
Says Jones: "Recent innovations in printed coil technology enabled us to produce – effectively on a PCB – a flat coil…There are other printed coil developments out there, but this enabled us to produce the sensor element at a very low cost and we've combined that with a special material that is patented, which sits in front of the coil and amplifies the signal of the magnetic properties from the target. "The clever part is that we've combined the flat coil technology with this new material, which has enabled us to generate relatively simple electronics."

The sensor was originally developed by Micro-Epsilon as a a high-volume, low-cost solution for load detection in washing machines

While Jones is unwilling to be any more explicit about the nature of this 'special material' at this stage (preferring to refer to it as a 'special film'), he is unequivocal about the benefits that customers will see from it, saying: "At that price level, they'll see a significant improvement in accuracy and resolution. With the lead sensor we're able to take resolutions down to single microns. We've got the core technology now and we can customise it to the customer's needs. You may find that the customer wants very high resolution and we can calibrate a reduced measurement range, for example. Or you may find that the customer thinks the core sensor's great but they want a particular interface like CANbus. So where it comes into its own is it's a modular design with very high accuracy for its price level."

Another significant factor in the new sensor, according to Jones, is its compactness relative to competitive products. He says: "What's also revolutionary here is the compactness of the metal cylindrical sensor. Contained within that sensor are all the conditioning electronics. Everything is self-contained. Until now, for a non-contact displacement sensor with micron resolution, the current sensors – even Micro-Epsilon's eddy current sensors – need external electronics."

The first standard industrial sensor in the mainSENSORs family is the MDS-40 M30, which has a 40mm measuring range and an M30 cylindrical, barrel-type stainless steel housing. The alternative is the OEM version, the MDS-40MK, a miniature flat rectangular PCB version with a plastic housing and a 40mm measuring range. The signal output provides 4-20mA or 2-10V DC.



Micro-Epsilon already has a number of 'lead-in' customers for the technology. Says Jones: "We are a strong player, particularly in Germany. We're hoping to build on and develop that in the future."

www.micro-epsilon.co.uk

Want to know more about this technology?
www.eurekamagazine.co.uk

Liquid level sensor finds its niche

Paul Fanning reports on a liquid level sensor with a variety of potential applications that has been adopted by a major supermarket.

An innovative optical sensor capable of accurately measuring liquid levels regardless of dielectric constant, conductivity or temperature, is being used by one of Britain's largest supermarket group to monitor liquid levels in its refrigeration packs.

The patented OLS (Optical Level Sensor) measures liquid level directly, rather than calculating it from secondary effects, as would be the case with capacitance and ultrasonic devices.

"The company specified a sensor with 220mm of sensing range and a resolution of 4mm. The output from the sensor is 0 – 5V," says Peter Frank, chairman, Product Innovation. "As the nature of the technology is modular, it is possible to alter the range, resolution and output to suit customer requirements. Alternative options include 4 – 20mA and digital outputs. For example, a product with a range of 444mm is already in production and samples have been made of shorter units with increased resolution. If required, 2mm resolution can readily be achieved."

Product Innovation and UK distributor Frostechnic trialled the sensor with the supermarket group over an eight month period. The supermarket had also tested capacitance and ultrasonic-based products to measure refrigerant liquid levels, and chose the UK manufactured OLS because it is simple to install and requires no calibration or set-up time. One major advantage for the supermarket is that the refrigeration control system can continuously monitor the liquid levels inside the refrigeration packs. This is crucial to check for leaks which allow gases to escape that are harmful to both humans and the environment.

The sensor uses the optical principle of Total Internal Reflection in a novel way that allows it to work in a continuous probe. A long, narrow PCB incorporating a ladder of IR LEDs and sensors is encapsulated into a smooth clear rod, typically made from epoxy resin. The Infra Red components are arranged so that they can be powered in pairs (one transmitter and one sensor). The electronics scan these pairs until the point at which the Total Internal Reflection does not occur. This point is then interpreted as the liquid level. This level is of course independent of the type of liquid being measured. Unlike capacitance methods, it does not depend on the dielectric of the liquid, nor does any conductivity affect the result.

The OLS (Optical Level Sensor) measures liquid level directly rather than calculating it from secondary effect.

Frank believes that there is a range of potential applications for the technology. "It was invented for general purpose and then found a niche," he says. Indeed, the product was originally trialled in the automotive sector as a means of measuring the level in fuel tanks. Product Innovation originally worked with Schrader Electronics' development department and produced prototypes that, he says, "worked beautifully even in the deserts of New Mexico". However, the expense of mounting the device in the tank proved excessive and this application did not come to fruition.

"All level sensing is a niche market, but where we fit is where calibration is an issue because this doesn't need calibration. It sees the level that it is, it's as simple as that … it works in petrol, works in water – drinks industry is a possibility. It's really dependent on the optical properties of the liquid. They need to be sufficiently different to the optical properties of the rod to be able to distinguish when it's working."

Frank has still not given up hope for the product to find a place in the automotive market. The sensor is also well-suited to high pressure applications because the probe is fully encapsulated in a hard resin. And because the probe is smooth and solid it is of use where no moving parts or ease of cleaning are important factors.

www.productinnovation.com
www.frostechnic.com

Want to know more about this technology?
www.eurekamagazine.co.uk

INDUSTRIAL SCANNER REDUCES SPRAYING

Unnecessary and excessive spraying of pesticides on fruit trees is greatly reduced when growers make use of a simple methodology that depends on tree density, as established by an extraordinarily versatile industrial laser scanner.

Pesticide manufacturers tend to recommend a dosage per unit ground area that assumes maximum tree density. But if the trees are saplings with lots of air gaps, this results in clouds of surplus spray. However, according to Professor Jerry Cross, who is based at East Malling Research, they were able to use a Sick LMS200 industrial LiDAR, mounted sideways on the bag of a tractor, to make crop structure measurements and correlate these with spray effectiveness at different dosages. Working with Peter Walklate and Geoff Richardson, over ten years, funded by what is now the Chemicals Regulation Agency, the researchers have come up with a methodology called PACE – Pesticide dose Adjustment to the Crop Environment, which advises on pesticide dosage based on a few simple inputs, and relating what fruit tree rows look like, as compared with graphic illustrations on a website.

The LMS200 continues to be used for object measurement, position measurement, and navigation and area monitoring in a wide range of applications.
www.sick.co.uk

Vibration sensing ensures correct lubrication

Correct lubrication can be ensured by using 'PocketLube', which is based on C-Cubed's 'PocketVibrA' and works by monitoring bearing noise before, during and after lubrication.

C-Cubed is part of Jenton International and Jenton director Richard Little says: "Over lubrication is as bad as under lubrication", and explained how the new device could be used to avoid either problem. "You record bearing or mechanism noise unlubricated, then you lubricate in steps. The bearing noise comes down. You then find the bottom point, and in future, you know this is the point to lubricate, too. Additionally, if the bearing noise does not come down to this level, you know the bearing is damaged."

