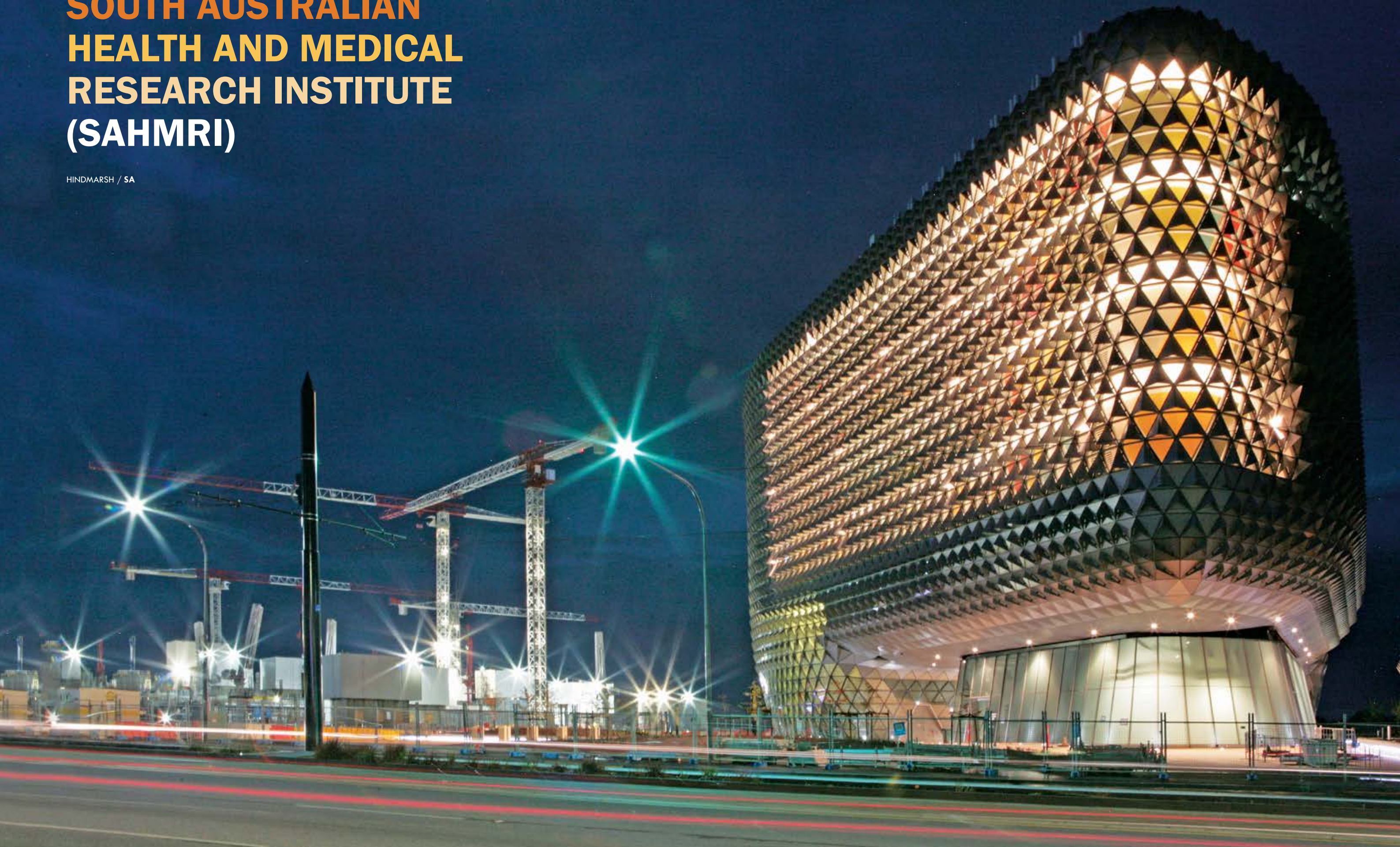


SOUTH AUSTRALIAN HEALTH AND MEDICAL RESEARCH INSTITUTE (SAHMRI)

HINDMARSH / SA



UNIQUE IN EVERY WAY

The Federal Government funded \$200 million SAHMRI facility is the first Australian laboratory on track for an anticipated LEED Gold rating for environmental sustainability.

