

WIND
ENGINEERING
SOCIETY



Newsletter

❖ Ramblings

The start of a new year not only brings cold weather but also a new editor. The honour (!) of preparing the newsletter has been bestowed on me and my first duty is to thank Roger Hoxey for the Sterling effort he did last year. Roger managed to increase the frequency and with a bit of luck I hope to maintain this level of publication. (We all have good intentions at the start of the new year). A number of changes are planned to the way we *present* the society. Plans are underway for the website to have a major overhaul, the format on the newsletter will hopefully change and you may have already noticed the *potential* new logo. If you have any ideas on how these or other services could be improved then please let me know. If you would like to get involved more with the newsletter (e.g. writing a column) then please get in touch. I am particularly keen to encourage the younger members since I suspect that their views are currently under represented.

My thanks are due to the several contributors that have sent me items for this Newsletter. Without them it would have not been produced.

Mark Sterling

❖ Chairman's Column

Paul Freathy writes:

Firstly, I would like to welcome Mark Sterling as Editor of the WES Newsletter. Having done the job myself for a year or two I know well the frustrations associated with the traditional reticence and prevarication of contributors. Of course, I am now on the other side of the fence and find myself part of that fine tradition! Mark takes over at a time when Roger Hoxey, as previous editor, has managed to increase the frequency of publication for which we are all grateful. We aim to maintain the four issues per year going forward but we will rely on members to provide Mark with material to publish – news items, relevant courses or events, recent interesting projects or a rant about something that bothers you. Please help.

I write this column also in the continuing glow of the Scruton Lecture held in November - see later report. Suffice it to say here that Brian Smith and Tom Wyatt did us proud and drew comfortably the largest audience ever assembled for a WES lecture. We had been a little nervous about moving the event from the Godfrey Mitchell theatre to the much larger Telford Room but in the event we had people sitting in the aisles – more than 200 guests. Well done Brian and Tom, and well done to all members who helped to publicise the society's flagship lecture.

In an effort to keep this piece reasonably short, I will just finish by saying that I have started to

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implement one of the key recommendations of the Strategy Committee, that each Executive Committee member should have an area of responsibility to champion. This will help us to make progress in developing our society and allowing it to grow in stature and size.

I wish all WES members a happy, successful and prosperous 2004.

❖ Snippets

- **Recent plans have been unveiled for a wind farm in Lincoln.** Fourteen 100 metre high wind turbines are proposed near Welton in North Lincolnshire. See <http://news.bbc.co.uk/1/hi/england/lincolnshire/3305829.stm>
- **English Archers are to be sent to Agincourt** in order to protest against a proposed wind farm in France. (http://news.bbc.co.uk/1/hi/wales/south_east/3304725.stm).
- **New offshore wind farms in the Thames Estuary have been given the go ahead.** Construction is due to start in 2004 and the 30 turbines are expected to be in operation by 2005. See news.bbc.co.uk/1/hi/england/kent/3241526.stm for further details.
- **A grade II listed windmill at Chillenden, Kent that was built in 1868 was destroyed on the 25th November as a result of severe storms.** The windmill was one of the few remaining examples of its kind and had just undergone extensive restoration work. See news.bbc.co.uk/1/hi/england/kent/3240320.stm for further details.
- **84mph winds battered the South Welsh coast bringing traffic to a standstill.** North Wales experienced winds up to 70mph with 50mph and 45mph recorded in Penzance and Plymouth respectively. (news.bbc.co.uk/1/hi/uk/3271799.stm).
- **97% of all the power cuts in last year's storms were caused by fallen trees** according to the BBC. (news.bbc.co.uk/1/hi/uk/3271799.stm).
- **The research agenda for the African ACP and Supporting European Engineers** can be found at the EAR-Iawe website (www.ear-iawe.org) under the news and information section – select short reports.
- **Tropical storm Odette** claimed the lives of 10 people in the Dominican Republic. Most of the deaths were apparently related to automobile accidents with trees and power lines toppling as a result of high winds and heavy rainfall. Odette was the 15th tropical storm in 2003 in the Atlantic-Caribbean region making it the busiest year on record. (<http://www.cnn.com/2003/WEATHER/12/07/odette.reut/index.html>).
- **Domestic wind mini turbines** have the potential to provide 15% of an average household's electricity needs. Windsave have manufactured a relatively small unit which is capable of topping up a household's mains supply. At an estimated one of payment of £750, the payback period is apparently a mere 30 months. (<http://www.guardian.co.uk/renewable/Story/0,2763,1091895,00.html>).
- **Gale force winds and heavy snow brought down power lines on new years eve.** Approximately 25,000 in Cumbria were left without electricity as bad weather swept across the country. (<http://news.bbc.co.uk/1/hi/world/europe/guernsey/3354391.stm>).
- **Severe gales** affected many northern and western parts of England and Wales on the 13th January. Heavy rain, sleet and wind gusts up to 70mph combined to make driving hazardous.