Lubrication points can automatically be identified by RFID tags, and hand held can be made to display which lubricant should be applied. The unit records noise readings and locations and amounts of lubricant administered, and can be used to trend bearing noise and amounts of lubricant for each point. Since the only major difference between the PocketLube and PocketVibrA is software, the PocketLube can always be upgraded to the PocketVibrA full asset management system.
www.pocketvibra.com

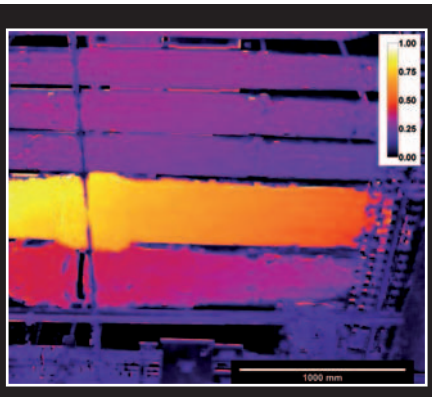
Water content measured without boiling

A small, hand held device is able to measure the boiling point of brake fluid in order to determine the water content.

The 'Suretest' brake fluid tester has been designed and is sold worldwide by Liquid Levers. The particular problem this addresses is to determine moisture content, which is capable of causing vapour lock even at a level of 3%. The crucial parameter that determines whether brake fluid is as it should be is the Equilibrium Reflux Boiling Temperature, but although early brake reservoir testers actually boiled a small quantity of brake fluid, this is liable to cause the formation of solids which are most undesirable if they get into the braking system or ABS pump.

The Suretest unit has a probe which heats fluid at known power, making it rise up inside the probe where it overflows a weir. From the rate of change

of temperature of the fluid at a known heat input and flow rate, it is possible to calculate the boiling temperature from a lookup table.
www.liquid-levers.com



Tiny strains measured by cameras

Researchers at NPL have developed and are applying a method of measuring very small movements and distortions, imperceptible to the human eye, using ordinary digital cameras and software able to determine movements down to 1/100 pixel.

The technique, called Digital Image Correlation, depends on taking two digital photographs and determining displacements and strains from the displacements of pixel blocks. It has been successfully used with 6 Mpixel and 39 Mpixel cameras, and has been applied to the measurement of residual stress from incremental hole drilling in small structures. It has also been applied to polymer composites, thermal expansion of electronic components, nuclear graphite, airbags and damage development in silk screens.
www.npl.co.uk

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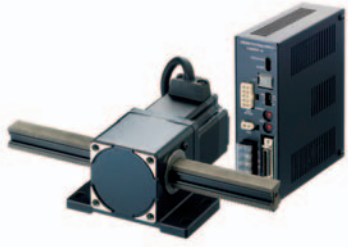

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Rotor magnets push motor technology

Tom Shelley reports on progress with high-speed composite magnet electric flywheels for motorsport and energy storage.

Magnetic loaded composite rotor magnets are key to high-speed flywheel motor generators developed for F1 racing, but have a range of potential applications in heavy goods vehicles, for smoothing energy delivery from renewable sources and to metro rail systems.

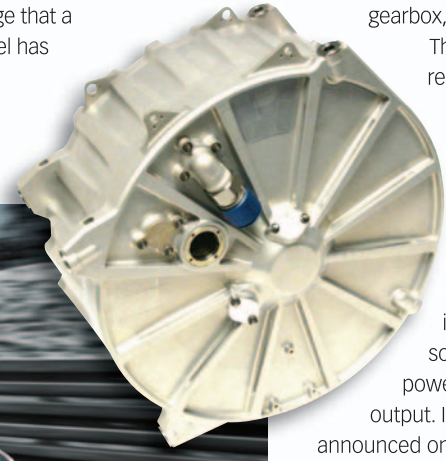
The motor technology was originally developed by Urenco for uranium enrichment centrifuges running at 40,000 to 65,000 rpm or even faster. Magnetic loaded composite (MLC) consists of iron or oxide metallic particles in a polymer matrix and has the advantages that, because the particles are separated, there is no little or no possibility of eddy currents and, should the rotor come apart, there are no flying lumps of magnet.

Although the exact material that constitutes the MLC used by Urenco and Williams is unknown, there have been a family of such materials commercially available for some years from the Swedish company Höganäs, which are sold under the 'Somaloy' brand name. These consist of iron and iron oxide based powders in a matrix of fatty acid amides and/or PPS – polyphenylene sulphide.

After trying to market the spinoff high energy flywheel technology themselves, it was subsequently acquired by Automotive Hybrid Power, based in Norfolk. In April 2008, Williams Grand Prix Engineering took a minority shareholding in AHP, the business transferred to the Williams F1 site in Oxfordshire and was renamed Williams Hybrid Power. Williams developed and tested it as a KERS (Kinetic Energy Recovery and Storage) system for its F1 cars and is continuing to develop it for road cars and other applications, including the Porsche 911 GT3 R Hybrid car showcased at this year's Geneva Motor Show

Apart from F1 and Porsche, Damien Scott, the general manager for Williams Technology, said discussions are ongoing with a number of major manufacturers, and WHP is one of the main participants in the Technology Strategy Board backed 'KinerStor' project which aims to develop flywheel energy storage systems for a cost of less than £1,000 per vehicle for mass produced road vehicles.

A major advantage that a motor-driven flywheel has over the competitive Torotrak gearbox approach is that there is no need for a vacuum shaft seal. The flywheel has to be maintained in a vacuum chamber in order to eliminate not only air drag but possible supersonic shockwaves. Furthermore, in a vehicle that is already an electric hybrid, Scott says: "It is much easier to integrate it into the vehicle system and use of an electrically connected flywheel gives flexibility as to its location." It does not have to be placed next to or integrated into the gearbox, if there is one.



There have also been a number of reports and studies of using high-speed, electrically-driven flywheels to provide smoothing of both energy supply and delivery. There have been trials on the London Underground. A larger scale application is the storage of energy from intermittent renewable energy sources such as wind and wave power so as to provide a smoother output. In the US, Beacon Power announced on 18th March 2010 that it had shipped, installed and successfully connected a 'Smart Energy' 25 'Gen4' flywheel energy storage system as part of a wind power/flywheel demonstration project being undertaken for the California Energy Commission.

www.williamshybridpower.com
www.hoganas.com

Design Pointers

- High speed motor generators have been developed from those used for uranium centrifuges for driving and recovering power from flywheels
- Similar systems are already in service for smoothing out power fluctuations from wind farms and have also been successfully trialled on the London Underground.

