



Tornadoes and Tropical Cyclones Edition

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❖ Chairman's Column

Professor Peter Bearman, Imperial College, London

WES members were treated to an excellent day out at the Met Office on Wednesday 8th February 2006. Unfortunately the long journey to Exeter was a deterrent for many but those who took to road and rail were well rewarded with some first rate presentations from Met Office staff. Not unexpectedly, climate change was high on the agenda as was the modelling of severe weather impacts. We also heard about how forecasting is made through the use of so-called ensemble modelling whereby the outputs of a range of different models are used to produce a more reliable longer term forecast. The visit also included a tour of the Met Office, including the Operations Centre which is the hub of the weather forecasting process. It is clear that there is much common ground in the activities of WES and the Met Office and that these interests are drawing even closer. WES is very grateful to the Met Office for its generous hospitality during our visit. We also thank Brian Lee for his organisation of this successful event.



Photo © UK Met Office

As well as looking back to meetings past, there is much for us to look forward to in the coming few months. First there is the AGM on Tuesday 9th May, not in itself a particularly exciting event but we promise to keep it short. The highlight of the evening is our annual “storm of the year” presentation. Such has been the severity of storm activity over the past 12 months that we have not one but two presentations. We are extremely fortunate to have Dr Elizabeth English from the Louisiana State University Hurricane Centre coming to talk about Hurricane Katrina. Intriguingly she has sub-titled her talk, “the inside story”. Not to be outdone we had our own severe storm event right here in the Midlands, the Birmingham Tornado. John Wright from the University of Birmingham and John Goodman, Head of the Emergency Planning Unit in Birmingham will share the presentation which is entitled from “Formation to Destruction”. The organisation of this event is in the hands of Andrew Quinn. With a severe storm recently hitting Northern Queensland we have to hope that we will not see a continuing escalation of the number of presentations made at our “storm of the year” meetings.

Another event to look forward to is the 7th UK Conference on Wind Engineering to be held in Glasgow on 4th – 6th September 2006. Information has been circulated to members and I do not intend to repeat it here but I simply want to remind you to have it prominently marked in your diaries.

Finally, it isn't often that your Chairman has an opportunity to write about funding for wind engineering research. The DTI has announced the Spring 2006 competition for funding for its £80m Technology Programme. Of particular interest to WES members will be the funding of £12m being set aside for “Management of Complex Fluid Flow Conditions”. One of the application areas highlighted is the built environment. I quote “one of the fastest growing sectors in the UK where iconic design, coupled with world-class engineering problem solving, is a key strength/capability. Major research challenges here range from modelling and influencing airflow in and around structures (e.g. buildings, bridges), and better management of the flow handling/pumping of novel concretes.” While I have no doubt that better management of concrete is important, it is extremely heartening for us to see aerodynamics of structures being emphasised. The DTI goes on to say that projects should identify needs in the measurement and prediction of flow conditions (steady and unsteady) and in the integration of CFD and mechanical dynamics. It is reassuring to note how well these topics fit with the WES research strategy.

Further information about this programme can be found at:

<http://www.dti.gov.uk/technologyprogramme/forthevents.html>



❖ Technical Feature

Tropical Cyclones

Short Contribution by **Professor Brian Lee, University of Portsmouth**

Introduction

By many definitions, Windstorms and the rainfall, landslides, flooding and storm surge which often accompany them, can accurately be called “mankind’s worst natural disaster”. This is true for numbers of people affected worldwide, for injury and loss of life and for global financial loss.

Such windstorms come in many guises. Lothar and Martin in France in 1999 and the Great Storm of 1987 in southern England are European examples of temperate cyclonic events we are most familiar with. In tropical regions a different kind of meteorological process produces windstorms of even greater ferocity, tropical cyclones, affecting places as far apart as Japan and Queensland, Mauritius, the Philippines and the Caribbean. Their consequences include high winds, extreme rainfall and coastal storm surge, though they include both relatively “dry” storms (Andrew in 1992) and equally “wet” storms (Mitch in 1998)

Tropical Cyclone is the generic name by which all versions of this climatic phenomenon are known.

Hurricane is used in the Caribbean/ Gulf of Mexico/North American area, Cyclone is the name given in the Indian Ocean/ South Pacific/ Australasian region, and Typhoon in the South and East China Seas/North West Pacific.