MAIN CONSTRUCTION COMPANY : Hindmarsh
CLIENT : The Department of Planning,
Transport and Infrastructure & SAHMRI
CONSTRUCTION VALUE : \$200 million
ARCHITECT : Woods Bagot
STRUCTURAL ENGINEER : Aurecon

levels of suspended post tensioned superstructure floor slabs above,” said Hindmarsh Project Manager, Marcus Anderson.

“Hindmarsh had a total of 30 staff working directly on the project in roles such as Project Management, Site Management, Site Safety, Coordination, Services Engineers, Administration, Graduates and Labourers.

“There were over 60 subcontractors involved, with a total peak workforce on site of over 300 workers; and there are seven key consultants working on the project including Architects, Structural & Civil Engineers, Services Engineers, Laboratory Specialists, Cost Managers, Building Surveyors, Environmental Engineers and Sustainability Consultants.”

Hindmarsh brought a high level of in-house engineering expertise to the project, for tasks including the structural facade as well as commissioning, BIM, shop drawing, value-engineering and rapid issue resolution.

“Our own engineers can derive, propose and resolve construction and commissioning solutions to a contractor query,” explained Catherine Tanner – Hindmarsh Building Engineering Services Coordinator.

“For example with a buildability issue, such as a modification to a floor plan, services need to be re-coordinated and we can work through the possible options and solutions, negatives and positives, and cost provisions to provide alternatives to consultants for a quicker response.

“The complexity of the integrated laboratory systems, including a cyclotron area, was a challenge. To have a variety of functions as well as integrate them into a single building is quite unusual, and the relationships of the services with each other needed to be considered.

“In the Cryogenic Room, there are emergency push buttons, various gas detection devices and mechanical ventilation boosting requirements. In an emergency event; security doors disengage, CCTV activates, lighting initiates, and additional mechanical exhaust triggers – one button integrates many services, so there is a requirement for complete overall integrated services testing as well as testing of each individual system.”

Another major challenge was the mechanical air balancing, with levels three to nine open to two atria, and a requirement for every facade panel to be installed and sealed before accurate air balancing can occur. Catherine said the solutions included installing temporary walls where necessary, again a benefit of having construction management and engineering expertise on the same team.

The level of expertise and dedication Catherine applied to the project was also recognised by the broader industry, with the talented engineer winning the 2013 NAWIC SA Young Achiever Award.

“The complexity and detail of SAHMRI draws on our expertise in delivering technical, innovative projects and this has therefore been a very rewarding experience for the entire team. The project has also enabled Hindmarsh to exercise our specialist capabilities working on multiple stakeholder projects in the health sector, most recently demonstrated by our delivery of the new Flinders Centre for Innovation in Cancer, also in Adelaide,” said Hindmarsh CEO Darren Dougan.

For more information contact Hindmarsh, 57 Wyatt Street Adelaide SA 5000, phone +61 8 8228 4188, fax +61 8 8228 4199, email sa@hindmarsh.com.au, website www.hindmarsh.com.au

Unique in every way, the new South Australian Health and Medical Research Institute (SAHMRI) is the result of an outstanding collaboration between the design, construction and engineering personnel involved. The \$200 million facility is the first Australian laboratory on track for an anticipated LEED Gold rating for environmental sustainability, and incorporates state-of-the-art technology including South Australia’s first cyclotron. As Managing Contractor for the 30,000m² facility, Hindmarsh was the point of integration for all the construction and engineering aspects of the project, working closely with a design team including Woods Bagot (Architecture), Aurecon (Structure, Civil, Facade and Electrical Engineering Services) and Norman Disney & Young (Mechanical and Hydraulic Services).

Hindmarsh succeeded in delivering SAHMRI for early use by December 2013, an outcome Hindmarsh Chief Executive Officer Darren Dougan says is testament to the collaboration and shared vision of all project partners.

