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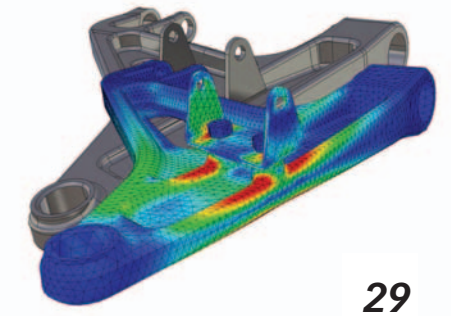

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Asking the right questions

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

There were numerous important points and issues raised at The Future of UK Manufacturing Summit held at the Institute of Mechanical Engineers last month. However, amongst all the matters that were addressed, the most powerful impression one took away from the event was of a sector angry and frustrated with its treatment by government over the years.

And who could blame them? As delegates raised issues such as chronic under-investment, punitive taxation, energy costs and the skills shortage, it was difficult to see how anyone could argue that manufacturing has not had the dice loaded against it for decades.

However, given that the three main parties were represented at the Summit, it was at least to be hoped that Vince Cable MP, Trade Minister Lord Mervyn Davies and Malcolm Harbour MEP went away from the event knowing that the manufacturing sector needs far more commitment from whoever wins the next election than has been the case until now.

It is with this thought in mind that Findlay Media, with the support of the ERA Foundation and the Institution of Mechanical Engineers, has launched the 'Vote Manufacturing' campaign. The campaign is designed to encourage voters to ask their candidates for specific answers on the key issues affecting the manufacturing sector and, in turn, asks candidates to back talk with actions. This is being backed by a petition on the Downing Street website, which I urge you all to support.

Whether we like it or not, the future of manufacturing is a political issue that needs to be addressed as soon as possible. But if we don't ask the questions, how can we expect to get the answers we need?

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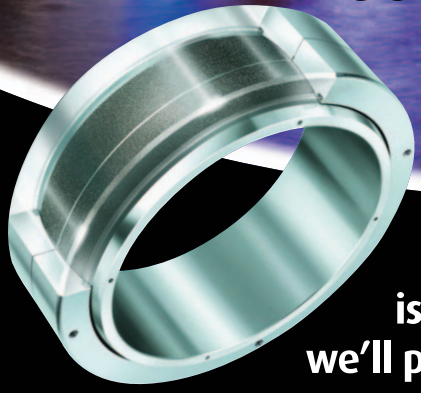
LOADS ON YOUR MIND?

Creative bearing designs for construction projects



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Campaign issues call to arms for government action

A manifesto for action for the manufacturing sector has arisen from 'The Future of UK Manufacturing Summit' held in London last month.

The Summit, held at the Institution of Mechanical Engineers' London headquarters, endorsed five priority actions vital for manufacturing businesses and their employees.

- Action on long-term leadership
- Action on incentives and taxes
- Action on engineering skills
- Action on energy costs
- Action on culture change.

The 'Vote Manufacturing' campaign, launched by Findlay Media with the support of the ERA Foundation and the Institution of Mechanical Engineers, is designed to drive home to all candidates in the forthcoming General Election the importance of manufacturing. The campaign urges candidates to back their doorstep talk with appropriate, decisive and immediate actions. The 'Vote Manufacturing' campaign also features a petition on the Downing Street website, which everyone associated with manufacturing industry is encouraged to support.

Campaign Director Ed Tranter said: "After a period of enormous economic change within the UK and the wider world, manufacturing has never been more important. "With economists and politicians of every type agreeing that manufacturing is the key to a balanced and successful economy, the stage is firmly set for deciding how we get there."

A Voter's Checklist is available for downloading from the 'Vote Manufacturing' website. This Checklist positions the Summit's five key issues as questions for doorstep candidates and sets out the answers they ought to be able to give. Logos and posters are available for download.

www.votemanufacturing.co.uk

CARBON FIBRE BREAKTHROUGH KEY TO PRODUCTION SUPERCAR

Key to McLaren's new MP4-12C sports car is its carbon fibre 'Monocell', whose hollow tubular construction not only protects its occupants, but also provides the vehicle's main structural strength.

Another factor that makes the car stand out is the way in which McLaren has been able to combine its traditional craftsmanship manufacture of F1 and occasional supercars with supply chain and production engineering management to ramp up to producing 1000 cars a year.

The MP4-12C is designed to be the fastest car of its type on the road, with an acceleration of 0 to 200km/h in less than 10s and a top speed in excess of 200mph. McLaren also hopes to make a profit from the car's £150,000 price tag.

Three years of research and development have gone into the car – four years into the Monocell – which has a V8 engine developed from scratch. Carbon emissions are less than 300g/km.

Further details of the car will be featured in a forthcoming edition of 'Eureka'.

http://mclaren.com/

Briefs

UK NEEDS 30,000 NEW ENGINEERS, SAYS REPORT

Semta, the employer-led sector skills council for science, engineering and manufacturing technologies, has published its latest Sector Skills Assessment Report, which identifies the number of new highly-skilled science, engineering and manufacturing posts it believes need to be created between 2010 and 2016. The research indicates some 205,000 jobs are needed within Semta's sectors as a whole by 2016, to replace those who leave their jobs because of retirement and to meet the demand from sectors like bioscience and advanced manufacturing.

www.semta.org.uk

GRANTS FOR HEALTHCARE PRODUCT DEVELOPMENT

Engineering consultancy Frazer-Nash has been awarded a series of development grants by the NHS National Innovation Centre to develop healthcare product concepts to support the needs of NHS patients. Frazer-Nash will be developing solutions for three specific product needs: A splint to immobilise a fractured neck of femur; a carry chair, to allow ambulance crews to move patients more easily; and a new paediatric transport chair.

www.fnc.co.uk

Drives regulate fountain height

Two variable speed drives turn down the pumps on a prestige fountain to stop motorists being showered when it gets windy.

The fountain is the centrepiece of the ornamental lake on the Funeven Business Estate in London and the drives regulate the height of the fountain according to wind speed.

Wilson Electric installed an anemometer with a 4 to 20mA analogue output and Vacon NXL variable speed drives for each of the two 11kW pump motors. When the anemometer produces more signal current, the motor speeds are reduced.

For more information on this technology, visit www.eurekamagazine.co.uk

Breakthrough in seal design

Federal-Mogul Corporation has developed an innovative seal design called MicroTorq that is claimed to reduce friction by up to 70% versus conventional lip-type seals.

The new seal can provide an improvement in vehicle fuel economy of up to 0.49% and a reduction in CO_2 emissions ranging from 1 to 2g/km compared to traditional seal designs.

Easier to install and more accommodating of shaft misalignment or eccentricity, the seals are said to require less package space. The many benefits can be achieved relatively simply, even on existing engines, as the MicroTorq seal can be used without changing the design of adjacent components.

For more information on this technology, visit www.eurekamagazine.co.uk

Automation kits cut costs

Parker Hannifin has launched an extensive range of modular automation and robotics kits, ranging from simple twin-axis assemblies through to integrated multiple-axis gantry and palletising robots. In addition, Parker is offering a custom design and engineering facility for applications where standard systems are unsuitable.

A typical modular automation kit incorporates all the components, including framework, motors, gearboxes, drives, sensors and cables to construct a simple linear handling system. This can easily be extended through the addition of extra modules, while increasingly complex multiple axis gantry, assembly or packaging systems with a sophisticated control infrastructure, can be constructed quickly and cost-effectively, either on-site or at one of Parker's factories for delivery as a pre-configured and fully-tested system.

Based on standard Parker electromechanical, pneumatic, drive and control technologies, the latest range of modular automation kits are capable of delivering exceptionally high levels of performance, accuracy and reliability. For example, speeds of up to 5m/sec are possible over extended stroke lengths, with precision and repeatability typically to within ±0.05mm, with load handling up to 1600kg.

For more information on this technology, visit www.eurekamagazine.co.uk

WiFi tags put sensing in the clouds

A credit card sized PCB uses standard IEEE 802.11 b/g WiFi connections to transfer sensor data to client servers and web browser pages through the cloud of computing power that constitutes the Internet.

Developed by Cores Electronics in Austin, Texas, the makers of the Tag4m, as it is designated, are presently targeting it at the oil, gas and water industries, but its £100 price starting price makes it suitable for any industrial application involving distributed sensing, especially as its configuration allows it to be used to additionally undertake simple control tasks.

The device is powered by a 3V CR-123A lithium battery and, if woken up only once every 500s from its sleep state, battery life is said to be two years. The front end is based on a 14-bit A/D converter and offers five analogue channels: one 0 to 10V, three 0 to 0.4V and one 4 to 20mA plus four digital I/O lines. An onboard -40 to 125°C thermistor allows either direct temperature measurements or cold junction compensation for thermocouples, three of which can be connected at once.

For more information on this technology, visit www.eurekamagazine.co.uk

Barcodes fix curved positions

A novel linear encoder establishes positions along curved tracks by using a vision system to read printed bar codes. Should they become damaged, new code sections can be printed from information available over the Internet.

The Sick OLM100 can read a bar code tape up to 10km long with a resolution of up to 0.1mm and a repeatability of 1mm from a standoff distance of 80mm to 120mm. The system uses a 1024 pixel line CMOS sensor to read bar codes illuminated by red LEDs. These have a life of around 100,000h as opposed to about half this amount for diode lasers.

For more information on this technology, visit www.eurekamagazine.co.uk

Replaceable seals reduce downtime dramatically

A range of pipe flanges for fluid systems developed by Jbj Techniques has been designed greater ease of maintenance. Suited for pressures of up to 450 bar, flow rates up to 20,000 lpm and pipe sizes between 20 and 220 mm outside diameter, the QM Repaceable Seal range is aimed specifically at the steel, oil, gas and food industries, where ease of maintenance is particularly attractive.

Maintenance is improved through the ability to remove the seal, which is supported within a special retaining element, and to replace it without fully disconnecting or moving the mating flange or runs of pipework; typically the case with the standard DIN and CETOP flanges found in heavy pipework systems. The flange design has considerable commercial potential in areas where the cost of downtime is very high, such as the offshore industry.

For more information on this technology, visit www.eurekamagazine.co.uk

Roller pinions save cost in precise movement

US company Nexen makes rack and pinion drives that use roller pinions to enable a positional accuracy of up to +30µm in both directions, with a backlash of less than 3.2µm.

This is possible because opposing contact is maintained by multiple rollers engaging the rack teeth in opposition at all times without incurring a frictional penalty. Speeds of up to 11m/s are attainable and the system is modular in design with 1m and 0.5m linear and curved segments. Pinions are available in shaft mount and ISO 9409 flange mount versions. Noise levels are less than 75dB at full speed.

For more information on this technology, visit www.eurekamagazine.co.uk

Solution to last month's Coffee Time Challenge

The solution to last month's Coffee Time Challenge, which looked for a way of reading a sensor in all circumstances, comes from Sick, in the form of its 'PBS' range, the letters standing for: Pressure Basic Switch.

These devices, which have ranges from 0 to 1 bar to 0 to 600 bar, plus absolute and compound/vacuum versions, have two joints where they can be rotated. The first, at the base of the device, which is secured by tightening a large nut, allows the device to be rotated on its mounting through up to 320°, so the cable connector can be oriented in the optimal direction, rather than applying a bending force to cables. The second, higher up, allows the display to be rotated relative to the device through up to 330°, so the display and control buttons can be oriented for optimal access and observation.

Last, but not least, the electronic display can be reprogrammed quickly through a few button presses so that it is the other way up, or rather, right way up, when the sensor is upside down.

www.sick.co.uk

Softening the blow

Ask different people about the value of design consultancies and the role they play and you will get very different answers. To a company whose products would never have reached the market by any other means, they are a godsend. However, those who feel their position has been usurped by their presence will often respond differently.