Tropical Storm Names

The names used for Atlantic tropical storms are maintained and updated by the World Meteorological Organisation. The 21 names in use for each year are rotated every 6 years, though names are retired if they are associated with a particularly catastrophic event. In 2004 four such names were retired, Charley, Frances, Ivan and Jeanne, and it may be expected that Katrina will join the list of 2005 name retirees.

Definitions of Magnitude

The principle definition of the strength a hurricane is its Category in the Saffir-Simpson Scale that is principally based on a damage rating system. The wind speeds given are 1-minute average speeds at 10m about the open sea surface.

Category	Wind Speed	Storm Surge	Damage
1	74 – 95 mph	4 – 5 ft	No real damage to buildings
2	96 – 110 mph	6 – 8 ft	Some damage to building roofs, doors and windows
3	111 – 130 mph	9 – 12 ft	Some structural damage to small homes large trees blown down
4	131 – 155 mph	13 – 18 ft	Extensive curtain wall failures, entire roof failure on small homes
5	> 155 mph	> 18 ft	Complete building failures



Flood Protection Risk

The levee system protecting New Orleans is one of the latest victims of tropical cyclone activity and was designed to cope with a Category 3 hurricane, but failed when hit by Katrina which was only Category 1 or 2 within the metropolitan area. In the civil engineering press it has been claimed that the levee defences were designed to withstand a 1 in 200 to 1 in 300 year hurricane event. However, of the 25 hurricanes to hit the Louisiana coastline in the past 100 years, 8 have been Category 3 and a further 4 have been in Categories 4 and 5. These figures, indicating risk factors, might be contrasted with those for European flood defence systems, where the bund and barriers protecting Thames Estuary have been designed to a 1 in 1000 year standard, and those protecting the coast of the Netherlands, to a 1 in 10,000 year standard.

**See the WES meeting on
Hurricanes and
Tornadoes in our events
section**

Useful Web Sites

- Gray & Klotzbach's forecast for 2006
<http://tropical.atmos.colostate.edu/Forecasts/2005/dec2005/>
- Saunders and Lea's forecast for 2006
<http://tsr.mssl.ucl.ac.uk/>
- Definitions of Saffir-Simpson Hurricane Scale
<http://www.nhc.noaa.gov/aboutsshs.shtml>
- Daily update on global tropical cyclone activity
<http://www.solar.ifa.hawaii.edu/Tropical/tropical.html>
- Daily information about NW Pacific typhoons
<http://www.npmoc.navy.mil/jtwc.html>
- Daily Atlantic update by US National Hurricane Centre
<http://www.nhc.noaa.gov/>
- Terrapin Storm tracking
<http://hurricane.terrapin.com>

Forecasts for the 2006 Atlantic Hurricane Season

1. Bill Gray and Philip Klotzbach, Colorado State University.

The CSU team is predicting a 2006 hurricane season that will be worse than average but will fall short of the severity of the 2005 season. They are predicting,

- 17 named tropical storms, against an average of 10
- 9 hurricanes, against an average of 6, and
- 5 major hurricanes, with wind speeds exceeding 110 mph, against an average of 2. It is calculated that there is an 80% chance that 1 of these major hurricanes will hit the US coast.

2. Mark Saunders and Adam Lea, University College London

The UCL team predict that Atlantic basin and US landfalling tropical cyclone activity will be 60 % above the 1950-2005 average in 2006, defined in terms of an Accumulated Cyclone Energy (ACE) index.

Specifically, they predict,

- 15.7 tropical storms, against an average of 10.3
- 8.5 hurricanes, against an average of 6.2, and
- 3.9 intense hurricanes (Categories 3 to 5) against an average of 2.7



❖ Snippets

UK Offshore Wind Energy Needs Funding, Study Reveals



Norwich, UK [RenewableEnergyAccess.com]

New research shows that the UK offshore wind program can meet 6% of power needs by 2015 but not without additional Government intervention. The study, "Offshore Wind: At a Crossroads," which highlights the critical juncture in the UK, was recently released by the British Wind Energy Association (BWEA) and Renewables East, the renewable energy agency for the East of England.