“As one of the largest medical research infrastructure projects ever undertaken in Australia, and the Southern Hemisphere for that matter, it’s a credit to the Hindmarsh team and our project partners to have delivered this innovative, complex facility on time and on budget,” Mr Dougan said. “Hindmarsh is proud to be involved in a project of this magnitude and significance, which will improve medical research capabilities and health outcomes for generations to come.”

The nine storey building features East and West atria, fully flexible laboratory spaces, informal gathering spaces, abundant natural light, a public plaza at the base of the building, and a MITRU facility, where radio-isotopes will be manufactured for clinical and medical research purposes.

SAHMRI’s facade has a unique geometry which combines a structural steel diagrid sub-frame with an aluminium curtain wall comprising individual triangles of high performance double glazing each with an individual sunshade, in addition to expanded woven mesh,

and perforated and solid aluminium infill panels – in total over 14,000 individual triangles.

The project commenced in May 2010, with an initial stage of complete modelling in 3D Revit software undertaken to resolve the numerous structural and system complexities. Hindmarsh acted as the point of coordination for the project’s highly detailed BIM modelling. Further to this, a consultant was hired to survey floors seven and eight and update the BIM model to ensure the highly precise structure and facade were properly detailed and each installation point accurate. Hindmarsh provides BIM to clients for both structural and architectural modelling. Engineering services are then incorporated to maximise efficiency.

“The building has three levels below plaza, which is founded on 337 CFA piles. A plaza slab forms the start of the transfer structure with seven clusters of steel raking columns which support the entire five

MULTI-FUNCTIONAL SUSTAINABLE MATERIAL SIMPLIFIES SAHMRI FITOUT

Instead of using a variety of lining and board products throughout the SAHMRI, and dealing with all the complexity multiple sources and quantities entails, the project was able to implement the KISS principle by using one product from USG Australasia.

Supplied through Boral, USG's patented Fiberock® was used for all the wall linings and wall partitions throughout the facility, including labs, research areas and offices. A High Density Gypsum Fibre board, USG Fiberock covers a lot of bases – it's resistant to water, fire, mould and impact, and has superior acoustic qualities.

In total, 30,000m² of Fiberock was supplied, with USG Australasia's staff working closely with Boral and the builder, Hindmarsh, to make sure supplies were on ground in a timely manner. USG liaised with Boral to forecast project needs well ahead of program to ensure their stock level was increased appropriately.

"Boral were able to organize the entire supply of wall system requirements with one board, instead of up to five different types, which minimized complications in terms of site storage and the logistics of allocating loads to cranes for specific tasks," said USG Australasia's Southern Business Development Manager, France Tokay.

"Using one multipurpose board also substantially streamlined the fitout process."

A leading global manufacturer of building materials and solutions, USG have been innovating with synthetic gypsum for over 30 years, with the technology for Fiberock (formerly marketed as Powerscape) developed 15 years ago.

It came about in one of those serendipitous moments during some gypsum growing research, when some cellulose fibre inadvertently was added to the mix – this was only realized later when the experiment's results were analysed, and the new possibilities of mixing gypsum and cellulose under specific conditions recognized.

"It is like paperless plasterboard, except plasterboard relies on the paper for its strength, and Fiberock is created by a patented process of growing gypsum under high pressure which interlinks the crystals with paper, so there is no paper needed on the outside. There is also no possibility of delamination, as it is a solid matrix," explained USG Australasia National Business Development Manager, Peter Wood.

"All the required testing has been done to have Fiberock approved by GECA as a sustainable product. Its recyclability is good, and every board can be re-used by removing it, rebating the edges and using it elsewhere. Fiberock also contains very little new material. It comprises 10% recycled cellulose (from post-consumer paper and cardboard), and 85% re-encapsulated gypsum.

"Our gypsum is a byproduct of coal-fired electricity plants, which use limestone scrubbers to capture the sulphur emitted from coal-burning. This converts the limestone to calcium sulphate, which we use to make gypsum, which would otherwise be sourced from mining.

"USG is passionate about the science of gypsum, and there is ongoing experimentation at our US operation into new possibilities. The company has been around for 112 years. We were the original inventors of plasterboard, and we have a large R&D Department in the USA.

