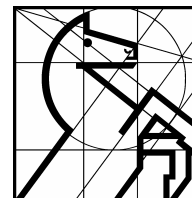


eMech

IMechE West Cumbria e-Newsletter
Edition 3, January 2003



IMechE
West Cumbria

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EDITORIAL

Just... a brief New Year **eMech** to say **HAPPY NEW YEAR**, and to let you know about the two most recent events held in West Cumbria – the brilliant presentation on the [London Eye](#), and our Young Members Social evening – [Karting at Maryport](#).

Our next event, a tour round UCB Films on January 20th is already fully booked, so please make sure you contact the event organisers in good time if you don't want to miss out on the remaining events in the first half of 2003. Keep your [diary](#) up to date!!

We also need your HELP!! Not just your IDEAS but also a small amount of your time – why not join our [Committee](#), help us organise our events and set up the best communication support network in the country?

Please don't forget - feel free to forward **eMech** to anyone else 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**, then please email [the Editor](#) with **Unsubscribe** as the subject and we will happily remove you from the mailing list.

CHEERS!!

*Editor: [Chris George](#), Publicity Officer, IMechE West Cumbria
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Disclaimer: Any mistakes are those of the Editor alone. Under no circumstances is the Chair responsible...

STOP PRESS

West Cumbria are to take over the Editorship of the **Professional Engineering Development Handbook**, which 'seeks to provide a convenient source of information regarding events outside a person's own institution'. It is a great publication, which is distributed to all professional engineers in the region. Current editor, Ashley Kirby, is stepping down after 12 years excellent service, and your humble editor will attempt to take up the mantle. But I need to know....

What do YOU think – Is it any good? Do you use it? How could it be made better?

PLEASE let me know through the usual [email](#) channels!! – CG

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1. Outstanding Engineering In The Public Eye

Basic Engineering Principles and United Teamwork Triumph

Despite the recent rallying calls for I K Brunel in the 'Greatest Britons', the public perception of 'engineering' is often fairly derisory at best – the work of the engineer is most often ignored, until it goes wrong... Not so for one of the few Millennium projects to be hailed a success – The British Airways London Eye.

Already at home in position by the Thames, the story of just how the Eye was designed and built represents a thrilling achievement for 'modern' engineering. The difficulty and ultimately the joy of fulfilling a seemingly impossible task to daunting and unmovable deadlines was wonderfully conveyed by Dr Alan Mann of Babbie, Allott & Lomax, at the recent IMechE West Cumbria presentation, to a packed audience of young and old engineers at The Barn, Rosehill.

After describing the origins of the design, from a competition in the London Evening Standard, the project was really launched as late as September 1998, with the advent of serious money from British Airways and an absolute deadline of 'wheel turning' at the stroke of the Millennium.

The scale of the project was breathtaking – 135 metres high, to carry 800 passengers at any one time (over water!), to allow for 1,600 passengers per hour to achieve the underlying economic basis of the Eye, classified as a public 'Ride'. The original concept also demanded availability for 364 days per year for 10 to 14 hours per day for a maximum envisaged period of just 5 years. This is unashamedly a money-making opportunity, but one with awesome risks for all concerned at the time. Why does good engineering always seem obvious and comfortable after the event?

The first element of the project was to put together a team who could deliver on all the many engineering aspects, to integrate the civil, mechanical, and electrical engineering disciplines required. Unfortunately for some, doubtless competent British companies, most of the partner companies who joined the project were from Europe, where the necessary reservoirs of experience can be found and demonstrated on the innovative ski-lifts and other unusual transport systems.

The Eye was broken down into its simple constituent parts, and the basic engineering principles used were excellently conveyed by Dr Mann, using diagrams and remarkable views of the components of the wheel during construction and erection. From spindle, hub, bearings, A-frame, cables, rim, drive and control system, plus the necessary 'river structures', the simplicity of the design became evident – but at what scale!

The huge 25m long main spindle was cast in several parts by, of all companies, Skoda, and involved welding through 500mm thick section. A major issue for the spindle and indeed all items on the Eye, was fatigue strength, given the cyclic loading nature on the elements of the wheel, and coupled with inherent mass-spring systems that could compound the loads to be endured. Dr Mann neatly outlined the serious role of the mechanical engineer as arbiter when deciding appropriate safety factors to be employed: whilst conventional loading indicated 'the thicker the better', the fatigue loading indicated an increasing fracture risk, so Dr Mann actually had to argue to REDUCE the basic safety factor to achieve a tolerable fracture risk factor.

Another fascinating aspect was the incorporation of the means of erecting the structure into the basic design – large securing eyes were cast into place to help during the main lift process. As Dr Mann said, it is no good have a great design that can't be put together!

The need to produce a wheel rim that was concentric, not oval, and planar true was discussed, as were the interesting solutions of constraining the wheel transversely at the bottom to bring it in line with the 'intelligent' loading platform that senses where the wheel

is and minimise the gap across to the capsules. Naturally, with any modern facility, wheelchair access is needed and indeed enjoyed by many passengers.