In both 2004 and 2005 the UK was the only country in the world to build offshore wind farms, the release states, thereby making the country a pioneer in this sector. Currently four working offshore wind farms are located in the UK (Blyth Offshore, North Hoyle, Scroby Sands and Kentish Flats) and produce 213 megawatts (MW) of electricity, the equivalent of powering around 135,000 UK homes, with a fifth, the 90 MW Barrow project, currently undergoing final commissioning. Without additional support for offshore wind farms, however, the opportunity for the UK to be a world leader could be missed.

"Offshore Wind: At a Crossroads" reports on interviews with more than 30 companies showing that without additional support for the sector only 2,000 MW of offshore wind capacity will be installed in UK waters by 2015, which is only 25% of what is possible over the next ten years. The major reason cited for the difference between what is possible and what is expected is the gap between the current costs of developing offshore wind and the revenues available to developers through the current Renewables Obligation.

A report identifies that the industry could deliver some 8,000 MW of offshore wind capacity by 2015. This amount of development is equivalent to 6% of the UK electricity supply, generating 24.5 terawatt hours (TWh) that is equivalent to meeting the annual electricity needs of more than 5 million homes. It represents GBP 10 billion [USD\$ 17 billion] of investment and prevents the emissions of 10-20 million tons of carbon dioxide.

And on our hurricane theme, from the ultra-reliable online news source 'the onion':

<http://www.theonion.com/content/node/45796>

National Weather Service to Give Hurricanes Full Names

SILVER SPRING, MD—The National Weather Service announced Friday that, in response to the increasing number of hurricanes, it is revising its naming system. "The hundreds of hurricanes we expect in the North Atlantic in 2006 will receive both proper and surnames," Max Mayfield of the weather service said. "In fact, tropical storms Alberto Fergus, Beverly Stenwick-Brown, and Chris Stubbs Jr. have already received names under the new system." After all possible first and last names are exhausted, storms will be given titles, beginning with Hurricane Assistant Accounts Manager Alexander Epps, CPA.



❖ Conference Update:

We have had a terrific response to the call for abstracts, with more than forty submissions having been received to date from both the academic and industrial sectors. There has been a good response from the UK Wind Engineering community, but it is particularly pleasing to report that a significant number of the contributions have come from colleagues across the globe, including North America, Europe, Australia and the Far East. The conference should, therefore, provide an opportunity to forge new, or maintain existing, national and international links. Abstracts will now be reviewed with the aim of communicating the results to authors by mid May 2006. Programme details will be available from the conference web page in due course (Full contact details in the events section).

Dr. Marco Vezza, University of Glasgow



Photo © University of Glasgow

❖ Future WES Events

Tuesday 9th May 2006 at 6.00pm

Hurricanes and Tornadoes: An eventful year in wind engineering

Preceded by the WES Annual General Meeting

Institution of Civil Engineers, One Great George Street, London SW1P 3AA

Contact Pauline Arundel, Tel: 020 7665 2236 pauline.arundel@ice.org.uk

Monday 22nd May 2006

Half day informal seminar on **Vehicle Aerodynamics**

at 12.00 in room F32 of the Civil / Mechanical Engineering Building,

School of Engineering, University of Birmingham

l.a.boyle@bham.ac.uk, or 0121 414 5137

Sponsored by Rail Research UK and the Wind Engineering Society

4–6 September 2006

7th UK Conference on Wind Engineering (WES 06)

Strathclyde, James Weir Building, Montrose Street, Glasgow G1 1XJ, UK

Contact: Dr. Ian J Taylor, Department of Mechanical Engineering, University of

Tel: (44) 0141 548 3753, Email: ian.taylor@strath.ac.uk www.mecheng.strath.ac.uk/wes2006

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Your news, articles and
announcements for the next
issue.

Let us know about new staff, services or
projects – please contact the editors with any
ideas – contact details on front cover

❖ Other Forthcoming Conferences

2006

The fourth International Symposium on Computational Wind Engineering

(CWE2006). Pacifico Yokohama, Yokohama, Japan. July 16 – 19.

<http://www.wind.arch.t-kougei.ac.jp/cwe2006/>

2007

12th International Conference on Wind Engineering (ICWE12)

Cairns, Queensland, Australia, 1 – 6 July

www.awes.org/icwe12