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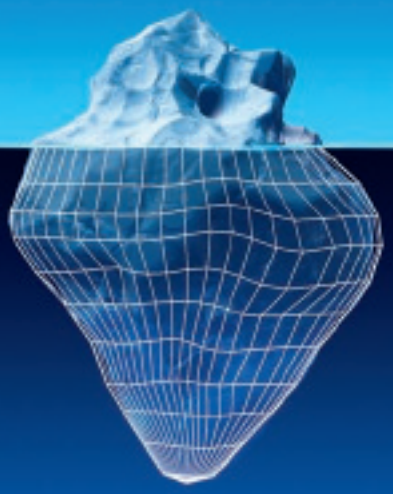

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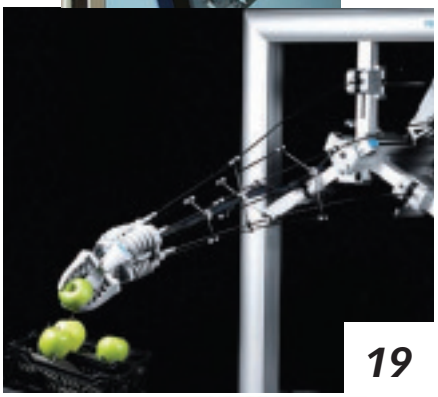

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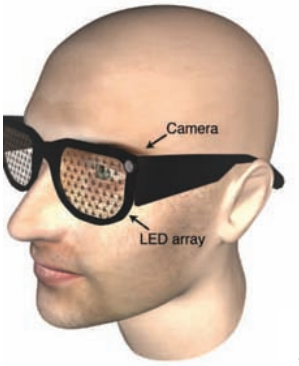

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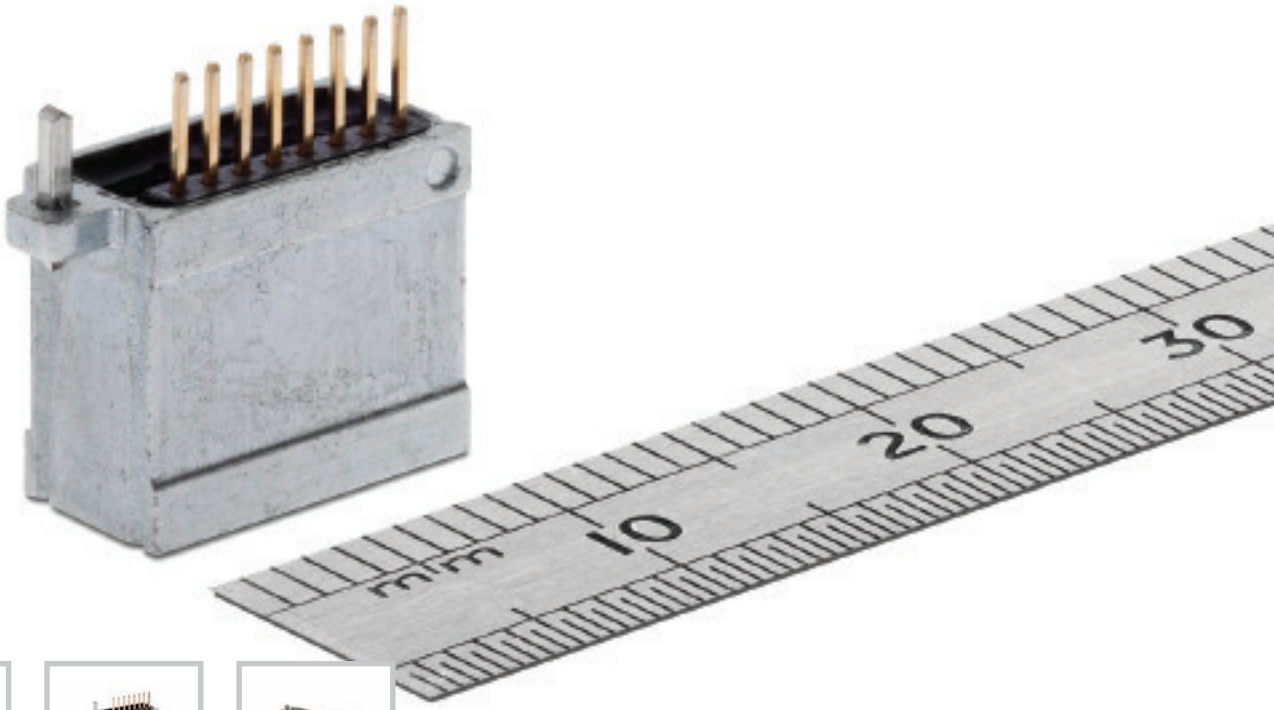

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A prize worth boasting about

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

The Prime Minister's recent announcement of the new Queen Elizabeth Prize for Engineering, launched by the Government and the Royal Academy of Engineering, is one that has been pretty much universally welcomed by the sector as a whole.

This comes as no surprise in an industry that has long complained about the lack of recognition it receives, the lack of media profile it engenders and the shortage of support it receives from government. After all, anyone winning this prize will – whether they like it or not – suddenly find the spotlight turned on them as an engineer.

This raising of the industry's profile, one hopes, will be the main benefit of this prize (apart from the £1 million for the deserving recipient, of course). One of the most common complaints made about engineers – often by other engineers – is that they fail to shout about their achievements to the extent they should. Whether it stems from shyness, the culture of engineering or an admirable humility, this failure to bring their achievements to public attention has a negative effect on the profession as a whole.

How negative can be seen from the inability of most panellists at the recent NI Days Panel Discussion to name a living engineering hero other than James Dyson. This seemed a shocking indictment not of this country's engineers' achievements, but of their talent for self promotion. It is this silence that allows the mendacious myth to persist that 'we don't make anything in this country anymore'.

It is fervently to be hoped, then, that the awarding of a prize such as the one announced by the Prime Minister will encourage engineers to stop hiding their lights under a bushel and make the world at large aware of their achievements.

BRIEFS

Airbus creates 200 jobs

Airbus is to create up to 200 jobs at its Filton site due to increasing demand for its A350 passenger aircraft.

Airbus recently received a conditional offer of funding from the government's £1.4billion Regional Growth Fund. The grant will be used to support the expansion of aircraft wing design, manufacture, assembly and equipping capabilities.

Business Secretary Vince Cable, said: "The South West is becoming a real hub for composites and aerospace manufacturing. It is exactly the sort of place where targeted government support through schemes like the Regional Growth Fund can have a real benefit.

"By helping companies large and small unlock their potential for growth, we can make sure that we rebalance the economy and emerge with a stronger and more diverse industrial base."

www.airbus.com

Dyson funds professorship

Wiltshire based manufacturer Dyson has pledged £1.4million to the University of Cambridge to fund a professor of fluid mechanics.

The newly appointed professor will focus teaching and research on the science and engineering of air movement. The £1.4m donation will fund the professorship for 10 years.

Sir James Dyson said: "Britain needs bright ideas. We need more British students to take on research projects at British universities – we are struggling to fulfil our engineering needs.

"Forging working relationships with universities will help us solve our engineering challenges and continue to export the best technology."

www.dyson.com

National Composites Centre declared open for business

A multi-million pound centre of excellence seeking to enhance the UK's composites expertise has been officially opened by Business Secretary Vince Cable.

The National Composites Centre is a 8500m2 state of the art building offering laboratory space for SMEs to develop new products using advanced materials. Located in Bristol's Science Park, it is one of seven research and technology facilities which form the High Value Manufacturing technology and innovation centre.

Business Secretary Vince Cable, said: "Here in the UK we are very good at invention, but we need to do more to innovate and turn our ideas into products and jobs. I don't want the UK to miss out on any opportunities to create economic growth through manufacturing.

"This centre will work with our world class universities and international businesses based in the South West and across the UK, to develop and commercialise new technologies."

Cable maintained the centre's work will strengthen the UK's manufacturing centre, exploit the next generation of advanced composites materials and help maintain the country's global lead in this technology area. "I look forward to seeing what they produce," he concluded.

www.nationalcompositescentre.co.uk

Engineering design show

10th -11th October 2012 · Jaguar Exhibition Hall · Ricoh Arena · Coventry

Engineering Design Show confirms more exhibitors

A number of companies have confirmed they are to exhibit at next year's Design Engineering Show.

Among those are bearing specialist Schaeffler, plastic experts Distrupol and leading adhesive specialist Henkel. Other names to have joined the list of exhibitors include Albis, RUD Chains, TFC and CRDM. The show aims to focus specifically on the issues facing design engineers and show them the latest range of technologies.

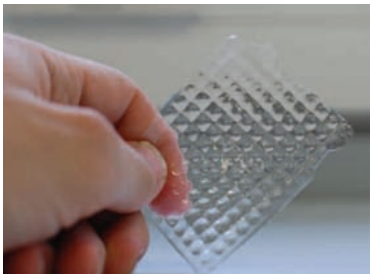
The Show, which will take place on October 10th and 11th 2012 at the Jaguar Exhibition Hall at the Ricoh Arena, Coventry, will focus on the needs of design engineers in both the mechanical and electronic fields and will include a comprehensive conference and workshop programme.

Running throughout the two days of the show, the conference will focus on a broad range of themes and topics focused on the requirements and realities of design engineering within the UK, and have the UK leading technology and engineering firms on hand to showcase the latest innovations. With subjects ranging from materials development through to regulation, the conference will bring together speakers from across industry, government and academia.

For more details of the event or become an exhibitor, please visit the website or contact Luke Webster at **lwebster@findlay.co.uk** **www.engineeringdesignshow.co.uk**

Download the floor plan below

Novel coating to reduce carbon footprint of aircraft



University of Surrey researchers have developed a new process to make bespoke coatings that could one day reduce the drag resistance of ships and aeroplanes and thereby lower fuel consumption.

The simple, low-cost process, called infrared radiation-assisted evaporative lithography, has enabled the team of physicists to create plastic coatings with small bumps and ridges in sizes ranging from less than a millimetre to a couple of centimetres. With the right design, the researchers believe this texture will reduce the drag forces when large vessels pass through air or water.

Project leader Professor Joseph Keddie, of the Department of Physics, said: "It's an exciting prospect to have an impact on the energy consumed by planes and ships through a straightforward, inexpensive technology.

"Our process can create coatings with nearly any desired texture to meet the particular requirements of an application. Our project will help to transfer our research ideas into industrial manufacturing."

To create the coating, the researchers used beams of infrared light to heat certain spots on wet coatings made of tiny plastic particles in water. As the hotter spots evaporate more quickly, the plastic particles are then guided there as the evaporating water is replaced.

www.surrey.ac.uk

World's lightest material

Researchers in the US have developed what they claim to be the world's lightest material.

With a density of just 0.9mg/cc, about 100 times lighter than Styrofoam, the new material has a micro-lattice cellular architecture and is made up of 99.99% air.

According to lead researcher Dr Tobia Schaedler, from the University of California, it demonstrates unprecedented mechanical behaviour for a metal, including complete recovery from compression exceeding 50% strain and remarkably high energy absorption.

"The trick is to fabricate a lattice of interconnected hollow tubes with a wall thickness 1,000 times thinner than a human hair," Dr Schaedler said.

"Materials actually get stronger as the dimensions are reduced to the nanoscale. Combine this with the possibility of tailoring the architecture of the micro-lattice and you have a unique cellular material."

Developed for the Defense Advanced Research Projects Agency, the researchers believe the novel material could be used for battery electrodes and acoustic, vibration or shock energy absorption.

William Carter, manager of the architected materials group at HRL Laboratories, compared the metal to larger, more familiar edifices: "Modern buildings, exemplified by the Eiffel Tower or the Golden Gate Bridge, are incredibly light and weight efficient by virtue of their architecture. We are revolutionising lightweight materials by bringing this concept to the nano and micro scales."

www.universityofcalifornia.edu

EVAPORATOR MOTORS ENGINEERED FOR A/C SYSTEMS

Frame brushless DC condenser and evaporator motors provide ideal solutions for transit coach air conditioning (A/C) systems. Their 27.6 VDC brushless construction and DSP-based electronic commutation deliver virtually maintenance free operation and long service life up to 60,000 hours. They can easily accommodate OEM or retrofit applications as drop-in replacements for most existing brushed DC motors up to 2hp.