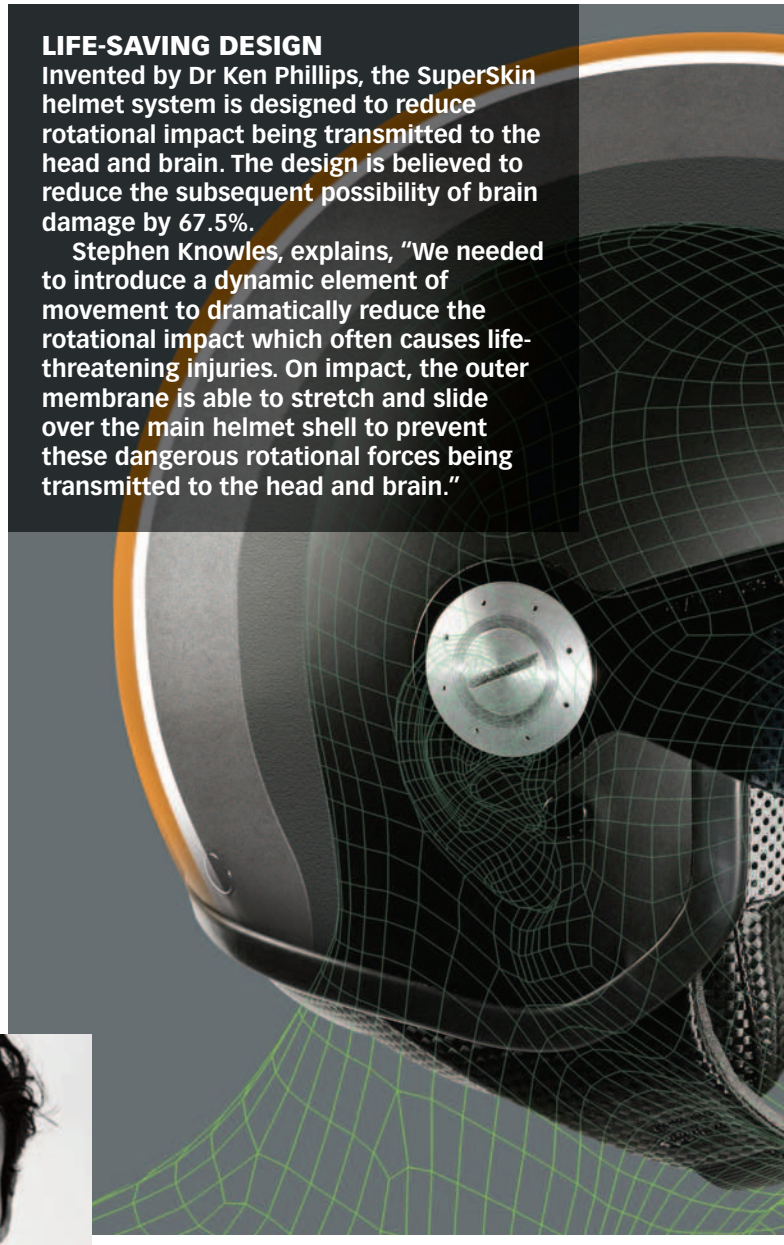
A positive example of the former is offered by Industrial Design Consultancy's (IDC) work on the SuperSkin motorcycle helmet. Designed to reduce rotational impact by incorporating an outer membrane able to stretch and slide over the main helmet shell to prevent these dangerous rotational forces being transmitted to the head and brain, the helmet had been in development for more than 15 years before finally being brought to market this year.

Asked what he believed IDC had brought to the process, Dr Ken Phillips, the inventor of the system, has no qualms: "It brought everything. I went to the company with a concept and we ended up with a finished product. Without IDC, that wouldn't have been possible."

The development process brought together IDC's engineers, modelmakers and designers to develop a skin-like membrane. The design required careful selection of materials: a strong synthetic sits on top of the gel-like lubricant to form a protective layer across the surface of the helmet. State of the art vacuum casting was used to create prototypes and the materials tested for resistance and strength.

This kind of service demonstrates not only the technical capabilities of IDC, but also, believes its managing director Stephen Knowles, the kind of innovation of which companies like his are capable. "You get innovative people everywhere," he says, "but the reason we're so innovative as a company is that we have a critical mass of innovative people."

This, however, is hardly the kind of talk calculated to appease the in-house designer, who hears his company has called in an external agency and is feeling threatened. This is something Colin Smithers, managing director and CEO of electronic design consultancy Plextek, acknowledges. "Our biggest competitor isn't any other design house," he says, "it's the internal engineering departments of our customers. They think we're taking their rice bowl; they think we're taking all the interesting stuff; they think we're disproving their manhood. It may just be that they're too busy to deliver and the engineering department just cannot deliver because they're overloaded and they choose

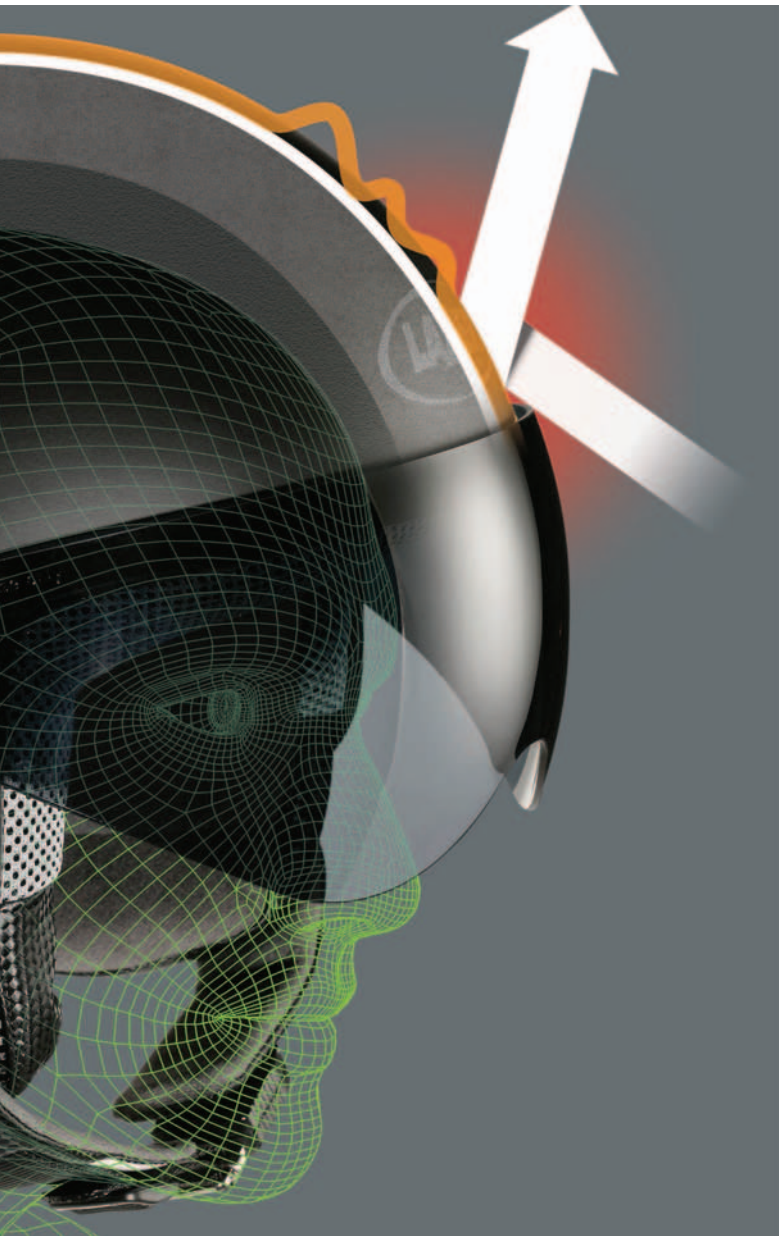


LIFE-SAVING DESIGN
Invented by Dr Ken Phillips, the SuperSkin helmet system is designed to reduce rotational impact being transmitted to the head and brain. The design is believed to reduce the subsequent possibility of brain damage by 67.5%.

Stephen Knowles, explains, "We needed to introduce a dynamic element of movement to dramatically reduce the rotational impact which often causes life-threatening injuries. On impact, the outer membrane is able to stretch and slide over the main helmet shell to prevent these dangerous rotational forces being transmitted to the head and brain."

"People come to us for a different perspective; a fresh look at the problem," Stephen Knowles, Industrial Design Consultancy

Bringing in external industrial design expertise may dent the pride of internal engineers, but it can pay dividends in terms of success and innovation. Paul Fanning reports.



to take it outside. That doesn't stop the internal engineering department hating the fact. It's eternal. It's the way of internal engineers – they hate not to have the good work. It's natural enough."

However, the fact remains that outsourcing is now a relatively commonplace activity in the industrial sector and the reasons for this

"Sometimes, the internal engineering department simply can't hack it."
Colin Smithers
Plextek

are by no means necessarily a negative reflection on in-house teams.

Says Knowles: "People come to us for a different perspective; a fresh look at the problem. A lot of companies only design a new product every six months or a year, so the skills they have in-house tend to be general skills to push that through. When they need specific skills, like design or aesthetics, those are something that are only needed for a few weeks in each of those projects. You can't justify having that kind of expertise sat in your company permanently, so being able to call on an external design house to pull in those types of expertise can be quite beneficial."

However, this still may not allay fears entirely. "Sometimes you do get a 'not invented here' syndrome," says Mike Cane of Cambridge Design Partnership, "and we're sensitive to that. Part of it is how the contract is set up. Obviously, there's no point in us reproducing technology or expertise that already exists in the company, so we tend to find the experts and work with them. We learn from each other."

Knowles concurs: "Internal design departments shouldn't feel threatened, because what we do a lot of is to fit in different pieces of the jigsaw around the in-house skills."

There is not always a happy ending, however. Says Smithers: "Sometimes it can't be overcome. Sometimes the internal engineering department simply can't hack it. It's down to personalities; in some cases, it's not a problem and sometimes it works a dream and that's down to personalities. In fact, sometimes it's working really well and then a new personality gets involved and it all falls apart."

From the client's point of view, of course, the ability to mesh internal and external expertise is even more crucial and playing to the strengths of both parties is vital to this. Display instrumentation manufacturer BEKA Associates has been working with consultancy Product Partners for more than a decade to develop enclosures for its products. BEKA's engineering manager Andrew Hicks believes that clear delineation of the two roles is key to a successful relationship. "We're engineers. If it's square and it works, it looks good to us. But that product needs to look up to date as well as being fully functional and practical for our market area. While functionally, our products will obviously tick all the boxes, the thing that will make people stop and

look is if it looks really good. And that's what Product Partners can bring."

Hicks also believes that retaining a sense of ownership is important to overcoming any potential clashes. "At the end of the day, we're the customer. If we want something, then it'll happen. It's important to bear in mind that at the end of the day, it's your project. They're there to deliver something that will suit you."

One of the most common objections to the presence of design consultants is cost. Resentment of an apparently expensive adjunct to an in-house team is a fairly natural reaction and one that design consultants themselves are understandably keen to downplay. Says Cane: "People think that bringing in a consultant is a terribly expensive solution because they simply look at their salary, work out what they get paid an hour and compare it with what the consultant is getting per hour. What they're forgetting is that they're not just getting in an individual, they're getting a whole set of skills."

"Sometimes, you do get a 'not invented here' syndrome."
Mike Cane
Cambridge Design Partnership

Knowles also acknowledges this image problem. "It's perceived as a costly expenditure because it's very noticeable," he says. "But compare it to the cost of having a project to deliver and not having enough people to do it, then having to recruit, manage and equip a group of people – even then, there's no guarantee they're going to deliver! Compared to that, it's very cost-effective."

The ability to pick up and put down design consultants as and when necessary is another key advantage in terms of cost, but can also has positive implications for the design process as a whole. According to Cane, the ability to stop a project when it becomes clear that it isn't working is something companies find easier to do with external consultants than when it is in the hands of an in-house team. "In manufacturing companies, people can get too wedded to a project. There's an attitude that it's their project and they want to see it through. It's much harder to stop a project than it is to start one."

A detailed assessment of whether or not a project is likely to succeed in the first place is another function that design consultancies can bring. Says Cane: "Sometimes, companies can find they're four-fifths of the way through the project, they've ordered production tooling and spent a lot of money and, suddenly, the product doesn't work. Or you go to market research and discover that people didn't really want that product in the first place. And that's a big cost you've got to avoid, so our process is front-loaded to make sure that, by the time you get around to spending that money, what you're going to launch is going to work and give real value."

Such an approach can seem costly and laborious, but, says Cane, it pays off. "As soon as you realise the project isn't going to work, you need to be able stop it and stop wasting money. Failing quickly and failing cheaply is the key. The trouble is that if you tell the customer you should do this extra work up front, they think it's increasing the cost of the project. They say 'I know what I want. Why don't you just design one?'."

The attitude and co-operation of the clients is fundamental to a successful collaboration and a crucial part of this is a clear brief. Says IDC's Knowles: "The problems come if there's not a clear idea of what you want to do at the beginning and someone changes their mind halfway through; that's where the costs can increase. You end up spending more money, but don't quite reach the finishing line. That's the biggest danger with clients: when they don't quite know what they want to do."

Of course, problems can arise in the process from both sides. Tales of design agencies who come in, charge a great deal and fail to deliver the goods are a major cause of reluctance on the part of companies to follow this route. With this in mind, it is worth asking what criteria should be looked at before choosing a design partner.

According to Smithers, knowing what to look for is key. "The majority of people who first look to put out work are in exactly the same situation as new house owners who is looking to have their kitchen done. It's the first time they've had it done and they don't know what to ask for. It's only by the time they're asking for their second kitchen that they know what to ask for because they know all the things that went wrong the first time."

Clearly experience of the product or technology areas is another factor, but that, says Knowles, is far from the be-all and end-all. "The important thing is for there to have been some experience in similar fields. I don't think it's imperative that you've designed exactly what people want before; sometimes that can lead you down the tried-and-tested route. If you put someone on a slightly different track that can lead them a slightly different way, which in turn can lead to innovation."

Cane offers another warning: "The sign of a good consultancy is to have a smaller number of long-term clients. If you're consistently delivering, people will come to you year after year. And you should be able to ask for references from those clients. If they've got lots of little projects with lots of customers who never come back, then that should sound an alarm."

For all this, however, the outsourcing of design will always be seen by some as a threat, but it is one that many companies have learned to live with very successfully. Cane concludes: "I don't think we're a threat. What is a threat to a company is their products becoming outdated, expensive and uncompetitive. That's how people lose their jobs. So it makes sense for people to work with us."

www.idc.uk.com
www.plextek.com
www.cambridge-design.co.uk
www.productpartners.co.uk

The art of innovation

And the deterministic methodology of reliability engineering.

