



# Newsletter



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## ❖ Ramblings

Welcome to the second WES newsletter of 2004 and many thanks to those of you who have contributed. Once again the UK has experienced severe gales resulting in significant damage and disruption. On a slightly more personal note the arrival of my brother with his new digital video camera one windy Saturday afternoon in March encouraged me to participate in my first ever storm chasing event. (Event is possibly too grand of a word since there were only two of us and the resulting footage was of a very low quality). For those of you who prefer a more professional approach I recently discovered some interesting video footage at [www.ultimatechase.com](http://www.ultimatechase.com). I hope you enjoy this newsletter and look forward to receiving your comments.

*Mark Sterling*

## ❖ Chairman's Column

*Paul Freathy writes:*

The past year for WES has been a successful one, both in terms of the goals achieved and the foundations laid for the future. This has been in no small measure due to the continued efforts of your committee. In the last year we have allocated areas of responsibility for committee members and this will both increase their workload and provide new impetus for progress in WES. Committee members give up their time voluntarily and I thank them all for their support.

Perhaps it is true of all Chairmen, but I look back over my first year and wonder how the year passed so quickly. I set as one of my principal goals when taking over last May that we should work to implement the recommendations of the Strategy Committee that had reported previously. So, it is fair that I should take the opportunity of this halfway review to assess how well we have done and what remains to be achieved.

The reduced fee for student membership was introduced a while ago and we will be offering discounts for students who attend the annual conference in September 2004, as a means of encouraging early participation in the work of the Society. The well attended University Day in September 2003 showed that there is good work going on in Universities. Nevertheless, I think we should all be concerned that wind engineering remains somewhat peripheral. We must look for more ways to encourage its teaching and attractiveness as a worthwhile topic for research.

We have always felt that our wind engineering meetings and activities should be promoted to as wide an audience as possible, and especially like to encourage membership from practising engineers who have to design for wind effects. We are currently developing stronger links with the Institution of Structural Engineers with just that goal in mind.

In the last year we have also safeguarded the Newsletter as a principal means of communication with members, keeping its frequency up and developing its content. Roger Hoxey was instrumental in setting us on this path and now Mark Sterling has bravely taken up the challenge to maintain the momentum. Our web site has also been updated with a much fresher look.

During 2003/4 we have also maintained an excellent programme of meetings, for which I congratulate the meetings champions and the speakers who gave their time freely. The standard of presentation has been very high and we can see the effects in the good size of audience that we have achieved. For a small society such as WES, this is an important achievement. It is also greatly appreciated by the ICE, which has a mandate to fulfil the role of a 'learned society'.

Of course, I cannot pass the subject of technical meetings without a further vote of thanks to our two Scruton lecturers, Brian Smith and Tom Wyatt. We did take something of a gamble by moving the venue to the Telford Room, more than doubling the number seats we needed to fill, and we were all nervous before the event. However, I think we can safely say it was a triumph, with people sitting on the steps to listen to a most interesting review of dynamics and wind.

One area where I also promised progress is in achieving routes to Chartered Engineer status for wind engineers. We have had useful discussions with the Institution on this matter and I am pleased to say that they do recognise the value and importance of encouraging membership from specialist fields in the Associated Societies. In this area we have not made as much progress as I would have liked but we will keep up the pressure and I am hopeful of being able to set a first batch of members on the road to CEng during this next year.

Overall, it was a good year with more challenges and opportunities to come. We look forward particularly to the bi-annual conference in September 2004. I encourage you all to participate and invite friends, colleagues and



clients to take part in this and other technical activities of WES.