Both the condenser and evaporator motors benefit from environmentally sealed and electronically protected construction to resist hot water spray, rain, humidity, salt, fog, shock, and vibration typically encountered by heavy-duty transit vehicles. They have been rigorously field-tested and qualified in OEM applications.

www.ametektechnicalproducts.com

MAGNETIC SENSORS FOR DIFFICULT APPLICATIONS

New solutions for difficult position sensing applications don't come along every day, so the new MFS and MGS magnetic sensors from market leader ifm electronic Ltd are a breath of fresh air. The innovation is to take a solid-state magnetic sensing chip as used in hard drives and package that in a completely sealed stainless steel housing, in standard M12 (MFS) and M18 (MGS). The housing is formed from not only a stainless steel body, but an integral stainless steel sensing face, too. This alternative position detection technology opens up new applications in harsh environments too dirty for photocells but where inductive sensors just don't have the range. Of course the magnet and the sensor also operate through non-ferrous metals, e.g. aluminium.

www.ifm.com/uk

Huco Dynatork extends elastomeric choice

The new Huco Dynatork L-Jaw elastomeric couplings are an economical, proven solution for general purpose applications. They are fully interchangeable with other industry-standard designs and provide both quality and affordability. Their addition to the company's range further enforces its ability to provide a coupling to meet any application need.

This range of straight, torsionally soft, couplings is new to Huco Dynatork but widely used in the US. These products are easy to install and require no lubrication or maintenance. The design uses the flexibility and resilience of a polyurethane element of which four types are available to suit the needs of the application: Buna-N rubber, Urethane, Hytrel and bronze.

Huco Dynatork L-Jaw couplings are an excellent choice for all light and medium duty, industrial applications where the take-up of vibration is an important factor. Models are available with torque capacities up to 0.70kNm.

www.huco.com

Lenze extends I/O system

The Lenze I/O System 1000 has been extended in response to customer demand with additional bus couplers and module functions. The system is popular because of its compact size with DIN rail mounting, particularly easy handling and low costs. The high bandwidth of 48MBits/s allows speedy response times and the use of real-time buses.

Stations of I/O can be created without the need for tools. The 12.5mm wide modules clip together onto a DIN rail, and wire connections are 'push-in' using clamp cage technology. The particularly easy handling is illustrated by clear labelling, LED indications on each channel and a two part construction where the electronics can be exchanged without disturbing the wiring. An integrated support for a standard 10 x 3mm shield bus bar is included so EMC shielding can be achieved easily without external terminals.

www.lenze.co.uk

Solution to last month's Coffee Time Challenge

The solution to November's Coffee Time Challenge of how to dispense beer more quickly and with less wastage comes in the form of the Bottoms Up Beer Dispenser from US company GrinOn Industries.

This device literally approaches the problem from a different angle, filling the plastic beer glass from the bottom rather than pouring from the top. This has the major advantage of avoiding the build-up of froth caused by pouring from the top, as well as ensuring that the correct amount is dispensed.

The cup features a small hole at the bottom, covered up by a circular magnet. Pressurised beer lifts the magnet up, filling the cup until the weight of the beer on top of the magnet pushes it back down, sealing the bottom. This system is not only faster (serving 56 beers in a minute), but minimises spillage.

While these cups are around 30 pence more expensive than standard plastic cups, it is believed that the difference can be made up (and then some) by companies paying to advertise on the magnets.

www.bottomsupbeer.com

Highly versatile positioning and measuring indicator

The new Linear Measuring Indicator (LMI) from HepcoMotion is more than just a precise length measuring system. This easy-to-install, compact product can also be adapted for rotary applications where angular measurement is required. Highly versatile and economical, LMI's offer repeatable, precise measurement to improve productivity and reduce rejects in many industrial applications.

It's an ideal addition to an automatic saw, for example, to provide an accurate cut to length facility for metal, wood, stone, plastic, paper or glass. In this regard the LMI's incremental mode is a boon for cutting uniform short lengths from a single billet or for creating partial cuts at regular intervals along its length.

Values are shown on a bright and clear, seven-digit LCD whose display is accessed via a four-button touch pad. Measurements can be shown in millimetres, metres, inches or degrees.

www.hepcomotion.com

Torque sensor robust and maintenance-free

The Type 4520A contactless torque sensor from Kistler costs less than £1,500, the same as many slip-ring types, and is exceptionally robust and very low maintenance. Non-contact, frequency modulation signal transmission, used to transmit the torque signal from the rotating shaft, virtually eliminates wear leading to a long life, even in continuous use applications. A TTL speed signal at 60 pulses/rev. and an external 100% range check input are provided as standard.

Ten models are available with rated torque from 1 to 1,000Nm each with industry standard ±10V signal output. Class 0.5 accuracy at speeds of up to 10,000rpm is combined with a maximum overload capacity of 150%.

The Kistler Type 4520A torque sensor range is ideal for static and dynamic torque measurement in production, quality control and research and development applications.

www.kistler.co.uk

ABB launches all-in-one string inverter

A string inverter that converts direct current generated from photovoltaic cells into alternating current for use in residential and small and medium-sized commercial and industrial buildings has been launched by ABB.

The PVS300, rated from 3.3kW to 8kW is aimed at installers and end-users and includes built-in protection functions that reduce the need for costly and space-consuming external protection devices and larger enclosures. It is a compact, reliable, safe and cost-effective solution, suitable for installations using multiple inverters.

The new transformerless, single-phase inverter has an intuitive and versatile control unit that is equipped with a graphical display. Built-in assistants and a help menu ensure that the control unit's functionalities are easy to use.

There are three mounting options for the control unit. It can be integrated within the inverter housing, or mounted separately on a wall to monitor inverter performance from outside the installation room. It can be also wirelessly connected so the inverter can be installed in a remote part of the site, and monitored wirelessly from inside.

www.abb.com

Conversion kit saves from encoder failure

Sick (UK)'s unique Incremental Encoder Conversion Kit helps protect manufacturers and operators from the costly effects of incremental encoder failure, by providing them with an immediate solution.

"Incremental encoders are vital in all fields of operating machinery in critical tasks," points out Sick Encoder Product Manager Darren Pratt. "Speed, acceleration, distance and position are all affected. Programmable encoders have helped reduce specification difficulties for engineers, but there are still a large number of model variations, especially for older machines.

"The Sick Incremental Encoder Conversion Kit is designed to replace as many different types of incremental encoders as possible, whatever their origin, and thus reduce the requirement for customers to hold specific stock."

The key is Sick's new PGT-10-S hand held encoder programmer, which allows an incremental encoder to be configured to exact specifications on the spot without requiring a PC. By enabling immediate replacement of an enormous range of encoders, the kit dramatically reduces downtime and revenue loss. Also in the kit is a selection of three programmable encoder types together with appropriate mechanical and electrical accessories.

www.sick.co.uk

‘Vacuum wars’ prompt

Following the victory of Vax over Dyson in a recent judgement over design infringement, Paul Fanning asks what the implications are for designers.

Dyson has come to represent something of a flagship for innovative UK manufacturing in recent years. Rightly or wrongly, the company has come to symbolise a standard of excellence in British design, manufacturing and marketing that it is fervently hoped that others will follow. Indeed, such is the strength of the brand that, at a recent industry event, the only living engineering ‘hero’ many could name was the company’s founder, Sir James Dyson.

While technological innovation has of course been at the heart of Dyson’s success, another major factor has been its highly distinctive and game-changing designs. The appearance of its products has instantly branded them in the minds of consumers and reinforced technological innovation with practical, attractive and desirable aesthetics.

Given the importance of these designs, Dyson’s recent defeat in its appeal of a lawsuit for infringement of a registered design against Vax has sent shockwaves not only through the company itself, but also throughout everyone in the UK design community concerned with the protection of IP. As one spokesman for Dyson put it during my research for this article: “If we, with our in-house teams of lawyers and IP experts can’t protect ourselves, who can?” Doubtless, much of UK manufacturing is currently asking itself the same question.

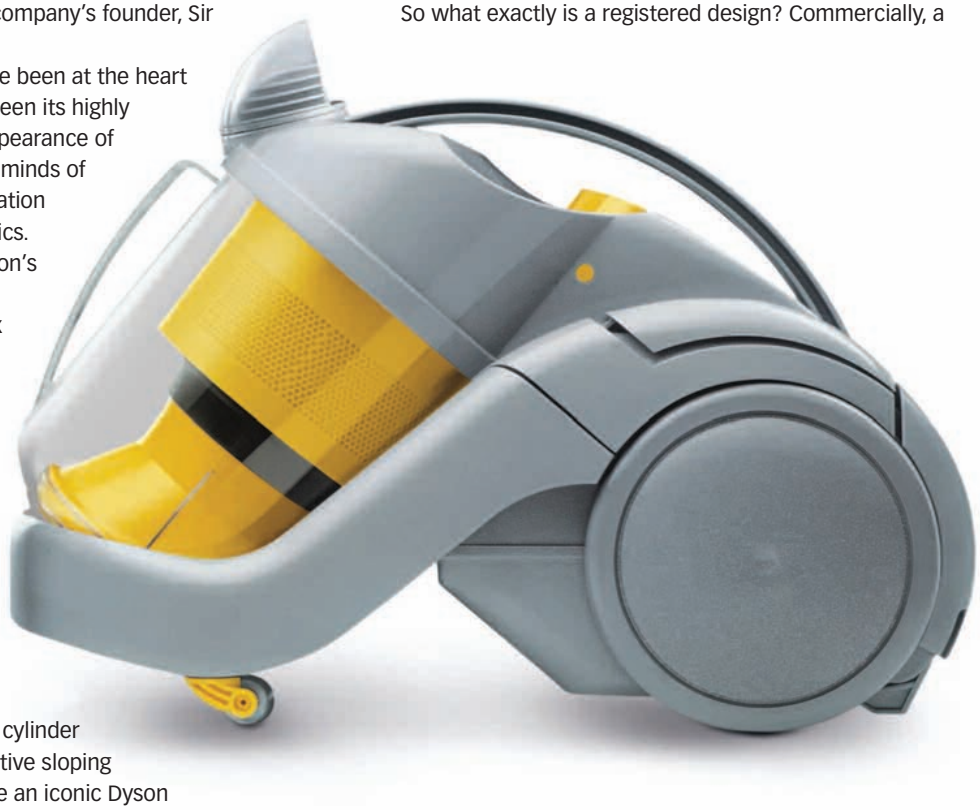
The case centred on two products, Dyson’s DC02 vacuum cleaner and Vax’s Mach Zen vacuum cleaner (see pictures, right). The DC02 cylinder vacuum cleaner, with its distinctive and innovative sloping transparent dust container, had almost become an iconic Dyson product. Thus, when Vax started to produce a similar-looking vacuum cleaner – the Mach Zen – Dyson sued Vax for registered design infringement. However, Dyson originally lost in the UK High Court because the trial judge held that the Mach Zen produced “a different overall impression on the informed user” (this being the test for infringement) compared with the design as depicted in Dyson’s UK registered design.

Visual appearance may well be protectable by one or more registered design applications

The question in this instance centred on the ‘design rights’ established by Dyson’s original registered design. This dated back to 1994 and – as dictated by the law at the time – concerned the design of the product as a whole.

So what exactly is a registered design? Commercially, a newly-developed product may merit being protected by a variety of different forms of intellectual property protection. For example, a new product might include a technical innovation that could be protected by means of a patent application, make use of a new brand name that could be protected by means of a trade mark application and have a new visual appearance. It is the new visual appearance that may well be protectable by one or more registered design applications.

It is possible to protect a 3-D visual appearance. It is also possible to protect 2-D aspects of visual appearance, such as any 2-D surface decoration. Under the modern law on registered designs, the



IP questions

registered design may be concerned with the whole or just part of a product.

Registered design, then, was the substance of the dispute between Dyson and Vax. In assessing the scope of protection by using the test of whether the alleged infringement did or did not 'produce a different overall impression on the informed user' the court will assess whether the designer had a limited degree of 'design freedom' (which narrows the scope of protection of the registered design) and will also assess who is the 'informed user' who has to apply the infringement test.

The UK Court of Appeal applied the case law that the informed user is a notional person who adopts a middle position between being an

expert and being an uninterested member of the public, and the informed user is a person who pays a relatively high degree of attention when he uses the product in question.

The Court of Appeal then considered whether the designer had a lot or a little 'design freedom' in devising the design of the registered design. The original trial judge had felt that a significant number of the design features were present for technical reasons, and thus that designer had limited design freedom (which implies a narrowish scope of protection for the registered design). These 'technical' design features included: the 45° slope of the dust container bin; the fact that the bin is transparent; why large wheels are at the rear of the vacuum cleaner; why the rear wheels are spaced apart; and why there are prominent wheel arches over the wheels with buttons incorporated into the wheel arches.

Design law talks about a design being applied to a "product" and the modern design law applies a broad definition to what is a "product"

According to Paul Price, a patent attorney and European design attorney for leading IP law firm D Young & Co LLP, this issue of design freedom is one that can make protection of design features difficult. He says: "As a rule of thumb, if it becomes technically necessary for certain design features to be present in order for the product to conform to a commercially-acceptable model, the designer is said to be constrained and those features can be difficult to protect."

The appeal court judges agreed with the trial judge regarding his assessment of these 'technical' design features and they also felt that the remaining features of the registered design were not taken by the Mach Zen machine to a sufficient extent for it to produce the same overall impression on the informed user, and thus that the Mach Zen had been correctly held not to be an infringement.