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At first it may seem incongruous to combine the creative process of innovation with the deterministic methodology of reliability engineering. However, correctly applied the two are complimentary.

TTP develop novel, innovative devices and products using a mixture of 'Creative' and 'Embodiment' sessions. The Creative sessions are typically conceptualisation meetings designed to generate ideas which meet a requirement specification. A team of engineers, scientists, and designers gather to generate concepts - at its heart, innovation is a creative process and it should not be controlled too tightly.

The next step is Embodiment and although a concept may at first appear to be attractive, the question is "whether it is feasible?". When production volumes are high, and reliability requirements stringent, the traditional empirical approach (prototype-test-modify) is both extremely risky and time consuming, and also likely to be unsuccessful.

The solution is to use advanced reliability engineering methods to quantify the feasibility of a concept at the early, innovation stage. At the heart of TTP's reliability engineering is probabilistic design. Based on statistical design calculations, it determines the design performance and reliability at a lower cost than prototyping. As a result, testing becomes largely design verification rather than performance discovery-which is quicker and less expensive.

Using probabilistic methods, the major design sensitivities are determined at the outset, long before tooling is made. The result is that materials selection, tool configuration and other downstream manufacturing activities are better qualified. All these factors help to reduce risk, which in turn reduces cost and timelines.

In conclusion, the combination of creative innovation and reliability engineering methods create a competitive advantage for TTP and our clients. In our experience it is cheaper, faster and gives a significantly better chance of success.

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A problem solved

Active Technologies - Original ideas and value come about through a fresh pair of eyes

Active Technologies has been involved in a number of designs that have gone on to be patented, demonstrating our innovating capabilities in new concepts through to improving existing products.

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We provide a broad range of services to a broad range of clients that covers everything from individuals to the largest multi-national corporations. This broad offering means that we can deal with just about any engineering project that comes our way.

Our business is essentially problem-solving and this applies equally to our consultancy services and our product design and development.

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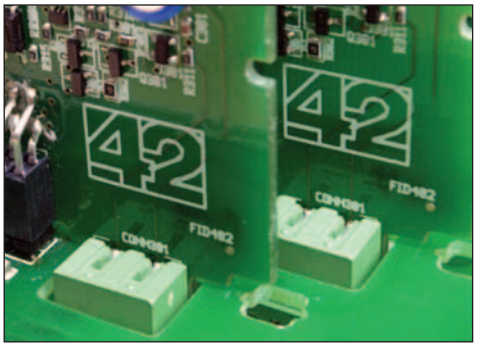

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An engineer by nature

For Tony Lowe, engineering was always likely to be his career choice. "It was second nature to me," he said. "From an early age, I enjoyed messing about with cars, taking things apart and – sometimes – putting them back together again. It was never really a choice for me, it was a natural progression."

After graduating from Imperial College, Lowe joined Ricardo, later going on to co-own NPL Technologies, which was subsequently purchased by the ARRK Group in 2007.

Stronger together

Bringing together four companies to create a single-source solution is the challenge facing Tony Lowe of ARRK Europe. Paul Fanning reports.

At the time of writing, Tony Lowe is UK managing director of four UK companies, part of the product development specialist ARRK. However, as you're reading this, he is managing director responsible for the evolution of ARRK Europe. His position and responsibilities will not be changing significantly in the interim, but the company he leads most definitely is.

Traditionally, ARRK's four UK businesses (ARRK R&D, ARRK PDG, ARRK Tooling Development and NPL Technologies) have operated independently, as Lowe explains. "In the past, customers have bought services from the individual companies, irrespective of whether they're part of ARRK. In fact, I have examples of projects where customers have come to the Basildon technical centre for design and engineering services and then subsequently gone to NPL in Nuneaton for prototype or composite parts and, finally, to our tooling facility in Portsmouth. But they didn't do that because they were all part of ARRK; they were selected independently as the supplier of choice. In truth, customers have sometimes been unaware that individual companies have even been part of the ARRK group."

This situation has been a legacy of ARRK's Japanese parent's history of growing by acquisition. Says Lowe: "'Do your own thing' has very much been an ARRK philosophy up to now. That's fine when things are going well but, in a difficult environment, you need to highlight some areas that need improvement both individually and collectively. ARRK has some real strengths in individual companies, but what it's not been doing is utilising the strengths of the combined units more effectively."

With this in mind, it has been decided to integrate the companies into one entity called ARRK Europe. This process has already begun with the merging of ARRK R&D, now the Basildon Technical Centre, and NPL Technologies, now the Nuneaton Technical Centre, with the other businesses to follow at a later date.

Turning four companies into one is a challenge, but Lowe believes the company is starting from a good position. "The last year has been very challenging for all the businesses and for the market as a whole," he says. "But I think that has provided opportunities, painful though they have been, to really review each business. And when you really examine yourself and ask 'what do we have to do to be here next year?', you start making harder decisions than when you've just been ticking along."

Lowe is keen to point out, however, that innovation has sprung from these apparently unpromising circumstances. "Necessity breeds innovation, but it's not always technological innovation like a new widget or a new 'silver bullet'. It's often more process innovation. How can we do this more cost-effectively? Do we really need these steps in the process? That's going to be a big part of the integration of the company: finding cleverer ways of doing things together."

And innovation is certainly something that ranks highly in ARRK's list of priorities. With a history of aiding the development process for clients in sectors such as transportation, medical, aerospace and defence. Indeed, Eureka was shown the Personal Rapid Transport system being used at Heathrow that ARRK helped to develop at its Basildon Technical Centre. However, it has also been involved with the development of products as diverse as a lightweight ultrasound system and even a high-tech riding saddle.

"Necessity breeds invention, but it's not always technological innovation like a new widget or a new 'silver bullet'"

Going forward, Lowe sees significant opportunities for ARRK in the UK in areas such as renewables, marine, medical and in niche vehicle applications. "There are always new sports car projects around the country," he says. "Britain's great at doing that sort of thing. It's about low-volume, competitive pricing and innovation."

He is nonetheless disappointed about government's attitude to industry in this country, saying: "I don't think they've been particularly supportive at all. They saw financial services as the cash cow and the Holy Grail. But now it's realised we actually need to make something to create wealth. Apprenticeship training schemes have also been poorly supported by government. It's basically down to the company to commit to apprenticeships and to pay accordingly. I'm proud to say that, in a number of our companies, we continue to support apprenticeship schemes. As painful as that is in terms of cost, it's the lifeblood of the business going forward and if you stop that, then you cut off the feeder of good people through your business."

In spite of the difficulties facing the industry, Lowe remains an advocate of grasping opportunities by exploiting new techniques and technologies to maintain a strong position. "You've got to be still taking chances. You've got to be prepared to do something different. It's too easy just to stand still with what appears to be high-tech today and find that in as little as a year's time, you're an also ran"

www.arrk.co.uk

Selling the benefits

A need to educate consumers was the major theme to emerge from the recent Eureka Linear Motion Round Table. Paul Fanning reports.

Discussion began with the presentation of the results of Eureka's Linear Motion Survey, the most alarming result of which revealed that, while 50% of the 179 respondents anticipated specifying linear motion systems or components in the next 12 months, 71% of those admitted that their knowledge of the technology 'needs brushing up'.

In the light of this statistic, Andrew Smith laid some of the blame at the door of manufacturers, saying: "We've got a knowledge gap and it's there because we, as manufacturers. have not trained our customers and made it look easy enough for them to feel comfortable with the technology."

Perhaps because of this knowledge gap, it was agreed that there was a widespread reluctance on the part of some designers to employ linear solutions. This was made clear by John Loonam, who said: "You wouldn't believe the number of customers I've seen who've tried to avoid linear like the plague and have ended up bodging together a solution using rotary technology and had problems as a result."

Echoing this, Dr Nick Campbell admitted he had looked at trying to achieve linear-type results using rotary technology for cost reasons, but had never been able to arrive at a satisfactory solution. He also agreed that there was a knowledge gap that could only be bridged by good application support from manufacturers. "I see a number of what I would describe as 'design howlers' caused by the fact that people simply don't have the experience to design these systems."

Emphasising the importance of the manufacturer's role in increasing understanding of the technology, James McMath said: "We'd rather be involved from the outset than come in as 'tail-end charlies' when the framework of the machine is already in place and we may not even be able to help short of a complete redesign."

Loonam estimated that 30% of his customers were now asking for help designing systems from the outset and that, of the 70% who were not, more than half needed help later in the implementation process. The situation was reversed for Rockwell, according to Smith, who said that 80% of customers were supported from the outset, although he conceded that the discrepancy may lie in the difficulties of mechanical and electrical engineers in working together. "They speak different languages," he said.

Bradley McEwan believed things were getting better, however. "The skill sets for this technology in OEMs are getting higher and higher. The problem is that, while the skill sets are getting better, they are still not integrating in such a way to allow for overall competence in linear motion."

Speaking for the OEMs, Dr Campbell pointed out that specifying linear systems was a system engineering task and, as such, required a breadth of disciplines not available to a lot of companies with fewer than 50 employees. However, McEwan made it clear that he believed that the general automation in terms of mechanical motions were already defined by the time systems engineers came into the equation and that the problems that usually occurred did so at the design stage.

Highlighting this, when asked how many customers actually gave them a proper specification when they were building linear systems, Smith's answer was blunt: "Between zero and zero". Loonam concurred, describing as 'literally a handful' the number of customers who had done this. Martin Wooler said: "We often get promised a spec, but what we actually get is usually a drawing."

Jock Hall put this in perspective, however, saying: "If you can specify, you're three quarters of the way there already. It's getting to that point that's the problem."

There then followed presentations by Schaeffler and Rockwell Automation.

Pictured left are, from the left, Andrew McMath, John Loonam and Jock Hall.
Facing page, from the left, Martin Wooler, Andrew Smith and Bradley McEwan.

Participants:

Dr Nick Campbell
Project Manager,
Inca Digital Printers

John Loonam
Linear Technology Specialist,
Schaeffler

Andrew Smith
Team Leader, Commercial Engineering,
Rockwell Automation

Bradley McEwan
Commercial Engineer,
Rockwell Automation

James McMath
Sales Manager – UK Encoder Sales,
Renishaw

Martin Wooler
Marketing Manager,
Zettlex UK

Jock Hall
Senior Partner, Spinoff Technical Systems

Schaeffler's Loonam used the opportunity to dispel a number of widely-held myths about linear motion technology. Amongst these were the fact that linear must always be straight, that it cannot be used in heavy engineering, that it is not stiff enough and can flex and that it is invariably too expensive for most engineering applications. He disproved these misconceptions with a range of examples from Schaeffler's experience in the field. Regarding the point about heavy engineering, it was pointed out that Schaeffler's linear solutions were employed in steelworks for the movement of saws and transfer lines and that it can be used in the nuclear industry as specialised coatings and materials are now available to meet the requirements of these harsh environments.

Rockwell's presentation focused on case studies that showed the potential benefits of the technology in technical, financial and logistical terms. In one of these examples – at a contact lens manufacturer – the task was to develop a new, high-speed manufacturing process that reduced mould take-out times by 40% and thereby improved cycle times overall. In fact, using linear motor stages with lightened slides, Rockwell reduced mould take-out times by 50% and reduced cycle times by 0.1s, which equated to an increase of 300,000 products per year.

The implications went beyond this, as these improvements meant the end user did not have to open another plant in order to meet demand. Smith said: "Although this may have cost a third more than a standard solution, the implications were massive in that the company didn't have to build a new plant, while payback time was less than three months per machine."

These examples again highlighted the degree to which application support was key to the increased adoption of linear motion technology, with Smith pointing out that early involvement at the design stage of one of the projects he had mentioned had probably avoided 95% of the problems that might otherwise have been encountered. He did concede, however, that this level of support did cause its own set of problems. "It's a hugely expensive sales process at the moment. However, we have a responsibility to develop tools and educate customers and I believe that in the next three to five years, levels of awareness will grow as a result." Wooler also made clear the level of support necessary at this point, saying: "It's a consultative sell rather than just box-shifting."

Dr Campbell made it clear that he felt that, while there may be a knowledge gap on the part of the OEMs, there was also a problem at some points of the manufacturer level as well, saying: "We need prompt, technically-competent post-sales support. I occasionally see sales people who are absolutely clueless about the technical products we are trying to sell and who appear to have no technical back-up."

Asked to arrive at a set of conclusions that Eureka's readers should take away from the debate, McEwan said: "Customers need to understand that there is a benefit in educating themselves."

The panel also felt it was crucial to impress on people that linear motion was now a relatively mature technology and that the risk factor was nowhere near as great as some imagine. "People don't realise it's already there," said Loonam. "They don't realise that there are highly successful examples and there is a lot of technical help available."

James McMath also stressed the maturity of the technology, saying: "On a simple level, I've been doing this for 10 years, which should be a comfort to the customer." Summing up, McEwan pointed out: "Linear motion is no longer 'bleeding edge', it's leading edge."