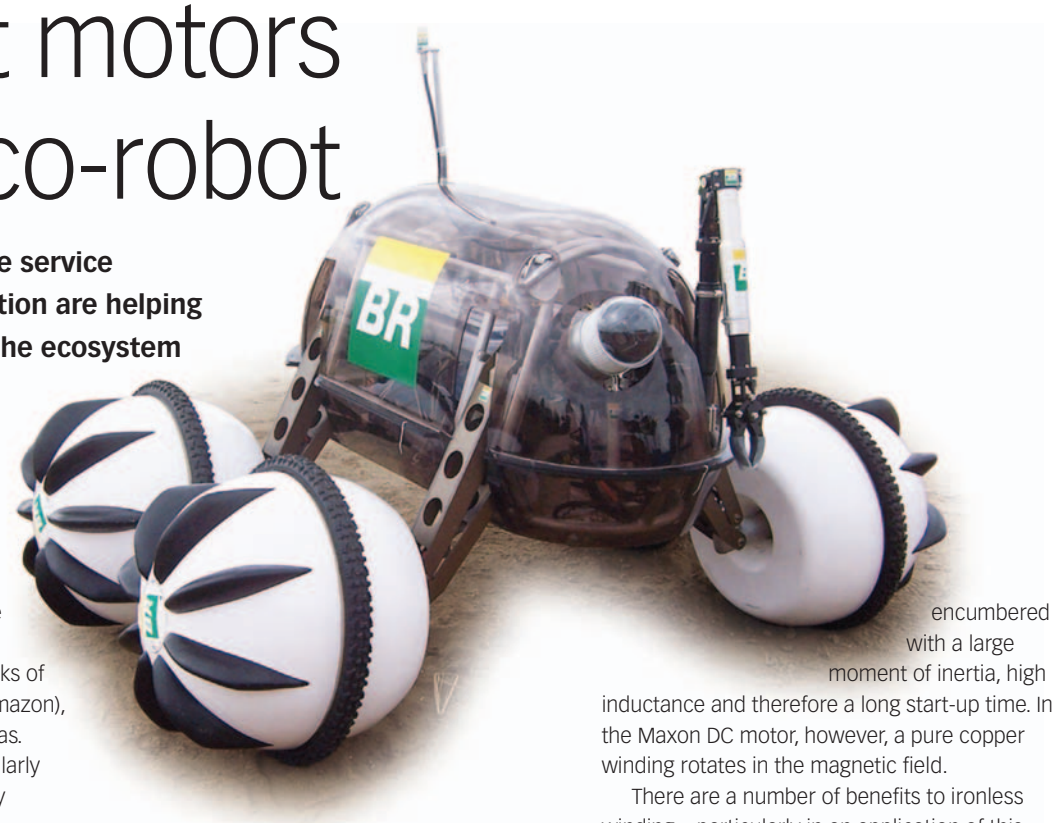
Compact motors power eco-robot

DC motors with a long service service life and low energy consumption are helping to power robots monitoring the ecosystem of the Amazon.

Christened 'Chico Mendes' in honour of a rainforest activist killed in 1988, the robot was developed with the help of the latest submarine and drive technology in a joint project between the sociological research institution Piatam (Potential Impacts and Environmental Risks of the Petroleum and Gas Industry in the Amazon), the Brazilian state university and Petrobras.

In developing the robot, it was particularly important to ensure that it minimised any possible damage to the very nature it is supposed to be protecting. Such specifications posed a particularly difficult challenge in drive technology terms.

'Chico Mendes' has to battle through mud, water and swamps with the help of electric microdrives. This involves eight of Maxon Motor's DC motors delivering a high performance in a tiny space. Their low energy usage is one of the key reasons why they were chosen for the project. The environmental robots are driven by solar power in an initial phase.



'Chico Mendes' is a robot designed to monitor the water and soil quality of the Amazon Basin and uses Maxon DC motors in all four wheels.

Maxon RE 40 motors feature in all four of the robot's wheels, while another four Maxon RE 35 motors are housed in the adaptive suspension, and automatically adapt to conditions depending on the terrain and water conditions in the rain forest. Two planetary gearheads, measuring 42mm and 52mm across, provide the requisite torque for the vehicle which is 1.5m long, 2.2m wide and 1.2m high.

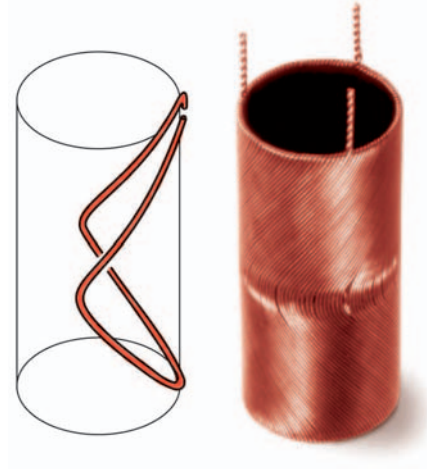
The environmental robot's high dynamism requires equally dynamic electronics to control the DC motors. All operating DC motors can be accurately controlled using Maxon Motor's digital positioning controller EPOS 70/10. EPOS stands for 'easy-to-use positioning system'. All EPOS controllers can be networked according to CANopen standards. The drives are programmed according to IEC 61131-3 standard using a simple software tool with graphic user interface.

Key to the DC motors' drive is Maxon's patented ironless winding system. The rotor of a conventional DC motor comprises an armature iron with inserted spool segments. This rotor is encumbered with a large moment of inertia, high inductance and therefore a long start-up time. In the Maxon DC motor, however, a pure copper winding rotates in the magnetic field.

There are a number of benefits to ironless winding – particularly in an application of this sort. There is no magnetic detent, while the low mass moment of inertia means it is able to offer rapid acceleration.

Designed specifically for applications for use in high-tech applications in battery-powered appliances, the motors use brushes made of precious metal that ensures constant and low-contact resistance with the commutator – even after a prolonged standstill. It also means low start-up voltages and minimal electrical interference.

www.maxonmotor.co.uk



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Hybrids keep the pressure up

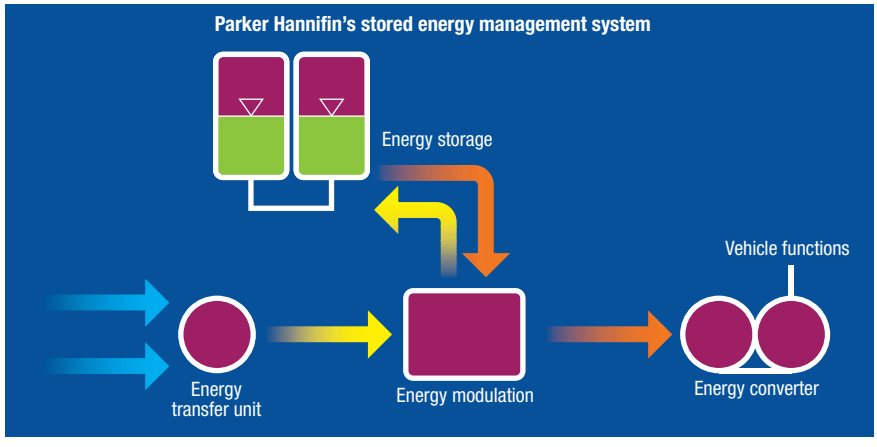
Tom Shelley reports on the latest approaches to applying hybrid technologies to construction equipment and refuse vehicles.

By their nature, commercial vehicles tend to consume large quantities of fuel, meaning that they are extremely expensive to run. This has meant that the need to develop systems to mitigate the problem is being addressed.

The solution generally arrived at has been the hydraulic hybrid system, which takes advantage of the stop-start nature of commercial vehicles by storing the kinetic energy created by braking in a hydraulic accumulator and immediately using it when accelerating again.

