Cyclone Testing Station

Newsletter - September 2009 www.jcu.edu.au/cts

Thoughts from the Chairman

The CTS continues to forge ahead despite concerns with the economy and we have taken firm steps to shore up our position with the appointment of Graeme Stark as our Business Development Manager. Graeme, who is very well known in the industry, will ensure open communication with all our stakeholders and clients and will seek further opportunities for the CTS. Graeme can be contacted on 0429 270066 or by e-mail at Graeme.stark@jcu.edu.au.

Our three cornerstones of research, education and application of wind engineering to the built environment will ensure that we continue to remain viable and relevant and we look forward to the future with renewed vigour.

Doug Meecham
Chairman, CTS Management Committee

Web Site Changes

The Station's web site has been refreshed to be consistent with the new JCU style and layout templates. You are encouraged to visit the site at www.jcu.edu.au/cts. We would welcome any feedback by clicking on the "Contact us" tab.

CTS reports on Brisbane storms

The CTS team is well known for its damage investigation reports following major wind events.

In April 2009, the Station published a detailed damage investigation report on the Brisbane Storms in November 2008. The Technical Report, TR55 can be downloaded from our website at http://www.jcu.edu.au/cts/research_reports/index.htm.

If we are to eliminate or minimise damage in future high wind events, it is vital that issues identified in damage investigations are followed up by relevant stakeholders.

The CTS team are already working with others on some of the issues identified and would be happy to help in identifying solutions in other areas if required. Please contact Cam Leitch on 07 47914754 or by e-mail at Campbell.leitch@jcu.edu.au if you wish to pursue solutions to problems identified in the Brisbane storms.

Complete roof panel lifted off house after Brisbane storms

NATA Accreditation for CTS

While many clients would be already aware, some readers may not know that the Cyclone Testing Station is NATA Accredited for the testing of roof and wall claddings and associated components, wall panel racking testing and the standard flying debris impact test.

Clients who avail themselves of The Cyclone Testing Station's services have access to a unique combination of experience and facilities. The CTS team's experience and reputation on wind engineering issues, its independence, along with the quality assurance benefits that come with NATA Accreditation, provide a suite of benefits that cannot be matched elsewhere.

Conferences

The Cyclone Testing Station continues to take an active role in relevant national and international conferences. This activity is fundamental to the role of the Station in accessing and disseminating state-of-the-art knowledge on wind engineering issues.

11th Americas Conference on Wind Engineering, June 2009

The 11th Americas Conference on Wind Engineering was held in June 2009, in Puerto Rico. A paper titled "Application of Simulated Cyclonic Wind Loads on Roof Cladding" by Henderson, Ginger, Morrison and Kopp was presented by David Henderson as part of his PhD studies. He received a $2,000 student scholarship from the Australasian Wind Engineering Society to attend this conference. David also took this opportunity to visit UWO and the University of Florida, to represent the Station and discuss current techniques in wind engineering research and testing.

7th Asia-Pacific conference on Wind Engineering, Nov 2009 in Taipei, Taiwan

Peter Kim and Ulrich Frye will be representing the Station at this conference and presenting the following papers:
"**Response of Cladding to Windborne Debris Impact**", by Ulrich Frye, John Ginger and Peter Mullins
"**Internal Pressure with Varying Sizes of Dominant Openings and Volumes – Model Studies**", by John Ginger and Peter Kim, and
"**Codification of Internal Pressure for Building Design**" by John Holmes and John Ginger.

Wind Loading Standard

John Ginger continues to represent the Station as a committee member on Standards group BD06/2 (wind loading standard). This committee has completed a review of proposed changes to AS/NZS 1170.2 with the revised standard due to be released for public comment in the near future.

Extreme Wind Speed Baseline Climate Investigation:

John Ginger is leading a team that has just started a project funded by the Australian Government Department of Climate Change, to investigate the difference in wind velocity measurements between 3-cup and Dines anemometers.

This project is fundamentally important for analyzing historical data records that comprise a mixture of records from both types of instruments.