## ❖ Snippets

- **Wind effects on trees are still a problem.** A woman driver had a lucky escape on 01/02/04 when high winds lodged a tree in Wiltshire. On the same night Avon Fire Brigade received 30 calls relating to property damage as a result of fallen trees. In Gloucestershire a power transformer was damaged after a tree fell on it.  
([news.bbc.co.uk/1/hi/england/3448849.stm](http://news.bbc.co.uk/1/hi/england/3448849.stm)).
- **Storm force winds** and heavy rain have caused damage to property and flooded roads across Wales. In Cardiff, the city's Queen Street station was closed on Saturday night and Sunday morning after part of the roof blew off and onto the tracks.  
([news.bbc.co.uk/1/hi/wales/3448875.stm](http://news.bbc.co.uk/1/hi/wales/3448875.stm))
- **RWE Innogy's wind farms win £400m backing.** The Times reported (30/01/04) that Englefield Capital, a private equity firm, and First Islamic Investment Bank are backing RWE Innogy's 13 existing wind farms and any others that are developed by the utility giant over the next three years. As part of the deal, RWE Innogy's retail arm, npower, will buy the electricity output from the fund's farms under long-term contracts, as part of its strategy to meet the Government's renewable obligation targets.
- **High winds halt marriages.** Devizes Register Office (Wiltshire) was hit by the falling tree as storms battered the country on 31/01/04. No-one was inside at the time, but council workers say the accident has caused extensive damage which will take some time to repair. Council workers appealed to anyone who has a wedding planned at the register office to contact them as they are unable to access records still inside the building.  
([news.bbc.co.uk/1/hi/england/gloucestershire/3452983.stm](http://news.bbc.co.uk/1/hi/england/gloucestershire/3452983.stm))
- **Storms batter UK in March.** At least 6 people died in March as a result of storms. High winds caused severe damage and resulted in a number of fatal accidents. In Leicester an Everton fan was killed as a result of flying debris. Two people died in Blundeston (Lowestoft) when a tree which had previously been reported to be in good condition fell on their car. In Ipswich, the Orwell bridge was closed because the winds were too strong to allow motorists to drive across.  
([news.bbc.co.uk/1/hi/england/south\\_yorkshire/3553287.stm](http://news.bbc.co.uk/1/hi/england/south_yorkshire/3553287.stm))
- **Glass panels fail.** In North Yorkshire it is reported that glass panes were blown loose at the Albion Shopping Plaza, in the centre of Leeds.  
([news.bbc.co.uk/1/hi/england/3554253.stm](http://news.bbc.co.uk/1/hi/england/3554253.stm)).
- **Damage in Nottingham.** The strong winds mentioned above also caused significant damage in Nottingham. Train services were disrupted as a result of roof damage to platforms 3 and 6 at Nottingham's main train station. Nearby in Sneinton, the Victoria Leisure Centre also suffered significant roof damage and resulted in closure of the main Hall and pool.  
([news.bbc.co.uk/1/hi/uk/3551473.stm](http://news.bbc.co.uk/1/hi/uk/3551473.stm)).
- **Boat race abandoned.** The 22<sup>nd</sup> Vest International Veterans' Head of the River race was cancelled as a result of the high winds. It is reported that six boats began to sink and one actually broke in two.  
([www.thesun.co.uk/article/0,,2-2004131787,,00.htm](http://www.thesun.co.uk/article/0,,2-2004131787,,00.htm))
- **Sport disrupted.** A number of football matches were called off for safety reasons as a result of the high winds. At Northampton two fans were injured when advertising hoardings blew loose and fell into the crowd. Racing at Uttoxeter was also called off. Also outside the Madejski



Stadium in Reading a music stage failed causing large speakers and scaffolding to be brought to the ground. ([www.telegraph.co.uk/news/main.jhtml?xml=%2Fnews%2F2004%2F03%2F22%2Fngale22.xml](http://www.telegraph.co.uk/news/main.jhtml?xml=%2Fnews%2F2004%2F03%2F22%2Fngale22.xml)).

- **And finally**, an exhausted windsurfer was saved by a lifeboat on a training exercise. It is reported that the man was so tired that he could not stand up on his board and was hanging on to it while drifting along the north Kent coast. ([www.telegraph.co.uk/news/main.jhtml?xml=%2Fnews%2F2004%2F03%2F22%2Fngale22.xml](http://www.telegraph.co.uk/news/main.jhtml?xml=%2Fnews%2F2004%2F03%2F22%2Fngale22.xml)).

## ❖ Meeting Report

*Robert Huxford writes:*

### **Extreme Winds**

This amazing lecture was held by the ICE associated Wind Engineering Society last week. Better and more authoritative than a BBC Horizon Programme, the following report does not do justice to the event and its astonishing images and 3d graphical simulations.

