Slide 1

Collaboration in Transparent Enclosures

Lightweight Structures Association Australasia conference

12-14 October, 2011

aurecon

Slide 2

Glass has changed buildings

The modernisation process is a constant to-and-fro of performance and expectation, as glass has become larger, better, more consistent, buildings have changed;

Consider the changes in expectations; light penetration, thermal, acoustics, cleaning, repair and maintenance, construction methods, available material and labour, brand identity, longevity, resistance to attack (think environmental and human)

aurecon Presentation Title
Date

Slide 3

Fitness for Purpose
(expectation management)

aurecon

not suited for your environment?

Not getting the **feeling** the way you thought?

Will your expectation **change**?

Slide 4

Navigating the requirements for all and sundry glass performances can highlight very quickly the conflicts of the proposed design and the briefing;

- maximise daylight
- Minimise thermal gain
- Insulate
- ventilate
- 100 year design life
- least expensive solution
- no maintenance required
- acoustic performance

- activated facade
- controlled environment
- maximise glass spans
- minimise support structure
- Warranties
- Bespoke design
- Branding
- Standard systems

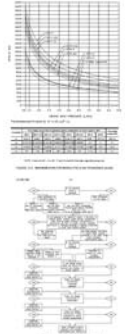- secure
- open
- Sustainable
- Quick return

Expectation Management

aurecon

Design?

- Steve Choat, Viridian & Chris Barker, AGG, AAGA
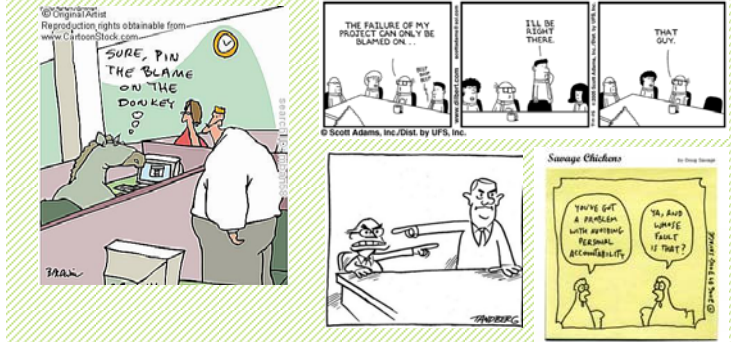Conference presentation 2010

Design?

Delivery Responsibility;

• Prescriptive specification

•Detail designed and documented by Consulting Engineer, Façade Consultant or other who will ultimately certify the design and review the construction. This is usually used for bespoke applications of glass not readily available.

• Performance Specification

•Outline design specified by Architect, Engineer or Façade Consultant. The design outlined in the Performance Specification should be capable of reaching the Client Brief. Typically used for conventional glazing systems with standardised components that a number of suppliers are capable of providing, the design and certification of the system is the responsibility of the contractor.

• Design and Build

•Systems not specified, drawings may only indicate aspiration and may not include any real detail.

Collaboration as we know it?

Design and Build

aurecon

Performance

aurecon

Performance

aurecon

Prescriptive

aurecon

Structural behaviour

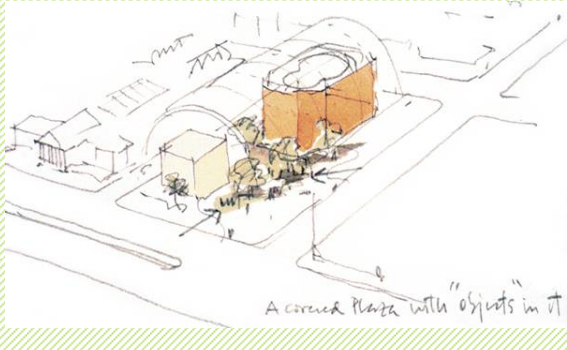Primary   Secondary   Tertiary

aurecon

Prescriptive – Kimmel Performing Arts Center

A covered Plaza with "objects" in it

aurecon

Prescriptive – Kimmel Performing Arts Center

aurecon

Prescriptive – Kimmel Performing Arts Center

aurecon

Prescriptive – Kimmel Performing Arts Center

aurecon

Prescriptive design; Cable suspended glass panels, Articulated fittings, Lubricant impregnated neoprene gaskets, Counterweighted tension systems, Flexible walls – span/33 deflection, installation sequencing, wrap-up insurances, independent verification, mock-ups, dynamic wind testing, pressure testing, aeroelastic model testing, FEA, fabrication methods and construction tolerance.

aurecon
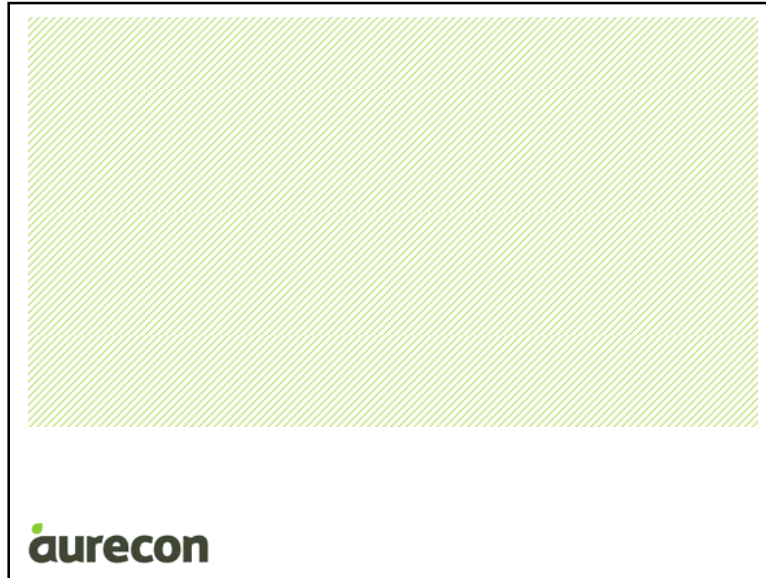
Performance design- Shanghai Centre