*** To access the Schaeffler and Rockwell presentations, as well as the results of Eureka's Linear Motion Survey, go to www.eurekamagazine.co.uk/linearmotionzone**

The Eureka Linear Motion Round Table

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Briefs

ES1 OFFERS IMPROVED CORROSION RESISTANCE

NSK has developed ES1 (Excellent Stainless Steel) for use in high-humidity, chemical and hygienic environments, where corrosion can impair the reliable long-term operating life of rolling bearings. ES1 is claimed to provide superior corrosion resistance and rolling contact fatigue life to conventional AISI 440C steel in wet and aggressive environments. The operating benefits of this new material specification have been proven following extensive testing by NSK. ES1 outperformed other stainless steels in a 5% aqueous sodium chloride immersion test, a salt-water spray test, 5-N sulphuric acid and 5-N hydrochloride solution immersion tests and during life tests in water.
www.nskeurope.com

BEARING SOLUTIONS CUT VEHICLE FUEL CONSUMPTION

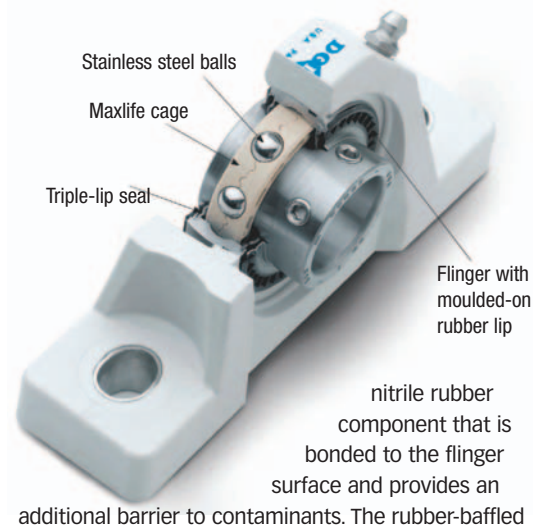
The Schaeffler Group has developed a range of innovative bearing solutions that are helping vehicle manufacturers produce more compact, lighter vehicles, with improved fuel consumption and reduced CO_2 emissions. The latest of these is the FAG wheel bearing, which is more compact and 10% lighter than its predecessor. The new bearing also offers simplified mounting via a self-centring, axial spur gear teeth design.
With a spur gear teeth design in which the wheel bearing and axle journal are connected axially rather than radially, the bearing module is lighter and can be mounted clearance-free.
www.schaeffler.co.uk

Bearings extend equipment life

Baldor Electric has launched a Dodge-brand mounted ball bearing incorporating sealing and lubrication innovations that can substantially extend equipment lifetimes in harsh, washdown-duty operating environments such as food and beverage processing.

Dodge Ultra Kleen ball bearings employ a 100% stainless steel bearing insert and feature a patented new sealing system and a ball retainer that retain lubrication and prevent washout in wet operating environments.

The new sealing system, called QuadGuard, consists of two patented features: a triple lip seal and a rubberised flinger. The triple lip seal offers three points of contact, keeping the lubricant in and contaminants out. This design maximises sealing with a minimal amount of drag. The rubberised flinger, the industry's first and only patented design, is a moulded



nitrile rubber component that is bonded to the flinger surface and provides an additional barrier to contaminants. The rubber-baffled design on the external surface of the flinger enhances the removal of liquid as it rotates, while grease chambers on the internal surface of the flinger prevent lubricant from exiting the bearing.
www.baldor.co.uk

SKF supplies customised bearings to hybrid-electric race car

SKF has been chosen by Zytek Engineering to supply customised and standard deep groove ball bearings to the electric motor generator unit and the intermediate shaft of the new Ginetta-Zytek GZ09HS racing car.

The car, manufactured by Zytek Engineering and managed by Corsa Motorsport, is the first racing car to feature an advanced alternative-fuelled hybrid propulsion system. It has the ability to run on either one or both of two propulsion systems – a normally aspirated V8 (petrol) engine and a 35kW electric motor, powered by an advanced lithium-ion battery, which can be recharged using a kinetic energy recovery system. This hybrid propulsion system is unique in racing today.
www.skf.com

Q&A

Rutland Plastics Limited

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Considerations for Plastic Injection Moulding

Q What are the advantages of using plastic moulded components?

A The two main advantages are weight and cost reduction. The latter is not only due to lower material costs and cheaper part production, but also the fact that by using injection moulding it is possible to combine more than one part into a single moulded component so reducing or eliminating assembly costs.
Plastics also provide for a wider variety of shapes and colours.

Q But aren't plastics less strong than other materials, such as metal?

A Not necessarily. Material selection and good product design can produce a moulded part that will meet your requirements. Plus, plastics can offer a longer life and do not corrode.

Q What do I need to consider when specifying a part for injection moulding?

A Your end use requirements for the part. These fall into functional, aesthetic and manufacturing related. Are any special strength characteristics required? When considering loading, for example, it is vital to be clear on the type of load, the rate at which the load may be applied, duration and frequency. The same approach can be applied to environmental factors such as exposure to very high or low temperatures, chemicals and UV light.

It is also necessary to specify your dimensional requirements, particularly critical dimensions and flatness, all with realistic tolerances. It may be that there are legal requirements as well, such as food contact or flammability, and not forgetting life expectancy.

Q Isn't injection moulding just for high volume parts?

A This is a common belief due to the fact that injection mould tools are relatively expensive. However, as alternative methods of manufacture such as machining or fabrication can result in expensive part prices, injection moulding can often be justified on hundreds of parts rather than tens of thousands. This is where support and advice from Rutland Plastics can help in designing components that not only minimise part cost but also mould tool cost. This free, no obligation advice can include a quote to enable you to assess the viability of a particular project.

Life-saving plastics

Tom Shelley reports on developments in plastics for the medical device market

There can be many reasons for turning from metals to plastics for medical products – easier processing, design freedom, colourability, lower weight and, of course, cost. But nothing is straightforward and new technologies are being developed to give plastic products performance equal to or better than metal equivalents.

Medical products have particular demands, especially the need to be able to withstand sterilisation by various means. If used in a hospital environment, it may also be desirable to make them biocidal, by adding silver or copper. But if they are to be used in the human body, they will need to be bio-compatible and it may also be desirable that they be transparent to NMR and X-Rays; hard to achieve with metals.

Plastic products, such as containers for the operating room, are mainly based on high temperature-resistant amorphous and partially crystalline plastics such as polyetheretherketone (PEEK), polyphenylene sulphide (PPS), polyphenylsulfone (PPSU) and polyetherimide (PEI).

If parts have to be slid relative to each other, it is possible to add lubricants such as polytetrafluoroethylene (PTFE) and 'Nano additives', according to Lehmann & Voss' European sales manager Thomas Collet. Where required, however, electrical and thermal conductivity can be provided by carbon fibres and other nano additives.

PEEK has, for some years, been used for implantable devices, especially by biomaterials company Invibio. A key reason for this is that the material can be engineered with fibre or filler reinforcement to have a modulus similar to that of cortical bone for spinal implants. Invibio's current top grade is 'PEEK Optima', which TWI's Dr Mehdi Tavakoli observes is characterised by high strength, extreme resistance to hydrolysis, and resistance to ionising radiation. "It can be repeatedly sterilised using steam, gamma rays and ethylene oxide without significant deterioration," he says. It can also be adhesively bonded to itself and titanium and nickel chrome alloys.

An investigation led by Dr. Tavakoli found that grit blasting with fine alumina NK60 grit and treatment with a neodymium YAG laser were effective in enhancing the strength of PEEK to PEEK joints, but grit blasting was not effective on metal surfaces. The test pieces were lap joints, tested in shear and the strongest plastic to plastic joints after grit blasting came out at 6.2MPa using 'Loctite' 4061 cyanoacrylate adhesive. A long-term implantable grade silicone adhesive achieved a shear strength of only 2.9MPa. The highest strength achieved with PEEK to 6-4 titanium joints was 5.9MPa with 4061 and 4.7MPa with Loctite M-31CL epoxy. For PEEK to Cobalt chrome, Allvac TJA-1537 from Titanium International, the strongest joints were 5.9MPa with 4061 and 4.8MPa with M-31 CL.

Dr Tavakoli notes that, although the Loctite adhesive had the highest strength, it can only be used in short-term medical devices (i.e. less than 29 or 30 days), depending on whether ISO or FDA regulations are followed.

Design Pointers

- Benefits such as easier processing, design freedom, colourability, lower weight and cost can often be achieved in medical products by making them from plastics instead of metals
- Such materials are suitable for use in a variety of other sterile or safety-critical applications.
- High grade PEEK, one of the most popular materials for use in implants, can be adhesively bonded to itself and to titanium and cobalt chrome alloys.

For uses outside the human body, SABIC Innovative Plastics has announced what it calls an 'LNP Stat-Loy' technology that provides permanent anti-static properties for more efficient aerosol and powder dispensing inhalation devices. So far, the technology has been applied to three transparent resin systems: acrylonitrile butadiene styrene (ABS), polymethylmethacrylate (PMMA)/acrylic, and 'Xylex', a polycarbonate (PC)/polyester alloy. It can also be applied to opaque resins such as polyamide 6, polybutylene terephthalate (PBT), polyoxymethylene (POM) and polypropylene (PP).

Other innovative uses of SABIC resins for medical products include the use of 'Cycoloy' PC/ABS resin for the housing components for the 'Breastlight' home use device for self examination developed by Scottish company PWB Health. PWB chose Cycoloy because of its impact properties and high flowability, making it suitable for thin wall moulding. SABIC's 'Lexan' PC was chosen for the lens because of its clarity, impact strength and its ability to be ultrasonically welded to its housing.

www.luvocom.com
www.invibio.com
www.loctite.co.uk
www.silicone-polymers.co.uk
www.sabic-ip.com

Film resists punctures and leaks

Tom Shelley reports on a few of the more surprising products that depend on thermoplastic polyurethane film

Blown thermoplastic polyurethane film is finding uses that range from hospital mattresses and bonding dissimilar materials to making fibre-reinforced laminates for bullet proof vests and producing airships.

The material is a lot tougher and more tear-resistant than other film-blown polymer sheet material and is also weather resistant and elastic. Applications include use in fuel cells, the lining of fuel tanks, sealings for gaskets and in the manufacture of impact-resistant glass.

One of the few companies in the UK – if not the only company – that blows PU as film is Permali Gloucester, which markets the material as 'Tuftane'. Managing director Gus King acknowledged that PU is an unusual material to film blow. This is possibly because it is produced by reacting pairs of components – isocyanates and polyols – rather than the single component resins that are normally film blown.

Film blowing is the process normally used to make plastic bags, but these seem to be about the only type of thin sheet plastic products that are not recommended applications for Tuftane, which is produced in a range of thicknesses from 35µm to 0.6mm. Permali only produces the film. Laminating it to other substances is undertaken by companies such as Holden Laminates, which is part of a long-established textile company John Holden, that as well as making a huge range of industrial textiles, waddings and non-wovens, can laminate just about anything fibrous to almost anything thermoplastic.

The first stage in the creation of a laminate or to bond different materials is to use infra red or flame heating to melt TPU laid onto the fibre or other material to be bonded, and to then pass this and the material to be bonded to through a laminating machine. In the case of the plastic bullet proof vests, the laminated layers are then placed in a mould and pressed together. Holden Laminates' sales manager Julie Thornhill said it only goes as far as producing laminates and noted there are yet more companies who specialise in pressing laminates together to form shaped products with thickness.

The hospital mattress application is produced, amongst others, by Huntleigh Healthcare, which has devised mattresses with individual inflated cells that can be cycled round, so as to vary which parts of the mattress are in most forceful contact with the anatomy of really sick patients so as to reduce the risk of pressure sores.

For this application and many others, it is essential to minimise the possibility of gas leakage. For this reason, TPU film is finding favour with makers of escape hoods and suits for emergency services, and with makers of small airships popular for advertising promotions and as camera platforms, especially in the US, where PU is displacing PVC.

While airship manufacture is clearly a niche application, it is a very demanding one that gives some idea of the material's properties.

Airship Solutions uses PU film that is only 0.09mm thick. It says 'Polyurethane is an incredibly resilient material that is ideal for use in blimps due to its properties for containing helium'. It adds 'in the event the hull gets punctured, it is very simple to fix'.

The alternative balloon and airship material is currently Nylon Ripstop, which is favoured for larger lighter than air vessels, but suffers from the fact that it does not stretch. Hence if used for the hull, pressure has to be regulated, either by a pressure release valve, an expansion panel, or internal bladders called ballonets.

www.tuftane.com
www.huntleigh-healthcare.com
www.john-holden.com
www.airship.com.au

Design Pointers

- TPU film is tough and tear- and puncture-resistant is relatively impervious to gases
- As well as those listed, applications for the material include drive belts, valve seals, water filter components and in electronic components
- It can be laminated to fibres, including aramid fibre, and used to bond dissimilar materials

Compact actuators bring safe landings

Tom Shelley reports on a dramatic application of an actuator that is soon to be available in the UK

Electrohydraulic actuators with a variety of uses have been chosen for a system that raises and lowers safety nets round warship decks, particularly helicopter landing pads.

The devices come from the US civilian sector, where they are used on power boats and large trucks. Whilst rugged, with higher power densities than are possible with purely electric actuators, the devices can also be integrated into sophisticated control systems.