Again, the attention to reducing fatigue stresses was illustrated by use of gussets in the rim construction, but one of the major problems was how to deal with the effects of wind, whilst using inherently 'springy' cables that hold up the main A-frame as well as tension the rim to the hub. The various measures taken were clearly outlined, including some simple but effective mass-damper systems above each capsule.

The strikingly pleasing capsules contain a wealth of innovation and led to some interesting risk assessments. As the capsule needs to power revolve for every wheel revolution, what happens if it doesn't? Strong glass was therefore called for, as well as highly efficient heating, ventilation & air conditioning (HVAC) systems for the fully enclosed space. These have been somewhat problematic to date and have all been changed in the light of experience – the prototype can't always be right first time!

The advanced control and monitoring systems were briefly outlined, to ensure that each capsule is steady and level at all times, within certain tolerable limits. The use of a radio and laser sensor system to monitor position and attitude is just one of many invisible systems that underlie this amazing creation.

The unexpected setback during the first lifting and erection operation, when failure of some attachments temporarily postponed the lift were candidly described – it was Dr Mann who gave the orders to lift and to stop - and gave an insight into the total dedication and commitment required by all the professional engineering teams working to the limits. And the wheel turned on the dot of midnight on that Millennium Eve, and carried full paying passengers shortly afterwards.

Now the wheel is running to capacity every day, and is booked up for months to come. It will shortly enjoy a more lengthy scheduled maintenance period in January, and the temporary nature of the wheel is to be rescinded, as all involved realise that London now has an engineering marvel to rival (and beat!) that other temporary structure, the Eiffel Tower!

Dr Mann acknowledged that very few projects offer such fascinating and ultimately rewarding challenges, but the enthusiastic team spirit created in working for a common purpose was fully evident, even under the unrelenting glare of the public eye.

Probably the best and most inspirational engineering presentation held so far in West Cumbria!



Dr Alan Mann (right) becomes yet another delighted recipient of an IMechE West Cumbria 'Pit Tankie' from a somewhat surprised David Williamson, IMechE West Cumbria Hon Sec (and Clive Sinclair impersonator..)

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2. Everyone A Winner!!!

Fun For All in First Young Members IMechE Karting Challenge!!

Thanks to a last minute round-up of booking fees, the First (Annual?) Young Members' IMechE West Cumbria karting challenge proved to be a thoroughly enjoyable, exhilarating and exhausting evening for all concerned - great thanks to YM Chairman Andy Williams for the organisation!

The karts proved to be extremely demanding and fast, with plenty of opportunity to find the limits of adhesion especially on the sealed concrete racing surface. Age was no barrier to success, and t'Committee found a champion in the tidy and rapid driving of Treasurer Mike Edie who notched up 3 wins in 5 starts – there was no truth in the wicked rumour that everyone was being polite because he had the chequebook to pay for the event...

Other committee men, Ron Graham and Chris George also won heats, albeit with the slowest overall lap times... And Adrian Norendal, being of Nordic extraction, continued the Volvo tradition of crash testing at every opportunity...

After 26 furious heats during which everyone started from every grid position, the top six began an extended and very exciting Final, which proved the old racing adage – in order to finish first you first have to finish: the fastest in the heat of battle proved to be Stephen Tibbs, who kept his head and took the flag barely half a second ahead of James Moore. A splendid social event, and thanks to West Coast Indoor Karting for the facilities and running of the whole event. Anoraks can pour over the results summary in the [Appendix](#)...



"Wow – a Pit Tankie!" – Steven Tibbs cannot hide his joy at winning such a prize, presented by Adrian Norendal, flanked by unlucky losers James Moore and Paul



"Which Way Now, Gov?..."



Adrian Norendal's impersonation of a mobile traffic jam provided endless amusement, providing you weren't in his heat...

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3. AGM – March 19th: It's YOUR Turn!!

What do YOU want to happen??

If only the concept of perpetual motion could be made real... But nothing, not even IMechE West Cumbria, runs itself. So, to maintain the conservation of momentum, we need some new inertia!!

This is where **YOU** come in!!

Firstly – What do **YOU** want out of the IMechE in West Cumbria?? We need new ideas for Events for 2003/4, but how can we help YOU?? Should we be setting up (annual?) workshops to help gain higher professional status? Are you Chartered?? And how can we **REALLY** connect and support the education and development of a new generation of engineering enthusiasts in West Cumbria?? **PLEASE, PLEASE** speak to anyone on the current Committee – **NOW!!**

Secondly... Imagine the admiration and respect you could receive from putting '**IMechE Committee Member**' on your CV!! At our AGM on March 19th at Hundith Hill Hotel, Cockermouth, we need to rebuild the Committee that puts all this together.

Being on the Committee is not so demanding, we meet once a month in a range of excellent local hostelrys, and you have a great opportunity to make your mark if you want, or just help out in the background. Many Hands really do make Light Work, as the saying goes. So, please, **ASK** if you are at all interested – again, any of the current [Committee](#) will be pleased to let you know what goes on!

