CASE STUDY
SAHMRI

Location: Adelaide, SA
Architect: Woods Bagot
Builder: Hindmarsh

“We tried to get the materials to talk to each other and symbolically merge so the concrete has fluidity of movement”

- Anoop Menon, Woods Bagot

Concrete.
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The building's external form rightfully attracts plenty of public attention, but the unsung hero underpinning the elegant design is concrete.

This sophisticated engineering solution allows the building to seemingly 'float' above the ground plane, without a forest of columns supporting it.

Its nickname is the 'pine cone' – a nod to its distinctive dia-grid façade. But there's much more to the South Australian Health and Medical Research Institute (SAHMRI) than meets the eye.

Opened at the end of 2013, SAHMRI is South Australia's first independent leading health and medical research institute, home to more than 600 researchers.

The **concrete lift core** is the building's backbone that supports the entirety of the building. The post-tensioned concrete floor slabs and beams all tie back to this core.

The sculptural flower columns, which effectively transfer the column loads of the upper levels to six points on the ground plaza level, rely on the strength of concrete.

The 'branches' of each column meet the slab above at an angle, and therefore need to be supported laterally by the slab itself (which in turn is tied back to the concrete core).

Cover image: The striking "Pine Cone" SAHMRI exterior

Photographers: Peter Clarke: Front Cover, P1 Bottom, P2 Top, P3 Left & Right, P4 Bottom, Back Cover David Sievers: P1 Top, P2 Mid, P2 Bottom, P4 Top.

PERFORMANCE AND STYLE ON AN ATOMIC LEVEL

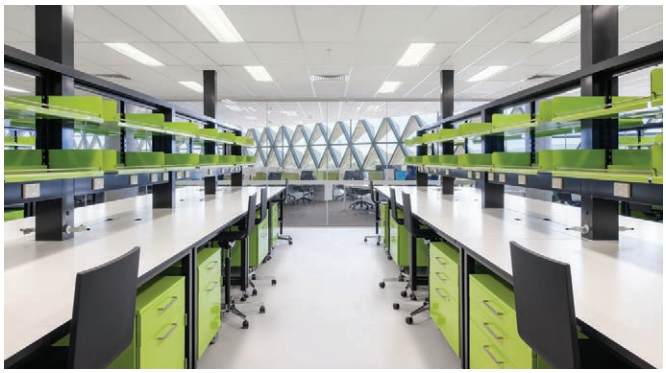
A critical challenge to be overcome in a research facility of this kind is control of vibration.

The **inherent mass and energy absorbing qualities** of concrete, coupled with its **spanning abilities,** was the simple yet effective solution to the problem.

On the upper lab floors, vibration is effectively dampened by the positioning of the columns on either side of the lab benches. The lab levels typically have 36 columns, with the loads transferred to the six points on the ground plaza level via the flower columns.

One of SAHMRI's most significant areas of expertise and activity is in nuclear medicine. Deep in the bowels of the building is a cyclotron, a particle accelerator used to produce radioisotopes for cancer testing and treatment. To contain the radiation, the cyclotron is housed within an in-situ concrete bunker - the walls, floor and roof of which are 1600mm thick.

Because the radioactivity only impacts on the first 100mm or so of wall depth, the internal walls of the bunker are lined with a sacrificial façade of purpose-manufactured concrete blocks. These can be removed and replaced at appropriate intervals to extend the overall life of the cyclotron.



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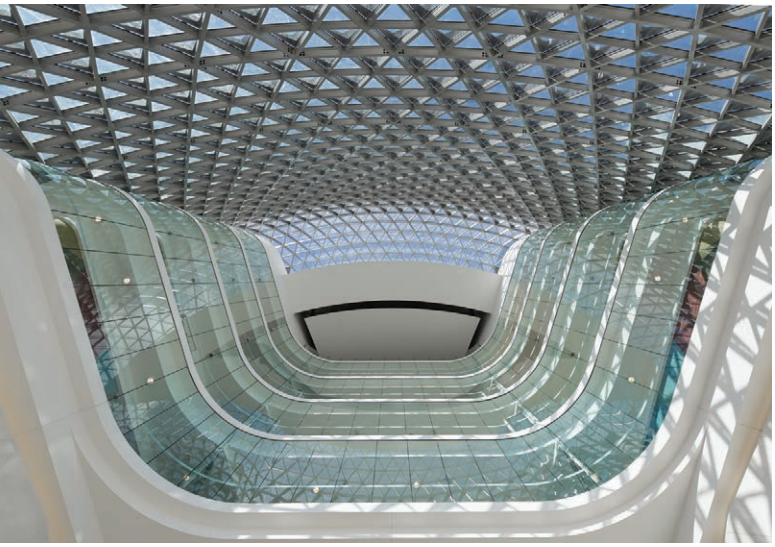


FORM, FUNCTION AND FREEDOM OF EXPRESSION

The use of concrete to 'do the heavy lifting' in SAHMRI has allowed other materials to shine and enabled one of the most important design objectives – to allow the building to proudly and openly tell its own story.