The nets are made by Permali Gloucester, with glass reinforced plastic supports and polyester nets capable of catching and retaining a 150kg sandbag or a 90kg steel weight, when both are dropped from 1.5m. They have to be turned down flat, outwards, so as not to obstruct a helicopter during landing, and then pulled upright afterwards and locked in position. Their real importance is in a rough sea, perhaps with waves breaking over the stern of the ship and the crew hampered not only by the wind and the sea but also by a build-up of ice on their clothing.

While the nets are there to catch personnel who might otherwise be washed overboard, they have also been known to catch the nose wheels of helicopters, in danger or sliding off, as well as items of ordnance.

The system has been sold to navies worldwide, including the Royal Navy, with cords to manually pull the net sections upright. However, an obvious improvement is to

Valve designs lower air costs

Lowering compressed air use in pneumatics applications can mean considerable financial savings. Paul Fanning looks at some options

The need to control costs and conserve energy has tended to focus on cutting power usage. Pneumatic actuation, however, is an area that has tended to escape scrutiny.

SMC Pneumatics' control system design engineer Mark Brinsley outlines the problem. "Because people are breathing air, they tend to assume it's free. But, obviously, you've got to compress it, which takes a huge compressor motor. It's thought of as a cheap form of energy, but not by accountants."

Quite how significant compressed air usage is can be seen from the fact that its generation represents about 10% of industry's total electricity consumption, rising to 30% in some sectors.

One type of air-saving solution that has existed for some time, but is starting to see increased interest as these costs are examined, is SMC Pneumatics' ASR and ASQ air-saving valves. These work by simply reducing the pressure required to operate the return stroke of a cylinder, but without compromising the speed at which the cylinder operates.

In the same size as a conventional flow controller, the ASR pressure valve incorporates a miniature integrated regulator with check valve and speed controller, whilst the ASQ comprises a quick supply and exhaust valve with speed controller. Says Brinsley: "If users are sending pneumatic cylinders out and in they're generally using one control pressure. If they're doing that, then they're using the same force on the out stroke as on the in stroke and we've found that most applications don't need that same force. So what we've done is reduced the pressure where we can. It's a question of 'right pressure, right force'."

The savings that can result are considerable. In fact, tests undertaken by SMC demonstrate that, as a rule, an air saving of 30 to 40% over a standard control set-up is possible.

Another approach is the use of improved

Design Pointers

- Compressed air usage represents 10% of industry's electricity consumption – rising to 30% in some sectors
- Considerable savings can be made using alternative valve technologies

introduce power operation of the safety nets that could be accomplished remotely. For this reason, Permali turned to Parker Hannifin, which came up with a US developed and manufactured electrohydraulic actuator that is more compact than an equivalent electric actuator, but unlike conventional hydraulic actuators, is completely self-contained.

The 'Compact EHA' as it is designated, uses a hydraulic cylinder to deliver forces of up to 22kN (5,000lbf) at up to 130mm/s from a unit that weighs around 5kg, and is about the size and shape of two hydraulic cylinders beside each other.

Made by Parker's Oildyne Division in Minneapolis, it uses a permanent magnet DC motor, either 12V or 24V, and is pre-flushed, filled and sealed. Parker's Martin Latimer says that it can be used in simple on-off mode, analogue-controlled or integrated into the company's IQAN, CANbus-based control system. Compared to an electric ballscrew, it is both smaller and less expensive. Light weight is ensured by use of an anodised aluminium housing.

With a maximum stroke of 203mm, the unit can be installed quickly and easily; normally, it can be just bolted in and connected up. It has internal relief valves, so driving its load into end stops is not going to break it.

Although new to the UK, the product is widely used in the US, where Latimer said it is used to lift the large outboard engines that are popular on American power boats, proving its suitability for a marine environment, and for tilting the cabs of that country's big '18 wheeler' trucks to access engines and mechanics. Other applications include: opening hatches and doors, ambulance tilt beds, jack plates, mower deck lifts, hospital stretchers and all terrain vehicle attachments.

www.permali.co.uk
www.parker.com

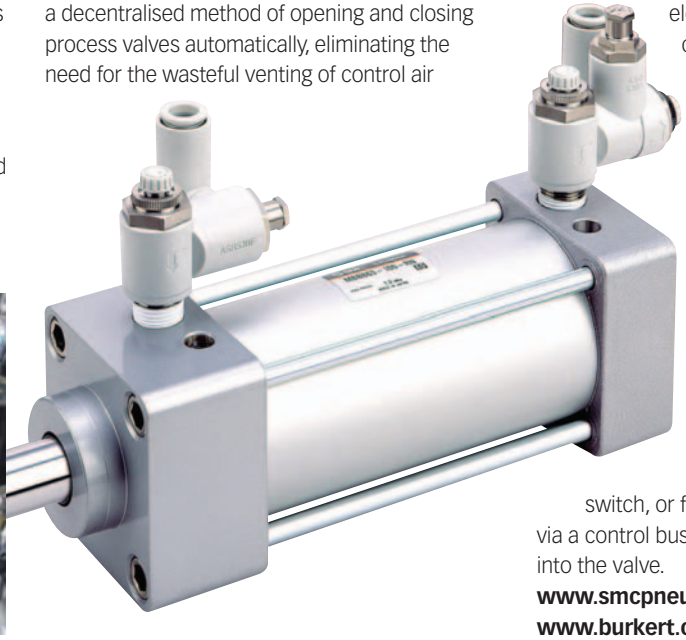
Design Pointers

- Proven to marine and other arduous applications, new, compact electrohydraulic actuators are smaller, cheaper and deliver more force in a smaller space than equivalent electrically driven ballscrews
- Permali has applied the actuators to automating safety nets for helicopter landing pads on ships, which they make and supply, building on their ability to mould difficult materials, particularly high performance composites
- The actuator is also used in truck and power boat applications and has also been used for opening hatches and doors, ambulance tilt beds, jack plates, mower deck lifts, hospital stretchers and ATV (All terrain vehicle) attachments

process valve control techniques, which can lead to reduced compressed air use through the adoption of on-actuator or in-actuator pneumatic solenoid valves.

At present, most pneumatically piloted valves on production and process lines centralise pneumatic control around valve islands in a control cabinet or enclosure. This arrangement means that the pipework carrying the pilot pressure to the actual valve from the valve island can travel for many metres before it reaches the valve head. As a result, the venting cycle of the valves operation will exhaust proportionately more air than is necessary.

Burkert's type 8690, 8691 and 8695 valve control heads, developed for use in the food, beverage and pharmaceutical industries, provide a decentralised method of opening and closing process valves automatically, eliminating the need for the wasteful venting of control air normally associated with pneumatic tubing between the process valve and its related control solenoid valve.

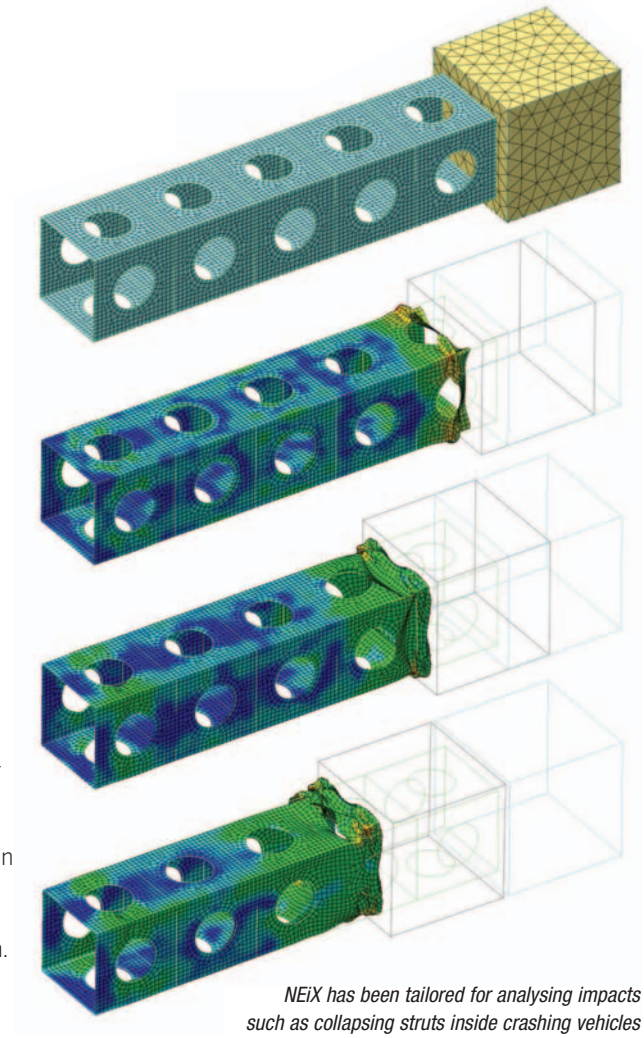


The control heads integrate electrical and pneumatic control components, as well as position feedback units and, optionally, field bus interfaces for AS-Interface or DeviceNet. They are mounted directly above the valve body, and, because there is little or no distance between the actuator and the valve that it is piloting, there is no air bleed: it is sealed. With this system, the pressure feed goes directly into the valve head and the control signal is supplied either from a local closed loop control sensor or switch, or from a PLC / machine controller via a control bus or multipole (parallel) directly into the valve.

www.smcpneumatics.co.uk
www.burkert.co.uk

Using analysis to gain a vital edge

Tom Shelley reports on some the benefits to be obtained by using advanced analysis, but cautions about the pitfalls.



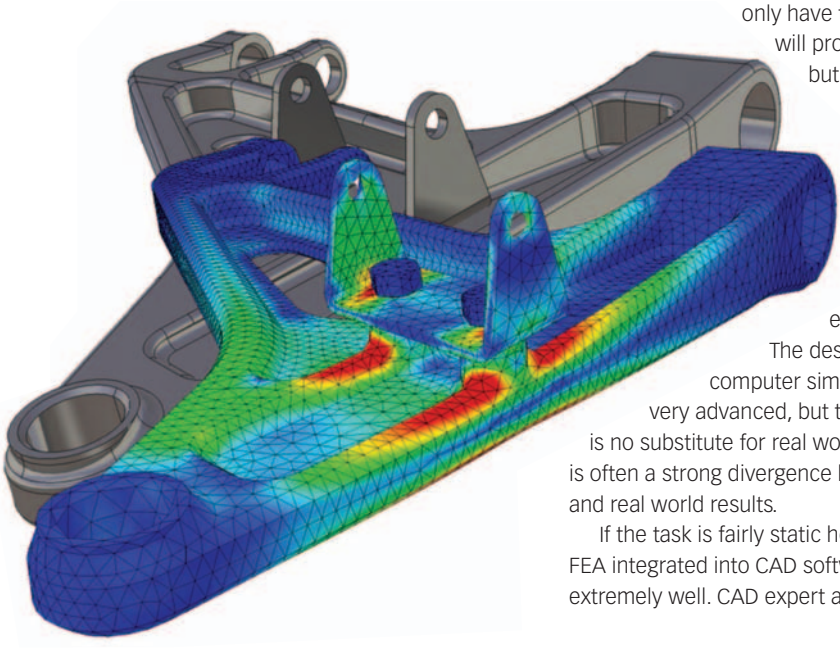
NEiX has been tailored for analysing impacts such as collapsing struts inside crashing vehicles

CAD analysis packages have an enormous potential to produce better designs and get them to market quicker, but it is still desirable to understand what they are actually doing. There also have to be practical tests to verify that what the software is predicting is reflected in the real world.

Take software to model impacts, for example. SSA, based in Leafield near Oxford, sells and uses a package called NEiX. Based on Nastran Finite Element Analysis, the software has been tailored by Noran Engineering, now NEi Software, for analysing impacts: collapsing struts inside crashing vehicles, and more violent impacts such as explosions inside containers and missiles striking armour plate.

The big problem with this and other kinds of computer modelling is that, while the mathematical modelling may be good, materials deformed at high strain rates do not behave like materials deformed on a tensile testing machine, and much is still being learned about the physics and metallurgy. In particular, metals deformed at high strain rates may become superplastic and deform easily, or strain hardening may increase making them harder to deform, or they become brittle because dislocations do not have time to move. Similarly, composites made up of different materials can be stronger or weaker at high strain rates, depending on many factors.

That does not mean that computer modelling is useless – far from it. But, as Jon Storey of SSA explains: "You always need to verify finite element analysis in some way." In the hands of engineers with expert knowledge, this is not a problem. "Initially", Storey noted, "finite element analysis was a very specialist world. Now you often only have to push a button. It will produce a solution, but it may not be meaningful. This is one of the dangers."



Designers and users of real world armour plate strongly endorse this view. The designers all use computer simulation, some of it very advanced, but they all insist there is no substitute for real world tests and there is often a strong divergence between predicted and real world results.

If the task is fairly static however, simplified FEA integrated into CAD software can work extremely well. CAD expert and trainer Elise Moss, for instance, used SolidWorks to greatly improve the design of the support system for solar photovoltaic modules for Solar Infra, working in conjunction with Sandia National Laboratories in Albuquerque. She says that many passive solar modules sold in California cannot be used within 5m to 20m of the coast, because of problems with salt water corrosion, while others cannot survive high winds or heavy snow fall.