- **And finally**, WES member Adam Robertson (SRI) was interviewed on Radio 4 Leading Edge programme (15/01/04) for his work on downbursts.

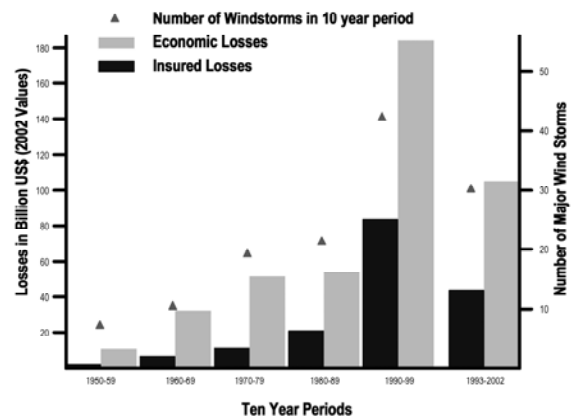
❖ Meeting Report

SCRUTON LECTURE
Structures, Dynamics & Wind – A 10 year
Review
November 5th, 2003

Approaching this, the flagship lecture of the Society, the presenters and organisers were all unjustifiably nervous about the prospect of filling the Telford Room at the Institution. With two such distinguished and well known presenters as Brian Smith and Tom Wyatt we should have known better. This evening was a triumph and drew the largest audience WES has ever assembled.

Starting with a drinks reception downstairs at the Institution, it was soon apparent that we should not have worried. As we moved upstairs to the lecture room, seats steadily filled up until we had people sitting in the aisles – more than 200 all told. The Chairman welcomed everybody to the lecture by referring to the distinguished history of the Scruton Lecture and the man after whom it was named. Brian Lee then introduced our two speakers and the lecture commenced.

For the next hour, Brian and Tom led us through a review of how different structures are affected dynamically by the wind and the measures that have been taken to improve their behaviour. They covered bridges, cables and towers but began with a review of wind climate and reported wind damage. As the figure below shows the recorded number of windstorm events appears to be increasing and the cost of losses with it. The increase in numbers of storms may be the subject of debate, as the authors noted Cook, for example, has shown that there is no evidence of increasing storms in the UK, but the economic position is undeniable. Caused in large part by increasing urbanisation and industrialisation, the global impact of wind on structures is clear and increasing.



Applying their considerable joint experience, we were then taken through some of the major projects that our two speakers had been involved with. In each case, particular wind issues were identified and the solutions to problems described. There were some surprises along the way and, as we were told, surprises in this game are seldom positive. One example concerned the Tsing Ma bridge, although designed in the previous decade the full aeroelastic model was re-tested in the 1990's and found to give much lower critical wind speed for instability than had been previously reported. The problem was traced to having the model the opposite way round to the previous tests, although the section was nominally symmetrical and careful measurement showed differences in the manufactured model of less than 1mm! The authors took this as vindication of a slightly out-of-fashion view that larger scale sectional model tests still have a very important role to play in bridge testing. Another important message to come out included the importance of wind structure, especially angle of inclination of the approach wind and its appropriate averaging time. Aerodynamic devices such as turning vanes were discussed and free-end effects during construction. The discussion of bridges concluded with a look forward to the increasing use of artist-designed bridges – often with no longitudinal axis of symmetry – to increasing spans and to possible use of non-metallic support cables.