### **Sting Jets 110mph**

Peter Clark, Met Office

In October 1987 a severe storm caused widespread devastation in the South East of England, flattening tens of thousands of trees, disrupting the power supply in parts of London, and driving one of the cross-channel ferries onto the cliffs near Dover. The cause: sting jets. Peter Clark from the Met Office gave an account of the processes, which have been inferred from detailed inspection of satellite images and by atmospheric modelling. Imagine a tightly formed cyclone with the characteristic anti-clockwise spiral of cloud, leading to a fine tip at the edge of the eye of the storm. It is from this tip or cloud head that the jets emerge, seen in the satellite images as trails of thin cloud, sometimes there are multiple jets approximately 50km apart. The strongest gusts are close to the hooked tail of the cloud head, with the speed reaching 50m/s, (110mph) Normally the atmosphere is reasonably stable and stratified. Sting jets arise through atmospheric instability caused by a mix of fronts: an intrusion of dry air within a warm

moist front. An accelerating jet descends from the cloud head, snow falls from above, and the warm air sublimates or melts the snow. The jet over-runs over an unstable surface region of warm moist air, which enables the sting jet finally to reach the surface. The results have been well publicised.

[www.metoffice.gov.uk/education/historic/1987.html](http://www.metoffice.gov.uk/education/historic/1987.html)

[www.sc1.ac.uk/discover/2003ex19.cfm](http://www.sc1.ac.uk/discover/2003ex19.cfm)

### **Thunderstorm Down Bursts**

Professor Norman Toy, School of Engineering University of Surrey

A downburst is a rapid downward movement of air which hits the ground, spreading out in a radial fashion. A plane flying into a down burst will firstly be confronted with a severe headwind – possibly up to 150 mph, then the downburst causing the plane to loose altitude rapidly, and then a severe tailwind again, of up to 150mph. Unfortunately 150mph is around the landing and take-off speed of commercial airliners. Within the space of as little as 1 minute the pilot will be confronted with a series of perplexing phenomena, culminating in an indicated airspeed close to zero with stall indicators buzzing. A 68 m/s downburst came within 6 minutes of permanently vitiating Ronald Reagan's presidency. On 4 July 1977 in Wisconsin– a downburst left a 166 mile long 17 mile wide swath of damage.

Professor Toy ran through the stages of development: precipitation in the upper levels of a cumulous cloud leads to a downward movement of air. In the mature stage updraft and downdraft exist. The downdraft may hit the ground and spread out forming a gust front. In extreme circumstances a downburst can develop with extreme gusts.

There are 4 types of thunderstorm

1. **Single cell storm** – lifespan 20-30 minutes – not strong enough to produce severe weather – rare in occurrence
2. **Multi-cell cluster storm** – group of single cells at different lifestages moving as one unit –
3. **Multi cell line storm** – squall lines – consist of a line of storms with a continuous well developed gust front at the leading edge of the line. There may be breaks in the line, or it maybe continuous. They are well known for their downbursts.



**4. Supercell storm** – defined as a thunderstorm with rotating updraft – similar to a single cell

There are two types of downbursts:

- Macroburst – winds extending more than 4km – lifetime 5-30 minutes – wind speeds as high as 215kmph
- Microburst – less than 4km in diameter – lifetime 5-15 minutes – winds as high as 268kmph

It can be difficult to differentiate between a downburst and a tornado after the event. However there are some tell tale features. In a tornado, the winds are towards the tornado, in a downburst the winds flow away.

As to the frequency of events in UK, Professor Toy reckoned they were at least as common as Tornadoes. In the USA 800800 tornadoes are recorded each year, but around 100,000 downbursts.

[ww2010.atmos.uiuc.edu/\(Gh\)/guides/mtr/svr/com/p/out/micro/anat.rxml](http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/svr/com/p/out/micro/anat.rxml)  
[ww2010.atmos.uiuc.edu/\(Gh\)/guides/mtr/svr/com/p/out/micro/home.rxml](http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/svr/com/p/out/micro/home.rxml)  
[www.usatoday.com/weather/tg/wmcrbrst/wmcrbrs1.htm](http://www.usatoday.com/weather/tg/wmcrbrst/wmcrbrs1.htm)

### **Tornadoes – 290 mph**

Mark Humpage, Tornado and Storm Research Organisation – TORRO

Mark Humpage began with some definitions:

- Tornado – a rotating column of air that connects the cloud-base with the ground
- Funnel Cloud – a funnel descending from the cloud base but with no ground connection
- Waterspout – a tornado over water.

On average 33 tornadoes are reported in the UK each year; mostly in October/November. There are two main causes: firstly summer set-up – caused by atmospheric instability arising from a high land temperature, with steep rate of change of temperature with height, combined with weak windshear; secondly autumn set-up caused by high wind shear, associated with weather fronts, complemented by terrain.