These remaining design features which produced a different overall impression included: differences between the wands of the registered design and the Mach Zen in relation to their shape and attachment point to the main body of the vacuum cleaners; differences in how the wheel arches flow forwards; and differences in the external shapes of the bins and the internal cyclones that can be seen inside.

The appeal judges described the registered design as producing a visual impression that is "smooth, curving and elegant" whilst that of the Mach Zen is "rugged, angular and industrial" with the end result that the informed user would consider that the Mach Zen produces a different overall visual impression and thus is not an infringement.

The original trial judge had felt that a significant number of the design features were present for technical reasons

However, it is important to remember that the registered design had been obtained under the old law.

According to Paul Price, this fact means the Appeal Court's decision may not be quite as crushing to the hopes of UK designers as might at first be thought. He says: "This was a very old registered design that was filed in 1994. Back then, you used to have to register the whole design of a product. Under the new law, you are able to protect particular parts of a design, which allows you to focus in on aspects of your product that you feel a competitor may want to copy and protect them accordingly. Thus, in this case, Dyson could have registered the design of the 45° angle of their product's inclined bin or the large wheels at the rear of the machine."

Anthony Albutt, a partner in D Young & Co's Electronics, Engineering and IT Group believes that, this judgement aside, the law as it now stands actually provides an impressive level of protection for designers. "I don't see things as being all doom and gloom. In fact, I think the law has evolved quite usefully for designers overall," he says. "Under the new law, things are pretty good. If you can show it, you can protect it. The protection of registered designs actually provides an incredibly powerful legal tool. A lot of people think solely in terms of patents, but they should be looking at design rights as a very powerful tool."

"When you see the judgement at first, you think it's unbelievable that Dyson wasn't able to protect its design, but in fact, it's really just a legacy of the old law."

Paul Price, D Young & Co: "This issue of design freedom is one that can make protection of design features difficult"

The decision in the Dyson vs Vax case may cause some alarm, but Albutt feels it may be seen as anomalous in years to come. He says: "When you see the judgement at first, you think it's unbelievable that Dyson weren't able to protect their design, but in fact, it's really just a legacy of the old law."

In terms of the lessons to be learned, however, Paul Price says: "Perhaps a lesson for future innovative designs would be to sit down and consider what aspects of the design are likely to be attractive to competitors, and then file to protect those aspects of the product by means of separate registered designs, taking advantage of the possibilities offered here in the UK (and in the EU) by the modern registered design law with its ability to protect part of the overall design of a product in addition to protecting the overall design of the product."

www.dyoung.com

For a copy of the judgement in this case go to: http://tinyurl.com/d6xxadm

Registered design – by Paul Price, D Young & Co LLP

Under the new or modern design law that applies in the UK and many European countries, and also to Community Registered Design applications, there is a broad definition of what is registrable as a design.

The registered design may be concerned with the whole of a product, or just part of a product. For example, the shape of the whole of a mobile phone might be new, or it could be that just the shape of the antenna is new and thus commercially it is important to protect the shape of the antenna by itself. If the mobile phone is covered with a pattern, it could be that all or just part of the pattern is desired to be protected.

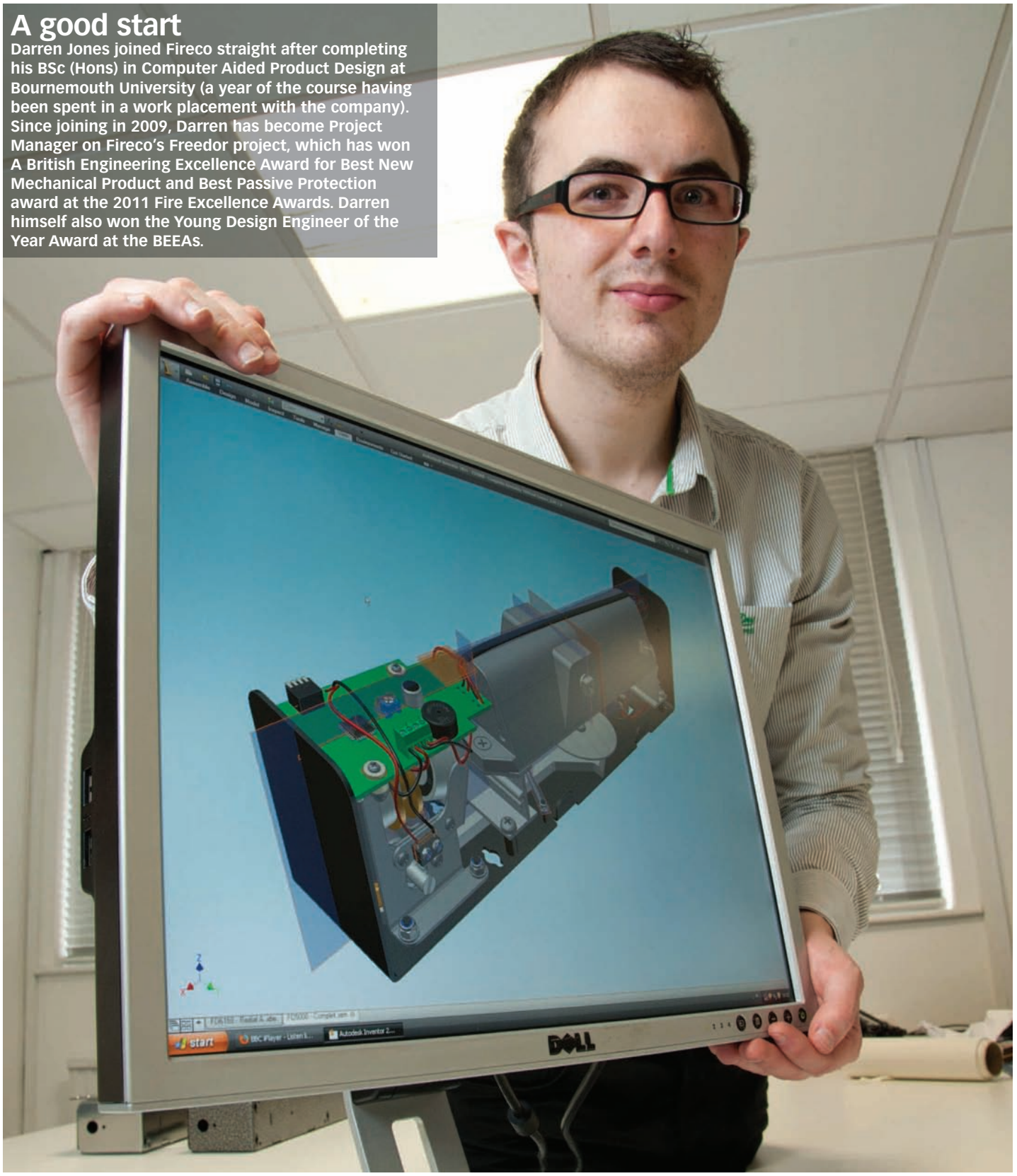
Design law talks about a design being applied to a "product" and the modern design law applies a broad definition to what is a "product" which includes, in addition to the usual industrial items, less obvious possibilities such as handicraft items (e.g. one-off sculptures), packaging (such as printed food cartons), the get-up of the product, graphic symbols (such as an icon on a computer screen, or a cartoon character) and typographic typefaces.

Because the modern design law classifies a"graphic symbol" as a "product" the design of which can be protected by means of a registered design application, it is generally speaking the case that anything visual may be protected by means of a registered design application. Under the new-style law, it continues to be possible to protect in the traditional manner a 3-D visual appearance (such as the new shape of the mobile phone) or a 2-D visual appearance (such as the colourful pattern applied to the casing of the mobile phone), but the important thing to appreciate is that the new-style law broadens out the possibilities so that, for example, the menus and icons that are displayed on the screen of the mobile phone can each be classified as a "graphic symbol" that is itself capable of being protected as a registered design.

To be registrable, the design must be new, and must also have "individual character" which is a subjective test meaning that the design must produce a different overall impression on the"informed user" compared with existing designs. Novelty and individual character are assessed on a world-wide basis against existing publicly-known designs, although there are some limited exemptions which might excuse a known design from being taken into account and you can discuss these exemptions further with your design attorney.

A good start

Darren Jones joined Fireco straight after completing his BSc (Hons) in Computer Aided Product Design at Bournemouth University (a year of the course having been spent in a work placement with the company). Since joining in 2009, Darren has become Project Manager on Fireco's Freedor project, which has won A British Engineering Excellence Award for Best New Mechanical Product and Best Passive Protection award at the 2011 Fire Excellence Awards. Darren himself also won the Young Design Engineer of the Year Award at the BEEAs.



‘Dasbo’ does the double

Having won Young Design Engineer of the Year and having seen the product he managed triumph at the recent British Engineering Excellence Awards, it’s fair to say that Darren Jones career has got off to a good start. Here, he talks to Paul Fanning.

When Darren Jones of Leading UK Automatic Door Company Fireco took the stage of the Globe Theatre London for the second time at the recent British Engineering Excellence Awards to accept the Young Design Engineer of the Year Award, a chant went up from his table. The chant was ‘Dasbo!’

Happily, the story behind the nickname is not as sinister as it might at first appear. Darren’s affectionate nickname among his work colleagues does not refer to a murky past of crime and anti-social behaviour. It actually came about as Darren’s colleagues felt that Darren was probably the person least likely ever to be given an ASBO!

A brief glance at Darren’s career thus far would appear to confirm the impression that he is a model of good behaviour. He began work with Fireco Ltd in 2009, joining the company straight from University. Darren’s first introduction to the company was during his placement year at University when he spent 42 weeks working in the development department. After graduating Darren enjoyed working at Fireco so much, he came back and started his career in 2009. Employed as a design engineer, Darren’s first project was to develop a new, innovative product: Freedor.

Freedor is the world’s first wireless, electrically powered free-swing door closer and is installed at the top of a fire door to allow it to swing freely, be left in any position and be closed automatically when the fire alarm sounds. The product is also the reason that Darren appeared on stage twice at the BEEAs, having already collected the New Mechanical Product of the Year Award for Freedor on behalf of Fireco. He says: “Obviously, it was amazing to get the award for myself, but for us to get the award for the product as well was just fantastic for us as a company.”

In fact, though, the receipt of awards for Freedor is no new thing, it having already won the Best Passive Protection award at the 2011 Fire Excellence Awards. Darren is clear about what these awards mean to him. “It feels absolutely incredible to have two years of hard work recognised with these awards, having taken the product from initial conception to installation in places like the British Museum..”

As project manager on the Freedor development, Darren was fundamentally involved in the initial concepts of Freedor, all the way through to the finished product. In addition, Darren’s training allowed him to undertake extensive virtual prototyping through CAD, Finite Element Analysis testing and the assessment of aesthetics and functionality, ensuring this met target audience requirements and British and European Standards.

However, Darren’s specific triumph with relation to Freedor lies in being the sole inventor of the unique and patented rocker assembly within the product, which is able to change state from free-swing to closer via the innovative use of two opposed electro-permanent magnets. The rocker pivots between the magnets so that when one is charged with a current of low voltage, the rocker is attracted to the opposing neutral magnet, which creates a state of change in the Freedor. Unlike the free-swing devices available on the market which rely upon mains voltage being permanently applied, the Freedor draws ultra low current from D.C. primary cells with a useful life of 18 months. Freedor fails to safe when the battery level is low. Freedor needs to hear a fire alarm that exceeds 65dBA, verifying the alarm over a 14 second period. Freedor will then release the door preventing the spread of fire and smoke around the building.

“Obviously, it was amazing to get the award for myself, but for us to get the award for the product as well was just fantastic.”

By applying the electro-permanent magnets, which only use power when releasing the door, Freedor has been able to use fewer batteries and help sustain the natural environment. Quick installation involving no wiring makes the process as easy as when installing a normal door closer. Freedor is a stand-alone wireless product.

Perhaps the greatest testament to the success of Darren and Fireco’s design work has been the commercial success that the product has already enjoyed. Freedor only went on the market this year and has already exceeded all expectations in sales and response. The demand for the product has been so great, additional production staff have been employed to cope.

At the moment Darren is putting together future iterations of Freedor. He says: “I’m currently looking at a version using radio technology, for instance. In fact, that’s one of the things you soon learn when you come from college to work – that you’re never finished with a product. At college, you would finish one project and move on to the next. In industry, on the other hand, products are always evolving and having to be modified and adapted. So that means you’re always having to think about things in a new way. You’re always learning.”

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Pictures courtesy of Festo

Manufacturers urged to automate

As manufacturing rides on a wave of enthusiasm from Government, the lack of automation is causing real concern. Justin Cunningham reports.

UK engineering and manufacturing has an opportunity; not least because government, mainstream media and the general public all want to see more of it and view it as key to driving economic recovery.