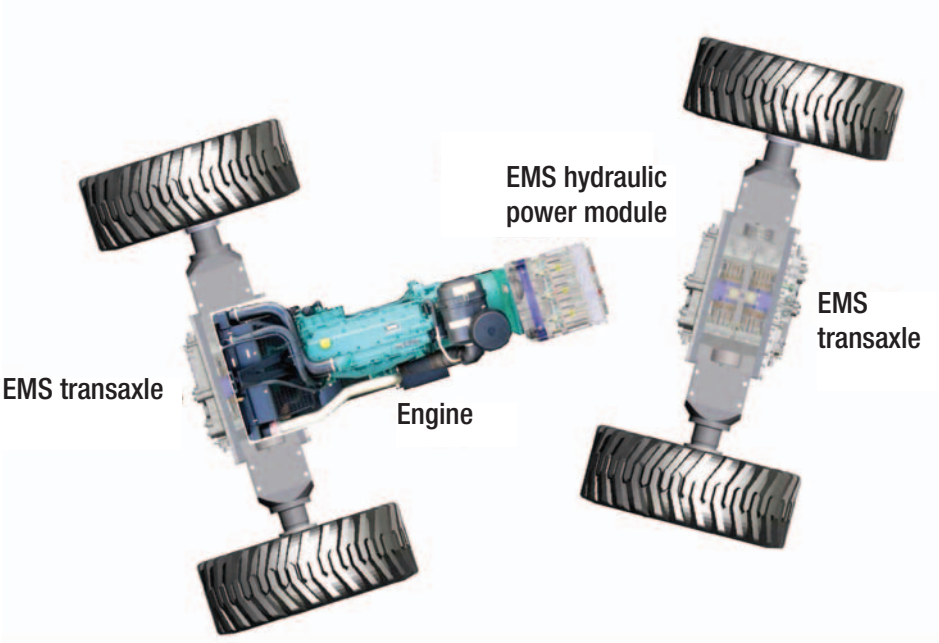
A number of systems have been developed for this purpose. One is Parker Hannifin's Stored Energy Management System (SEMS), which was developed especially for use with vehicles such as refuse trucks and short-haul delivery lorries that frequently stop and start in the course of their normal working life.

SEMS incorporates a conventional Parker hydraulic accumulator, which is automatically charged every time the vehicle brakes; alternatively, the accumulator can be powered via an electronically controlled pump attached to a power take-off (PTO) point. The accumulator is normally linked to a hydraulic converter that reduces the stored high pressure energy to the exact level required by the different items of ancillary equipment on each vehicle.



Overall system management is then achieved by Parker's IQAN software based hydraulic control technology, which combines in-cab HMI units and joysticks with specialised sensors, I/O and interfaces, to create a powerful yet flexible method of monitoring and controlling hydraulic systems.

Another, similar system is



Bosch Rexroth's Hydrostatic Regenerative Braking (HRB) system. Here, the system goes into action mode when the vehicle's driver presses the brake pedal, causing a hydraulic unit to push hydraulic fluid into a high-pressure reservoir.

When accelerating, the electronically-controlled hydraulic pressure reservoir releases the pressure, thus relieving the load on the diesel engine. As a result, the engine consumes less fuel, generates fewer exhaust gases and functions more quietly.

HRB functions through the use of a hydraulic axial piston unit that is integrated in the mechanical drive train by means of a gearbox. Upon braking this unit acts as a pump and uses the released brake energy to charge a hydraulic accumulator (bladder accumulator) with hydraulic oil. Electronics control this procedure via a hydraulic valve control block and give the signal to reverse the process when the vehicle begins to move.The pressurised oil is then released from the accumulator in a controlled manner and flows back through the axial piston unit. This unit is driven by the oil flow and thus functions as a motor, delivering its power to the mechanical drive train while a pressure relief valve ensures maximum safety. Rexroth's HRB can be retrofitted in the chassis as an add-on system without major modifications – even in vehicles without hydraulics.

The latest development of this type, however, comes from Haldex Hydraulics and is able to take the energy from a descending loader bucket, and use it to help propel the vehicle. Combined with energy storage in an accumulator, full scale laboratory tests suggest that in service, in a vehicle, it should be able to achieve fuel savings in excess of 50%.

Design Pointers

- Hydraulic hybrid systems are widely used to recover energy that would otherwise be lost
- Haldex' system is open loop and aims to integrate all hydraulic functions
- System pressure and some load on the engine is maintained at all times so as to be quick to respond and keep the engine operating with maximum efficiency

While other hydraulic hybrid systems capture braking energy, store it and redeploy the stored energy for propulsion, however, the Haldex Energy Management System is the only hydraulic hybrid that provides energy management the Haldex Hydraulics Energy Management System aims to integrate all functions on a piece of construction equipment, and do everything by hydraulics.

Jeff Maney, director of advanced solutions engineering at Haldex Hydraulics, noted his company's system is 'strictly series' and that, unlike a conventional hydrostatic swashplate transmission system, "In our system, the high pressure port is always the high pressure port. The flow changes direction." The system is open loop, also unlike a conventional hydrostatic transmission, which is closed loop, with pressure in the loop dictated by load rather than system control.

The EMS system aims to maintain a constant supply pressure and some load on the engine at all times. Even when the machine is stationary, Maney said the swashplate in the unit attached to the engine is kept at a shallow angle, while the swashplates in the motors attached to the wheels are at zero angle and the units are at full pressure. The surplus high pressure oil is used to slowly add charge to the accumulator. Movement is initiated by controlling the swash plates at the wheels which leads to the pump swashplate angle being increased to deliver more high pressure oil. He said that this means that they 'draw torque, rather than torque being pushed towards them'. This should mean the system is very quick to respond, and thus easier to control. Hydraulic systems which have to be pressurised before anything happens, can sometimes oscillate if demand changes are made quickly.

Traction control and anti-lock braking is, built in, as Maney explains: "If a wheel starts to slip, the torque is backed off until it stops, whether it is forwards or backwards torque."

The overall goal of the control system is to avoid energy waste. Hence, energy from a descending bucket on a loader can be stored or delivered to help accelerate the vehicle. Surplus energy is delivered to the hydraulic accumulator during braking events and released from it when extra energy is required for forward acceleration or to perform lifting actions. This principle is used in other hybrid systems, of course, but others we are aware of do not try to integrate everything at once.

This accumulator is sized at six US gallons on the 180HP powered system on the development test bed, which is considered to be large enough to store energy for the demand side of an operating cycle, but not so large as to introduce excessive weight. Maney said that the test system can absorb up to 550 HP, which is more than three times the engine input. Compared to parallel hybrid systems, component sizes will be larger but complexity and the number of component is reduced, which also eases control.

