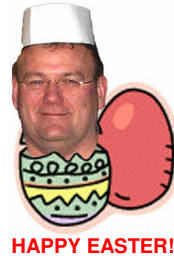


eMech

IMechE West Cumbria e-Newsletter
Edition 9, Easter 2004



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EDITORIAL

There is a prize to anyone who can answer the question – where does all the time go? It doesn't seem that long since our last **eMech**, but sooooooooooooo much has happened...

So, apologies for not having got this out sooner, but here (at last) are the collected ramblings of events from December to March as well as looking forward to the last events in another remarkably successful year for IMechE West Cumbria.

NEW COMMITTEE

Painless, wasn't it? For anyone who hung on after the QM2 'virtual presentation' in Carlisle, we elected a new committee to keep the momentum going of the past few years and get even more engineering excitement into West Cumbria (who writes this rubbish...?) If anyone wants to know, see the new [Contact](#) list below, but ANYONE is welcome to attend any committee meeting and PARTICULARLY to bring forward any ideas for things to do in the future – especially in the Carlisle area.

SCHOOLS ALL AT S.E.A.

A wonderful first event for a number of our SEAs (Science & Engineering Ambassadors) was held at the Lakes College, Workington recently. Eight primary schools brought some of their Year 5 & 6 students to wrestle with a number of engineering-related projects, from building an electric car/boat/plane, ball-launcher to a scale model of the structure in the Eden Project – a brilliant time was had by all, and a **further event is now being scheduled for July**. If anyone wants to become a SEA, [please contact](#) any of the Committee and we can organise the necessary training and CRB clearance through SETPoint – it's another great line to put on your CV!!!



Don't speak to strange men, children...

COMING NEXT!!!

April 23rd – Adrian's Awayday to Nissan, Sunderland – FULLY BOOKED!!! Watch out for an in-depth report on the karaoke sessions on the coach. Oh, yes... we're also going to look round the most productive car plant in Europe!

May 12th – Carrs Mill visit, Silloth – Hurry, hurry, only limited places on this visit too... Call [David Williamson](#) NOW (01946 776214) to book your spot!

NEW SEASON

What a season is being lined for 2004/5 - we have some cracking events being pinned down, including:

- **STARCHASER** – we're going to let a rocket off in September!
- **PEPPERCORN** – 21st Century Steam technology to rescue our railways
- **M-SPORT** – A visit to the world-class Rally preparation facility at Dovenby

Full details in the next **eMech**!!!

THE NEW SUPER INSTITUTION..

What does anyone think..? Will we ever be able to come together as a whole profession to raise our status in society? (Or is it just those pesky Electricals wanting total domination as ever...) Please [email](#) your views – we want to keep this raised through our Region if we want to make any sort of progress. *(NB – the line about the Electricals is a JOKE intended to provoke reaction...)*

JOKE d'ENGINEER...

Three engineering students were sitting around talking between classes, when one brought up the question of who designed the human body.

One of the students insisted that the human body must have been designed by an electrical engineer because of the perfection of the nerves and synapses.

Another disagreed, and exclaimed that it had to have been a mechanical engineer who designed the human body. The system of levers and pulleys is ingenious.

"No," the third student said "you're both wrong. A civil engineer designed the human body. Who else would have put a toxic waste pipe through a recreation area?"

A JOLLY GOOD FELLOW!

And finally, for those who weren't at the AGM, many congratulations to our Chairman, Ron Graham, who not only is a jolly good fellow, but the IMechE think so as well, having elected him as a Fellow! An inspiration for us all – and getting involved in t'Committee will do you no harm at all!!

*Please don't forget - feel free to forward **eMech** to anyone else (with their permission!) or get them to drop their [email address to me](#) so we can keep in touch. Also... if you find you do NOT want to be emailed with **eMech**, please email [the Editor](#) with **Unsubscribe** as the subject and we will happily remove you from the mailing list.*

**A VERY HAPPY EASTER TO ALL READERS - hope to see you
at an IMechE West Cumbria event soon!!**

Editor: [Chris George](#), Publicity Officer, IMechE West Cumbria
Tel (Work): 01946 811771

Disclaimer: Any mistakes are those of the Editor alone. Under no circumstances is the Chair responsible...