The UK uses a grading system for the strength of the Tornadoes: from T0 to T10 – Weak tornadoes: 39 – 114 mph; strong 115 212 mph, Violent 213-290 mph. Most UK tornadoes are in

the T0-T3 range. The USA grades tornadoes on the basis of damage. Mark Humpage showed photographs of the aftermath of a 200mph tornado which had stripped the bark off trees and reduced a brick built bank to rubble.

UK Facts:

- Greatest UK Outbreak 23 Nov 1981: 105 in one 6 hour period
- Majority occur in the South East and Eastern UK.
- Longest Track is 107 kilometres 1950 in Bucks and Cambridgeshire
- Widest known tornado track in UK is 900 metres – Selsey in 1998

Further information

TORRO Website

[www.torro.org.uk](http://www.torro.org.uk)

[www.mhweather.co.uk](http://www.mhweather.co.uk)

(Selected photographs from all the presentations can be seen at the start and end of the newsletters – Ed).

## **❖ International Developments**

The establishment of the new structure for the International Association of Wind Engineering that I outlined in the last newsletter continues. In particular the process has begun of asking for existing national and regional societies to formally apply for membership (and the WES committee will need to consider this at some future date). There is also the need to assist in the development of societies in countries and regions where none currently exist. I am in particular trying to co-ordinate this development, by putting often isolated wind engineers in contact with each other, circulating a simple draft constitution etc.

On a European level, the COST Action C14 comes to a close with a final workshop in Brussels in early May, the proceedings of which will be widely available in the near future. At present there is no continuing activity planned, although a couple of suggestions have been made that will need to be followed up – a new COST action focussing on climate disasters in urban areas, which could include wind related disasters, and a possible European / African workshop on wind engineering in Africa. I will keep the Society informed on the progress of



these initiatives if and when any progress is made.

*Chris Baker*

## ❖ WES WEB SITE

Many thanks to Prof Brian Lee for providing the wind damage photographs that now grace our website. If any of you out there have any more photos you would like to see displayed then please let me know.

The website is currently hosted by The University of Birmingham and as a result of modernisation work is in the process of being moved from its existing server to a temporary server and then to another server. In addition a significant amount of behind the scenes work will need to be started in order to ensure that the site complies with the disability legislation. All of these changes should occur without any problems (!), however if any of you do have difficulties in accessing the site then please let me know.

*Mark*

## ❖ 6<sup>th</sup> UK Conference on Wind Engineering (WES 04)

15th - 17th September, 2004

And also a special one-day conference jointly supported by the

Royal Meteorological Society and the Wind Engineering Society on

**'Extreme winds and developments in modelling of wind storms'**

15th September, 2004

to be held at Mitchell Hall, Cranfield University, UK

**'Extreme winds and developments in modelling of wind storms'**

This special one-day conference is to be held on Wednesday 15th September, 2004 on the subject of Extreme Winds. Three sessions are planned, the first on Meteorology of Strong Winds with an invited paper by Prof. Keith Browning, the second on Modelling Wind Storms

chaired by Prof. Lord Julian Hunt and the third on Engineering Application with an invited paper by Prof. Nick Cook. The engineering application will include design wind speeds and wind statistics such as information for pedestrian winds, dispersion and fatigue studies. Papers on aspects of wind and its application to engineering have been requested.

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

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

This will continue on 16th and 17th September and full registration to the conference will include the special one-day conference on 15th September.

Papers on any aspect of wind engineering can be accepted. Topics in the past have included Bluff Bodies, Street Level Environment, Model, Full-Scale and Desk Studies, Wind Characteristics, Buildings, Dynamics, Fatigue, and CFD.

### REGISTER NOW

Please register your interest in these conferences by contacting [eileen@ukwes.org](mailto:eileen@ukwes.org) More details are available on the Wind Engineering web site @ [www.ukwes.org](http://www.ukwes.org)

Both conferences will be held at Mitchell Hall on the Cranfield University Campus. Accommodation is available at the conference venue. Booking details from [eileen@ukwes.org](mailto:eileen@ukwes.org)

Conference convenor Roger Hoxey  
Environmental Engineering Group  
Silsoe Research Institute  
Wrest Park, Silsoe  
Bedford MK45 4HS, UK  
Phone +44 (0)1525 864024 direct line  
860000 reception  
Email [roger.hoxey@bbsrc.ac.uk](mailto:roger.hoxey@bbsrc.ac.uk) or  
[roger@ukwes.org](mailto:roger@ukwes.org)

Conference Secretary Eileen Martindale  
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Bedford MK45 4HS, UK



Tel: 01525 860000 x 2484  
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eileen@ukwes.org

***There is space for a few more contributions both full length and for the short presentation session intended to cover work in progress, new ideas and unconventional thoughts.***

*Roger Hoxey*

## ❖ Request for data on thunderstorms

Valeria Durañona is a research student from Uruguay who will be spending 3 months at the University of Birmingham examining thunderstorm characteristics. She would be keen to talk with any members who have an interest in this area and/or have data relating to thunderstorm downbursts. Her email address is valeria\_dd@hotmail.com.