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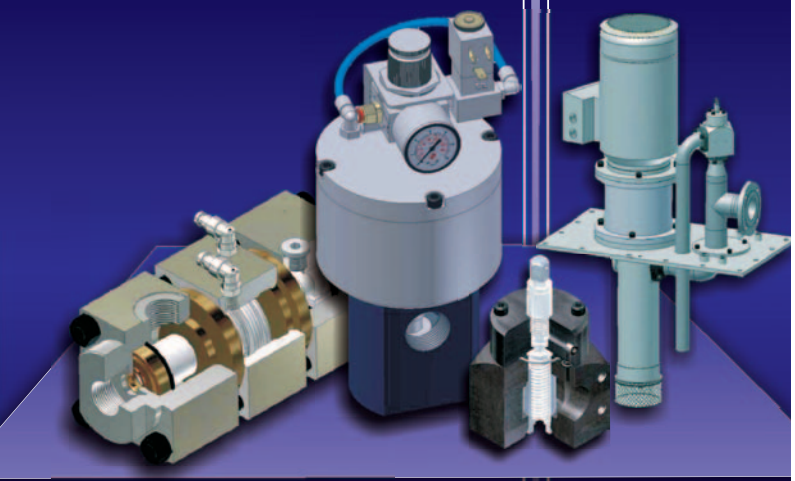

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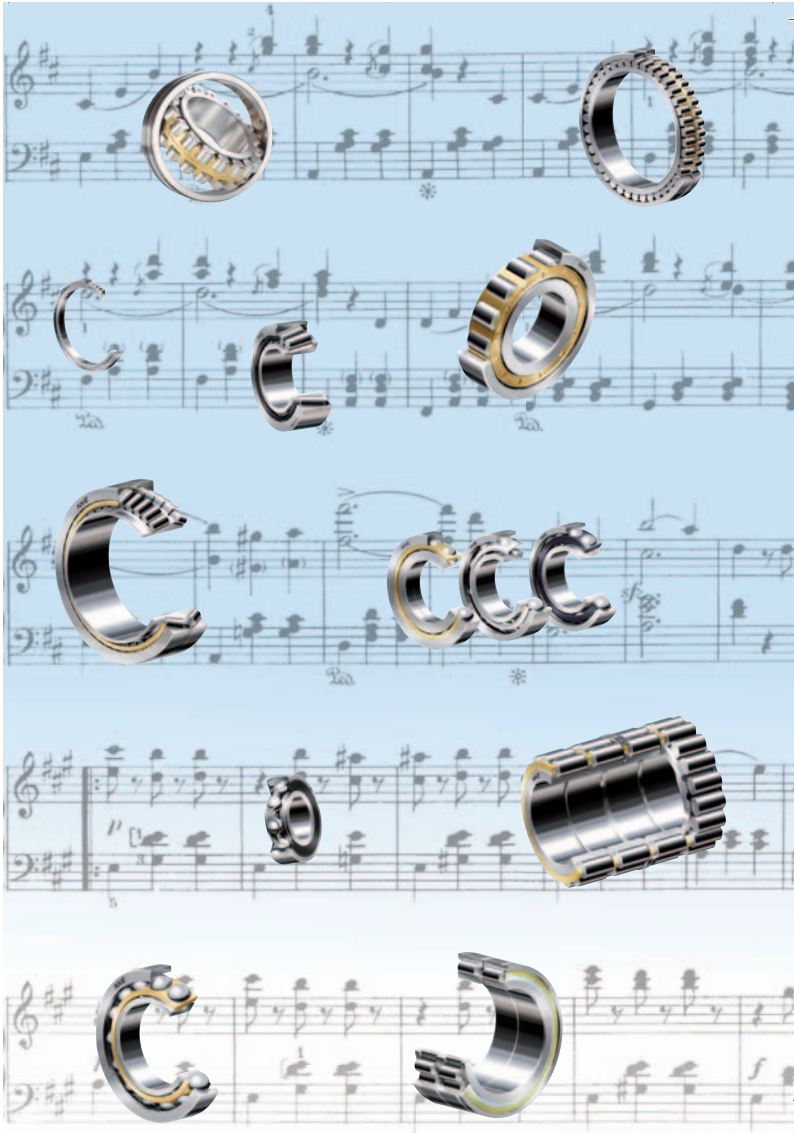

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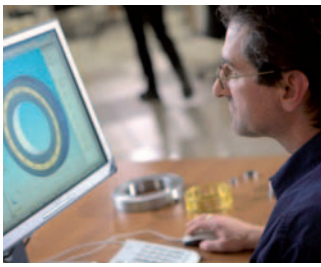

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Something for everyone

The Drives & Controls and IFPEX shows promise a lot of innovation. Paul Fanning takes a look at what's on offer.

Birmingham's NEC is set to be the focus of the largest manufacturing and engineering event of 2010. Drives and Controls, Air-Tech, IFPEX, and Plant and Works Exhibition – taking place between the 8th-10th June – will form part of the manufacturing and engineering series of shows alongside MACH 10, Subcon and Electrex.

Many of the UK's leading automation and motion engineering companies have shown their confidence in the future of the industry by booking substantial stands for the 2010 Drives & Controls show, including Danfoss, Leuze Electronic, Phoenix Contact, Rockwell Automation and SEW Eurodrive.

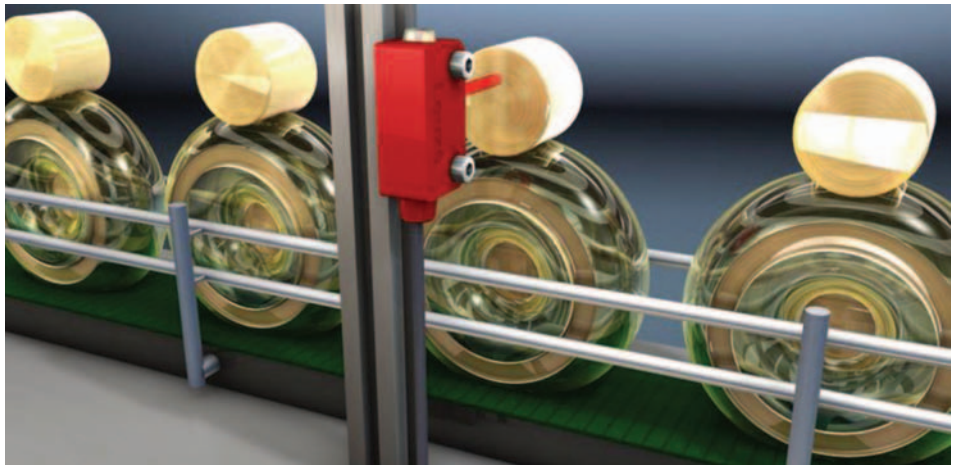
Further confidence is given by the fact that many of the companies attending the show are either first-timers (including Alldrives, Kroy, Micro-Epsilon and SITI/Alphadrive) or have not taken part in Drives & Controls exhibitions for many years. Examples of returning exhibitors include Baldor, HMS Industrial Networks, Motovario, Schmersal, Sick, Synatel, Trio Motion Control and SS White.

All sectors of the industry will be represented at the exhibition, including automation (with names such as Horner, ILME, Lamonde and Schneider Electric), drives (including Gefran and Lenze), motors (Lafert, Marelli, Motor Technology and WEG), safety (Pilz, Schmersal and Steute), mechanical and actuation (Centa, CRD Devices, Habasit Rossi, Linak, Moore International, Motovario, Olsen

Engineering, Reliance Precision and Wittenstein) and electrical (Block, HVR and Rittal).

Other technologies represented at the show will include communications (Harting and HMS), sensors and measurement (Heidenhain, Micro-Epsilon and Red Lion) and software (Aceri, Auctotec, Don Tyne and Thinking Space).

Many of the sector's major players will take part in the show via their distributors and partners. For example, Siemens and Schaeffler will be represented on the HMK Automation & Drives stand. Items from ABB's portfolio will be found on Quantum Controls' stand, while

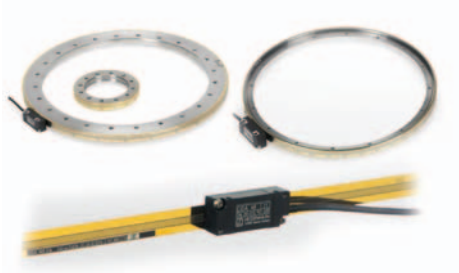


Right: Schneider Electric will launch the Altivair 32 modular drive.
Below left: Leuze electronic's brand new '2 Series' miniature sensors will be on display.

products from the German automation supplier Beckhoff will be demonstrated on the stand of its UK distributor, Hayes Controls.