1. SAVING MONEY, MINIMISING WASTE

New BS Standard helps SMEs progress to ISO 14000 accreditation

The December presentation at the Grove Court in Cleator was great, especially for a small/medium company like mine. If you weren't there, you missed out...!! Here's what I learnt:

- How to identify savings of up to 10% of my company's energy bill
- How to get FREE support and training to reach level 3 of the new British Standard BS8555
- How BS8555 gives my company a staged, progressive and highly practical route to achieving full ISO14000 accreditation
- How modern variable speed air compressors can slash running costs
- What nice salesmen Atlas Copco have..

You see, it pays to attend IMechE Presentations...

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2. ENGINEERING AN ICON

Inspirational Engineering combines High Art and Technical Audacity

The Millennium Bridge at Gateshead has already become a much loved and admired icon of our times, another world-class example of integrated engineering excellence, right here in the North (OK – east instead of west..)

We were highly fortunate to have Phil Snowsill, the senior design engineer from AK Heavy Engineering, to enlighten us on how it all came together, how it works and some of the engineering challenges that faced the design team.

Another packed house at the Rosehill Barn heard Phil describe how the concept originated, as a piece of public art to link the wonderful quayside developments at Gateshead (the Baltic and new Sage Centres) to the equally impressive redevelopments on the Newcastle quay front.

The statistics were impressive – 105m span, 850 tonnes, 18mm/sec controlled opening speed to give 25m full headroom thanks to the unique and beautiful double arch 'Blinking Eye' design – could it have been done before the age of computer aided design and stress engineering?

Perhaps some of the most startling facts to emerge were how sensitive the structure is to twist – only 0.19 degrees of twist is allowed, amounting to 20mm out of synchronisation, before permanent set would occur. Shortly after that, a catastrophic structural failure would occur...

The control and synchronisation of the two sets of massive rams on either side of the river was obviously a key aspect in the success of the enterprise, and Phil described the required performance standards: designating one side as the Master, the other rams had to move within +/- 4mm to obviate twist. In actual practice, Phil quoted an astonishing working figure of +/-0.25mm.

This has been achieved using an ingenious Ceramic Integrated Measuring System (CIMS) whereby a fine pattern etched in the steel ram is overlaid by a ceramic coating to provide the main sealing surface. Sensors detect the movement of the pattern in the master cylinder and send out a control pulse to the other systems to ensure an overall average value is taken and applied. A special data cable had to be laid across the Tyne to relay the information to the other side. Needless to say, there was an intense study of all possible failure modes to ensure the absolute guarantee of safety and reliability.

The fabled low operating costs were also mentioned - £3.75 to open the bridge, thanks to the terrific balance and engineering thinking built in to this most aesthetically pleasing and inspirational structure.

As a result of the huge success and admiration heaped on the Gateshead Millennium Bridge, AK Heavy Engineering have now opened a whole new portfolio of projects, never having previously

been involved in such work, and there a further wonderful bridges to be found, particularly in London – the Paddington Helical Screw, the Canary Wharf Swinging footbridge.

I just feel so pleased as a latent Northerner (my Mother was from Yorkshire!) that we got the 'Blinking Eye' and London got the wobbly 'Streak of Light' by the Tate Modern..

We were particularly delighted to see a strong contingent from St Bees enjoy this most excellent example of engineering inspiration.



Phil Snowsill is overwhelmed at receiving not only the 'History of the IMechE' but also a goodie bag from Hon. Treas., Mike Edie

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3. GENESIS OF A QUEEN

Exceptional presentation links Blue Peter to the remarkable new Queen Mary 2

Alon was worried. Well, it was the first event he had organised for IMechE West Cumbria, and then the speaker announced that he couldn't make it... But... He would send a presentation and get someone else to come down from Scotland just in case.. The disk almost didn't arrive, but Jimmy Rae from Glasgow did, clutching a backup CD.