Earlier this month, the Department for Business, Innovation and Skills launched its 'Make it in Great Britain' campaign, which aims to showcase the variety of products made in the UK and promote the nation's manufacturing industry. But, while the enthusiasm is perhaps higher than it has been for generations, the UK is perhaps not always the high added value player that it aspires to be.

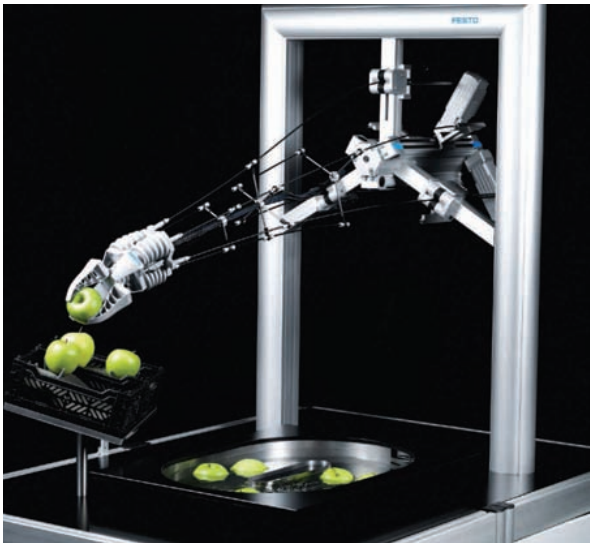
When it comes to automation, there is still much reluctance from many industry sectors. Notably, the UK automotive sector gets it, and is certainly on a par, if not ahead, of many European car makers. But take the automotive sector out of the equation and the picture becomes quite different. Compared to our European neighbours, the UK lags behind by a significant margin when it comes to using advanced technologies to produce its goods.

As a result, the British Automation and Robotics Association (BARA) has been awarded £600,000 to fund its Automating Manufacturing Programme. The primary aim is to offer help and support to industry to encourage the uptake of associated technologies in the UK.

While some readers might be wondering what relevance this has for them, the role of the design engineer is essential in getting this technology rolled out. Design engineers are the people that need to take the initiative and not just design products for manufacture, but design products that inherently lend themselves to automated production processes. This is key in influencing the use of the right technology, for the right application, in the right environment.

Mike Wilson, president of BARA, says: "One of the challenges that many people think we face in the UK is that a lot of our firms are smaller companies making bespoke products rather than larger companies doing high-volume production. Therefore, it makes it potentially difficult to apply. But, if you have got the right flexible automation then it is equally attractive and potentially very beneficial.

"It is the designers that are the key to allowing that to happen in many cases. If you are assembling something you need to design it in a way that automation can be applied to put it together. Often, if you design for automation you actually get a better product which can be very easily put together and is therefore more reliable and cost effective."



The programme is primarily set up to assist SMEs in all industry sectors and will offer independent and impartial advice to assist in the implementation of automation technologies. The overall aim is to increase the competitive edge of UK industry.

BARA has carefully selected independent advisers who will offer support to the enrolled manufacturers in two stages. The first is a strategic review of their manufacturing operation, commencing with an audit aiming to identify opportunities for improving production through automation, followed by a recommendation report which is presented at a review meeting. The second stage will provide a more detailed intervention to develop the outcomes from the audit, which will provide the client manufacturer with the knowledge and information required to plan and successfully implement the automation solution.

A study carried out by BARA showed a number of barriers that were impeding the use of robotics and automating systems in the UK especially compared to our European counterparts.

The first is barrier is awareness. Many UK companies don't realise the potential benefits. The second is risk and resource. In many cases, especially in the current climate, shifting a production environment is risky and in a lot of cases financially difficult.

Additionally, the study showed that many firms do not have the in house knowledge to identify and develop automation opportunities either through lack of skill or lack of time. Fundamentally, this is the issue that the programme is intended to address.

"The overall objective is to help UK manufacturing grow by being more competitive, and automation is one area in which we are sadly weak," says Wilson. "It is very difficult to measure automation as it can be hard to quantify. But one of the things we can measure is robot usage.

"Robot density is the number of robots per 10,000 employees. Germany has 144 robots per 10,000 employees, Italy has 114, Spain 57, France 56, and the UK just 27. And, if you look at other indicators like PLC usage you get the same sort of picture."

While many feel that the implementation of automation systems will result in fewer jobs, a number of studies show the opposite. The fact is, the UK is not a low labour cost economy. But even China is investing heavily, buying nearly 15,000 robots last year compared to just 880 in the UK. And Foxconn's Chinese operations say they are going to install some 1 million robots within the next three years.

Steve Brambley, deputy director at Gambica – the trade association for Instrumentation, Control, Automation and Laboratory Technology – says: "It's becoming less about labour costs as those countries begin to invest and implement automation systems. We can compete again, but only if we also invest in the right flexible production technologies. Smart automated systems and processes... represent a key component to grow and rebalance the British economy."

In terms of robots being brought and put to use, the level of investment from the UK does appear to be relatively low. However, the UK tends to be fairly unusual is so far as that, in many cases, it is a lower volume production of more customised and bespoke products. As a result, the investment seems to be more focused towards providing flexible manufacturing systems.

Steve Sands, marketing manager at Festo, says: "Flexible automation systems are definitely growing. A very strong part of our business is in pick-and-place systems. These are not just pneumatic systems, but three-, four- and five-axis, servo-driven systems. And this is still growing phenomenally."

Other areas for exploitation include the packaging and distribution side of an operation. For example, the UK automates more of its food manufacturing processes than many European countries. Festo sees a lot of potential in many different market sectors for its 'pick and place' machines.

"There are developments coming in agriculture, for example, where they are looking to take the food processing closer to the field," says Sands. "Rather than transporting low value material, the may actually do the processing much closer to the source, allowing them to then transport higher value product. So there are other areas of opportunity not so closely related to the raw manufacturers."

However, Sands also has a word of warning for companies and design engineers that are looking to invest and implement automation technology. Industry has seen many examples of white elephant projects that result in a very high cost to the company, but don't yield the results that people want and expect.

A lot comes down to making sure the technology that is used is appropriate, can be properly installed and maintained, so the maximum lifetime value from the system can be extracted.

"The engineers that bring these systems together need to engage an awful lot of people," says Sands. "And it is up to suppliers like Festo to provide that support to designers and assist

them in getting the engagement and training to get the payback that is expected from those investments.

Manchester based power management company, Eaton, is also keen to get the message out to engineers and is developing a concept of 'lean automation'. The basic premise is to take lean manufacturing principles and apply them to automation systems.

Lean automation aims to make implementation of getting automation machinery installed and working a much quicker and easier process. One way it is helping firms achieve this is by helping firms develop standardised platform designs for their production equipment. These can then be used across a range of machines, to make a range of different products.

In practice, Eaton has developed two primary technologies to facilitate this. The first is a bus-based control wiring system for the control panels, known as the SmartWire-DT.

This essentially eliminates the need for much of the conventional wiring by using a single bus cable. This modular approach is scalable and flexible, allowing any control device from a simple sensor to a complex motion controller to send data to a PLC for onward transmission to a high-level SCADA or ERP system.

The second is the integration of the human machine interface (HMI) and Programmable Logic Controller (PLC) in to a single compact unit. The benefits include cost and space saving as well as simplified programming.

"Lean automation is an attractive concept that is starting to transform the way automation systems are designed and built," says Stuart Greenwood, product marketing manager for industrial automation and control at Eaton. "Clearly, there will be further developments, but that shouldn't deter potential adopters from taking advantage.

"Already components and technologies are available that provide almost all of the benefits of lean automation, and those benefits are undoubtedly the key to unlocking competitive advantage and gaining market share."

www.bara.co.uk
www.festo.com
www.eaton.com

Oil-free chains get put to work

The increasing need for reduced maintenance has meant lubrication free chains are finding increasing applications in industry. Justin Cunningham reports.

Design engineers are increasingly being asked to improve in-use efficiency as well improve reliability and reduce maintenance costs. Sourcing the best components for a particular project or application is essential and can provide a lot of inherent benefit.

Reducing the need for lubrication in bearings has been a frequent subject of interest in our editorial pages, but lubrication-free chains are another technology that has the potential to deliver improvements.

Lubricant-free chains are not exactly new, and have been around for the last couple of decades. However, the uptake has been limited to a certain number of industries and specific applications due to problems with operating conditions and temperatures.

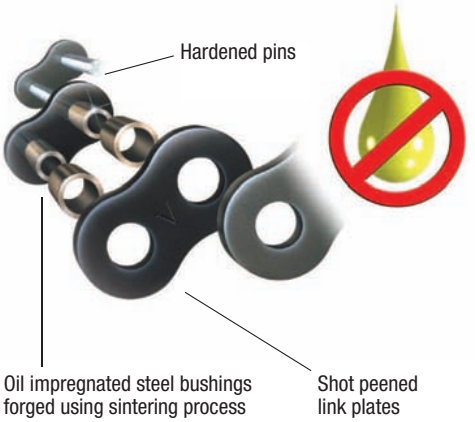
However, Tsubakimoto Europe say its latest lubricant-free chain is the best yet and should allow it to be used for a number of new applications. With demands for increased cleanliness spreading to industries such as paper, packaging and electronics, chains that require no additional lubrication are becoming ever more popular.

Tsubakimoto's Lambda drive chain uses internal lubrication that combats wear just as well as a normally lubricanted chain, without risking contamination to the conveyed product or surrounding machinery area.

The chains' link plates undergo shot peening, a process that improves the surface hardness. The process expands the surface of the cold metal, thereby inducing compressive stresses or relieving tensile stresses already present. These are then combined with oil-impregnated steel bushes to give the chains the properties necessary for long life without lubrication.

In many cases, this type of roller chain will directly retrofit with standard BS/DIN or ANSI chain sizes and wear tends to be minimal since the key bearing areas of the chain are always lubricated, reducing the friction normally created. Industries and applications that have traditionally used expensive lubricants are now finding they can operate without the need for additional chain lubrication, even in some arduous washdown environments.

The Lambda chain is the culmination of more than two decades of development and the company boasts that it will comfortably outlast both traditional externally lubricated chains and other 'lube-free' chains that it claims have not received the same depth of design input or product development.



Lambda chains can operate over a wide operating temperature range from -10°C through to 230°C without compromising lubrication performance. This helps to create an environment where less frequent chain replacement results in less consumption of resources and ultimately contributes to reducing CO_2 emissions.

The chain provides a direct replacement for standard size roller chains and only requires standard dimension sprockets. Unlike normally lubricated chains Lambda is dry to handle and available in the size range 06B-24B in both single strand and 'duplex' form.

Many standard attachment variants are available for BS/DIN in addition to an equally wide range of ANSI sizes. Special corrosion protective N.E.P Lambda and ultra-long life X-Lambda versions are also available for specific applications.

With such a strong development history Lambda is available not just as a oil-free chain but also in a number of variants within the ANSI series.

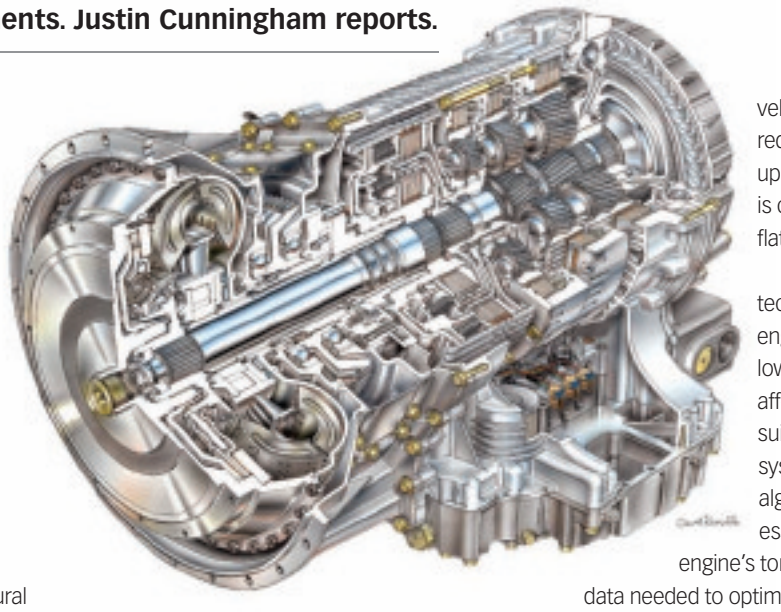
The Lambda heavy series, which has the advantage of higher shock load resistance than standard ANSI Lambda, is particularly suitable for harsh environments where the chain will be subject to heavy impact. Equally, it can be used for compact drives and equipment that must operate in tight spaces; or where higher transmission power, allowable load or tensile strength is required.