"In Australia we provide supply of the boards and the joint compounds used with them to contractors and subcontractors, via resellers and distributors.

"The only real challenge with a project using Fiberock boards is for everybody involved to be well-educated in the process, as there are slightly different handling issues compared to standard plasterboard and other familiar systems.

"Specification has also been something of a challenge for us – getting it approved by Government departments who are used to familiar products. SAHMRI is a breakthrough project for us to be given the go-ahead for, as while the product is manufactured in the USA and there was a preference for Australian-made, there is no local equivalent."

Fiberock has been used in the majority of recent major health infrastructure projects due to its high performance specifications which are ideal for settings such as Royal Children's Hospital Melbourne, Gold Coast University Hospital, the Mater Queensland and Midland Hospital Perth.

"A hospital might require up to 70 different wall systems – we can narrow it down half a dozen," said Peter.

"It is a finished wall system, and the higher cost of the board compared to conventional plasterboard is balanced by the time, labour and logistical savings. A contractor can achieve with a single layer of Fiberock what other walls would achieve with a double layer.

"Education of architects and contractors is key so they can see the value in the boards – which also includes longevity, and an ongoing benefit is reduced maintenance of partitions and walls.

"As the company that invented plasterboard, this is the next evolutionary step, which helps the industry and the end-user."

For more information contact USG Australasia, Suite 412, 1 Queens Road, Melbourne, VIC 3004, phone 1800 226 215, website www.fiberock.com.au



ENGINEERING THE LEADING EDGE IN GREEN AND GOLD

Australia's first LEED (Leadership in Energy and Environmental Design) Gold rated laboratory facility presented Norman Disney & Young (NDY) with a worthy set of engineering challenges, and an opportunity to showcase innovative, sustainable and multidisciplinary expertise in resolving them. The engineering services NDY provided included mechanical, laboratory gases, thermal energy modelling, façade modelling, building automation, fire engineering, hydraulics, acoustics, specialist lighting and facilitating the complete 3-D Revit Modeling of the facility.

"Laboratory buildings have a considerable amount of specialist services within the ceiling spaces and riser spaces and hence require a high level of coordination. The use of 3D modeling (in Revit) was essential to ensure the services were adequately coordinated and that site clashes were minimized to avoid unnecessary costs and time delays. This also enabled congested spaces to be spatially optimized between services, architecture and structure," said NDY Director, George Balales.

"The complete building is configured as an Intelligent Building with all systems and services connected over an integrated IP network with intelligent patching facilities over fibre and copper cabling."

In SAHMRI's basement, the Molecular Imaging Therapy & Research Unit (MITRU) facility included the installation of the first Cyclotron facility in South Australia producing isotopes for medical purposes. The design of the exhaust systems to the hot pharmacy areas included high efficiency filtration to ensure exhaust air quality meets Environmental Protection Agency requirements. Zone air pressure control and monitoring is also essential to provide the necessary pressure differentials between functional spaces for control of air borne contaminants, which could impact the manufacture of the radio-isotopes. Within the laboratory spaces, the need to maintain close volumetric flow control and accurate monitoring resulted in the use of variable air flow venturi valves on the air distribution system. These are being used in SAHMRI to a greater extent than any other laboratory facility in South Australia.

Other projects NDY Adelaide are currently working on include the Myer Centre Upgrade, Sunguard Data Centre, ALDI SA Distribution Centre, Masters Home Improvement Store, Pinewood Studios Malaysia, Westpac, Edinburgh Defence Building 575, Adelaide City Council building upgrades, West Torrens Council Civic Centre and Ashman Grove Aged Care Facility.

"All NDY people understand and are committed to excellence in sustainable design. We collaborate in an integrated and complementary way to achieve long-term results for our clients and the community," said George Balales.

"We take a holistic approach to buildings, energy, natural resources, and transportation technologies and how they intersect and impact on our built environment. Our approach to each project takes a considered view on how these elements converge – either individually or collectively – and prescribe solutions to minimise the environmental impact of each component."