These wind speeds are used for producing design wind speeds and hence must be assessed for consistency and reliability.

New Equipment for Flying Debris Testing

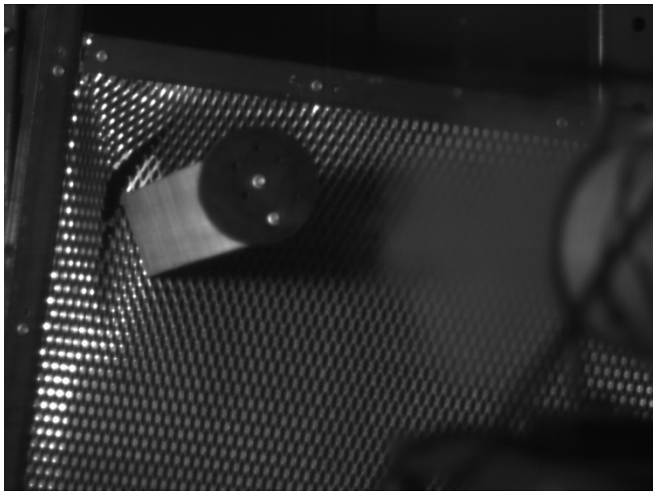
The CTS operates an air cannon facility to assess the effects of flying debris on building materials.

Anyone who is not familiar with the air cannon facility can view video clips and other information on our website at www.jcu.edu.au/cts/facilities.

A new velocity measurement system has recently been installed to improve reliability and accuracy. The CTS also has a new very high frequency response force sensor capable of measuring forces in three dimensions.

The facility is now being used for research into the behaviour of cladding in response to impact from wind driven debris.

If you are interested in having systems tested for resistance to flying debris, please contact Ulrich Frye on 07 47816091 or by e-mail at Ulrich.frye@jcu.edu.au.



High speed photography of standard flying debris test piece striking screen

Installation of Windows

The Cyclone Testing Station recently released a Technical Alert 09/1 on the installation of windows. This is available on the website.

The Brisbane storms investigation and other field inspections conducted by the CTS team highlighted a number of concerns with practices used for fixing windows. Some of the concerns included gaps between the reveal and jamb studs that were not packed and nails that appeared to be either of insufficient length or diameter to fulfill their intended function.

As well as releasing the Technical Alert, the CTS team is working with the Australian Window Association and its Technical Committee to identify options to improve the information that is available to installers. It is possible that this will include improvements to industry literature and changes to Standards. In the meantime, the Technical Alert includes proposed interim procedures to ensure that windows are installed correctly.

Evaluation of Building Materials for use in Cyclonic Areas

In May 2008 the Building Code of Australia introduced a new cyclic testing regime for metal roof assemblies in cyclonic areas, to replace the NT 10,000 cycle test and the AS4040.3 cyclic test used in Qld and WA.

The new testing regime had two objectives. The first of these was to overcome the need to test materials twice to cover all cyclonic areas in Australia. The second objective was to ensure that the proposed test method adequately considered both the risk to the community and the cost of the installation. Neither of the previous two regimes met the objectives.

The cyclic regime chosen was the Low-High-Low regime. While the introduction of a single new cyclonic regime should ultimately be beneficial to all parties, in the short term it has required significant additional testing. The relevant States and Territories acknowledged the amount of work involved by allowing a 12-month extension for completion. This meant that in Queensland, the Northern Territory and Western Australia, testing to the Low-High-Low regime became mandatory from May 2009.

One issue that still requires clarification is the extent to which immediate supporting members will experience the cyclic loads seen by the cladding and hence the extent to which these members need to be included in cyclic testing. Limited research has shown that shorter spanning supporting members such as residential roofing battens can experience similar cyclic loading to the cladding. More research is needed to understand the loading applying to longer spanning supporting members.