Performance specification, Shanghai Centre 632m, independent verification, structural glass mullions suspended on outer steel frame creating atrium space.

aurecon

Figure – three layers, internal, skeleton, skin

aurecon

Figure - glass stiffened mullions

Figure - circulation atrium

Prescriptive design; largest laminated toughened assembly in the world at the time, client built own autoclave, Articulated fittings, load support lugs routed into glass, independent verification, mock-ups, load testing, details accommodate construction tolerance, fittings laminated into glazing assembly.
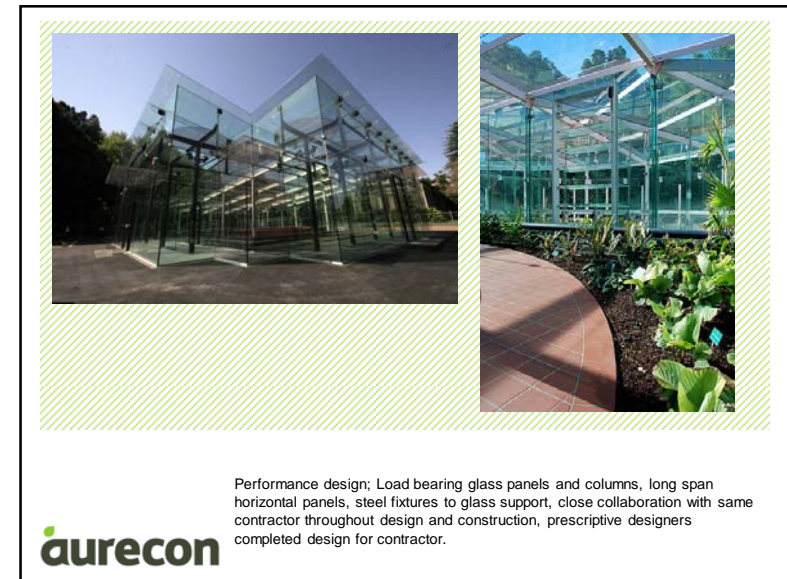
Performance design; Load bearing glass panels and columns, long span horizontal panels, steel fixtures to glass support, close collaboration with same contractor throughout design and construction, prescriptive designers completed design for contractor.

Performance Specifications – Current Projects
Advanced Engineering Building (AEB) – University of Brisbane

Aluminium   Aluminium/Timber Hybrid

- Use of natural resources – aluminium/timber hybrid mullions used to many parts of the façade to reduce embodied energy, carbon and total U-Value of the system.
- Array of custom terracotta extrusions used as sun shading devices.
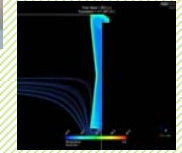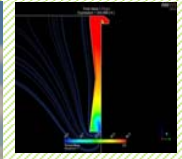- Various internal and external automated screen blinds with sun tracking and wind reading sensors.

áurecon

Performance Specifications – Current Projects
Centre for Obesity, Diabetes and Cardiovascular Disease (CODCD) – University of Sydney

Computational Fluid Dynamic (CFD) Analysis to demonstrate the thermal performance characteristics of the double skin façade used on CODCD.

- Double skin façade system to improve occupant thermal comfort without compromising visual clarity through the façade.
- Utilises a combination of louvre systems for natural ventilation and sun shading.
- Aluminium curtain wall system with High performance glazing, fixed vertical sunshades and woven aluminium screens.

áurecon

Performance Specification- Current projects
Life House – RPA, Sydney

- External glass screen with dual layer frit located at strategic locations to minimise the appearance of the supporting structure while providing blocking the sun, providing thermal comfort and improved visibility.
- Aluminium curtain wall system with High performance glazing with fixed vertical concrete precast and aluminium sunshades to the East and West elevations.

áurecon

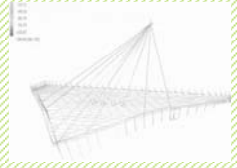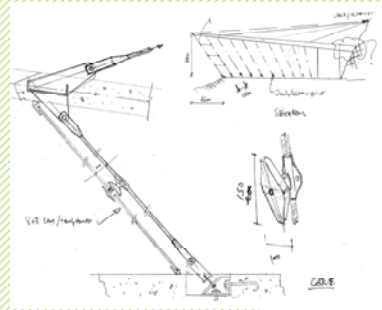**Prescriptive – Kimmel Performing Arts Center**

Figure - roof model

Figure - concept details

áurecon

Super-home's troubled times...

Dec 2007 Work begins on $10m super-home

Nov 2009 Owner Julian McPike tells Mountain Scene how Queenstown design-build company Jagged Ltd quit eight months previously after he'd paid them almost $5m. The company left several furious local subbies out of pocket

Dec 2009 Main contractor Slant Build Ltd, owned by Arrowtown engineer Glenn Parker, is liquidated by subbie United Scaffolding. After the collapse, Parker left the Wakatipu reportedly bound for Abu Dhabi

Jan 2010 New glass contractors are hired and work resumes

Mar 2010 Jagged Ltd, owned by Parker and Queenstown business partner Warrick Weber, is put into liquidation, as well as Weber's Weber Consulting Ltd

Nov 2010 A fourth company associated with the super-home build, another Parker-Weber entity called Slant Ltd, goes into liquidation

Performance specification; cable suspended trapezoidal laminated assembly. Concrete roof suspended from bedrock, glazing cable restrain roof, remote location, limited suppliers.