What we got was one of the most brilliant presentations yet in our long line of successes here in West Cumbria. In the raked lecture theatre at Carlisle College, the PowerPoint presentation put together by Stephen Payne worked marvellously, only causing a few nervous moments as it paused to load occasional video clips or gather further commentary (it was PowerPoint plus Stephen's calm, understated commentary)

Stephen Payne revealed himself to be an absolute star, tracing his interest in ships right back to being enthralled by the Blue Peter coverage of the building and launch of the Queen Elizabeth 2 in the late 60s. A couple of years later, Stephen got the chance to go onboard when a family holiday to the south coast happened to coincide with an open day aboard the luxury liner.

Stephen's passion was contained in a remarkable letter that he wrote to Blue Peter after the launch – the programme had suggested that there would never be another liner built like the QE2. Stephen wrote in to disagree, and for his trouble was rewarded with a much-prized Blue Peter badge. Who would have thought that some 30 years further on, Stephen would be given the chance to prove Blue Peter wrong?

Stephen followed a path driven by his passion to become a naval architect, and became engrossed in the differences between the modern cruise ships and the ocean liners of the 20th century. Speed, stamina and comfort were obvious differences, but he was selected by the Chairman of the Carnival Corporation to be the man to design and build the most remarkable ocean liner so far built – Queen Mary 2.

It is impossible to cover the depth and detail presented by Stephen, but he gave us a terrific insight into how you turn a blank sheet of paper into an ocean liner:

It was to be the largest liner possible, based on the economics of scale (providing it can be filled – something Carnival Corporation are very good at!) Length was determined by the limits of manoeuvrable turning circle in the main ports of operation, height was dictated by needing to get the liner under a particular bridge in North America, width (a limitation in design for QE2 to allow it to pass through the Panama Canal) was not a restriction.

Stephen scoured the previous generations of liners to find the best features and incorporated them into QM2 – the wave-piercing bow of QE2, the snowplough to protect the foredecks, the raked afterdecks for streamlined open-air comfort. Wonderfully, Stephen even incorporated one of the original steam sirens salvaged from the original Queen Mary. Typical of his homage to the past, even though it is now operated by compressed air, Stephen has incorporated a steam injector so that the horn still emits the traditional vapour trail when sounded.

It is not enough just to draw flowing lines on paper (or in a computer memory bank..) This liner had to be built, and sadly for the UK, the best shipyard to handle such a monstrous task was in St Nazaire. To achieve an economic build in a simply astounding time scale, the liner was designed in 92 separate modules, each of around 600 tonnes. The modules were prefabricated to remarkable standards of precision and then hoisted into position for welding onto the main structure, just like some sort of enormous Lego system. The logistics of achieving this must have been amazing, but the facts speak for themselves: from laying the keel, it took just 15 months before the vessel floated – absolutely astounding, a tribute not only to the management and organisation of the shipyard, but also a remarkable credit to the design team led by Stephen Payne.

After launch came the sea trials – would it work..? QM2 has exceeded expectation, effortlessly cruising at 30 knots with virtually no vibration levels evident – true luxury. The propulsion system uses four gigantic electric motors slung under the vessel in pods, each one weighing as much as a jumbo jet at takeoff.... And two of them rotate to give QM2 one of the greatest levels of manoeuvrability ever seen on any boat (a great shot of QM2 pulling a tight ‘handbrake turn’ was shown!)

The interior fittings are just awesome, with more than just a nod to the opulent class-driven standards of yesteryear. But on QM2, **every** passenger can enjoy this luxury – I am saving up to book my ticket now! Stephen also introduced the concept of the nautical equivalent of the mile-high club – the mile-long club... (Sounds MUCH more comfortable...)

Jimmy Rae added a super dimension to the evening with proud tales of how he’d worked on QE2 as an apprentice in Glasgow, and had now had the privilege of being responsible for the dockyard management in St Nazaire – he was proud to say that QM2 was ‘Clyde-built in France’..!!

Another truly uplifting evening!! And by the way, Stephen couldn’t make it at the last minute because he was collecting the marine equivalent of an Oscar for his exceptional work on QM2 – very much deserved.

There are so many more details that were covered – please check out the QM2 website for more information – it is very good. www.qm2-uk.co.uk. An exciting rendezvous is also scheduled for April, when QE2 & QM2 will be seen together for the first time at sea and coming home to Southampton – watch out for press coverage!