Alongside the exhibitions, there will also be a comprehensive and focused seminar programme, with speakers representing some of industry's most pre-eminent organisations, has been confirmed by DFA Media for its series of exhibitions - Drives and Controls, Air-Tech, IFPEX, and Plant and Works Exhibition in 2010.

Important subject areas for the seminar



Heidenhain (GB) will display its comprehensive range of rotary encoders.

programme will include: Motor efficiency; Gearbox safety; Health and Safety; Industrial Communications; Maintenance in industry; Finance/ obtaining credit; Marketing; Energy efficiency; and Training.

DFA Media's 2010 events will feature two seminar theatres – one for the Drives and Controls (www.drives2010.com) and Plant and Works Exhibition (www.pwe2010.com) and the other for the International Fluid Power Exhibition (IFPEX) (www. ifpex2010.com) and Air-Tech (www. airtech2010.com) Exhibitions.

Each theatre will have its own relevant and distinctive programme.

The free industry focused seminar programme, run across the three days of the shows, will include a variety of presentations ranging from technical seminars to marketing strategy and even an insight into the financial world to help visitors understand the often misunderstood concept of lending criteria and what banks are looking for in manufacturers in today's financial world. Graeme Allinson, head of manufacturing, transport and logistics at Barclays Commercial Bank, has confirmed he will be presenting at the Drives and Controls, Plant and Works Exhibition, IFPEX and Air-Tech shows, to talk about what banks look for when they lend money.

Ranging from energy management and plant safety to manual handling, Ethernet communications and gearbox maintenance, the seminar programme will cover a broad range of subjects specifically chosen for their topicality and relevance to today's engineers.

These highly-focused seminars will also give delegates the opportunity to pick up best practice tips and valuable advice from a variety of speakers, representing a broad cross section of the engineering and manufacturing sector.

Speakers at the seminars will include: Paul Higgins, the Carbon Trust's head of financial services; Chris Dee, executive director of the British Compressed Air Society; Ian Morris of the British Fluid Power Association; Professor Len Gelman, director of Centre of Vibro-Acoustics and Fatigue at Cranfield University; Stephen Barker, representing Gambica Trade Association; Matt Gallagher, CEO of The British Institute of Non-Destructive Testing (Bindt); Geoff Walker, representing the Institution of Diagnostic Engineers, plus many more.

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READER INTERVIEW

60 SECOND

ANDREW REDMAN, OWNER, REALISE DESIGN

Q How did you get into the engineering industry?

A Like a lot of engineers, it started at an early age. Dad was a marine engineer, so it's kind of in the blood. We've also got an artistic streak in the family, so it's always been a mixture of the two. So I suppose, in the end, product design is about the only place I can exist in this world.

Q What does your role involve on a day-to-day basis?

A Because I'm running the consultancy, no two days are alike. It ranges from setting marketing strategy and discussing search engine optimisation for our website to dealing with the latest design issues for a client. I'm out and about a fair bit, have quite a lot of meetings and for around 40% of the time I'm in front of the computer working on the CAD. I'm still in a position to be hands-on and hopefully that always continues because that's key to me.

Q What are some of the projects you are currently working on?

A There's quite a broad range, actually. We're doing everything from helping companies to rebrand, to a new launch of cosmetics, which is quite exciting, to designing a device and system to train bees to detect explosives, which is also very exciting. It's quite a mix.

Q What is the most interesting project that you've been involved in?

A It's probably what I call our '40 days and nights in the desert' project. It was a 30m carbon fibre camera mast called Vortex and it takes a TV or film camera and does a vertical tracking shot right from eye level. So it can zoom up 30m and then do a 360º all-round view from there. The point really was to make something portable that can be taken to all sorts of sporting occasions. It's being used by Formula One, it's been outside Buckingham Palace and it'll be doing the London Marathon. That was a really exciting project.

Q How has the industry changed since you first started?

A I think the technology for doing the job is the main thing: things like CAD and rapid prototyping. Also the collaboration and communication that's possible over the internet has made a massive difference to the way we work. And the knock-on effect of that is that everything happens so much faster.

Q What are the big issues facing industry?

A There are three big ones: the first is China. It's an old story in manufacturing, of course, but I'm now getting bombarded by people sending requests regarding rapid prototyping from China. They're really scaling up.

The second thing is the level of talent in this country. It's a huge issue for us. To be a centre of manufacturing excellence, we've got to have a critical mass of good people. One of the things we're incredibly bad at in this country is creating the right impression of our industry and attracting young people. Basically, the youth in this country just doesn't see manufacturing as cool. We've got to be a lot more savvy about it as an industry.

The third thing is the environment. It's about engaging with government and getting them to see this as a massive opportunity, rather than just a cost. This is where we can actually compete on the world stage and I get frustrated that progress is so slow.

Q How do you see the industry going forward?

A I think we have to look at the environmental opportunities. We're going to have to create that as an area of expertise. I think it's going to involve a lot more global collaboration, but also a lot more local, high-value relationship-building.

Got an interesting project? To be considered as a future 60-second interview candidate contact: pfanning@findlay.co.uk

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Design Engineer

Location: North West (Cheshire)
Salary: £35-40k + benefits

Middlewich Food Trays produces polystyrene food trays that are sold via wholesalers to the takeaway market. To maintain an advantage in this high volume, competitive market Middlewich Food Trays carries out in-house development of off the shelf production equipment and the design and manufacture of special purpose machinery exclusively for its own use. The company has a well equipped workshop with CNC, fabrication and general engineering facilities capable of producing almost any part.

The successful applicant will work as part of a small team, reporting directly to the directors, who are responsible for the entire design process. The applicant will spend the majority of time designing in Solid Works to produce engineering drawing for the workshop, or models to be passed to our CAM operators. Although the production of the design will be carried out by the workshop the applicant will be expected to follow the design from inception through to use on the shop floor. Some procurement of special items may be required.

The successful applicant will have several years design experience and be a capable user of a solid modelling package, preferably Solid Works. Hands on experience in a previous role or a hobby is essential. Experience with plastics machinery and production equipment would be an advantage.

For full details and to apply for this job go to www.EurekaJobs.co.uk and type in reference: 325324

Lead Technologist, High Value Manufacturing (Process Industries)

Location: South West (Wiltshire) Salary: £45 - £55K

At the Technology Strategy Board, we help businesses to develop by exploiting great ideas and leading edge technology. Investing time, money and expertise, we bring together business, researchers and policy makers to find innovative solutions to help underpin UK business, support economic growth and place the UK at the forefront of world innovation. We now have this opportunity for a key player to join our team focusing on high value manufacturing (process industries).

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Degree qualified in a scientific, engineering or related discipline and, ideally, membership of an appropriate professional body, you will show strong evidence of continued personal development. With senior level experience gained in a manufacturing environment, you'll be an excellent communicator, influencer and team player. You'll also be adept at working across technology fields and have up-to-date knowledge of key technology trends and relevant UK and global business opportunities. Most importantly however, you'll share our commitment to driving forward future innovation.