Specifically for food industry applications, Tsubaki offers the Lambda FG series with a special food grade lubricant impregnated in the bush (NSF-H3 certified) and anti-corrosive oil (NSF-H1 certified) to prevent chain corrosion.

www.tsubaki.eu

Software drives hardware improvements

Using software to precisely control commercial gearboxes is yielding significant efficiency improvements. Justin Cunningham reports.



The design of many mechanical systems is reaching a stage where significant improvements are getting harder to find. Further improvement of many systems is now more likely to come from intelligent software that will allow precise control and optimised operation of the mechanical components based on demand.

For power transmission, this is exactly what Allison Transmission is looking to develop. For many years, epicyclic planetary automatic transmissions have used fairly generalised operating profiles, allowing a single platform to cope with a wide variety of vehicles, duty cycles and driving styles.

While these have a certain amount of natural efficiency over varying conditions, it does leave scope for further improvement. Optimising a transmission for a specific 'mission profile' can yield significant savings in fuel economy, but the technology has the potential to bring numerous other benefits.

"Think about a vehicle running in an operation. You generally simplify this to four phases of the duty cycle; accelerate, cruise, decelerate and stop," says Manlio Alvaro of Allison Transmission. "We use electronics that optimise the operation of the vehicle in each of these phases. We have the ability to adjust a range of parameters to optimise a transmission for an engine, vehicle, duty cycle, the terrain or even minimise the inefficiencies caused by poorly trained drivers."

Allison has developed a system called load-based shift scheduling (LBSS) that automatically switches in real time from gearshifts that optimise fuel economy to shifts that deliver more power. By diagnosing the load of the vehicle as well as the topography of the route – i.e. on road, off-road, uphill, downhill – the system will automatically select the best operating profile.

Another feature that is also becoming popular in numerous applications is vehicle acceleration control (VAC). This uses the engine control unit (ECU) to limit the torque of the engine to make sure that the vehicle always stays within a certain range or within a specific acceleration profile. The results are predetermined smooth acceleration curves for either duty cycle or fuel efficiency benefits. Testing on a known bus duty cycle suggests a 3% improvement in fuel economy is possible.

"For obvious reasons this is subject to load and topography," says Alvaro. "This actually changes the acceleration profile of the vehicle, limiting torque and power of the engine. If the vehicle is fully loaded it will require more torque to move up an off-road hill than when it is completely unloaded on a flat road."

The principle behind this technology is to bring the engine speed down to the lowest rpm without adversely affecting performance. Using a suite of sensors, control systems and proprietary algorithms the transmission is essentially in control of the engine's torque output. Much of the data needed to optimise a transmission for a given profile comes from the experience of the fleet operators, which often have a database of typical duty cycles. Allison also collaborates closely with engine manufacturers and OEMs to optimise transmissions for particular vehicles.

Using software so heavily to control in real-time the engine output and gearshifts opens up the ability to record data and engine performance. Prognostic systems have now also been integrated in to the transmission systems to help with maintenance. At any point, the status of the oil, filters, operating time, output revolutions and shift density can be seen to help with planning maintenance schedules.

The message to design engineers at large is that many mechanical systems are reaching a level whereby technical possibility and further gains in efficiency and operating proficiency are likely to be yielded from precise control and clever algorithms. That means designing mechanical components that naturally lend themselves to this level of control is likely to become a much more important aspect of mechanical product development in the future.

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Crash avoidance technologies get active

Justin Cunningham reports on the sensing technologies that aim to prevent car collisions from ever happening.

Following the dreadful crash on the M5 last month, questions of road and car safety have started appearing all over the media. And while our roads and cars might be the safer than ever, there clearly remains an inherent danger. This is something that is driving engineers to develop and deploy better safety technology.

One area that is beginning to play a bigger role is a move from passive safety; devices such as airbags, seatbelts and side impact protection systems that are effective once a crash has happened, to active safety.

The concept of active safety is basically to let the car, and onboard computers and systems, take evasive action to avoid or prevent a crash from happening. Delphi Automotive, a supplier of electronics and technologies to the automotive sector, has been developing systems to protect a wide range of road users from vehicle occupants to cyclists and pedestrians.

"The automotive industry has been very successful in developing passive safety systems that help to manage [and dissipate] the amount of energy involved in a crash," says Michael Gassen, president, Delphi Europe. "To further advance road safety, however, we must work collectively to reduce the severity of crashes, or eliminate them."

Delphi is developing a radar and camera sensing system called the RACam. The device integrates a suite of active safety systems including full speed range adaptive cruise control, adaptive headlamp control, traffic sign recognition, forward collision warning, pedestrian detection and, perhaps most impressive, autonomous braking. This would automatically slow a vehicle in situations where the driver does not react to a hazard ahead, and is in danger of colliding with the vehicle in front. The single box system is expected to be on the roads in 2014.

Delphi is developing a radar and camera sensing system called the RACam

"The fusion of radar and camera [systems] into one intelligent module provides a sophisticated analysis of the road." says Mike Thoeny, global engineering director of Delphi's electronic controls product business unit. "The technology allows the vehicle to respond with appropriate action such as automatically applying the brakes to avoid a collision."

The RACam uses Delphi's electronically scanning radar (ESR) making mid and long range sensing possible with a single radar. And, with RACam, radar sensing, vision sensing and substantial computing power are integrated in a single, compact module that can be mounted on the windscreen side of the rear view mirror.

The vast number of sensors now used to measure and manage cars diagnostics systems is undoubtably a growing market. And these offer the potentail for other active safety innovations.

One sensor technology originally developed for the motorsport industry has been steadily migrating down. Bf1systems developed a tyre pressure and temperature monitoring system originally for motorsport to aid active safety systems on road cars and in other industries. It claims an in-tyre sensor could become part of an active safety system by providing real-time data such as tyre wear, age, type and pressure level to a vehicle's stability control system (SCS).

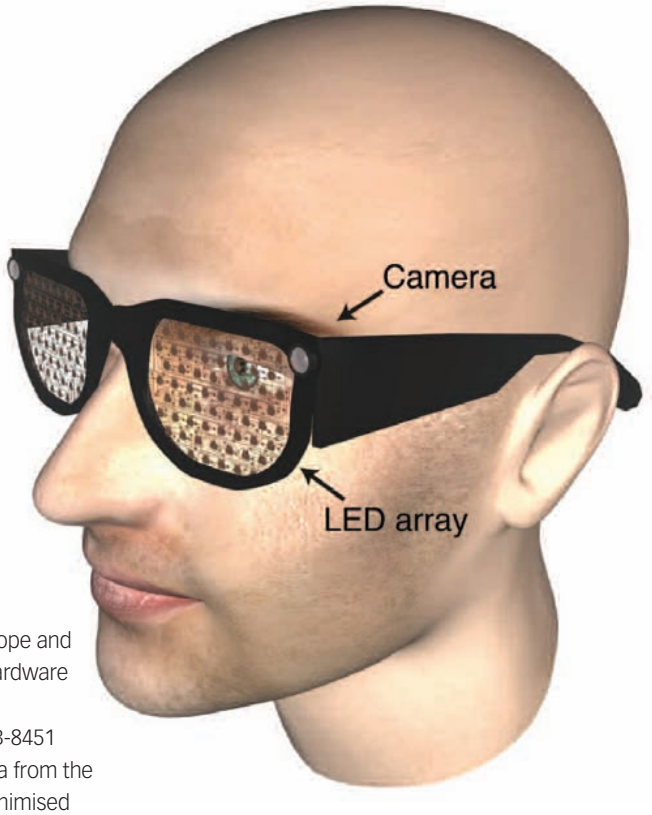
James Shingleton, OEM electronics manager at bf1systems, says: "More accurate real-time information could enable the Electronic Stability Program (ESP) to apply different control methods as it will know, for example, that a particular tyre is deflated. That information would affect the way braking is used and how successful a SCS is.

"It could also be used to inform the car which type of tyre is fitted and it can then determine if the maximum speed rating is exceeded for that tyre, and take appropriate action."

With new legislation set to be introduced in Europe in November 2012, the firm hopes that the safety benefits of accurately measuring tyre pressure will be on vehicles very soon.

www.delphi.com
www.bf1systems.com

LED glasses assist visually impaired



Glasses that can help the visually impaired are being facilitated by National Instruments. Paul Fanning reports.

A system designed to help the visually impaired to recognise and identify objects is being developed that could revolutionise the life of tens of thousands of sufferers in the UK alone.

Stephen Hicks and Luis Moreno at the University of Oxford's Department of Clinical Neurosciences built a prototype for a pair of glasses that uses the individual's ability to sense changes in contrast. They acquire video feeds from head-mounted cameras, and process the image data to detect nearby objects of interest such as people, sign posts, or obstacles to navigate. The detected objects are simplified and displayed back to the user via banks of LEDs attached to a head-mounted display, which can indicated the position and class of objects in the user's vicinity.

One of the common misconceptions associated with blindness is that it refers to one's complete inability to see. However, a "blind" person may have some degree of residual vision or be able to detect changes in contrast. And just as there are scientists out there working to develop limb prosthetics, there are also some working on visual prosthetics, which are electronic aids that support sight for visually impaired people. Using NI LabVIEW software, the NI Vision Development Module, and the NI USB-8451 interface to prototype and validate innovative, technology-based techniques are being deployed to develop this solution.

The team developed the simulation software using LabVIEW and the NI Vision Development Module because it provided ready-to-run vision analysis functions and drivers for acquiring, displaying, and logging images from a multitude of camera types. They also used the NI USB-8451 interface to acquire data from a gyroscope and control the LEDs, thereby minimising hardware requirements.

Says Luis Moreno: "By using the USB-8451 interface to simultaneously acquire data from the gyroscope and control the LEDs, we minimised our hardware requirements. This both simplified system development and saved us money."

Using NI Vision, the team was able to test their ideas quickly and efficiently

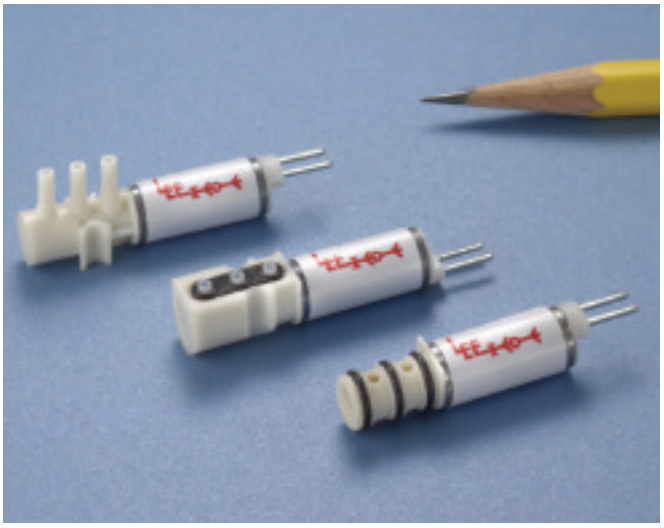
The goal is to incorporate this technology into a pair of electronic glasses. They already have a name for them: Smart Specs. These glasses will give visually impaired individuals more independence by helping them identify nearby objects and navigate their surroundings..

Says Stephen Hicks: "There are enless possibilities for future iterations of this technology. We could use coloured LEDs to feed different information to the wearer so that they can differentiate between different objects, such as people and road signs. We could also establish the proximity of detected objects by controlling the brightness of the LED array.

"We believe that we could further improve our optical character recognition routines, enabling the technology to distinguish newspaper headlines from a video image before reading them back to the wearer through integrated earphones. Similarly, we could integrate barcode identification algorithms, which already exist as part of the NI Vision Development Module to identify products and download prices that could be read back to the wearer."

www.ni.com

Quiet Operation Solenoid Valve



- Whisper technology reduces noise by 50%
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- Flows 4.4 SLPM air at 10psig
- Life of 250 million Cycles
- Operating temperature 40°F to 120°F

The quiet operation High Density Interface solenoid valve eliminates the inherent clicking sound in a typical solenoid valve. This new design uses "whisper" technology to achieve patient comfort and is ideal for medical applications flowing gas or air, such as dialysis machines, patient monitors, ventilators/ respirators, and other bedside medical devices.