Anoop Menon of Woods Bagot, the architects for SAHMRI, says research laboratories are typically sterile, internally focused spaces, with the external expression very much of secondary consideration.

"We wanted to turn that idea on its head," he says.

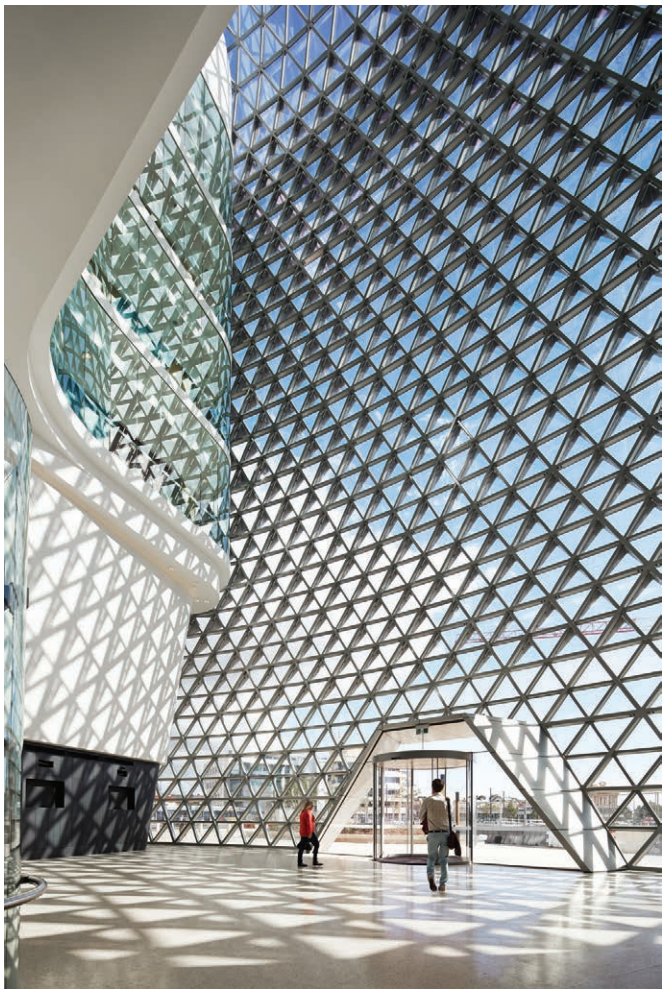
"We wanted people walking past this building to look up and see the researchers working inside – and hopefully be inspired."

While most of the concrete underpinning SAHMRI's form and function is hidden from the eye, it does feature prominently in the ground-level internal plaza. Here, the structural concrete floor slab is finished with a 150mm topping slab, ground and polished to expose the aggregate.

The external plaza area also features a concrete slab with an acid-washed finish, while precast concrete planter boxes at the building entrance complement the surrounding forms and finishes.

"So, the fluidity of the building, the shapes, the transparent façade showing the internal atriums on either side... it's all about attracting the eye and revealing and promoting what happens inside."

– Anoop Menon, Woods Bagot



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A SOLID SYMPHONY

The **durability** and **strength** of concrete was a key factor in its specification for the project, particularly for the outside plaza area.

But the **solidity** of the concrete form, coupled with its **finish,** was also crucial to the overall aesthetic of the plaza level, inside and out, contrasting with the glass forms and the aluminium and steel façade.

“We tried to get the materials to talk to each other and symbolically merge,” says Menon.

“The concrete has fluidity of movement. The patterns on the surface reflect the dia-grid façade.”

Ultimately, the success of any public building is measured by its level of engagement with those who use it, the physical environment around it, and the community at large.

It’s a testament to this remarkable building, and those who designed and built it, that its occupants describe it in glowing terms – and that more than four years after its opening, there is still a waiting list for public tours.

IT COULD ONLY BE CONCRETE

As you can see, concrete is an incredibly adaptable and capable material and the natural choice for projects with niche requirements like this outstanding research facility. It also offers a range of broader benefits to even the simplest of buildings and infrastructure:

- Easy to obtain, with longstanding national supply & distribution chains
- Build Fast. In high rise buildings floor cycle times of as little as four days are common
- Building with concrete is **so well accepted** it allows for more efficient scheduling of trades, saving time and money
- Little wastage onsite, ensuring fast site clean-up
- Concrete elements can be factory manufactured to precise specifications, then delivered to site for fast installation

Coupled with maintenance free performance plus its enhanced resistance to fire, flood and other natural disasters, concrete is sustainable and cost-effective over its lifecycle.

See SAHMRI for yourself:

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