Cables, of course, are a well known source of potentially dramatic dynamic oscillations in wind, often in combination with ice accretion – an extreme example of which is shown below. Another readily observable source of dynamic oscillations can be found in lighting columns, which suffer potentially from vortex shedding,

drag-saddle instabilities and galloping. By their nature very slender, and probably suffering from a perceived low level of importance and complexity, video footage was shown of a number of examples where the level of complacency in design had unfortunate consequences. As the authors noted, we understand the behaviour of the columns reasonably well but many cases of vibration are caused by the luminaires and their behaviour is less well understood.



Thus the lecture took us through the highly technical world of long-span bridges and brought us back to earth with a look at the prosaic world of lighting columns – nature affects all structures big and small, simple and complex. This is a reassuring message for wind engineers and we were grateful for the reminder. On closing, Lord Hunt took a break from his busy schedule at the House of Lords to give a personal vote of thanks to the speakers, which was warmly echoed by the long applause from those present.

This Scruton lecture was a hugely successful event for WES and we all owe our thanks to Brian and Tom. We also gratefully acknowledge the sponsorship of four member organisations who each contributed towards the cost of the pre-meeting reception - these were Anemos Associates Ltd, Arup, BRE and Silsoe. Their support helped us to give the lecture a well-deserved high-profile and raise its standing.

Paul Freathy

❖ IAWE

I wrote in the last newsletter concerning the major changes that are taking place in the International Association of Wind Engineering. The last two or three months have seen a very substantial amount of work taking place behind the scenes to implement these changes - with the President Giovanni Solari taking a lead in this. His first task was relatively straightforward - to establish a secretariat - mainly comprised of members of his own Department in the University of Genoa. The next steps were somewhat trickier however - the establishing of IAWE as a legal entity, so that a bank account could be opened and administered etc. This (inevitably) involved lawyers, but eventually the necessary documentation was produced and signed (by three Executive Committee members) to set up the IAWE as a legal organisation under Italian law - but with sufficient flexibility to enable transfer to other legal jurisdictions when the President ceases to be an Italian. Giovanni very kindly covered the cost of these formalities from his own research funds. The next task was to sort out the procedural issues I raised in the last newsletter - and to confirm that while I will remain Regional Representative for the European and African Region, I will carry out the duties of the Regional Co-ordinator until the next European Conference. The most recent issue to be dealt with has been to negotiate with the Journal of Wind Engineering over its contribution to IAWE funds as the Official Journal of the Society, and this looks likely to be satisfactorily settled shortly.

At the time of writing the issues that are currently being addressed are both to do with membership of the Society - firstly to bring the existing national societies into IAWE membership and secondly to help in the formation of national or regional societies where none exist at present. Watch this space!

Chris Baker

❖ WES WEB SITE

As mentioned at the start, the website is due to be redesigned. I NEED your help. Please suggest changes and forward any relevant material – appropriate wind engineering photographs would be really useful.

Mark



❖ 6th UK Conference on Wind Engineering (WES 04)

The 6th UK Conference on Wind Engineering (**WES 04**) will be held at Cranfield University, Cranfield, Bedfordshire, England from 15 to 17 September, 2004. The conference will explore and discuss developments, projects and techniques applied to the field of wind engineering. Interest in these conferences is strong and they typically attract 60+ delegates, including some from overseas, reflecting the widespread expertise and interest in the topic world-wide.

The format of the conference will include invited lecturers to review key areas and stimulate discussion within the sessions. Other papers will be selected for presentation by the Scientific Committee.

WES conferences have a proudly held tradition of welcoming new delegates and speakers in a constructive and friendly atmosphere. They provide a forum where information can be exchanged and advice sought freely, without 'points scoring'.

One-page abstracts are required by **31 March 2004**. Accepted abstracts will need to be developed into extended abstracts of 4 pages in length, and be submitted by **13 August 2004**. These will be bound into a single volume of conference papers available to delegates on arrival.

Papers on any aspect of Wind Engineering can be accepted. Topics in the past have included: *Extreme winds; Wind characteristics; Bluff bodies Buildings; Street level environment; Dynamics & fatigue; Model, full scale & desk studies; CFD*

Please see the website for full details.