For full details and to apply for this job go to www.EurekaJobs.co.uk and type in reference: 325251

A new wave?

Every sailor is aware of the immense power that storms can exert on their vessel. Wind power has been harnessed for thousands of years but what about wave power?

Wave power is now being harnessed experimentally on quite a large scale to generate electric power, although it is far from obvious as to which technology is most cost effective. It is estimated that the worldwide useful wave power resource that might be harnessed is more than 2TW.

Certainly, yachtsman are only too well aware of the dangers of waves driving them onto shore, and even large ferries stop sailing when waves are large enough to potentially drive them against harbour walls when making port.

The biggest problem is that waves tend to drive boats where the wind sends them, which is often not along the course that sailors wish to follow. The second biggest problem is that mechanisms that rely on translating oscillating motion into forward motion tend not to be very efficient. This means, apart from cost and complexity, average forward speed is not likely to be very fast, especially as progress is unlikely to be rapid in calm weather.

The Challenge

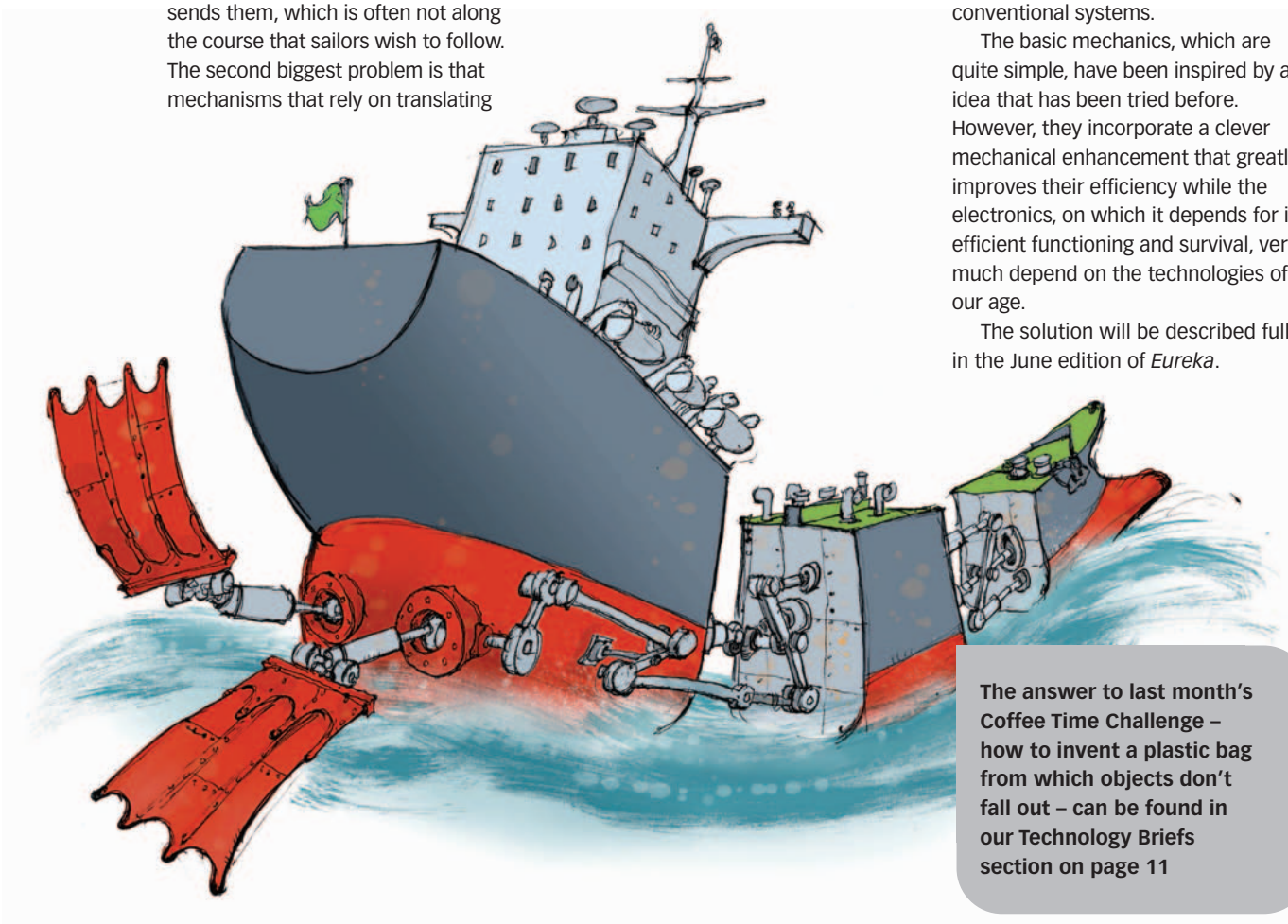
Our challenge this month is to come up with a wave-powered vessel that is commercially viable.

Boats are designed for users, whether their purpose is pleasure, war or carriage of freight, and part of the challenge is to not only come up with a design of wave powered vessel that is mechanically efficient and cost effective, but also a design for which relatively low average forward speeds are unimportant. Part of the consideration is that, despite being slow, it must still be agile enough to avoid being run down by faster vessels, without having to have an auxiliary engine system.

It is perhaps for these reasons that it is only now that a commercially viable wave powered vessel has become available. Prototyped and tested on a series of long ocean voyages, it has recently gone on sale, and the first production units have been found capable of performing vital tasks at a small fraction of the cost of conventional systems.

The basic mechanics, which are quite simple, have been inspired by an idea that has been tried before. However, they incorporate a clever mechanical enhancement that greatly improves their efficiency while the electronics, on which it depends for its efficient functioning and survival, very much depend on the technologies of our age.

The solution will be described fully in the June edition of *Eureka*.



The answer to last month's Coffee Time Challenge – how to invent a plastic bag from which objects don't fall out – can be found in our Technology Briefs section on page 11

Adhesives

Versatile two part silicones

Loctite's range of two-part, fast curing silicone adhesives now comprises four products that allow handling strength within minutes. In many cases, there is no need for surface preparation and, depending on the specific product, they can withstand temperatures up to 220°C continuous or 300°C for short term exposure.

As well as fast curing, these products have excellent cure through volume, and give good adhesion to a wide range of substrates without the need for a primer.

Dispensing is carried out by means of a manual applicator or via a bi-mixer nozzle attached to a pneumatic gun.

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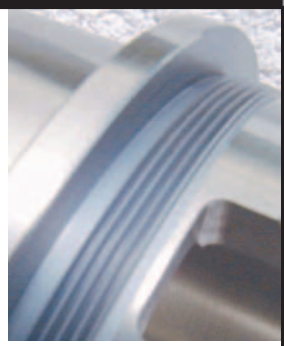
www.loctitesolutions.com

Adhesive Tapes

www.tesa.co.uk

Coatings

WS2 Stops galling of SS and Titanium



Stainless Steels and Titanium are both prone to galling and seizing. WS2 is a very low friction dry lubricant surface treatment, developed by NASA for use in deep space. It has been shown to provide a very cost effective solution, preventing both problems on threads and other sliding surfaces.