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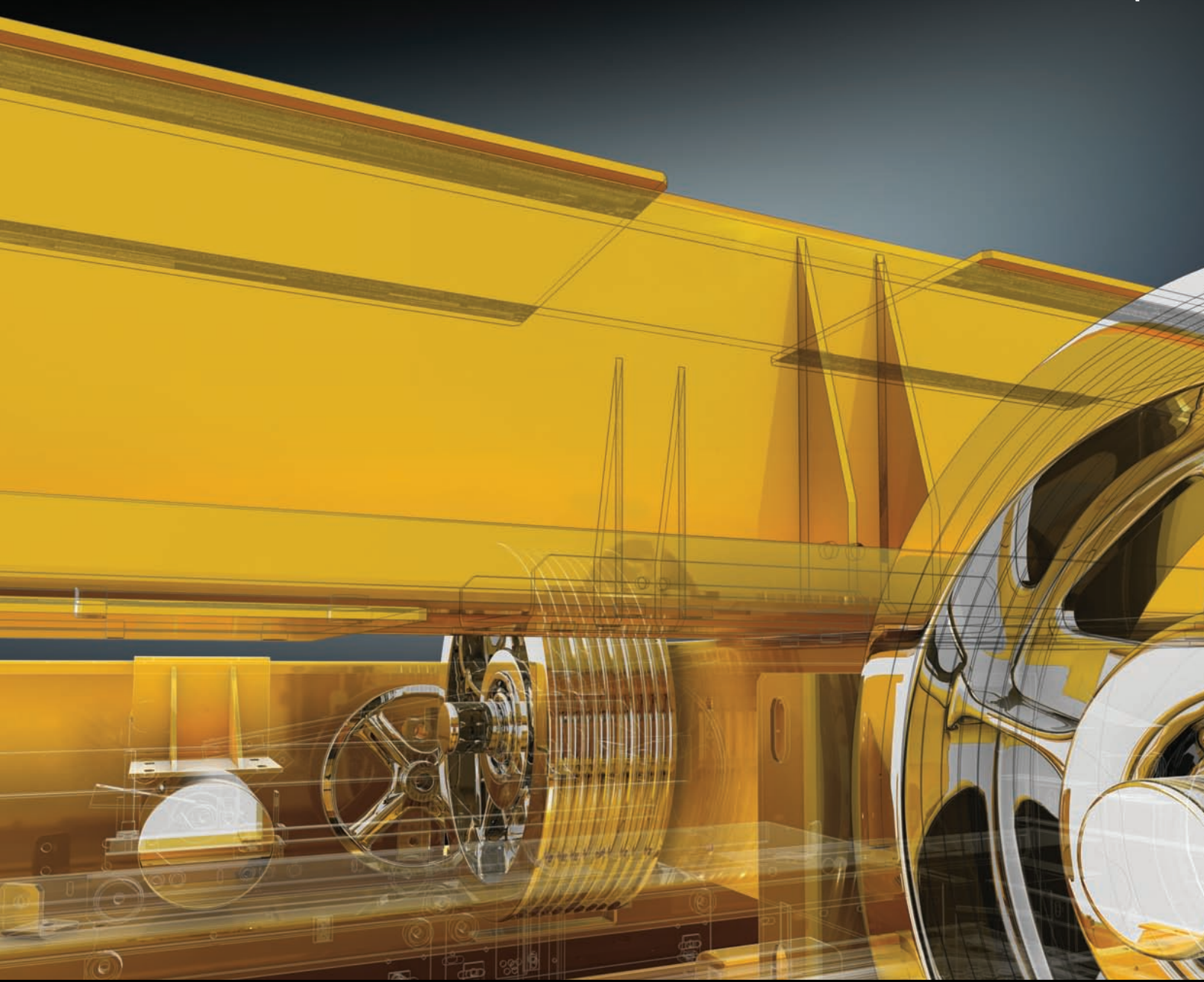

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Autodesk to enter PLM market

Autodesk says will offer a PLM solution from next year. Justin Cunningham talks to two of the company's executives to find out what's behind the move.

Autodesk has announced it is to enter the product lifecycle management (PLM) market from 1st March 2012 with 'Autodesk 360 for PLM'.

The company develops CAD systems such as Inventor and data management tools such as Vault that make up its Product Data Management (PDM) offering, but the move to PLM will incorporate many more business application and management tools. It says customers have been demanding PLM capability to manage wider business activities such as supply chain and operations management.

Richard Tinsdeall, sales director of North Europe, says: "Customers want to do PLM, but not everyone that wants to do it, is doing it, or feels they can do it at the moment. For Autodesk that is a big opportunity."

Autodesk is uniquely going to make its PLM applications accessible via a cloud-based subscription service. It says it wants its offering to be simpler to use and priced significantly lower than its rivals.

Lieven Grauls, technical manager for North Europe, says: "Users will go to a website and log-in, and will instantly be able to access a number of different apps to manage different business activities and product data.

"The apps we offer are probably going to give 80% of what every customer will want, and can then be optimised further for specific needs."

Autodesk say its PLM platform will give users a modern and intuitive user experience through an easy-to-configure web based interface. The result should mean PLM will take significantly less time to implement, and although initial consultation is likely to be needed, Autodesk was keen to stress this is not about growing a consulting business, but putting PLM into the hands of companies that have previously found it out of reach.

"Customers want to do PLM, but not everyone that wants to do it, is doing it, or feels they can do it"

The PLM tool can work independently of its PDM offerings and Autodesk does expect some customers to use some systems and not others. However, at the point of passing the magazine for press there was no comment on exact compatibility with other software or CAD systems.

Although exact pricing has also not yet been announced, the company did allude to what it referred to as 'Old-Iron PLM' vs. its own PLM system and said the total upfront cost for a given sized company was $5.5million with a total cost of entry at just under $6million vs. its own system which will be $100,000 and $300,000 respectively.

The drivers of accessibility and ease of use perhaps point to a market niche of better PLM operation in SMEs, though the company says that larger companies would certainly not be ruled out of its sights. Whether Autodesk 360 for PLM will be able to directly compete and be powerful enough for the likes of Airbus or Toyota-sized operations to use as a direct substitute remains to be seen.

It seems Autodesk has come at PLM from a slightly different angle. Rather than develop and deploy a solution that can be used by OEMs for very large product development and operations management, which by its nature is very complex, it seems to have developed a simpler, easier-to-use and more intuitive system that is perhaps more suited to SMEs. Yes, either can probably be scaled down or scaled up as appropriate as no company wants to turn away potential business, but fundamentally both these PLM philosophies have their niches.

Tinsdeall says: "Many companies, particularly in the SME environment, currently do a lot of activities in Excel spreadsheets or on bespoke databases built in Access. [Autodesk 360 for PLM] offers them a far more connected and powerful way of doing those business applications and product management activities."

The message to existing CAD customers, many of which are design engineers, is that this is an extension of Autodesk's Digital Prototyping Solution and will allow engineers to position their activities in to the wider product lifecycle and business activities.

Functionality of the system is yet to be clearly announced, but one aspect that is known is the systems reporting tool. A 'dashboard' will be available to make it quick and easy to see the status of projects, approaching deadlines and design reviews, as well as information about various other business activities. It hopes PLM will show the impact of engineering and design decisions on wider business activities, and - like its market rival – allow companies using its system to get much more from their data than they are at the moment.

www.autodesk.co.uk

Bridging the divide

Justin Cunningham talks to PTC about the thinking behind bringing software engineering in to its PLM offering and the imminent release of Creo 2.0.

The recent PTC Live TechForum in Copenhagen gave the chance to find out some of the newest innovations and developments plans by the company. Perhaps one of the most striking is that of MKS Integrity. PTC acquired MKS earlier this year with the aim of bringing software engineering into product development and therefore as a wider part of PLM.

Software development, management, procurement and testing will now be able to have the same level of scrutiny applied to it as similar hardware processes. Software engineering has therefore become part of PTC's PLM solution and is no longer developed as a separate and distinct entity using an ALM system as it has been in the past.

Although this might appear superficial and perhaps a case of semantics, chief technology officer of the Integrity business unit at PTC, Andrew Wertkin, is keen to explain just what is on offer. "There are other tools and processes for managing software engineering that were never a part of the PLM system, where the end result is a binary code on a bill of materials," he says. "So the problem is we are not applying that same amount of engineering rigour to software as we are to hardware. We are not able to do any cross-disciplinary change management and there can be very little visibility of release readiness."

For many industries software is driving innovation in its products. From vehicles to machinery, innovation in features, functions and improved capability is often the result of clever software. But software is also driving complexity. And this can have a knock-on effect resulting in quality issues, defects and other concerns. It seems to be a lot easier to test if hardware is set for release than it is for software.

Wertkin adds: "If you are not applying that same rigour to software when it is driving that much complexity, innovation and can often be responsible for safety critical functions, then you are setting yourself up for failure."

PTC believes it needs to bring together software and hardware engineering processes bridging the development gap to allow for a more holistic approach to product design. Engineers need to understand, be able to quantify and manage the trade-offs between hardware and software requirements. PTC believes these entities should be integrated and developed in parallel and not treated as two distinct activities that are brought together at the latter stages of product development and integration.

This philosophy is about taking a 'systems' view of product development to allow design engineers to see what effect trade-offs made between hardware and software have on the overall outcome of a mechanical product, be it reliability, performance or capability.

At the moment it seems to be that in most cases hardware is driving the software requirement. For example car and aircraft turbines engines have had vast amounts of software added over the years resulting in new levels of optimisation, control and flexibility to the mechanical system. But, moving forward, it is quite plausible that in some cases software will drive the hardware and mechanical aspects of products. PTC views this relationship as vital and something that needs to be understood, quantified and embedded in the capability of Integrity and its PLM system.

The combination of MKS Integrity and PTC's PLM products is intended to bring multiple benefits to manufacturers, including enabling best practices across hardware and software development lifecycles, increasing engineering visibility across the entire development process to improve product quality, traceability and long-term serviceability.

"The problem is we are not applying that same amount of engineering rigour to software as we are to hardware."
Andrew Wertkin
PTC

The other big announcement at the TechForum was the release of Creo 2.0. The release follows hot on the heels of Creo 1.0. In many respects Creo 1.0 was used to introduce to the company's latest CAD design package and prove its capability to the market. Given its very short development cycle and the short period between the releases of Creo 1.0 and 2.0, PTC expects most of its customers to go from Wildfire 4 and 5 straight to Creo 2.0.

Vice President of Creo product management at PTC Brian Thompson says: "Creo 2.0 had such a short development cycle we had to really focus down on what we wanted to do. We will significantly improve Creo Direct and introduce our 'any BOM' technology."

This will link complex Bill of Material management in the Windchill options and variants to a new app in Creo. More details of new and improved functionality are to be release in coming months before its official unveiling in March 2012.

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Keeping it steel

Can steel really compete with aluminium and composite materials when it comes to lightweighting? Justin Cunningham talks to a company that says it can.

With the need to reduce CO_2 emissions becoming ever more prevalent, one of the main drivers now is to reduce the weight of structures. From a composite fuselage to an aluminium chassis, many industries are turning their back on steel as the material of choice.

Steel has a long legacy in engineering and has long been the material of choice. It can be easily shaped and joined to produce strong and versatile structures. But, more recently, steel has become viewed as a bit old fashioned, a heavy and dirty material that has less place in 21st Century engineering.

For example, the demand on engineers to provide weight saving on vehicle structures has seen many naturally turn to aluminium. The difficulties in welding and manufacturing aluminium, its greater CO_2 footprint during production and disposal and the problems of repair have lbeen seen as hurdles that need to be overcome and not insurmountable. These are tradeoffs that many OEMs are considering taking on the chin, to reduce the all important CO_2 per km of its fleet, which ultimately is the main design driver.

"There is a great misconception about carbon footprint," says Greg Ludkovsky, Vice President of Global R&D at ArcelorMittal. "It is a story that still has not been properly highlighted. The amount of CO_2 it takes to produce and process aluminium means it can take decades of driving to equalise the carbon footprint compared to steel.

"The idea that you buy aluminium from one country, pollute the air there so a car will produce slightly less CO_2 in the country it is

Steel Innovation

The innovations by steel company ArcelorMittal have been prolific. The company is effectively making stronger grades of steel so that less of it can be used, and hence weight is reduced. Steel has big advantages as it is easy to join, repair, and recycle, as well as being cheaper than more exotic alternatives.

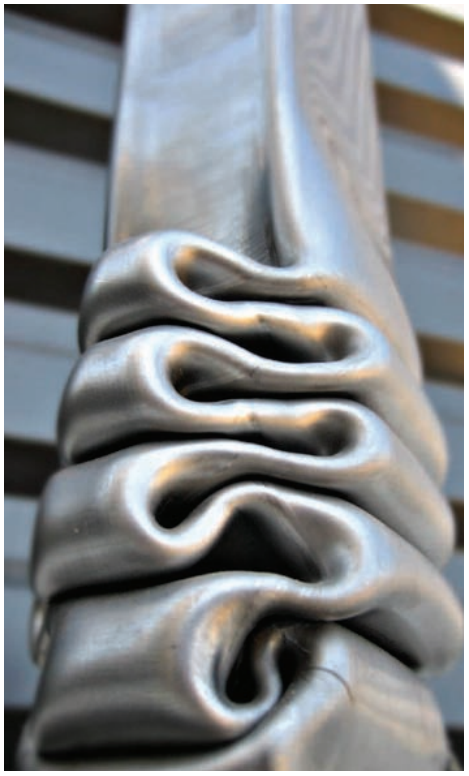
Nanotechnology has been used in steel manufacturing for some years, with high strength steel being a prime example.