## ❖ About WES

### 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](http://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 6 pm.

**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 (BBA V)**  
Ottawa, Canada, July 11-15, 2004  
[www.bbaa5.org](http://www.bbaa5.org)
- **ERCOFTAC SIG.5** is holding its next meeting on September 9-10th at the University of Nottingham on the topic of Urban Scale CFD
- **6<sup>th</sup> 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>
- **EACWE 4. The fourth European & African Conference on Wind Engineering.**  
Prague, 11-15 July, 2005  
<http://www.itam.cas.cz/eacwe2005>
- **The sixth Asia-Pacific Conference on Wind Engineering (APCWE VI)**  
Seoul, Korea, October 17-19, 2005  
<http://apcwe-vi.kaist.ac.kr>

## ❖ Contact Point

Contributions and responses to:



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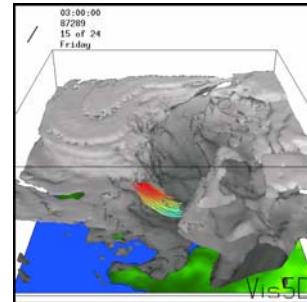


0121 414 5065

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.**

Examples of the illustrations used January's technical meeting.

### Sting Jets



### Tornadoes



Copyright acknowledged.





## ❖ Land Beaufort Scales

The original Beaufort scale had no wind speeds but was simply a description of the sea state and its effects on a 'man-of-war'. Records in this form were taken over a number of centuries and form a database which early researchers sought to extend with measured values. The problem they faced was that central continental recorders had no experience of the sea and choice of windspeed to match a Beaufort value was rather arbitrary. After a variety of attempts in the early 20th century WMO assigned speeds based on open sea measurements but the descriptions remained those of Admiral Beaufort.

T.V.Lawson gave a land based description of the conditions to replace the 'man-of-war' descriptions. The wind speeds remained those of 'over sea' making it very difficult to relate 'Gale' or 'Storm' conditions over land with those over the sea.

In the following the original WMO 'open sea' windspeeds have been corrected to 'standard open country values' of BS6399:Part 2 using the ESDU wind model. The descriptions remain those of Lawson.

The successively modified Beaufort/WMO/Lawson/BS6399-2 scale is as follows:

Beaufort Description Number	Vs (m/s) to BS 6399:Part 2			
	From	To		
0	0.0	0.2	Calm	Smoke rises vertically
1	0.2	1.1	Light air	Direction shown by smoke drift but not by vanes
2	1.1	2.2	Light breeze	Wind felt on face; leaves rustle; wind vane moves
3	2.2	3.7	Gentle breeze	Leaves and twigs in motion; wind extends a flag
4	3.7	6.0	Moderate breeze	Raises dust and loose paper; small branches move
5	6.0	8.1	Fresh breeze	Small trees in leaf sway
6	8.1	10.6	Strong breeze	Large branches begin to move; telephone wires whistle
7	10.6	13.3	Near gale	Whole trees in motion
8	13.3	16.5	Gale	Twigs break off; progress generally impeded
9	16.5	19.9	Strong gale	Slight structural damage occurs; chimney pots removed
10	19.9	23.8	Storm	Trees uprooted; considerable structural damage
11	23.8	28.0	Violent storm	Damage is widespread; seldom in UK
12	28.0	Plus	Hurricane	Countryside is devastated; only occurs in tropical storms

The descriptions now tie in well with the windspeeds BS 6399-2 and recent experience of storms of various return periods. The 1987 storm (150 year plus return) was a 'violent storm' on this scale, which is technically correct. The 1990 storms (10 year return) were just less than 'storm' force and produced commensurate damage. 'Strong gale' is about correct for a 1-year return wind. In sea areas on the west coast a 'strong gale' is expected once or twice a year. 'Gales' occur several times a year.

Note that a sequence of strong wind events of similar strength may occur together, only one of which qualifies as the 1 year storm event.

*Andrew Allsop.*