

Recent Fabric Structures - A Fabric Manufacturer's Perspective

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INTRODUCTION

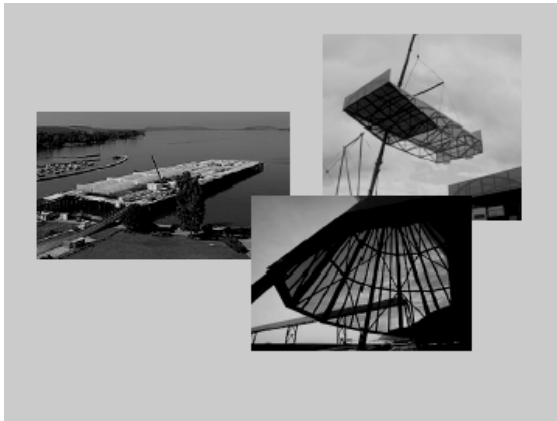
This paper will show you some recent structures either utilising unusual fabrics, unusual applications, or constructions, in order to show the possibilities, and hopefully stimulate ideas on fabric use.

The paper will be in two parts, diverting from the topic proper to discuss proposed changes to fire requirements of the Australian Building Code, the problems that fabric manufacturers have meeting the current 'quirky' AS1530 requirements, and the proposed new testing methods under evaluation by the BCA Board.

SOME RECENT PROJECTS

(Not all participants in these projects are known to the writer, so in order to avoid missing anyone credits have been omitted).

Swiss Expo 2002 – Silver Mesh



One of the architectural visions became a reality at the Arteplage of Biel-Bienne. To set up these three 'Towers of power', Valmex® Silver Mesh was used, exposing the structure of the building and underlying inherent lightness of the whole structure. Stretching for 300m, with a height of 25m Above the water level, 25,000sqm of fabric was utilised.

The Swiss National Exhibition would surely be one of the most remarkable events of this year in that country. The Expo takes place on four different sites with a mobile one (a ship) travelling between the sites.



LSAA 2002 Proceedings



Pier under construction



Lightweight elements lifted into place



'Lightweight structures'



Structure exposed



Structure exposed



Wonderful night visions

SHOPPING CENTRE – Silver fabric

A new housing sub-division in Europe required a local shopping centre. The concept was a temporary facility that could later be upgraded to a permanent shopping mall when required. The solution was, fabric structures, and the fabric was requested in a silver finish. Surprisingly for those that have seen this project reports are that it blends into the local landscape very well. Type II and type III fabrics were utilised.

LSAA 2002 Proceedings



BMW Pavilion – IAA Motor Show, Frankfurt 2001



Always spectacular BMW did not disappoint again at the 2001 IAA Motor Show in Frankfurt. A 3 story fabric structure, with double curvature, utilising predominantly a Type III fabric. These structures are designed for multiple use, (up to 3 exhibitions).



VALDEX FR 1000

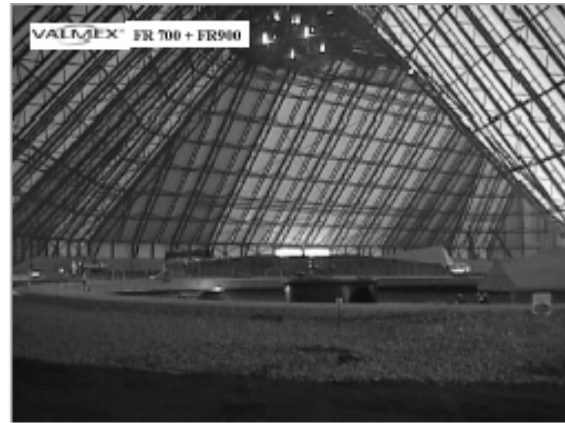
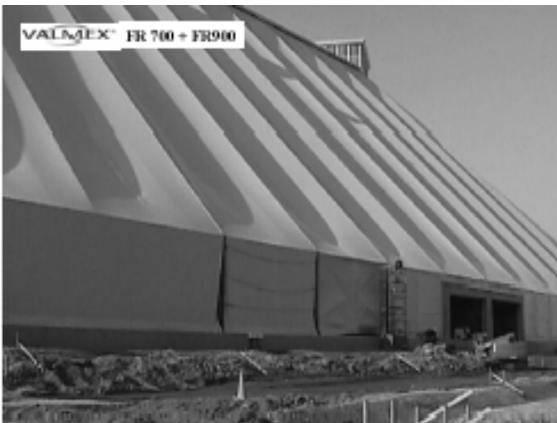


Coal Site Project – Japan

A coal fired power station, originally in the countryside, however over the years suburbia had crept up on it. Finally the ultimatum was to move the power station or cover up the coal pile to reduce dust on the surrounding community. Local OHS regulations played a part in the selection of a fabric structure, a conventionally clad building would require a large amount of very high scaffolding and workers fixing cladding at dangerous heights. The solution was fabric panels slid into tracks and lifted with a winch system from ground level. A geometric taurus with a folded surface allowed tensioning of the fabric in the valley tracks. Approximately 50,000sqm of fabric was utilised in an off white grey colour, as ultimately it would turn this colour with all the coal dust anyway.