Roger Hoxey

❖ Extreme winds and developments in modelling of wind storms

This one-day conference will be held in conjunction with the 6th UK Conference on Wind Engineering and will explore the meteorology of strong winds, developments in modelling these events and the application of both measurement

and modelling to wind engineering. This will be held on Wednesday 15th September and will consist of three sessions, Meteorology with a presentation by Keith Browning, Modelling, chaired by Julian Hunt, Extreme Winds for Engineers with a paper by Nick Cook.

The format of the conference will include invited lecturers to review the key areas and stimulate discussion within the sessions. Other contributions are invited for presentation which will be reviewed by a Scientific Committee.

This is an opportunity to bring together those whose responsibility it is to measure surface wind speed, those who develop models to represent wind storms, and those who explore the application of these measurements and models to wind engineering. The wind engineering requirement is usually to define a design wind speed appropriate for determining the loads on structures, although other characteristics of atmospheric boundary layer flows are also used.

Please see the website for full details.

Roger Hoxey

❖ Some recent papers by WES members

(If I've missed any then please let me know - Ed).

Harman, I. N., Best, M. J., Belcher, S.E. (2004) Radiative Exchange in an Urban Street Canyon. *Boundary-Layer Meteorology*, Volume 110, Issue 2, 301-316

Breeze G. (2003) Aerodynamic and water penetration investigations upon pitched roof vents, *JWEIA*, Volume 91, Issue 10, 1225-1236.

Sterling, M., Baker, C. J., Berry, P. M., and Wade, A., (2003). An experimental investigation of the lodging of wheat. *Journal of Agricultural and Forest Meteorology*. Vol. 119, Issues 3 -4, 149 - 165.

Berry, P. M., Sterling, M., Baker, C. J., Spink, J. H. and Sparkes, D. L., (2003). A calibrated model of wheat lodging compared with field measurements. *Journal of Agricultural and Forest Meteorology*. Vol. 119, Issues 3 -4, 167 - 180.



Sterling, M, Baker, C.J and Hoxey, R.P. (2003) Short term unsteady wind loading on a low-rise building. *Wind and Structures*, Vol. 6, no. 5 403-418.

❖ About WES

Executive Committee

Implementing the recommendations of the Strategy Committee, different members of the Executive Committee have agreed to take on specific roles within the society. They will champion these areas and look for opportunities to extend our service to members. Please help them by communicating to them any ideas that you have on the future direction of the society, especially in their chosen area of responsibility.

Paul Freathy – Chairman

Roger Hoxey – Vice-chairman, WES 2004 conference

Gordon Breeze – Meetings champion

Mark Sterling – Newsletter & web site champion

John Wills – retiring Hon Sec/Treasurer

Dick Barnard – incoming Hon Sec/Treasurer

Brian Lee – External relations champion

Tom Wyatt - WES representative on ICE Structures & Building Board

Brian Smith – Code activities champion

There remain a couple of responsibility areas to agree on, so watch this space in future newsletters.

ICE Support

Our contact at the Institution for all administrative support is Eunice Waddell. She can be contacted at

Tel: 020-7665-2238

Fax: 020-7799-1325

e-mail: Eunice.Waddell@ice.org.uk

WES website www.ukwes.org

❖ Forthcoming WES Meetings

The following meetings are suggested for this year. Unless stated otherwise all meetings will be held at the ICE from 5:30.

3 Feb 2004 High intensity winds. The meeting will consist of three presentations will on extreme winds. The presentations will be given by Peter Clark (Met Office) on the sting jet, Mark Humpage (TORRO) on tornadoes and Norman Toy (Surrey University) on downbursts

5th March 2004. Seminar on the Physical Simulation of Thunderstorm Winds by Chris Letchford, Texas Tech University. (This event will start at 13:00 and will take place at the University of Birmingham. Please contact me for further details – Ed.).