Copies of the CD containing Stephen’s presentation can be made available to educational establishments – it will provide a wonderful example of how an interest in childhood can find total fulfilment in adulthood, as well as how a truly incredible ocean liner for the 21st century was created – a remarkable story told by a remarkable engineer. Please contact [Alon Hankin](mailto:Alon.Hankin@qm2-uk.co.uk) for details.



Jimmy Rae is the proud recipient of our thanks from Alon Hankin, Web site co-ordinator and event organiser

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4. CORUS OF APPROVAL

Continuous Casting and heavy engineering keeps Distington on world map

Well, call me ignorant - I had no idea that the Distington name was so fundamental in the world of continuous casting. But it was Distington Engineering who pioneered the concepts, processes and techniques that underpin continuous casting operations world-wide today.

A fascinating presentation from David Preshaw, Design Manager and Brian Stalker, Export Sales Manager, at Corus Process Engineering (CPE) highlighted the Distington 'family tree' that has led to the Distington brand name now being associated with Danieli in Sheffield (thanks to the various takeovers and regroupings of the major engineering companies), but the principles established by the pioneers are still in operation today across the world, and especially at Corus, a world leader in metals technology.

CPE specialises in services to the steel and nuclear industries, and amongst many achievements, has manufactured the acclaimed Sellafield nuclear flasks, one of which was famously crashed into by an express train at 100mph without any significant damage.

The March visit centred on the Corus refurbishment operations of continuous casting equipment, and the implementation of further developments and improvements to increase the durability and performance of this harshly-used equipment.

Imagine a pot of molten steel, oscillating up and down. At the bottom, a precise form is achieved by an aperture created by copper clad faces through which the molten steel passes, to be bombarded with cooling jets and begin its transition into a useful end product. As the steel falls through gravity, it is then gently turned horizontal through a series of rollers to emerge as a slab of pure, homogenous material - the blooms and billets that eventually will be reformed into every conceivable steel surface and shape.

The scale and mass of the equipment used for this operation is definitely Heavy Engineering, and the environment in which the machinery operates is extreme. Not surprisingly, the elements that make up the process need regular refurbishment and it is to the facility in Workington that all Corus continuous casting equipment will return. In addition, refurbishment is also successfully sold to many other companies and countries around the world, and Workington has gained a hard-won reputation as a 'centre of excellence' for casters.

Several innovations have been developed by CPE to extend the life of the components, from peripherally drilled rollers which allow coolant to get much closer to the hot metal, and ceramic coating of the actual casting plates.

The premises needed to strip, clean and rebuild the continuous casting modules were of an appropriate scale, and the condition of the modules received for refurbishment was really quite awful. But thanks to the dedication and work of the refurbishment team ('they have the technology, they can rebuild it!') the rebuilt assemblies were fit to pass the stringent safety and performance tests before being allowed to be re-installed in the harsh environment of the continuous caster. 24-hour service is maintained, and an inventory of spare parts is also kept so that the refurbishment team can respond to any demand.

The visit was exceptionally well organised and professionally delivered, and many thanks are due to David and his team of enthusiastic and committed engineers who patiently explained and answered the many questions raised by their nosey visitors. Many thanks indeed!



The visiting party relax with some of the Corus team after a fascinating visit

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IMechE West Cumbria Area – 2003/2004 Calendar

April 2004	May 2004	June 2004	
Committee Meeting Date : Wed 07/04/04 Start Time : 19:30 hrs Venue : The Swan Hotel, Cockermouth Refreshments : Yes	Committee Meeting Date : Wed 05/05/04 Venue : tba Refreshments : Probably	Committee Meeting Date : Wed 09/06/04 Venue : Iggesund Paperboard Learning Centre Refreshments : Yes	
Programmed Events Visit to Nissan Date: Fri 23/04/04 Time : 14:00 hrs – Coach leaves Venue: Nissan, Sunderland Numbers : 50 Cost : £10 per head Reservations Required : Yes Refreshments : Yes Organiser: Adrian Norendal Tel : 019467 75700	Programmed Events Visit to Carrs Mill Date: Wed 12/05/04 Time : 19:30 hrs Venue: Carrs Mill, Silloth Numbers : 25 Reservations Required : Yes Refreshments : Yes Organiser: David Williamson Tel : 019467 76214		

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