As founder and prime mover behind the current revival of IMechE West Cumbria for over 2 years, current Chair Adrian Norendal is looking to hand on to someone new, so please don't think there is no room for any new faces – come and have a go!!!! (And think of your CV.....!!)

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DIARY

February	March	April	May
Committee Meeting Date : Wed 05/02/03 Time : 19:30 hrs Venue : Swan Pub, Cockermouth	Committee Meeting Date : Wed 05/03/03 Time : 19:30 hrs Venue : Travellers Rest, Workington	Committee Meeting Date : Wed 23/04/03 Time : 19:30 hrs Venue : Lakes College, Workington	Committee Meeting Date : Wed 07/05/03 Time : 19:30 hrs Venue : Swan Pub, Cockermouth
VISIT: Pirelli Date : Tues 11/02/03 Venue : Pirelli, Carlisle Time : 19:00 hrs Numbers : 25 people Booking Req'd: Yes Refreshments : Yes Organiser : Alastair Billson Tel : 019467 85731	LECTURE/AGM: The Falkirk Wheel Date : Wed 19/03/03 Time : 19:30 hrs Venue : Hundith Hill, Cockermouth Booking Req'd: No Refreshments : Yes Organiser : Mike Edie Tel : 019467 84304	VISIT: Florence Mine Date : Wed 08/04/03 Time : 19:30 hrs Venue : Florence Mine, Egremont Numbers : TBA Booking Req'd: Yes Refreshments : No Organiser : Dave Norton Tel : 019467 76209	LECTURE: The Bluebird Project Date : Wed 14/05/02 Time : 19:30 hrs Venue : The Barn, Rose Hill Numbers : < 100 Booking Req'd: No Refreshments : Yes Organiser : Andy Cumber Tel : 019467 77431

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CONTACTS

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IMechE West Cumbria 1st Karting Challenge – December 12th, 2002

Heat	1 st	Best	2 nd	Best	3 rd	Best
1	Paul	39.54	Jon	40.53	Andy Williams	40.71
2	Ron Graham	41.77	Kerry	45.22	Steve Edwards	41.30
3	Andrew	40.98	Simon	39.71	Matt	41.50
4	Mark	38.16	Adam	40.24	Andy Hall	42.43
5	Jon	39.36	Steven Tibbs	38.96	Michael Haddon	42.47
6	Mike Edie	39.91	James Moore	39.88	Steve Edwards	41.02
7	Martin Wilkinson	38.00	Matt	38.41	Andy Williams	40.24
8	Jamie Patterson	39.85	Adam	38.82	Ron Graham	40.52
9	Mark	38.04	Steven Tibbs	37.58	James Tuck	40.89
10	Simon	39.38	Richard	39.15	James Moore	38.72
11	Mike Edie	38.45	Andy Williams	38.45	Jon	40.41
12	Chris George	40.04	Michael Haddon	40.82	Ron Graham	41.47
13	Mark	38.02	Gavin	39.32	Martin Wilkinson	39.78
14	Chris Tudor	38.42	Richard	38.60	Matt	39.56
15	Mike Edie	38.14	Adam	39.38	James Tuck	40.50
16	Steven Tibbs	38.39	Paul	38.86	Chris George	40.11
17	James Moore	37.66	Gavin	38.45	Martin Wilkinson	38.57
18	Andy Williams	38.60	Jamie Patterson	38.82	Martin Fowler	41.49
19	Mark	37.33	Simon	37.99	Matt	40.11
20	Paul	39.28	Adrian Norendal	40.61	Andy Hall	40.70
21	Richard	38.15	Michael Haddon	40.58	Steven Tibbs	40.27
22	James Moore	37.61	Jon	40.07	Chris George	41.39
23	Matt	37.18	Mark	37.82	Steve Edwards	40.17
24	Adam	38.77	Martin Wilkinson	38.63	Ron Nixon	40.52
25	Steven Tibbs	37.40	Mike Edie	37.67	Simon	38.21
26	James Moore	36.90	Richard	37.34	Chris George	39.79

After Heats:

Position		Pts
1	Mark	57
2	James Moore	52
3	Mike Edie	50
4	Steven Tibbs	49
5	Matt	47
6	Paul	43
7	Richard	42
8	Jon	42
9	Simon	40
10	Martin Wilkinson	40
11	Adam	39
12	Andy Williams	38
13	Jamie Patterson	38
14	Ron Nixon	38
15	Chris George	36
16	Michael Haddon	35
17	Gavin	31
18	Steve Edwards	31
19	Andrew	30
20	James Tuck	27
21	Adrian Norendal	25
22	Kerry	25
23	Andy Hall	23
24	Martin Fowler	23
25	Chris Tudor	17
26	Claire	15

FINAL RESULTS

1	Steven Tibbs	36.93
2	James Moore	37.03
3	Paul	37.85
4	Mike Edie	37.58
5	Matt	37.49
6	Mark	37.15

Fastest Lap of Event:

	James Moore	36.90
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