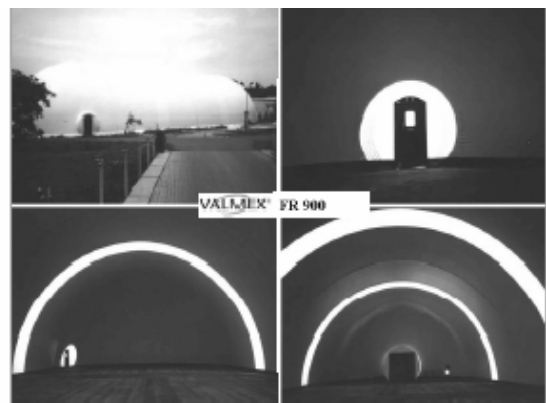
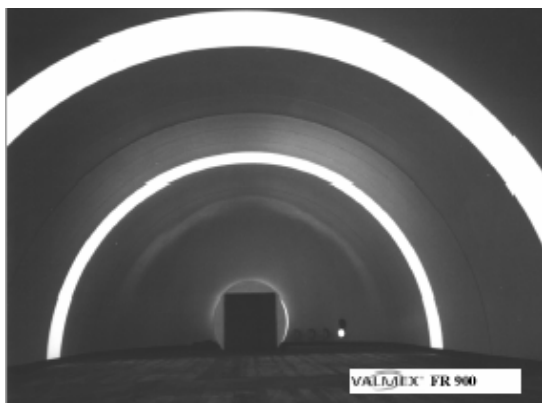


COAL SITE PROJECT JAPAN 2000



Industrial Inflatable – Blockout fabric

A large open span storage was required for agricultural produce that needed to be stored in the dark. At the same time the workers needed to navigate their way around the structure. The cheapest and most effective solution was a few panels in the translucent fabric.



China – with flair

Little needs to be said about this project, one of the writers favourites, other than it is done with flair that makes this project memorable. It adds an element of fun that could well be incorporated in many other projects.



FIRE CODES - Proposal to Amend the Building Code of Australia

Introduction

From a fabric suppliers point of view it became increasingly perplexing as to why fire retarded pvc fabrics have found it noticeably harder over the recent years (1) to meet BCA requirements under the current AS1530 test procedure (whilst the formulations have changed very little). These materials have no trouble passing the codes in all other major countries (UK, Germany, France, USA, etc). It has become apparent to us recently that changes to the actual test method (AS1530) have been the major contributor.

Commentary

The AS1530 test was never designed for fire retarded plastic materials (2,3,4), and changes to the test method over the years, including the addition of smoke testing, and subtle changes in the test method (4), made it even less applicable. It has reached the almost ludicrous stage now that it seems the only way to meet the current BCA requirements under AS1530 with fire retarded pvc membranes necessitates the removal of fire retardants in order to lower the smoke developed to acceptable levels.

The unsuitability of the AS1530 test method for our industry, and in particular fire retarded plastics, has been well known to various authorities. The AWTA is quite clear about this in notes (1,2,3) on the test method, and discussions with CSIRO indicate they are also well aware of the limitations. The ABC Board has been investigating alternative more suitable testing methods and The Fire Code Reform Centre was set up in 1993 (4) by the ABCB 'to facilitate the introduction of a fully engineered approach to building fire safety regulations'. A "Proposal to Amend The Building Code of Australia" (4) already published.

I suspect that very few, if any, in this room would be aware of the moves to amend the codes, which go back to 1993 when the 'Fire Code Reform Centre' (4) was set up, or even that a proposal to amend the code has already been published in July 2002 (4)!

It is perhaps an indictment on our organisation that we were not aware of the mooted changes and did not seek to have input into the proposed changes. We now face the possibility that another unsuitable test (for our application) has been selected which we will find impossible to meet.

Proposed New Codes

Referring to the 'Proposal to Amend the Building Code of Australia, July 2002' (4), the proposal is to replace the current AS1530 test with a 'Cone Calorimeter Test'. This proposal is as a result of the work done by the FCRM, which tested a range of lining materials. Unfortunately none of these materials are single ply architectural membranes, they are all LINING materials, and this is the crucial point for us!

A recent meeting between the writer and the Fire Science Division at the CSIRO, (one of the few people who the writer spoke to who immediately understood the mechanisms involved in our type of structure), would indicate that there may indeed be some doubts for fire retarded pvc membranes under this new test.

The technical aspects are probably beyond this meeting but it is imperative that this organisation (and any other organisations with similar interests) immediately get involved and contact the Building Code of Australia Board to ensure we do not end up with another set of ludicrous tests that the industry finds difficult or impossible to meet.

Recommendation

That the LSAA immediately set up a Technical Sub-Committee in order to access the new regulations and input their recommendations on any changes to the ABCB. At the same time address the issues with the current testing problems and compliance issues that remain in place until any new regulations are implemented.

References

Indtex/Mehler fire test results
AWTA Notes on test methods, AS 1530.2
AWTA Notes on test methods, AS/NZS 1530.3
AWTA Notes for guidance, Fire Hazard Properties of Materials & Australian Building Codes, 01 July 2001
ABCB Proposal to amend the Building Code of Australia, Fire Hazard Properties of Building Materials and Assemblies, Regulatory Proposal (Regulation Document) and Regulatory Assessment (Draft Regulatory Impact Statement), RD/RIS 2002-03
http://www.abcb.gov.au/content/publications/FCRC_PR_98-02_Project2A.pdf