In the absence of further research, The Cyclone Testing Station offers its interpretation of the current requirements as a starting point for discussion aimed at ensuring a common

interpretation of requirements. We would welcome feedback from others:

"The extent to which immediate supporting members need to be included in cyclic testing, in accordance with Clause 2.5.5 of AS1170.2, depends on the area that is to be supported by the member. Dynamic response (such as that represented in a Low High Low test) is considered as a 'local' phenomenon. Therefore, if the area supported by the member (typically span x spacing) is smaller than that considered as a 'local' area by AS/NZS1170.2, then it should be included in the test. Otherwise the supporting member can be omitted from the cyclic test providing that the connection detail between the cladding and the supporting member is correctly represented."

Designers are reminded of the importance of considering forces in all elements of the load path, including both members and connections. For example, even though the regulations do not specifically refer to the connections between immediate supporting members (such as battens) and the structure below, these connections must be properly considered in the design process. It is far too common after a wind event to see entire roofs blown away with the cladding still firmly fixed to the battens, apparently due to a lack of adequate connection between the battens and the structure below.

The Building Code of Australia currently states that only metal roof assemblies, their connections and immediate supporting members in cyclonic areas must be evaluated using the Low-High-Low regime. The logic behind this is that metal roof assemblies are potentially subject to fatigue and hence to premature failure as a result of the fluctuating wind loading from a cyclone.

Most roofing systems incorporate metal components, including fasteners and clips, so it is logical that they should also be evaluated using a similar cyclic regime before they are approved for use. This includes tiles fixed with metal tile clips or on metal battens, for example, or polycarbonate roofing using metal components. Even cases where metal clips or metal battens are not used may warrant cyclic testing, as the batten fixing would usually be sensitive to fatigue.

These topics warrant further investigation to clarify any anomalies in regulations.

Draft Guide to Low High Low Cyclic Testing

In April 2009, the Station published a draft guide on testing of roof and wall cladding using the Low-High-Low cyclonic regime. The aim was to initiate broader consultation on the subject. This can be downloaded from our website at http://www.jcu.edu.au/cts/idc/groups/public/documents/advice/jcuprd_047448.pdf

The Station would like to thank those who have contributed to this document and we encourage others to become involved in the further improvement of the draft.

The Station is seeking expressions of interest in a workshop to improve the current draft so that a final version can be prepared and published appropriately. This work is needed so that designers, certifiers and regulators can be confident in using results generated from different testing facilities.

New Process to Review Standards

Readers may be aware of recent communications from Standards Australia highlighting proposed new arrangements to address funding shortfalls in their operations.

The Cyclone Testing Station believes that a strong ongoing standards process is essential and is committed to playing a role in that process. We encourage readers to make themselves aware of the changes proposed by Standards Australia by visiting www.standards.org.au.

We are aware of some concern over the limited information released to date on how future Standards might be funded and it is hoped that further communication from Standards Australia in the coming months will address these issues.

Words from the Manager

It is very encouraging to once again have a Station Research Fellow; David Henderson will start in this position this month. Our research profile is also being promoted, with David Henderson, Peter Kim and Ulrich Frye all presenting papers on the Station's research at international wind engineering conferences.

The Station is continuing with the three-year Community Education program and is currently completing the Homeowners component of this program.

Other planned activities include training seminars for building trades and certifiers, and the continued release of appropriate technical literature.

I want to acknowledge the enthusiasm and drive that Graeme Stark is bringing to his new role as the Station's Business Development Manager. Graeme has already made contact with many of our stakeholders and I am confident that his input will ensure that the Station will continue to prosper.

As can be seen by the articles in this newsletter, we have a diverse and exciting range of activities at the Station. This includes research on internal pressure as well as wind driven debris and using the Pressure Load Actuator to investigate fatigue around cladding connections. Damage surveys continue to be important as do vulnerability studies. All of this work feeds back to assist the Station with one of its objectives, to reduce and mitigate risks and costs to the community from severe wind events.

Cam Leitch
Manager CTS

Newsletter online

The newsletter is available from our web site as a PDF at
http://www.jcu.edu.au/cts/newsletters/index.htm.

To receive future newsletters via email please subscribe at
http://www.jcu.edu.au/cts/JCUPRD_046078.html

The Cyclone Testing Station wishes to thank all of our benefactors and sponsors for their continued support

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