

# A FAÇADE TO STAND THE TEST OF TIME

**This Pathfinder project at Victoria University of Wellington looks at a team approach to getting a façade right first time by considering quality and value over cost.**

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**T**he façade is a critical element of a building, linking internal and external elements as well as presenting a 'face' to the world. It needs to perform, be fit for purpose and look good too. If not done right first time, there are costly implications for the entire building.

The project team behind the Alan MacDiarmid Building Teaching and Research Facility for Victoria University of Wellington had some local challenges to address, which made the specification, design and construction of the façade a priority. These included vulnerability to leaks due to the Capital's high winds and water load, plus the need to accommodate seismic movements.

## Mismatched expectations and lead times

The science behind a quality façade determines the best approach to address often-conflicting objectives. The weathering, structural and connectivity function of the joinery – its interface between the different materials – must be considered, while also ensuring the façade is safe and meets the acoustic, thermal and solar performance needed to provide the best possible environment for the building's occupants. It also needs to be buildable, maintainable, durable and affordable.

Long lead times for glazed elements or systems, typically sourced from outside New Zealand, often mean the envelope performance is locked in before the design of structural elements is complete, or the façade package is tendered as a design-build performance-specified package, risking incompatible tolerances between the building interfaces. This can lead to a mismatch between the client's early expectations on product quality and what providers can actually deliver to budget and lead time.

## Consider the whole system

With all these aspects to consider, it becomes obvious that the margin for error is formidable. To counteract this, the design and construction of a façade needs to be considered as a whole, as a collection of systems, not as isolated components. This is a shift away from glazing standardised window joinery to façade systems and can only be achieved under a multi-disciplinary approach.

## Team approach to requirements

Early in the design process of the Alan MacDiarmid Building, Jasmax sought Thermosash's expertise around performance considerations for the designs proposed, and Mainzeal was brought in during the documentation stage of the building. Workshops included the different consultants who would work together to meet the performance requirements, such as aesthetic, weathering, mechanical and structural considerations, with Aurecon acting as façade consultant and peer reviewer of the façade.

The façade package went out to competitive tender with a comprehensive performance specification. Thermosash were the successful bidders. Careful analysis of shop drawings, calculations and testing verified that all agreed performance requirements were met.

## Simple steps to success

This Pathfinder project succinctly demonstrates the often simple and sensible practice needed to avoid becoming a statistic of the leaky building syndrome. There were a number of characteristics that ensured the project's success:

- A client who demanded quality and based their decisions on best value rather than lowest cost. Thus the whole project team assessed the risks to deliver a quality façade that could stand the test of time, even under such extreme conditions.
- A client who recognised the importance of selecting the right project team, with knowledge of the limitations of available systems.
- A multi-disciplinary approach was taken – the project team worked together to find the best solutions.
- Communication between the consultants, contractor and trades ensured the interface between the different materials was durable and weathertight.
- Early involvement of the main contractor helped them to gain a greater understanding of the project complexity, keep to programme, ensure realistic costs were met, select appropriate subtrades to meet objectives and contribute to the design and construction methodology.
- A robust design and peer review process ensured the façade met all performance criteria. The façade performance criteria, testings, certification and quality assurance expectations were all clearly articulated to tenderers through a comprehensive specification.
- Aurecon, acting as the peer review consultants, were involved in the process and able to contribute to finding the best solution.
- Erection and testing of prototype joinery systems at an IANZ-certified laboratory determined their structural adequacy, weathering, air permeability and building movement tolerance.

Technical features of the project included:

- different joinery systems to meet the performance requirements for each façade, responding to its environment and orientation
- window systems customised for the project – the details were specifically designed and thoroughly reviewed to maximise optimum performance and aesthetic requirements
- sun shelves and fins that were integrated and supported from the joinery systems, minimising risky penetrations through the envelope



Placing the large glazing units.

- critical path considered in the manufacture of joinery and supply of glass to minimise delay potential and ensure performance requirements were met.
- a significant proportion of off-site manufacturing, with the project team well informed of agreed tolerance levels so there were no surprises during construction.

### Cutting corners not recommended

The façade generally represents around 15% of the cost of the building and is always on the critical path due to the need to close in buildings for following trades. These reasons alone signify merit in doing the façade properly – not just for large-scale projects, but for all projects.

The consequential costs of not doing the façade right the first time can be enormous. Projects often run into trouble when decisions are made to select products that are inappropriate or are too close to the envelope in their performance capabilities in the short-sighted hope of saving money.

### Quality at every stage

The process behind realising Victoria University's new research and teaching building was excellent. The client's experience and knowledge and the importance of selecting the right team were integral to its success in what were not always the easiest of conditions.

The quality of the building did not stop at the façade but was integral to every decision, steered by the client but upheld by everyone on the project team. The budget for the building did not change during the course of the project and has included additional work between the interface of this building and its neighbours.

### You get what you pay for

As an industry, we have long known the benefit in choosing value over lowest cost, yet the growing stockpile of leaky buildings is evidence that a significant proportion of the architecture, construction and engineering industry continue to turn a blind eye under pressure from developers and clients who demand the lowest cost.

Projects like this are important because they remind us that a project team with the expertise and willingness to work together plus a client willing to pay appropriately can create a building that will last the test of time.

*A detailed report is available at [www.constructing.co.nz](http://www.constructing.co.nz), see Pathfinder projects. ◀*



Alan MacDiarmid Building Teaching and Research Facility at Victoria University of Wellington.

Project	Victoria University of Wellington, Alan MacDiarmid Building Teaching and Research Facility
Client	Victoria University of Wellington (Ian Maskell, project manager)
Architects	Jasmax (Alistair Luke, principal architect, Roger Simmons, project architect)
Contractor	Mainzeal Construction Ltd (Dave O'Donovan, construction manager)
Structural engineers	Dunning Thornton
Services engineers	Beca Carter Hollings & Ferner Ltd
Laboratory design consultants	Labworks Architecture
Façade consultants	Aurecon (Karl Jones, principal façade engineer, John Sutherland, senior façade consultant)
Façade contractor	Thermosash (David Hayes, CEO, façade engineer)
Cost managers	Rider Levett Bucknall
Region	Wellington
Sector	Tertiary education
Anticipated construction value	\$38.8 million
Approximate project value	\$47.6 million
Design start	July 2006
Construction	September 2008 to March 2010
Procurement method	Early contractor involvement, P&G plus margins, building constructed in stages, trades packages tendered
Form of contract	NZ 3910