Update on Fire Testing for Tension Structure Fabrics in Australia, (and overseas developments)

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Background

This is an interesting journey into Government regulation, and how hard it is to get changes to Australian Standards. The perspective is that of a fabric supplier.

BCA

The Building Code of Australia calls up AS1530/parts 2&3 in the regulation of fire performance for tension membrane fabrics. Specifically Class 2–9 Buildings Specification C1.1, Clause C1.10. There is an anomaly in the BCA in that there is no specific category for tension membrane or tent/marquee roofing materials and generally these structures have historically been put into the sub–section 'sarking' or 'other'. (It is time, in fact well overdue, that membrane roofing materials had their own sub–section and was not just lumped into 'sarking' or 'other').

The BCA only makes reference to the 'Spread of Flame Index' and the 'Smoke Developed Index'. For the purpose of this paper there is no need to go into further detail on the actual test, suffice to say that the test AS1530 nominated in the BCA was probably never applicable in the testing of fabrics, in particular thermoplastics like PVC which are the workhorse of the industry.

Temporary structures such as tents and marquees are regulated at State level, having requirements which are based on AS1530. (This also needs addressing, a separate sub–section in the BCA is long overdue).

AS1530 –The Test

AS1530 was developed from corner–wall burn experiments to grade cellulosic wallboards according to their tendencies to ignite and spread flame vertically. Over the intervening years this test had also been modified to include a smoke test, and AS1530 was utilized over the years for an expanding list of building materials. I understand that it is not unusual for a test to be adopted and used in areas it was not originally designed for, many other countries have similar experiences. Whilst AS1530 was not an ideal test for tension fabrics most suppliers (PVC manufacturers in particular) had learned how to manage the conflicting requirements of a low spread of flame result whilst limiting smoke (made difficult as the chemicals used in the PVC fabrics to extinguish the flame showed up as smoke on the optical testing mechanism).

Problems Arise

By the mid 90's however it was becoming clear, to suppliers at least, that something was amiss with the test. The AWTA had changed the validity of its test certificates to 2 years which lead to suppliers getting frequent requests to update their certificates. When they did this they were finding vast differences from the original results, so much so that they were no longer able to meet the BCA requirements. This was very suspicious as in a lot of cases had been no changes whatsoever in the formulation.

We made our initial enquiries with the testing houses, AWTA, but this produced nothing, however at subsequent discussions with the CSIRO Fire Research Laboratories, it became immediately obvious what the problem was. The CSIRO knew immediately what the problem was, the test method had in fact been changed in 1999. Subtle changes in the method of clamping the sample had had a marked effect on the results, particularly thermoplastic materials. A search showed in fact that these warnings were clearly documented in the literature!

Action

It began as quite a lonely 'crusade' by us. CSIRO was certainly very aware of the problem, the BCA seemed aware of the problem but said they had no plans to go forward, in fact they were addressing it for 'sarking' materials and a report had been prepared in 1998 on replacement tests for wall and ceiling linings, however it seems that membrane roofing materials were overlooked in this review. The new proposed test (Cone Calorimeter) for linings was not appropriate for the thicker materials used in roofing membranes. Despite repeated requests from us, and now other suppliers and from the two Industry Associations LSAA and ACASPA, (that had been getting a growing chorus of member frustrations), there seemed to be no movement whatsoever in Canberra.

Stalemate

A stalemate had developed. With no possibility of re–testing fabrics (hugely expensive full scale tests for individual projects were out of the question) old certificates were being allowed in some constituencies but not in others, fire engineers had to be brought in on some projects, and there was general confusion in the community. An altogether unsatisfactory situation.

White Knight

2006 enter John Shaw of The Victorian Building Commission. The BCC was responsible for the licensing of temporary structures in Victoria. We had brought the problem to their attention in 2002 and although BCA changes were outside of his responsibility John was now experiencing the problems first hand.

John decided to sort the mess out himself for the Victorian temporary structures industry and arranged a meeting of interested parties (incl; CFA, MFB, fabric suppliers, tent & hire industry, engineers). Since the same test method would most likely be needed in the tension membrane industry this was to be borne in mind by the committee, ultimately with the aim of incorporating this test is the BCA. It is my understanding that John has the blessing of the other States to take the lead in this matter. Warrington Fire Research was employed by BCC to give technical assistance to the Committee.

Two meetings have now been held and as a result a Draft proposal presented by Warrington. Unfortunately at this stage we are not all in agreement on the direction and it may take some further work to move on. The test method being proposed by Warrington is a modification of ISO9705, and even in its modified state is a factor of ten times more expensive than the old AS1530! Warrington position is that this is the only test that meets all the criteria set down.

Fabric Suppliers Position

The ISO9705 test, even in its modified form, is too costly, a small scale test is required. If this test method is adopted it is going to have serious effects on the industry that will restrict in particular any new fabrics, or new suppliers to the industry. At this time there are two or three major suppliers of fabrics to this industry, with a handful of established products. Clearly those products will have to be tested as these suppliers have sufficient market share to justify it. What of the other less entrenched and smaller suppliers, are they going to spend $10,000 to test a fabric in the hope of selling it. Experience says not, they will try for an order first, however the purchaser is going to be very reluctant to order without all the certification in place.

The same applies to newly developed products from the current existing suppliers. As it stands the larger companies are prepared to outlay $1,000/test (with no guarantee it must be said that it will pass first time, it may need to go back for re–formulation and re–test more than once, at $1,000 a time) and then put the product into store in the hope of selling it. Clearly at a cost of $10,000/test this will be a significant barrier in the future.

What we as fabric suppliers are saying is, that in order to keep the costs to the Australian community down, adopt one of the test methods that are already in use, (or plan to be implemented, overseas). The major fabric suppliers are already selling into all these major overseas markets and will already have these certificates, thus requiring no additional expensive testing in Australia.

In our view there is nothing special about the Australian market that would require a different test here. Despite the perceived shortcomings of all these current tests the evidence is that they were successful in weeding out unsafe products for our industry as there is negligible to zero incidence of major fires or loss of life with materials that have passed these tests.

Other Countries

It is fair to say that other countries are also going through similar experiences. There are reports that in the US they are thinking about adopting new standards, and in parts of Europe they are similarly talking about adopting new standards. The European test method proposed is in fact very close to that proposed by Warrington, and that being the case we would suggest that this be adopted.

At the very least if we are going to have a ’special Australian test’ make it a small scale test that does not impose undue financial barriers on the industry.