After cold rolling this type of steel it has little or no formability, so it must be annealed to form strain-free grains. By introducing a second phase of particles in to the microstructure it is possible to strictly control the dimension of these grains, which if they become too large, result in a loss of strength in the steel.

By forming and introducing these nanoparticles at a certain dimension and quantity in to the material upon heating, the grain growth blocking action is achieved. The result is a fine grain microstructure which allows a good combination of plasticity and strength.

Greg Ludkovsky, Vice President of Global R&D at ArcelorMittal, says: "We are constantly re-inventing ourselves and we are developing totally new generations of products. But there is more to come.

"Going in to the next phase of using nano technology where we are beginning to develop material incorporating non –metallic particles in to the material as well. This new application of radical thinking is the next leap that will allow us to develop unique products in the future."



driven; the whole notion is totally ridiculous. It seems to be a bit of a desperate solution that is going to cost a lot of money. And intelligent application of steel can actually get you the same result."

To prove the point, ArcelorMittal, carried out a project called 'S-in motion' with the aim of creating lighter, safer and greener vehicles of the future using steel. The result saw the weight of the body-in-white and chassis reduced by 19%.

The company used a number of different steels including its high strength Usibor. Due to its strength, 1500MPa, it is difficult to cold form. However, the company has found that using a hot stamping process allows the production of complex shapes and can deliver strength precisely in the areas where it is needed.

One of its most remarkable breakthroughs was a one piece door ring made out of its hot stamped 1500MPa Usibor, but in the lower portion where it might have an impact and a higher level of ductility is needed for smooth energy absorption, the company put another of its hot stampable steels called Ductibor. This allowed strength and ductility to be accurately positioned in the areas that required it.

"To accomplish this, we developed a totally new way of laser welding the materials," says Ludkovsky. "In today's automotive community everyone is trying to adapt this approach because it is one move and takes out 20% of weight.

"It is very expensive to take weight out of a structure and costs a lot of money per kg that is removed if you substitute steel for another material. But, through our solution carmakers can get that major reduction in weight at a neutral cost. What we have established is that most of the time, and certainly when it comes to automotive structures, we can create solutions using steel that are at least as light as aluminium, and we do it at a significantly lower cost.

"Our goal is to show that steel is fully capable of competing with aluminium and deliver solutions that are significantly more cost effective and do not require major re tooling and do not take more out of the pockets of customers."

www.arcelormittal.com

The ceramic dynamic

Could plasma spraying technology offer the ability to manufacture high-strength, lightweight, pure ceramic components? Eureka reports.

Oxfordshire-based Zircotec is well known in industry for its gas plasma spraying technology. Its coatings technology bonds thin layers of ceramic to a range of materials to improve a substrate's properties.

Now, however, the firm is developing the process further to enable the production of pure ceramic components that eliminate the need for the original substrate altogether. With simple all ceramic tubular components already produced for use in very high-temperature furnace applications, Zircotec believes the spraying process offers opportunities for the manufacture of ultra light, heat-resistant parts for other sectors.

In 2010 the company's move to a new factory in Abingdon that included a bespoke robot spraying booth used for high-volume runs, led to the creation of pure ceramic components.

Terry Graham, managing director at Zircotec, says: "We have a project to manufacture high-temperature ceramic susceptor tubes for use in the drawing of optical fibres. In this case, we apply a zirconia-hafnia mix. These tubes provide sealed containment within the furnace and are heated to temperatures of more than 2000°C. They can withstand long periods exposed to high temperatures before needing to be exchanged."

This innovation prompted the team to consider other applications for pure ceramic components. The benefits of using ceramic are well known by engineers, notably the ability to cope with extremely high temperatures. However, its brittleness often stops it being used in dynamic applications.

Moving from manufacturing simple tubes to creating more involved shapes is a significant step that presents many challenges. To overcome this, Zircotec suggest a ceramic matrix technology could be used. This would essentially layer a carbon fibre composite with the ceramic material to produce complex, high-strength, lightweight parts. Taking the technology to the extreme, it might even be possible to manufacture items as intricate as exhausts, brake ducts or aerospace components.

The process-specific requirements and level of tolerance control Zircotec has achieved led it to consider migration to other sectors, although Zircotec's professional motorsport presence notably in F1, means racing applications are seen as the first opportunity.

"We enjoy a close working relationship with most of the F1 teams, supplying heat-resistant and anti-wear coatings," says Graham. "Through that work and F1's relentless quest to reduce weight, whilst maintaining performance, it's become evident that our ability to create pure ceramic components could be of interest to design engineers."

Zircotec is only too aware of the harsh environmental challenges that an F1 car can present, such as temperature, pressure and extreme vibration. As a firm whose technology solved many issues in the nuclear field, the firm is cautiously optimistic answers can be found.

The tubes are produced using a specially-constructed metal cylindrical former that enables high-purity tubes from just a few millimetres up to more than 200mm in diameter with lengths of up to 2m possible. Crucially, however, to enable the applications to evolve, Zircotec is able to manufacture other non-tubular ceramic components.

He says: "Our experience means we can tightly control process parameter and feedstock to achieve a consistent, desired wall thickness, even creating interference fits for tubes to slide within each other."

Considerable experience, first derived from the UK's nuclear industry has led Zircotec to pioneer the specialised process for use in automotive, motorsport and industrial coating applications. The firm enjoys a tradition since its inception for technology transfer from the first motorsport application to it most recently being used as an anti-wear coating on the winches of a yacht in this year's Volvo Ocean Race. The blend of weight and performance potential suggests its latest ceramic forming technology will be no less likely to see use in other engineering sectors.

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READER INTERVIEW

RICHARD CURTIS, TECHNICAL MANAGER, ERIKS SEALING TECHNOLOGY

Q How did you get into engineering?

A I was offered an engineer apprenticeship at the age of 17. Qualified as a fully skilled machinist four years later, soon after which I successfully applied for an application engineer's role at Shamban Europa. That's where I entered the wonderful world of seals.

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

A The technical manager's role at Eriks Sealing Technology involves supervising a small team of Application/Design Engineers who are responsible for a variety of processes and tasks. In layman's terms we listen to our customer's requirements, base the product design on the needs of the client and produce the necessary documentation to acquire costs to provide the customer with a quotation and proposal.

Q What interesting projects and technologies you have worked on?

A Over the past 24 years I've worked for 3 seal companies and experienced a vast array of applications. Some of the most exciting ones include hydraulic actuators and dampers on Formula 1 cars, compact seal designs on large civil aircraft landing gear and high performance seals used on Directional Drilling equipment used Oil and Gas recovery.

Q Are there any new technologies that have you excited / Any new technologies you see as being quite revolutionary to the wider world?

A Computer Aided Design has advanced significantly over the time I've been in Engineering. We are using software to automate drawing our standard product range. The time saving here is significant and allows my team to concentrate on more complex and higher value applications.

Q What is the biggest issue/driver facing your industry?

A Going green does pose difficulties to us, but we are working hard to make our product more sustainable. My biggest challenge will be to find suitable candidates for seal design engineers as we grow. Sealing is a science on its own and requires a particular mind set to be successful. Combine this with experience and the right people become difficult to find.

Q What advice can you give to younger engineers just entering the industry?

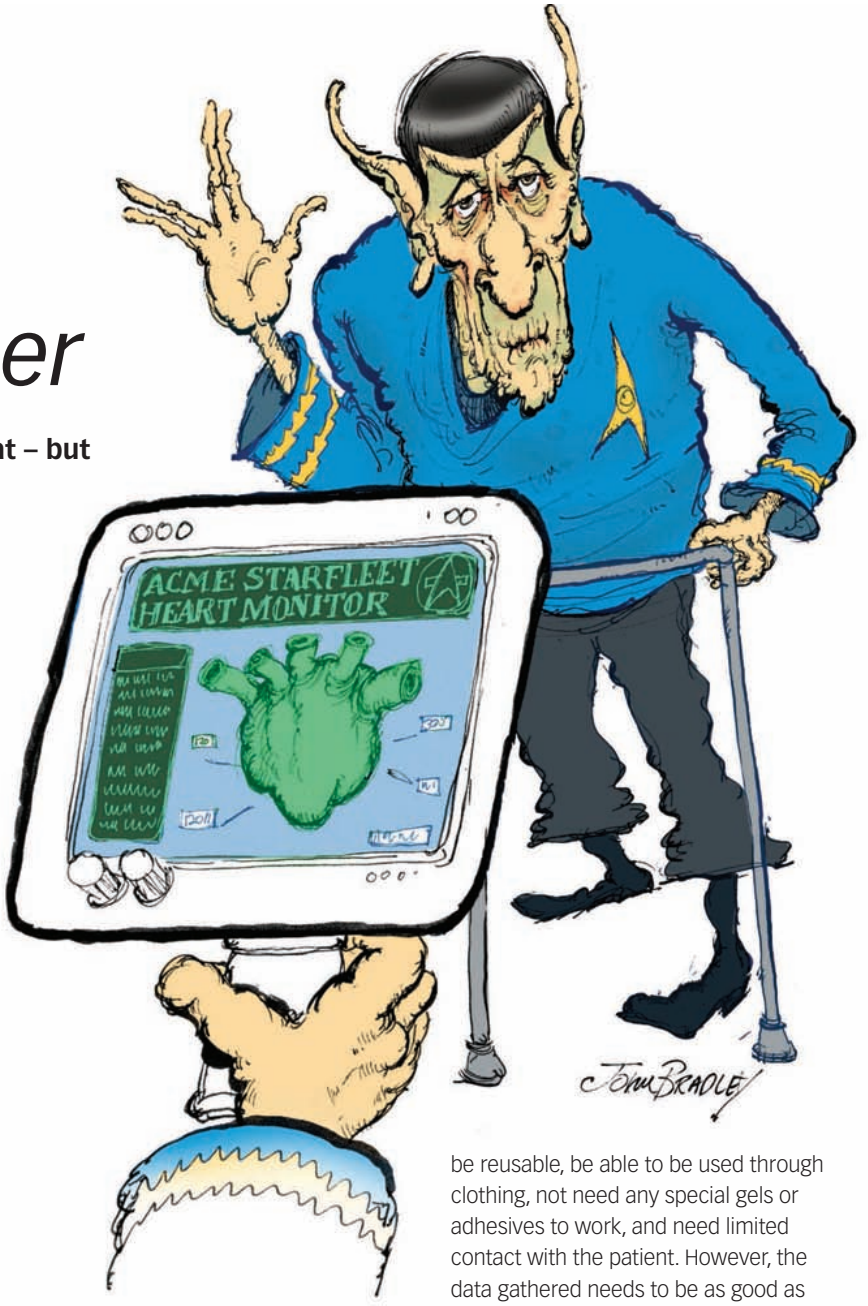
A I have been in this industry most of my working life, during which I've seen a broad range of engineered solutions, that would not have been possible if seals were not incorporated in their design. By being an import part of the customer's solution I found satisfaction. If you get good at it, your services will be in demand.

Q How do you see the industry changing going forward?

A The advancement of elastomeric and thermoplastic materials will enable the industry to seal colder and hotter temperatures, higher pressures, more aggressive media and higher surface speeds. Combine these materials with the design tools at our disposal, we can provide our customers with solutions for their more demanding applications.

Live long and prosper

Hospital ECG devices are great – but wouldn't it be better if they were a bit more practical?



Of all the engineering breakthroughs, those in the medical field are probably the ones that, from day to day, we least realise exist but are the ones we are most thankful for when we need them.

Among the various innovations out there is Electrocardiography (ECG). Always an essential prop in any hospital drama, it is essential for patient care and is a very visual example of how sensors are being used in the medical sector.

ECGs interpret the electrical activity of the heart using electrodes attached to the outer surface of the skin then record and display the data on a device external to the body. The electrodes detect and the external device amplifies the tiny electrical changes on the skin that are caused when the heart muscle depolarises during each heartbeat.

At rest, each heart muscle cell has a negative charge across its outer wall. Increasing this negative charge towards zero is called depolarization, which activates the mechanisms in the cell that cause it to contract.

During each heartbeat a healthy heart will have an orderly progression of a wave of depolarisation that is triggered by the cells in the sinoatrial node, which spread out through the atrium, passing through intrinsic conduction pathways and then spreading all over the ventricles.

This is detected as tiny rises and falls in the voltage between two electrodes placed either side of the heart and displayed as a sine wave on a screen. The wave indicates the overall rhythm of the heart and can highlight weaknesses in different parts of the muscle.

But for all their benefits, ECGs do tend to be rather intrusive. Up to 12 pads need to be stuck on to very specific areas of the body, directly on to the skin with a special gel and strong adhesive. These must then be discarded after each use. This means that patients have to wear scrubs around the hospital, have the discomfort of both the cold gel and strong adhesive being pulled off, during application and removal, and it is a physical attachment that is very restrictive to movement. Though that doesn't seem all that bad, it is the older generation who are perhaps more sensitive to these intrusions that are the highest users, and this can lead to problems and issues when monitoring.