She says that using SolidWorks, and with help from Sandia Labs, which was using SolidWorks Simulation, she was able to come up with an aluminium alloy support that would withstand winds of up to 800mph and 20 feet of snow. This module is now on sale in the US following the building of a pilot installation in South Africa. "In the course of the investigation," she says, "we also learned a lot about the differences between the types of

aluminium alloy and the lamination process to mount the cells. These incorporate thin copper conductors and have Mylar on one side and white plastic on their backs. The three layers are laminated together in a press and the Mylar melts. The end result is like a grilled cheese sandwich in a Panini press. Then the laminated cells go into the aluminium frame."

Thermal Analysis (ATH), to study problems similar to the design of the laminated structures of the photovoltaics is one of the capabilities now offered within the Simulia element of Release 20 of Dassault Système's V5 PLM platform. It allows the calculation of steady-state or transient temperature distributions in response to the direct heating of a surface, the flow of a liquid past a surface, or the specified temperature of the surface. Thermal material properties can be temperature dependent. When analysing assemblies, the thermal conductivity across the interface between contacting parts can be specified.

Another new capability is non-linear structural analysis (ANL). When ATH is used in conjunction with ANL, structural analyses can be undertaken that include the effects of temperature distributions calculated by ATH, which can cause parts to expand and contract and also affect their material properties.

ANL can model the effects of large displacements, allows the incorporation of yielding of metals and can accommodate the behaviour of inherently non-linear materials such as rubber. The software can also model plasticity using either isotropic hardening for general use or kinematic hardening for low-cycle fatigue studies.

The new software further enables the effect of multiple steps to be analysed, where parameters such as loading, restraints and contact conditions change from step to step. A typical example is a pressure vessel subject to bolt tightening, followed by internal pressurisation and thermal loading. A variety of connections can be modelled, including springs and welds as well as bolts. Other connections include: rigid connections, virtual parts, and nonlinear springs and dashpots.

A high-profile vindication of the benefits of modelling can be seen in the crushing victory of BMW Oracle Racing's yacht USA in February's America's Cup. The design successfully exploited computational fluid dynamics (CFD), even if it did use rather a lot of computing power.

The yacht had a wing instead of a main sail, which at 57m high was longer than that of an Airbus 380. BMW Oracle Racing's Mario Caponnetto said in an interview before the crucial races that, in a very short time, the optimisation work of the wing profile has been carried on with the Star-CCM+ CFD code by our partner CD-adapco and exploiting a remote supercomputing cluster.

"For us, it was very important that the CFD code was able to give indications on the wing behavior as far as stall is concerned. That behavior was later validated during sea trials. Furthermore, we created a database of optimal wing shape based on all the possibly encountered wind situations. The database is installed on board and allows optimising, at any moment, wing efficiency."

When asked to go into details, he said. "First of all, we exploited the 'client-server' architecture of the CD-adapco software. We could use a remote supercomputing cluster facility located in Italy. While sitting in our offices in Valencia or San Diego, we could check in real time the progress of the simulations running on the cluster. This happened thanks to a lightweight client, or if you like the final user, based on a Java interface, and a C++ server, or if you like the supercomputing cluster."

CFD is routinely used by designers of products from cars to domestic taps. Supercomputing clusters are not usually considered necessary.

www.ssanalysis.co.uk
www.nenastran.com
www.mossdesigns.com
www.solarinfra.com
www.solidworks.com
www.sandia.gov
www.3ds.com
www.bmworacleracing.com
www.cd-adapco.com

Design Pointers

- Advanced analytical modelling can be immensely useful, but can also produce erroneous results
- Problems can arise because of inexpert use, or underlying physical models that do not truly represent the behaviour of the materials under study
- In finite element analysis, this is a particular problem at high strain rates

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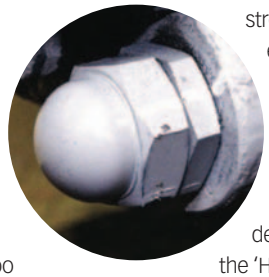
DESIGN BETTER PRODUCTS

The right track to secure fastening

Tom Shelley reports on the state of the art with regard to fasteners that resist extreme vibration yet which can be re-used repeatedly



There are now mechanical fasteners that can resist the most severe vibration forces, yet can be undone and replaced any number of times without loss of performance.

There is also a plethora of lock washers that work well, provided they are not re-used too many times. Unfortunately, there are an equally large number of fasteners that are said to resist vibration, but are not as effective as many believe.

Nuts and bolts have been coming undone ever since the start of the Industrial Revolution. At one time on the railways, there were gangers whose job it was to constantly patrol a length of track and look for loose bolts and other problems. In more recent times, such work has passed to maintenance companies. Unfortunately, traditional bolts and nuts, even with an additional half nut lock nut, cannot resist permanently the vibration forces of a set of points being struck repeatedly by steel wheels attached to several hundred tons of train travelling at 100mph or more.

In a recent investigation, it was found that maintenance engineers had deliberately damaged bolt threads with a chisel in a desperate attempt to stop nuts coming undone. However, even though such actions make it harder to undo nuts with a spanner, the unfastening torque is still much less than that applied by trains.

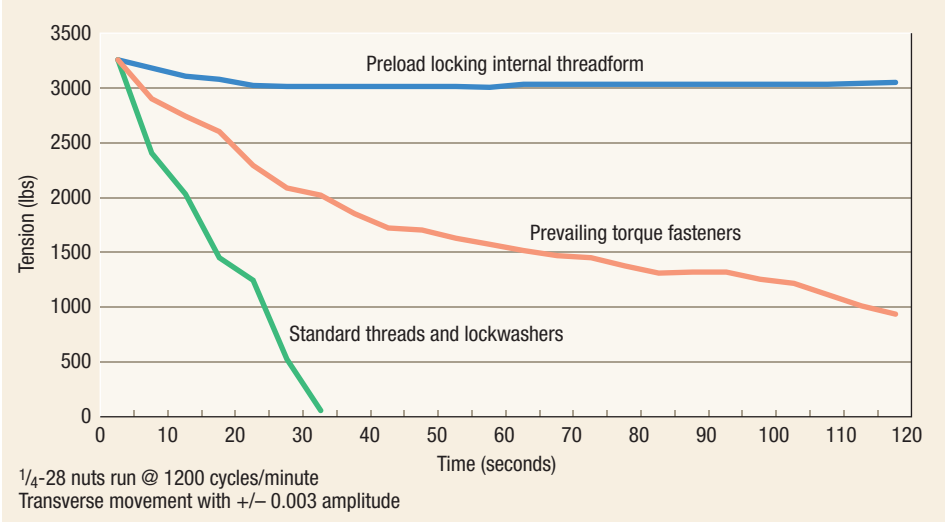
The solution that the British railway industry has now taken on board is a bolt and nut combination that was developed for the Japanese Railway industry 25 years ago and is exemplified by their application to a railway point stretcher bar proudly exhibited in the entrance hall of Staytite in High Wycombe.

David Cartledge, the company's director of sales, demonstrated how the 'Hard Lock' nut uses an eccentric cone on an inner nut that locks hard against a conical recess on the inside of an outer nut. If the inner nut starts to try to undo, the combination quickly wedges together even more firmly. Both nuts freely spin down the bolt until locked together. The outer nut includes a flange to prevent a socket being applied to the two nuts together. Hand tightening is enough to initiate the locking effect.

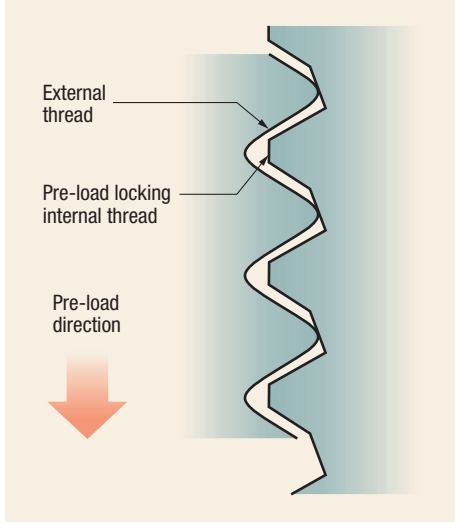
Cartledge also showed videos of performances of various fasteners on a Junkers Vibration test machine, which uses a load cell and two transverse moving plates clamped by the nut and bolt under test. An eccentric cam moves the plates relative to one another at 12.5Hz for a maximum of 120s, or 1500 cycles (some sources only test to 1000 cycles). The test is so aggressive that if the joint remains tight, bolts are likely to fatigue fail if they are cycled for longer periods, but it is an excellent test of a fastener's ability to withstand extreme vibration. Most bolt and locknut combinations fail to retain clamp load.

The Hard Lock retains more than 80% of its clamp load and endures that other popular vibration test, US National Aerospace Standard 3350. This test requires bolted joints to stay tight, despite being violently vibrated at 1780 cycles per minute for 17 minutes.

Another fastener system that Cartledge spoke of with glowing praise is the Nord-lock system which he described as 'working fantastically on a bolt in a hole'. This system uses two washers, each with inclined cams on one side, with an inclination greater than that of the screw thread



1/4-28 nuts run @ 1200 cycles/minute
Transverse movement with +/– 0.003 amplitude



and a series of radial teeth on the other. The washers are installed in pairs, cam face to cam face. When the bolt and/or nut is tightened, the teeth grip and lock the mating surfaces, and any rotation of the bolt or nut is blocked by the wedging action of the cams. When undone, there is a noticeable click as the cams disengage. The only problem for use on a nut and bolt combination, is that one needs to use two pairs, one under the bolt head and the other under the nut, which adds to cost.

The American Disc-Lock company offers a very similar looking product, except that it has a few ridges instead of a lot of teeth on the outsides of the washer combination. The same company also offers the Disc-lock locking nut, which its describes as 'the world's safest wheel nut'. This too uses a system of inclined cams. The two nut elements are attached to each other, with a tubular extension on one nut with a thread formed in it which is folded over to prevent the two parts coming apart. To remove it, the maker says that the spanner head or socket has to be placed over both nut elements.

Engineer's bodges with nuts and bolts have been taking place for years, but are generally a very bad idea. Nuts and bolts are designed to be tightened to torques that have been carefully calculated by the designers to give optimum results, even in the light of known imperfections in tightening equipment. Sarah Edmonds of Nord-Lock says: "The torque figures we quote are guidelines for a standard joint and represent the preload to achieve a point in the region of 75% of the yield of the bolt. Even the most accurate torque tightening equipment can have up to a 20% tolerance and therefore 75% is used to prevent any stretching of the bolt". The worst thing one can do, we are told, is to tighten to a proper torque and then give an extra quarter turn for good measure. This will stretch the bolt or wheel stud to the point where it will start to yield, very likely initiating a crack that will grow under fatigue loading, especially with salt on the road, where corrosion is enhanced at the growing crack tip.

This assumes, however, that the bolt or stud is of good material. Cartledge observed: "The bolt should always be stronger than the nut. The locking quality of the bolt depends on the thread of the bolt."

But what of all the nuts with deformed slits and/or cuts or internal teeth that are sold as anti vibration nuts? Knowing that Staytite makes its own anti vibration nut with a stainless steel insert with two teeth, Cartledge was asked for an opinion. He said that they all lose more than 90% of their clamp load in the Junkers test, but are bought on the principle that if it's hard to get it on, it should not come off. Having said that, none of them should unscrew completely, unless the vibrating bolted surface continues to press against the nut. Staytite nuts have long been used on Triumph motorcycles and by Ford.

This leaves serrated washers, nuts with nylon inserts and Spiralock's thread form. Serrated washers all work to some extent, although some of them do quite a lot of damage to mating surfaces. One good example of this type is the serrated family of Bellville washers sold by International Engineering Company. These incorporate an inherent spring force to keep them in contact.

Nylon insert nuts, when tested on the Junkers machine, retain about 20% of their initial clamp torque because of the effects of vibration induced heat in the plastic insert which moulds it into the threads. Plastic insert nuts should, however, only be used once.

Spiralock's technology, on the other hand, properly known as the Preload Locking Internal Thread Form, does work as claimed. It uses a female thread in which the bottom of the 60° Vee shape is truncated by a ramp. The combination of tension distributed along the length of the bolt, the elimination of the gap between bolt and nut threads and the ramp significant increases resistance to fastened joint loosening. It is much loved by NASA and said to be key to the reusability of the Space Shuttle engines.

www.staytite.com
www.nord-lock.com
www.disc-lock.com
www.iecltd.co.uk
www.spiralock.com

Design Pointers

- Reliable, re-usable fasteners do exist that can resist the most severe vibration tests
- Eccentric and inclined cams work well as do Spiralocks' thread form. Other solutions are less effective but may well be adequate for less demanding applications
- Tightening to maker's recommended torques is essential.
- Specialist software is available to help ensure optimum performance of conventional nuts and bolts. For information on unconventional designs, independent advice and mechanical testing is still crucial.