12 May 2004: Project case studies.

2 November 2004 Rail aerodynamics.

2 February 2005 Wind tunnel projects.

❖ Other Forthcoming Conferences

2004

- **The impact of wind and storm on city life (COST C14)**
von Karman Institute for fluid dynamics, Belgium, 5-7 May 2004
<http://www.vki.ac.be/costc14/>
- **8th National Conference on Wind Engineering (IN-VENTO-2004)**
Reggio Calabria, Italy, June 21-23, 2004
<http://www.ing.unirc.it/invento2004>
- **Fifth International Colloquium on Bluff Body Aerodynamics & Applications (BBAA V)**
Ottawa, Canada, July 11-15, 2004
www.bbba5.org
- **6th WES Conference**
Cranfield University
15 –17 September 2004

2005

- **10th Americas Conference on Wind Engineering (10ACWE)**
Baton Rouge, Louisiana, U.S.A., May 30 - June 4, 2005
<http://www.10ACWE.lsu.edu>
- **The sixth Asia-Pacific Conference on Wind Engineering (APCWE VI)**
Seoul, Korea, October 17-19, 2005
<http://apcwe-vi.kaist.ac.kr>



❖ Contact Point

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Please help to fill this space by contributing news clippings, people news, details of key projects or facilities that might interest others or notices of new books and meetings.

In the next newsletter we would like to include services offered by our corporate members.

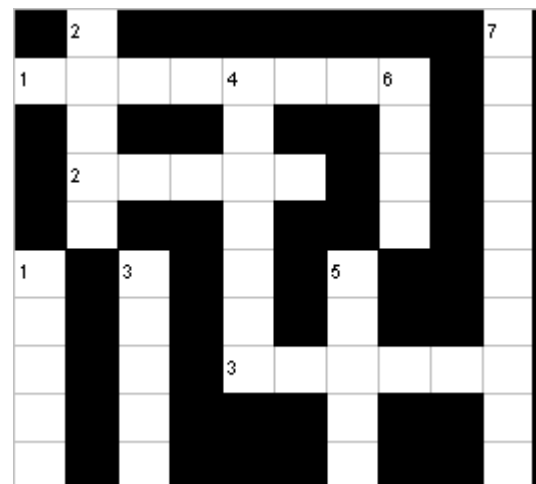
❖ A bit of fun..

Across

1. Mini wind turbine manufacture
2. Speciality food served in Birmingham
3. see 4 down.

Down

1. Small tube used to measure velocity.
2. Honduras bore the front of this 1998 hurricane.
3. Upcoming Canadian conference.
4. (and 3 across) non dimensional parameter used in conjunction with structural and aerodynamic damping.
5. _ _ _ _ _ Spiral.
6. Vortex.
7. Unravalled the relationship between small eddies and the rate of energy dissipation.



(If you think you can do any better then please send in your attempts – Ed).

And Finally...

❖ Wind Engineering paper wins prestigious award

Congratulations to John Macdonald (University of Bristol), Peter Irwin (RWDI) and Malcolm Fletcher (Halcrow) who were awarded the ICE Coopers Hill War Memorial Prize for their paper on vortex-induced vibrations of the Second Severn Crossing. (Proc. ICE: Structures and Buildings, Vol. 152(SB2), pp. 123-134, May 2002 (written discussion: Vol. 156(SB3), pp. 332-333, August 2003). The full abstract can be found online at <http://www.t-telford.com/jol>, however the main issues are summarised below:

- The large amplitude vibrations occurred in the first vertical bending mode with a natural frequency of 0.326Hz, in wind velocity of approx 18m/s within 15 degrees of normal to the bridge.
- The structural damping ratio of this mode was found from full-scale measurements to be only 0.29%, after allowing for the contribution of aerodynamic damping (which was very significant, becoming dominant above approx 10m/s, in the absence of vortex excitation). (c.f. 0.7% structural damping used in design and 0.48% in the latest version of BD49/01 Design Rules for Aerodynamic Effects on Bridges).
- The average longitudinal turbulence intensity for winds close to normal to the bridge, over the estuary, was found to be 6.2% (c.f. approx. 9.5% from ESDU). The high frequency turbulence was modelled in the wind tunnel using a turbulence intensity of 3%.
- The sectional model was quite sensitive to the vertical angle of attack of the wind, but full-scale measurements found the range of angles of practical significance above the estuary to be very small.
- The maximum RMS response at midspan was 191mm (i.e. 540mm peak-peak).



Second Severn Crossing



Second Severn Crossing cables.

[The Prize was founded in memory of members of the Royal Indian Engineering College, Coopers Hill, who fell in the First World War. It is one of a number of prizes awarded for papers in the ICE proceedings].