WS2 works well from -273° to 450° C and down to 10-14 Torr. WS2 has been applied to bearings and gears to extend life.

Design Out maintenance problems with WS2!

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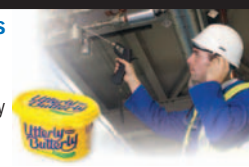
Energy Saving

Spirax Sarco steam system audit helps Dairy Crest achieve "stretched" 18% energy target



Dairy Crest reduced gas consumption at its Kirkby factory by 18%, thanks to a combination of energy saving measures, including a range of steam system improvements recommended by Spirax Sarco. Steam system optimisation played a major role in achieving the overall savings, leading to an extremely rapid payback for Spirax Sarco's audit. "In terms of payback we're talking months not years," says Dairy Crest Engineering Manager Gordon Davies.

One of the big improvements was raising the temperature in the boiler feed tank, from between 79 and 82oC, to 96oC. As a rule of thumb, increasing the temperature of the feed to a boiler by 6oC reduces the boiler's energy consumption by 1%, so this alone will have yielded savings of at least 2%.

@: Sharon.Graves@uk.SpiraxSarco.com
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Fans

Greener, quieter machines with the new GA type fan

Sanyo Denki's GA Series fans from EAO offer high airflow and static pressure but with lower noise and power consumption for greener, quieter machines.

The GA fans come in; 40mm, 60mm, 80mm and 92mm frame sizes, and have pulse sensors and PWM speed-control. The fans are reliable, dual ball-bearing fans guaranteed for a minimum 40,000 hours at 60˚C with 90% survival rate.

The new range offers up to 25% more airflow, 38% less power and 6dB(A) less noise than earlier products.

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Flowmeters

Titan's Breakthrough in Small Bore Flow Metering

Titan Enterprises breakthrough product is now available from £464 EXC VAT!

The new 'Atrato' is a direct and accurate through meter without a contorted flow path which can operate over very wide flow ranges. The ultrasonic technology used offers excellent turndown, linearity and repeatability.

The Atrato is capable of monitoring flow over a range of 200:1 and has accuracy better than ±1.5%. Its simple, yet effective design makes it applicable to a variety of markets, whilst its USB interface makes it extremely easy to install and use.

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www.flowmeters.co.uk

Imaging

High Dynamic Range Cameras Based On Solar Cell Technology

A new range of cameras from STEMMER IMAGING use a sensor based on solar cell technology to allow imaging from scenes which simultaneously contain both very light and very dark areas. This makes them ideally suited to use in environments with a very high dynamic range, or where there are strong and unpredictable brightness fluctuations. The new FX4 HDR (High Dynamic Range) sensor from IDS produces a logarithmic signal output. This enables fine differences in brightness to be imaged even in very bright scenes, without saturation, in a similar way to the human eye. Most of the USB and all of the GigE versions (HE, RE and SE) of the IDS uEye family of industrial cameras feature an FX4 HDR sensor version.

The FX4 HDR sensor features a patented pixel structure that provides a truly logarithmic output with effective suppression of fixed noise and gives a dynamic range of 120 db.

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Infrared Thermometers

Ircon® Announces Advanced Features for Modline® 6 Series Fibre Optic Infrared Thermometers

Ircon®, the worldwide leader in infrared (IR) noncontact temperature measurement, has introduced the new Modline® 6 Series of infrared thermometers. The new line of high performance sensors features advanced signal processing and background-reflected energy compensation capabilities, and includes one-and two-colour fiber optic IR devices designed for harsh operating environments.

The rugged Modline 6 Series thermometers deliver the best value in terms of price, performance, features and ease-of-use of any available fiber-optic infrared thermometer. They are used in a variety of demanding industrial applications, including metal heat treating, steel production, foundries, and primary and secondary glass.

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Laser Marking

New Hewlett Packard 3D printers available from Laser Lines Ltd

With many years experience selling the full range of Stratasys 3D Printing and Rapid Prototyping Systems, Laser Lines are now able to add HP Designjet 3D Printers to their portfolio.

Laser Lines have become a Hewlett Packard Preferred Partner so they can offer the HP Designjet 3D and the HP Designjet 3D Colour to complement their existing products, covering a range from an easy to use desktop 3D printer up to a large additive manufacturing centre capable of building parts almost a metre square in a wide range of materials.

The HP Designjet 3D offers a totally automated solution for producing models in an office environment.

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New Wing Nuts

Washer faced wing nut

BÜLTE washer faced wing nut is now included in the enlarged range of Bülte Plastics' fasteners.
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Wing faced nuts need no tools thanks to the wings which allow manual tightening. The integral washer removes the need for a separate washer and reduces assembly time (even load distribution and surface protection).

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Pressure & Temperature Measurement

PSD-30 pressure switch now also available with IO-Link

WIKA now provides its new model PSD-30 generation of pressure switches with an optional fieldbus independent communications interface, IO-Link. The point-to-point connection significantly reduces the expense of parameterisation, process monitoring and machine maintenance.

By using the IO-Link, manual input of the various instrument parameters such as switch points, reset points and units is no longer required. These are uploaded directly into the pressure switch from the central control system over a standard cable and can be reproduced at any time. This reduces the time required for commissioning or retrofitting. The operator is supported through a flexible choice of parameters and data documentation.

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Pressure Transmitters

SICK CLV65X delivers high-speed automatic identification

The CLV65X SMART scanner has an exceptionally quick read rate, up to 6 m/sec, and boasts improved decoding and stable reading rates on low contrast, partly destroyed or partially hidden barcodes. This high reliability makes it ideal for use in a number of industries, including automotive, materials handling, logistics, electronics, pharmaceutical, packaging and food and beverage, as well as in forklift applications.

Using Time of Flight Technology (TOFT) the intuitive scanner measures the time the laser takes to reach a label and then adapts its focus accordingly, ensuring high performance over long ranges, without the requirement for light switches to change focus positions.

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Sensors/Switches

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Test & Measurement

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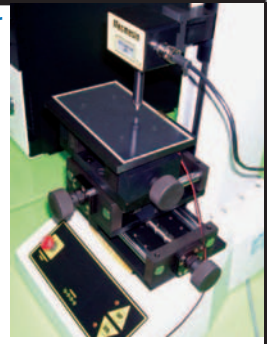

A Korean based company is using a Mecmesin force test system to establish consistent manufacture and touch uniformity for its navigation device touchscreens.

A MultiTest 1-i, rated to 1000N, combined with a 5N loadcell, adjustable X-Y table and compression probes enables the Korean H Company to test various points of the touch screen at different force levels to establish reliable operation of the product. The X-Y table provides added versatility offering users fine precision alignment of the touch screen beneath the compression probe, so that multiple points can be tested in quick succession with minimal set-up time required.

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Transmitters

VEGA launch new DP transmitter.

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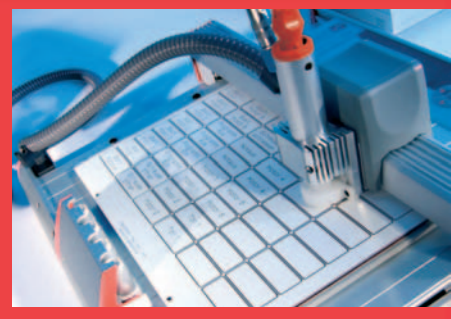

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