For more information contact Norman Disney & Young, Level 8, 11-19 Grenfell Street Adelaide SA 5000, phone 08 8290 6800, website www.ndy.com



LEADING EDGE MATERIALS CONSTRUCT A FUTURISTIC DESIGN

The cutting-edge research which will be carried out at the South Australian Health and Medical Research (SAHMRI) is matched by the extraordinarily challenging structural design of the building. With their many decades of experience in engineering innovative building products, Rondo were able to supply solutions which resolved some of SAHMRI's key construction challenges, backing them with expert technical advice.

Since the project commenced in 2010, Rondo has supplied their KEY-LOCK® Suspended Ceiling System, Steel Stud and Track, DUO® Exposed Grid Ceiling System, PANTHER® Access Panels, Shaftwall and Walk-About Trafficable Ceiling System.

Rondo's Technical Services team assisted in the design of SAHMRI's external service walk ways, which are subject to external wind loads, and provided seismic designs for Rondo's DUO® Exposed Grid Ceiling System.

Rondo's Wall Design Wizards on the company website were also used by Ceiling and Wall Contractors to ensure several full height walls were achievable as specified. In some cases this resulted in design modifications, with wall heights adjusted to match those calculated on the Rondo Wall Wizard.

The interior of SAHMRI features a large curved steel stair case with spiral sides which were formed with Rondo's 76mm Stud and Track as

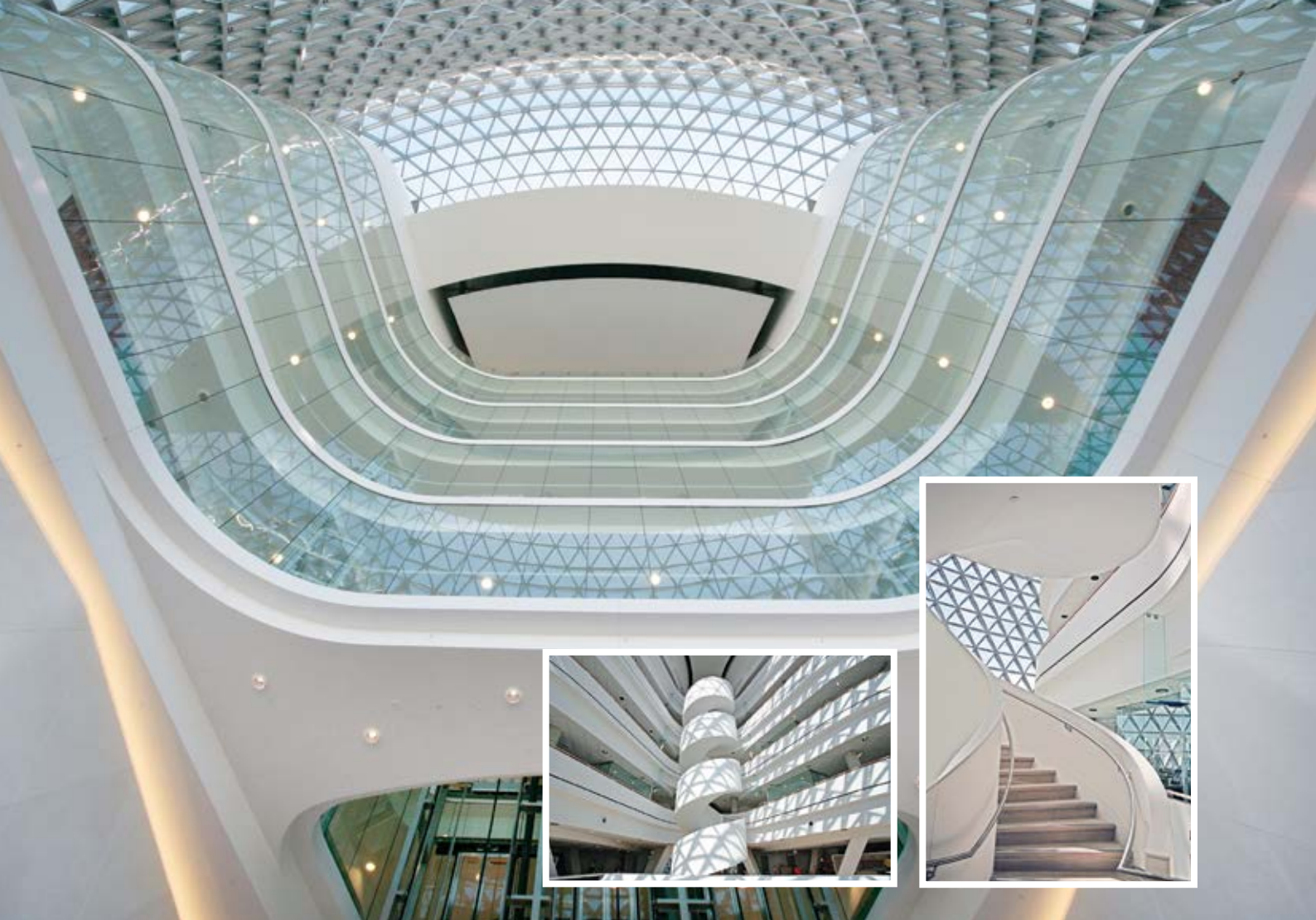
vertical support and with Flexible Track capping the Stud to create the spiral curve effect. The plasterboard lining the sides of the staircase is supported by Recessed Furring Channel which is curved around the stud work horizontally.