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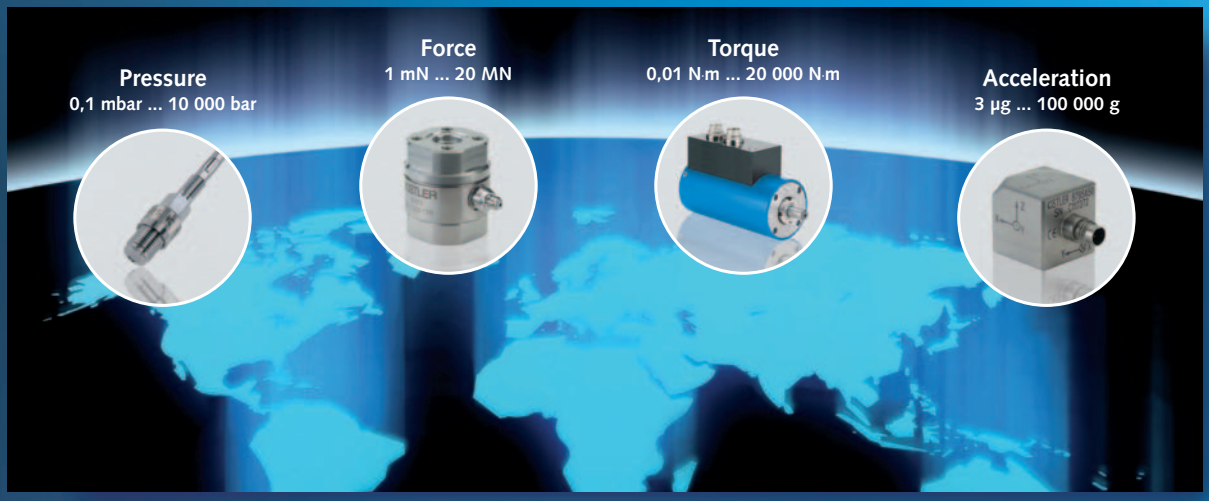

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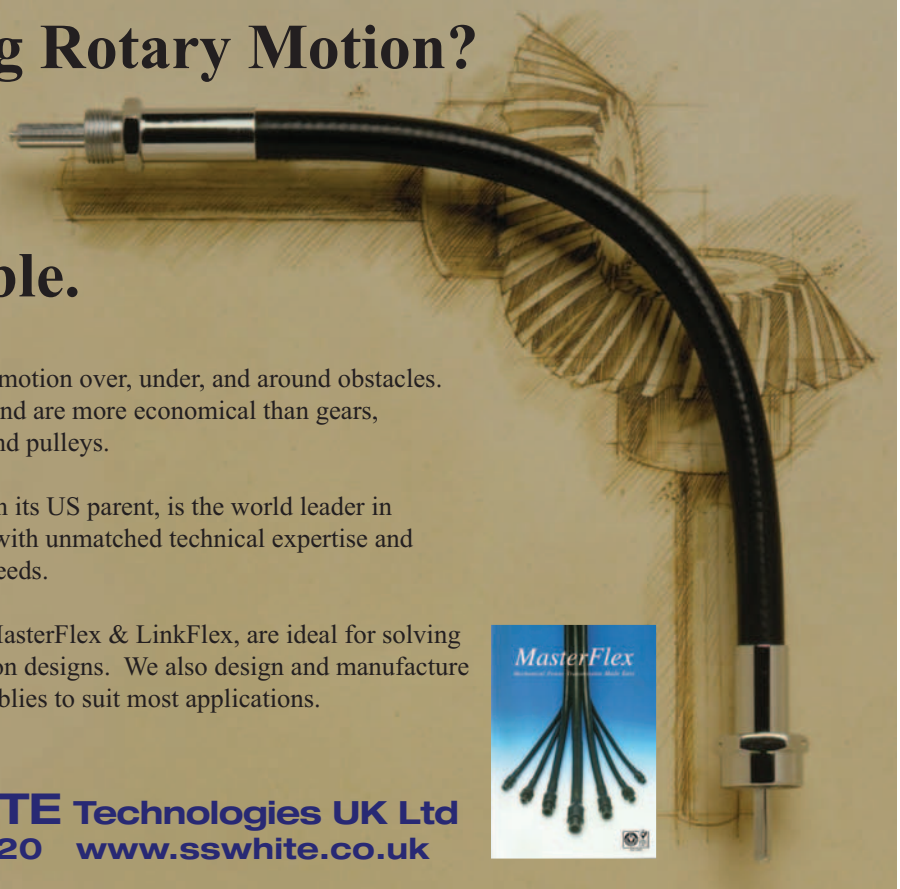

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Design in the spotlight at PDM10

Taking place from 18 to 21 May, the Plastics Design & Moulding conference and exhibition promises a range of attractions for visitors.

Major names from the plastics design and moulding community will be exhibiting at the Plastics Design & Moulding (PDM10) conference and exhibition, which takes place at the Telford International Centre from 18 to 20 May 2010.

Big name manufacturers of machinery equipment taking a stand at the show include Engel and Telsonic, while polymer suppliers confirming their presence include Distrupol, Ultra Polymers, Bayer UK, 4Plas, Luxus and ICO Polymers and many more.

"This year's PDM event is being supported by some of the country's biggest names in plastics manufacture, with a wealth of innovative technologies and techniques to unveil," said Steve Crowhurst, event director. "Our theme of New Knowledge, New Business is evident in the strength of our exhibitor line-up and the depth of our three-day conference programme. The event is already set to deliver invaluable insights and business opportunities to all the design and moulding professionals visiting the event."

Representatives from every part of the UK plastics design and moulding sector will be at at PDM10. Exhibitors include suppliers of injection moulding machinery, rotational moulding machinery, blow moulding machinery and ancillary equipment as well as automation companies, mouldmakers, polymer producers, compounders, polymer distributors, masterbatch and additive suppliers, software companies, materials testing specialists, moulders, rapid prototyping companies, design companies and other industry services.

Telsonic will be showing its USP750 Ultrasonic Welding System at PDM 2010

In addition, the exhibition will feature a strong conference programme addressing topics including 'Plastic Electronics', 'Process Optimisation', 'Plastics in Medical Devices' and 'Advanced Processing'. The conference programme will also include a debate on each day of the conference. Covering the subjects 'Moulding Business', 'Design' and 'Technology and Innovation', these debates will each be preceded by a keynote address from a senior industry figure.

Sir Richard Needham, international and commercial director at Dyson, will open the conference on Tuesday 18 May with his keynote to the event's Moulding Business Debate. His address will offer ideas about how to compete effectively in a global market, drawing on his extensive experience at Dyson, where he headed up the company's move to manufacture in China.

Professor Martin Darbyshire, CEO of the internationally renowned design consultancy Tangerine will lead the debate on Sustainable Product Design on Wednesday 19 May. He will highlight the growing importance of sustainability and how its integration into the product design process offers increased opportunities for plastics designers. He will also examine the crucial role sustainable product design will have in shaping the behaviour of tomorrow's consumer s to live in a more resource-friendly manner.

Lord Bhattacharyya, founder and director of internationally renowned WMG (formerly the Warwick Manufacturing Group), is to be keynote speaker at the Innovations Debate on the event's final day, Thursday 20 May. Drawing on his worldwide experiences, he will advocate that continuous change and innovation is essential for UK plastics design and manufacture to maintain competitiveness on a global stage. He will use the technological successes of Warwick Manufacturing Group by way of illustration.

www.pdmevent.com

www.beeas.co.uk

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READER INTERVIEW

60 SECOND

Andrew Breeze
Mechanical Design Engineer
Tracerco

Q How did you first get into the engineering industry?

A I just liked tinkering at first. I was always a hands-on, practical sort of a lad. I started off as a mechanical draughtsperson doing an apprenticeship when I was 16 or 17 and then just moved up the ranks, eventually getting into mechanical engineering itself.

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

A It's the mechanical design of instrumentation equipment. Basically it's instrumentation whereby we use electronics and radiation and put them inside of dip pipes for want of a better term and I do the mechanical work in and around that. I've been here probably just gone eight years.

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

A I'm not really at liberty to say, I'm afraid, but it's predominantly work for the oil and gas industry.

Q What is the most interesting project or piece of engineering that you've been involved in?

A I used to do quite a lot for the steel industry in days gone by. It's probably not the most technically complicated, but water cooling systems for the steel industry were always a bit of a challenge, especially when you were seeing a design all the way through from the design through to the actual plant shutdown installation works.

It was good to see everything from every angle. From the operator's angle right the way through to seeing design go in, seeing what problems might have occurred or what you could have avoided and applying that to future learning.

Q Has the industry changed a great deal since you joined?

A It's become a lot more red tape these days in a nutshell. Whereas you could just get on with your engineering in days gone by, there's a lot more paperwork and documentation these days. All provoked by insurance and covering oneself, shall we say?

It can be a little frustrating. It can sometimes put you off putting a design forward just because you know the knock-on implications in terms of red tape and paperwork that it might have. And so you'll sometimes make something simpler – albeit simple ideas tend to be the best ones – but you might simplify something in a bad way from an engineering stance in order to fulfil requirements from a hassle-free and political standpoint.

Q What are the big issues facing your industry?

A Within the UK it's shortage of engineers right across the field: every discipline; young and old. People are retiring and not enough new faces are coming into the industry.

I've seen it happening over the last 10 to 15 years and it's obviously becoming worse these days. And the people you do have left … well you're not spoiled for choice, to put it politely.

Some of them aren't as dedicated as they might have been in days gone by. If you haven't got so much competition, you can get away with being a bit more lackadaisical, whereas if you've got competition for a job, you've got to be a lot more alert and switched on.

Q How do you see the industry going forward?

A If we keep muddling along at this rate, more work will go abroad as they've got cheaper labour from design all the way to shopfloor. More work will go abroad as they pinch our ideas and use them to build their own economy. So in the short term, the work will disappear. Now whether the quality will disappear with it is another matter. But I do believe a lot more work will disappear overseas.

Q What still excites you about engineering?

A The challenge. Some of the work you do day to day can be a bit repetitive, but when you do get that odd challenge that stimulates the old grey matter and come up with a solution, that floats my boat.

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

Keeping it in the bag

How do you ensure that what you put into a bag doesn't fall out when it is the wrong way up?

The only problem with bags is that users have to keep them the right way up, if nothing is to fall out of them.

One can, of course, close or seal the top of the bag, but this may not be the ideal way of looking after what is inside. In addition, to access what is inside the bag, one then needs to open it, and then close or reseal it. This can only be done a limited number of times. If the bag is sealed, then of course, it can usually only be sealed and unsealed once. Repeating the process usually results in the seal not being a proper seal any more.

The dilemma is a particular problem for supermarkets that sell fruit. Shoppers like their fruit to be in an open bag. They are closer to it and can see more clearly what state it is in. Sealed in a closed bag with moisture, there is also a tendency for the fruit to rot more quickly, unless it is in an inert atmosphere. It must also then be marked with a sell by date.

The problem with fruit in open bags, particularly small fruits like cherries and strawberries, is that some of them manage to end up on the supermarket floor where they get trodden on, making a mess and forming a squishy patch on which somebody can slip.

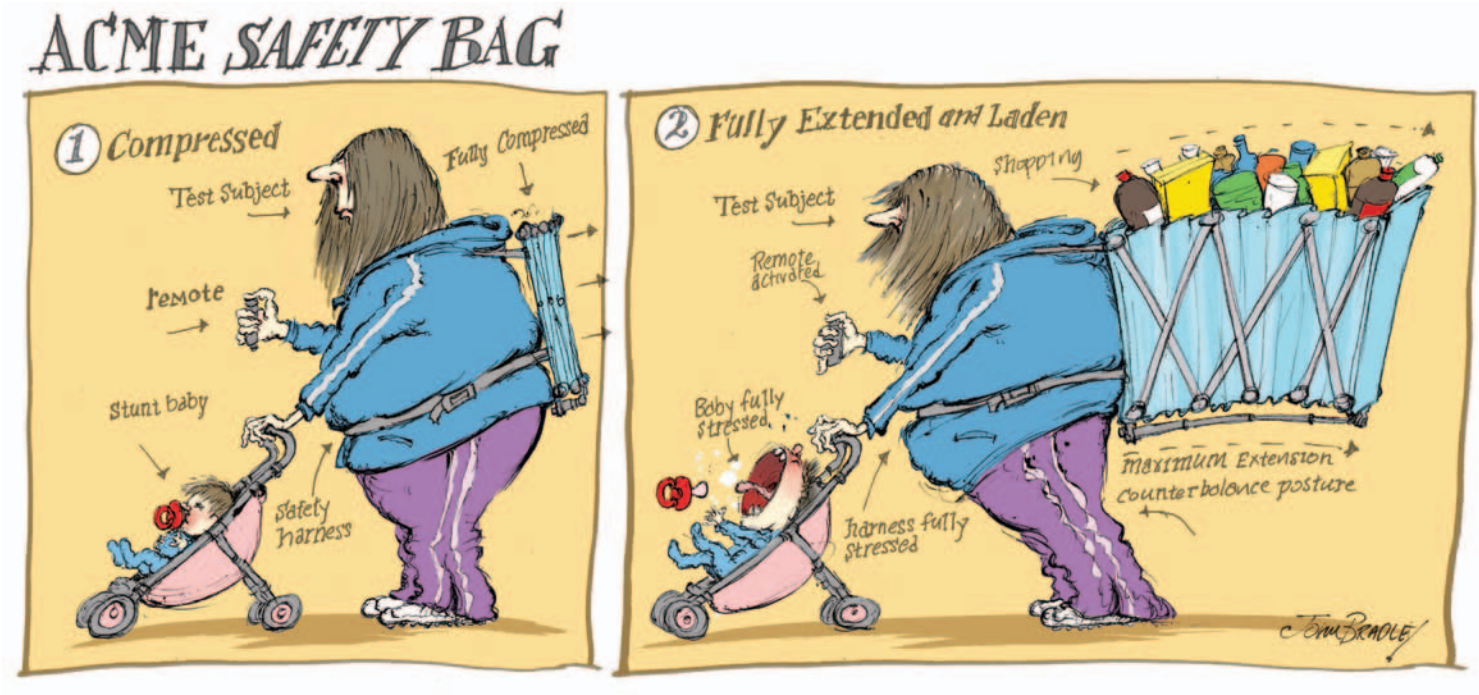
There are also numerous other applications where it is undesirable for objects to fall out of bags, whether they are bags or shopping, bags containing children's toys, or spare parts to be carried to a job where they are to be fitted.