The challenge

The challenge this month, then, is to come up with an improved way to monitor the heartbeats of patients in hospitals in a much less obtrusive manner. Ideally the technology should be reusable, be able to be used through clothing, not need any special gels or adhesives to work, and need limited contact with the patient. However, the data gathered needs to be as good as good – if not better – resolution than that of conventional electrodes.

The solution does take advantage of recent breakthroughs in technology and eagle eyed readers may have spotted earlier articles about the technology in the magazine. However, the device is now being used commercially to excellent effect.

We will publish the solution in the next issue of *Eureka*. In the mean time, see if you can come up with something better.

The answer to last month's Coffee Time Challenge of how to how to serve a pint quicker and with less wastage can be found in the Technology Briefs section on page 8.

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Sensors

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Sensortechnics' LBA series offers differential low pressure sensors based on thermal mass flow measurement of air through a micro-flow channel integrated within the silicon sensor chip. The sensors are ideal for differential pressure flow measurement. For high performance medical respiratory devices it is essential to detect very small flows around the zero flow point while additionally being able to measure full scale flows of several hundreds of l/min. For these demanding requirements Sensortechnics now offers special versions of its LBA sensors with increased resolution of 0.01 % in the lower pressure range and at the same time high dynamic ranges greater than 10,000.

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✆: 01788 560426

www.sensortechnics.com/lba-d

Speed Monitors

New SICK speed monitor introduces safe motion control

The new MOC3SA Speed Monitor from SICK (UK) offers improved speed limiting functionality on machine tool and general rotating machinery while enhancing the ease of set-up and maintenance. Competitively priced, it enables engineers and factory managers to meet safety requirements with greater day-to-day production flexibility and less downtime.

"SICK's configurable safety controller, Flexi Soft, introduced the concept of a simple standstill monitor," comments SICK (UK) Safety Specialist Iain Keetley-Smith. "Now we are launching our new MOC3SA Speed Monitor as a dedicated safe speed and standstill relay to add further capabilities."

A typical application for the standstill function would be to limit access to an area until the machine has come to a complete stop. Once this has been detected a solenoid is released from a safety gate switch allowing access.

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www.sick.co.uk

Steam Technology Centre

Spirax Sarco opens new state-of-the-art Steam Technology Centre

Spirax Sarco shows its continued commitment to world-class training with the opening of its UK Steam Technology Centre. The centre is the only training facility in the UK to offer a fully-operational steam system with SCADA control. This enables it to enhance the quality of training across Spirax Sarco's array of steam engineering courses, as well as supporting live technology demonstrations. The revamped centre offers a variety of training courses to help steam system operators address key issues, such as improving energy efficiency and carbon emissions, reducing downtime and operating costs and ensuring safe operation. Using leading-edge steam control technology, the training rig will showcase the modern approaches to process control, energy efficiency and carbon impact. SCADA linked systems allow delegates to observe all aspects of the boiler house and steam system design in real time.

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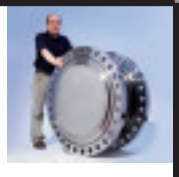
Torque Transducers

Torque transducers meet challenges in latest generation wind power plants



HBM has developed a comprehensive range of customized torque transducers with both rotating and non-rotating designs and nominal torques of up to 1.5 MN·m that ensure the latest generation of wind turbine plants can perform optimally.

Wind power plants are increasingly being developed, particularly for offshore applications, which pose new challenges to measurement technology. The expansion of wind technologies is critical in providing regenerative energy and torques require accurate measuring and careful monitoring to ensure maximum efficiency. Optimizing the torque increases the efficiency of a wind power plant; efficiency increases of just a few percent can result in savings worth millions. Rotors of wind power plants rotate relatively slowly with the speed being increased by gears to appropriate values for the downstream generator. This then converts the wind energy into electrical energy.

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Salary: Circa £35k per annum

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Joining our team of Premium Consumer Product Auditors, you'll be instrumental in helping us achieve the premium quality that is central to everything we do. Carrying out daily vehicle quality audits in line with the standards and procedures of Manufacturing Quality Operating Systems, your aim will be to identify any manufacturing variations or product concerns both during and after vehicle assembly.

For full details online enter reference: JSENGINEERING AUDITOR

Senior Hardware Design

Location: Essex
Type: Permanent
Salary: £35k-£40k per annum + benefits

We are looking for a senior hardware engineer to be responsible for the design and development of exciting hardware products. This position requires a good knowledge of Microprocessor based product design and a proven track record in delivering hardware solutions to timescale and to budget.

Experience with product development from specification and concept design to high volume manufacture is required, along with skills in schematic capture, PCB layout design and simulation, EMC and safety compliance, design for high volume manufacture, design for test and knowledge of mechanical design techniques.

The successful applicant will have to manage a small team of engineers along with external contractors for the design of various components of the system and liaise with the other members of the company on product architecture, software compatibility, production and product validation as well as providing technical expertise and support to all areas of the business.

For full details online enter reference: JSNJ61346/

Mechanical Automotive Test Engineer

Location: Northampton
Type: Permanent
Salary/Rate: £30k-£35k per annum + benefits

Job Details: This company, based in Northampton, has an opportunity for a Mechanical Automotive Test Engineer to support the Test Department in strength, durability, performance and characteristic testing of vehicles, as part of the product development process.

Major Responsibilities: Evolve and maintain timing plans for test activities - rig and vehicle testing; Aid in design of test rigs with a future progression to designing rigs independently; Set up test controllers and monitor rig tests, maintain detailed test logs on a range of prototype suspension components and assemblies; Carry out instrumentation on rigs and vehicles for data collection; Carry out detailed analysis of acquired data for fatigue, performance and reliability; Complete technical reports for tests carried out on rigs and vehicles; Support the evolution of test procedures to meet DFMEA and DVP requirements.

Qualifications: Bachelors/Masters Degree in mechanical/automotive engineering or equivalent

3+ years' demonstrable experience within a structural test function.

For full details online enter reference: JSDE13835

Mechanical Project Engineer

Location: West Midlands
Type: Contract
Salary: £25-£30 per hour

Large defence company, based in the West Midlands, is looking for a Mechanical Project Engineer to help with on-going projects. The suitable candidate must be eligible for SC clearance and have some defence sector experience.

Key Skills:
- Ability to write bill of materials
- Ability to review existing designs
- Some hands-on design experience.

Bonus Skills:
- SolidWorks
- Robotics.

For full details online enter reference: JSPROJECTENGINEER

Mechanical Design Engineer

Location: Cambridge, Cambridgeshire
Type:Permanent
Salary: £45k per annum, plus benefits

This international electronics development and manufacturing firm is looking for a Mechanical Design Engineer to work as part of the printhead development team, with specific responsibility for mechanical and functional design. The role covers the entire life cycle of the product, from initial concept through design, validation, field trials, release into production and maintenance. The successful candidate will be completing design work using 3D CAD and FEA techniques, working with particular focus on fluidic and thermal performance.

Experience: A degree in Mechanical Engineering or equivalent; A good grounding in applied mathematics, physics or chemistry; At least 5 years' experience on products of similar complexity – eg, precision electro-mechanical, high reliability and industrial environments; Proven understanding of fundamental manufacturing principles; 3D CAD modelling essential - Solidworks would be an advantage; Understanding of geometric dimensioning and tolerancing, including tolerance stack-up analysis; Solid understanding of capability studies for designs, jigs and fixtures.

For full details online enter reference: JS2401MDE

Design Engineer

Location: Berkshire
Type:Permanent Salary: Negotiable

To be responsible for the design and detail of engineering components and complete systems, using the Companies 3D CAD system, to defined standards. To undertake specific engineering tasks as determined by the functional area (for example Gear Design.

Responsibilities Include:

- To undertake CAD modelling and drafting on Unigraphics 3D CAD to Company standards and procedures
- To ensure verification is undertaken, documented and recorded
- To create Engineering Drawings and issue to the required standard
- Establish, maintain and manage a strong working relationship with new and existing customers, at all level
- Work as part of the core Engineering team - utilising the skills and experiences of Gear Technology, Production Engineering and key shop floor personnel
- To liaise with and provide guidance to, the Commercial Function and Manufacture Project Managers

For full details online enter reference: JS1110-18

Chief Engineer

Location: Leicestershire
Type: Permanent
Salary: 60k-70k per annum

Candidates will be required to have: A good Degree from an established university in a Chemical or Engineering Discipline; Ideally, also apprenticed; Proven record of development within a Blue Chip FMCG company; Expectations of the Role of Site Chief Engineer. Ideal background would be senior role for one of the major FMCG blue chips (Pepsico, R&B, P&G, Unilever) or similar.

The Site Chief Engineer is the Engineering Leader on a site and single accountability for developing the engineering team and delivering engineering activities on the site. Mission/Purpose of Site Chief Engineer includes:

- Development and ownership of site masterplan
- Site engineering logistics, utilities and buildings strategy
- Site obsolescence replacement strategy long term in consultation with Site Maintenance
- Steering team member for all site engineering projects

For full details online enter reference: 1110-08

Mechanical Biased Engineer

Location: Coventry
Type: Permanent
Salary: £29k-£34k per annum

Job details: An exciting new Mechanical maintenance engineering opportunity has arisen within a leading OEM automotive manufacturing company. The responsibilities of the mechanical biased Maintenance Engineer are as follows:

- Reactive and preventive maintenance of all production equipment
- (Blow molding machines, robots, CNC controlled finishing machines & ultra-sonic leak detection equipment)
- AC and DC Drives
- Hydraulics and Pneumatics
- Carrying out all maintenance within the production plant (automated Equipment)
- Fault finding on PLC Control systems (basic).

To fulfil these requirements, you must have the following skills/experience:

- Mechanical experience within an automotive, blow moulding/injection Environment
- Hydraulic and pneumatic knowledge
- Experience of faultfinding on PLCs

For full details online enter reference: JS-.BBBH32614

Component Engineer

Location: Cheltenham, Gloucestershire
Type: Contract
Salary: £30-£35 per hour

Role: Interrogate and extrapolate component related data from Legacy systems, enabling the resolution of component related issues; Establish and document the appropriate component details enabling the part to be procured – eg, manufacture, manufactures part numbers; Extract component technical attributes from manufacturers data to create component database record; Identify and select suitable components to replace obsolete or hard to find component parts; General Component Engineering activities; Address and manage prioritisation of activities; Reporting to Team Leader on progress; Any other task that may reasonable be requested by the business; Identify issues/solutions to Engineering Data.

Experience and Knowledge: Complete understanding of the technical aspects of component engineering; Familiarity with electronic, electro-mechanical and mechanical components; Commercial awareness and awareness of market availability of components; 5 years' experience within the component engineering skill.

For full details online enter reference: JS-.J113581A00144241

Design Engineer

Location: Derby, Derbyshire
Type: Contract
Salary/Rate: Negotiable

A design engineer is required to work on both new designs for engine pipe/harness systems and their associated mounting systems and modifications to existing designs, across a range of engines. Work will include 3D routing using Siemens NX6 (Unigraphics) CAD tool in a 3D digital mock-up environment. It will also include negotiation of interfaces with other departments within my client and external partners/customers. It will also involve support and resolution of issues found in-service, during the engine development programme or on engine build.

Essential Skills: Sound engineering knowledge with relevant qualifications. Knowledge of pipe and/or harness systems. Appreciation of installation issues, such as functional, environmental and maintainability considerations. Siemens NX (Unigraphics routing CAD packages and experience of working in 3D digital mock-ups. Some mechanical design knowledge, sufficient to be able to define simple bracket systems. Ability to work in a team and to communicate well at all levels.

For full details online enter reference: JS-.SMCC1702105

Lift Mechanical Design Engineer

Location: Cheshire
Type: Permanent
Salary: £35k per annum + benefits

Job Description:
A degree in Mechanical Engineering; 3D CAD experience, preferably ProE Wildfire 3.0; Practical mechanical experience & abilities, either work or leisure-based; Good organisational skills and a methodical manner; Good communication and administrative skills; Able to manage several projects at once.

The ideal candidate will have a proven ability to generate innovative ideas and concepts and be able to transform these into detailed designs taking them through to manufacture. They will also have 'hands-on' practical mechanical experience and knowledge of resolving engineering problems, such as repairing/restoring vehicles or other mechanical devices.

The Role: As a Mechanical Design Engineer, you will develop engineering and design solutions for both current and future projects, from feasibility through to production, using CAD systems (ProE Wildfire 3.0). You will prepare illustrations for use in manuals, maintain technical files & documentations, and arrange prototype parts and materials.

For full details online enter reference: JS-.1108-26

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