The Challenge

Our challenge this month, therefore, is to design a smart bag that contains whatever is inside it in such a way that it is easily accessible when required, but otherwise cannot release the contents if it happens to be tipped sideways or be turned upside down.

The obvious solution is a box with a good catch, and preferably a lock. This is, however, overkill. The solution we will offer next month is much simpler, and costs so little that even the most cost-conscious supermarket buyers should not object. To intrigue you, we can tell you that if you see it, you will at first think it cannot work, but it does, and has been extensively tested. See if you can come up with anything better.

The answer to last month's Coffee Time Challenge, how to design a sensor that can be read in all conditions and situations, can be found in our Technology briefs section on page 9



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Eco-Innovation Project Managers (Sustainable Design/ Manufacturing)

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

C-Tech Innovation is one of the UK's leading specialist research and technology development companies and has significant experience delivering programmes of eco-innovation business support.

They are looking to recruit two additional Project Managers to the Eco-Innovate team. The first will be an experienced Project Manager with the skills and knowledge to deliver the programme to clients. The second role is for a Graduate with a related degree and the ability to develop into the Project Managers role within a short time period. (The salary for this role will reflect experience and ability)

The successful candidates will have relevant experience in the following areas:

- Sustainable Manufacturing;
- Product Development
- Design for Sustainability;
- Re-use of Products;
- Recovery of Components of High Value;
- Recycling of Materials;
- Development of infrastructure and technology to improve resource efficiency;
- The principles of Environmental Management Systems and life cycle assessment.

This is not an exhaustive list and candidates will typically specialise in one or more areas and in one or more industries.

Both roles will be offered on a two year contract basis initially and it is anticipated that these will be renewed as further programmes commence.

For full details and to apply for this job go to www.EurekaJobs.co.uk and type in reference: 324580

SCADA/PLC TECHNICIAN (m/f)

Location: Europe (Non UK) Salary: £ 27,000 - £ 32,600 per annum

The Institut Laue-Langevin (ILL), situated in Grenoble, France, and founded by France, Germany and the United Kingdom, is Europe's leading research facility for fundamental research using neutrons. The ILL operates the brightest neutron source in the world. The Reactor Division, whose role is to produce the neutrons needed to supply the ILL's scientific instruments, is responsible for operating all the technical installations associated with the reactor.

The Reactor Division currently has a vacancy for a:

SCADA/PLC TECHNICIAN (m/f)

As a member of the "Autonomous installations/experiments" group within the Electricity and Electronics Service, you will be involved in the maintenance, modification, development and management of:

The automation/process control systems associated with the operation of the reactor and the scientific instruments, the safety systems associated with the experiments, the data acquisition servers and the SCADA applications and Ethernet networks associated with reactor operation.

In particular, you will be responsible for modifications and upgrades to the SCADA applications and the Ethernet networks between the programmable logic controllers, the data acquisition servers and the digital Human Machine Interfaces.

You must have a BTEC HNC/HND in Electrical & Electronic Engineering or equivalent relevant qualification and several years' professional experience of industrial computing / automation.

For full details and to apply for this job go to www.EurekaJobs.co.uk and type in reference: 324860

Adhesives

www.loctitesolutions.com

Radically improved instant adhesive

Loctite 3090 is a new two-part cyanoacrylate that increases the versatility of instant adhesives. Alongside the traditional benefits, 3090 allows any exposed adhesive outside of the joint to harden within minutes – removing the need for a post-assembly activator. In addition, gap sizes up to 5mm can be readily accommodated and the gel viscosity means it is suitable for vertical or overhead application.

It can be used on plastic, rubber, wood, stone, leather, fabric or metal and can withstand a force of 20N/mm². 3090 comes in a pack containing a dual syringe with seven mixer nozzles.

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WS2 Stops galling of SS and Titanium

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

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

Design Out maintenance problems with WS2!

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Coiled Spring Pins

www.spirol.com

Spirol coiled spring pins provide spray bottle solution

A manufacturer of moulded plastic spray bottle nozzles needed a way to make the adjustable spray tip tamper proof and prevent users applying too much or little solution. Spirol Industries came up with a solution involving pinning the nozzle in position. The nozzle caps arrive to the Spirol's Model PR Pin Inserter pre-adjusted for the proper piercing location. The operator loads the components into the fixture and activates the machine. The pin is installed, the machine retracts and resets. No machine adjustments are required during installation. Due to the rotational resistance provided by the pin, the end user cannot adjust the spray volume in the final assembly – making it tamper proof.

@: uksales@spirol.com
✆: 01536 444800

Drives Monitoring

www.abb.co.uk/energy

ABB drives show how much energy they are saving

Users of ABB industrial drives and ABB standard drives can now see exactly how much energy they are saving with a new application that displays the information on the drive's screen.

The drives' built-in energy efficiency parameters work out energy savings of the application in kWh and MWh; the cost of the energy saved in a local currency; and the carbon dioxide (CO2) emissions equivalent of the energy saved.

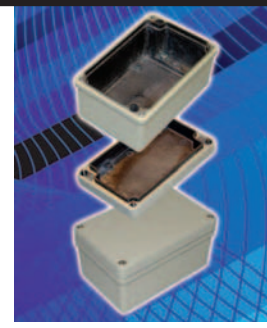
All these energy related measurements are displayed through the control panel's alphanumeric display and can be accessed by pressing a combination of the soft keys.

@: energy@gb.abb.com
✆: 01925 741 111

Enclosures

www.rolec-enclosures.co.uk

IP66 Diecast Enclosures with In-Built EMC Shielding



ROLEC conFORM enclosures have EMC contact fingers cast into the lid and base sections as standard. This gives a high degree of RFI/EMI shielding without the need for expensive and fragile EMC gaskets. This intelligent design solution provides high performance protection for the electronic systems at a much lower cost. conFORM aluminium enclosures are available in 14 sizes from 79 x 84 x 44mm to 268 x 168 x 100mm. IP67 gaskets can also be specified.

To learn more visit:
www.rolec-enclosures.co.uk/conform

@: sales@rolec-enclosures.co.uk
✆: 01489 583858

Flowmeters

www.flowmeters.co.uk

Titan's Breakthrough in Small Bore Flow Metering

Titan Enterprises have championed a breakthrough product, set to be launched at this year's Mtec event.

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

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

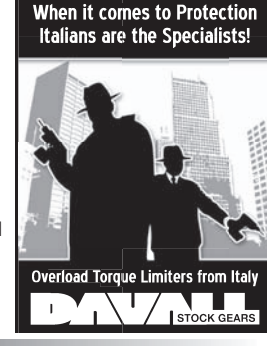
@: sales@flowmeters.co.uk
✆: 01935 812790

Gears

www.davall.co.uk

We talk the torque, you work the work, safely

Davall Stock Gears introduce a series of overload protection devices. Two styles of unit, a simple, low cost, slip at overload, or the more sensitive, positive disengagement, both styles to provide the end user with machine protection. Both series rely on the careful selection of high quality materials to ensure consistent and repetitive performance.



@: dsg@davall.co.uk
✆: 01707 283131

Imaging

www.stemmer-imaging.co.uk

Allied Vision's Prosilica GX-Series, available from Stemmer Imaging, uses Link Aggregation technology to achieve a data-transmission rate of 240MB/sec.

Link Aggregation, or IEEE 802.3ad, is a networking technology that uses multiple Ethernet ports in parallel to increase the link speed beyond the limits of a single port.

The GX3300 completes the range with eight megapixel resolution at 15fps.

Applications include machine vision, high-speed industrial inspection, avionics, traffic monitoring, licence-plate reading (ANPR), public security, intelligent transportation systems (ITS), character recognition, robotics and surveillance.

New for the GX series are video auto-iris control and three-axis motorised lens control.

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✆: 01252 780000

Laser Marking

www.laserlines.co.uk

Laser Marking Polypropylene Pipe

Laser Lines offers the Synrad laser marking system which is excellent for marking manufacturing data on 2-inch nominal O.D. UV resistant polypropylene pipe. On this example the mark file covers an area measuring 19.1 mm by 292.1 mm and consists of manufacturing data including company name and location (using a custom TrueType® font), logo, and patent/part numbers. The company name/location text object measures 14.2 mm high while the smallest part number text measures 6.1 mm high. The logo measures 19.3 mm high by 19.8 mm wide. measures 19.3 mm high by 19.8 mm wide (0.76" x 0.78").

At a power level of 80 watts, the engraved marks were achieved with good contrast at a Velocity of 305 millimetres per second in a cycle time of 8.69 seconds per mark.

@: garyb@laserlines.co.uk
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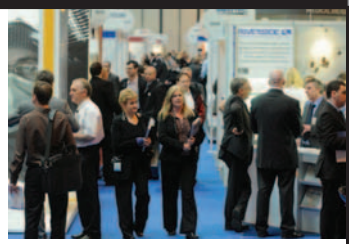

Visitor registration is now open to this year's MEDTEC UK (Birmingham NEC, 27-28 April), the UK's premier medical device manufacturing forum that provides design and manufacturing professionals with the annual showcase of the leading suppliers of raw materials and the latest manufacturing, automation technology and outsourcing technologies and tools that will help them make/retain their world-class status. Also featuring the renowned MEDTEC Conference and the new Medical Device Innovation and Technology Forum.

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✆: 01803 862553

Pressure & Temperature Measurement

www.wika.co.uk

New pressure transmitter P-30 Precise, fast - and compact!

"Three-in-one" solution for high expectations

When using pressure transmitters for precision measurements, users often had to compromise depending on the priority of the requirements. The new P-30 from WIKA now combines the three most important characteristics of its instrument category is highly precise, very fast and at the same time very compact.

For the development of this new pressure transmitter, WIKA looked at the requirements of engine test bench technology in the automotive sector. In these test benches, a quick data acquisition and analysis plays a more and more important role in the tests for optimising the power trains. The used measuring instruments must therefore fulfil high demands with regard to accuracy and measuring rate.

@: info@wika.co.uk
✆: 01737 644008

Sensors

www.pi.ws

Piezo Ceramic Linear Actuators

Piezo ceramic linear actuators from PI are used in a wide range of industrial applications where precise positioning or dynamic position control is required. Typical applications include vibration generation, vibration control, the alignment of optical components and the position adjustment of very high loads. Usually manufactured as a stack with multiple ceramic layers the actuators can be supplied incorporated into a lever assembly to give up to 1.5mm of travel. Blocking force can be as high as 70kN and in dynamic operation drive frequencies of up to 10kHz are possible. Drive electronics with position control capability are also available.

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Sensors/Switches

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New microwave barrier switch from VEGA.

The microwave barrier VEGA'MIP' (Microwave Impulse Point-level) is especially designed for the bulk solids industry. As this is a non-contact measurement, VEGAMIP 61 has no direct contact with the medium. This provides reliability for abrasive, aggressive or high temperature applications. In such cases VEGAMIP can measure from the outside through a microwave permeable window, e.g. in ceramic, glass or plastic material. It can also be applied to liquid level detection or object detection, such as truck positioning and on conveyors etc. and operates consistently with dirt, dust or build up.
Ranges are up to 100m.

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cube67+ – THE PLUS FOR ADDED FLEXIBILITY

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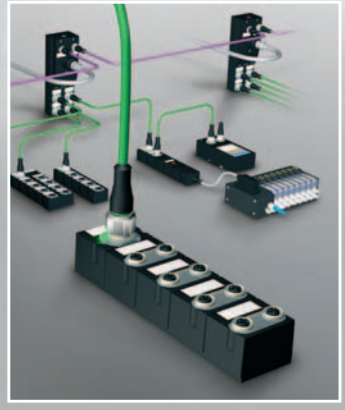
The innovative multi-protocol fieldbus system from Murrelektronik, which has radically simplified and modernized decentralized installation has taken a step further with a plus.

The single bus node can support up to 20 I/O modules in a 30m circumference and with a reduced number of cables. The range of I/O modules continues to grow and includes digital and analogue ports, safe outputs, logic, counter, valve island, temperature, I/O link etc. Both IP67 or IP20 are available.

Cube67+ : a truly flexible system.

- **More options**
- **More flexibility**
- **More distance**
- **More performance**



Cube67 – the modular bus system

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