Rondo 76mm Stud and Track was also used to form the curved bulkheads on each level of SAHMRI, which are one of the building's many non-linear architectural features. The curve was set out with Rondo Flexible Track from which stud droppers were installed, and finished at the bottom with similar Flexible Track. The framing braced back to the structure with 76mm stud supports. This provided the framework to which the plasterboard was installed to form the curved bulkheads.

Since pioneering the design and engineering of suspended ceilings in 1964, Rondo has grown into a world-leading Australian innovator in substrate systems for the lining industry with export markets in Asia, India and the Middle East in addition to a substantial client base across all Australian construction sectors. Other recent major projects for the medical sector include the award-winning Gold Coast University Hospital, Western Australia's Fiona Stanley Hospital, Queensland Children's Hospital and Royal North Shore Hospital Sydney.

For more information contact Rondo, Head Office 57-87 Lockwood Road Erskine Park NSW 2759 phone 1300 36 7663, website www.rondo.com.au





EXTRAORDINARY WORKMANSHIP

Curves and voids certainly added to the challenge SAHMRI presented to Ceiling and Wall Contractors (CWC). Their scope included supply and installation of all plasterboard partitions, suspended ceilings, internal aluminium partition framing and glazing including aluminium doors. Given the project's non-linear geometry and high performance specifications, completing the works required both trade skills of the highest order and innovative methods and materials.

CWC commenced onsite in February 2012 and completed their works package in December 2013. A team of up to 70 direct staff worked on the project including Senior Site Manager Ian Howell, and Site managers David Gabbana & Simon Bayly. CWC was assisted by specialist subcontractors Construction Glazing (Glazing), Ace Shopfitters (Aluminium Doors) and Asurco Contracting (External CFC Cladding). The CWC team also worked closely with key suppliers Boral Plasterboard and Rondo Building Services to ensure timely deliveries of the appropriate specified materials.

The spiral staircase required an innovative approach to install curved plasterboard with a Level 5 finish for both internal and external faces and soffit. Other unique aspects of their scope also included plantroom walls up to seven metres high; 150mm stud framed walls incorporating a structural steel design to the Western Facade from Levels 5 to 8; plasterboard ceilings and partitions constructed to meet PC2/QC2 laboratory standards; and spandrel cladding of the Atrium/Lift well from Levels 5 to 9.

“Once the facade was installed, we had to spread ourselves throughout the project and attack on all fronts,” said CWC Contracts Manager, Luke Hoyle.

“The challenges included the installation of the atrium ceiling, the spiral staircase, expressed jointed mdf to L00-L03 lift well, expressed jointed plasterboard lining surrounding the main entry and plasterboard lined balustrading/bulkheads to the eastern atrium, which were all installed working from scaffolding.

“Access in many areas was difficult and given the amount of natural light in these areas, we had to ensure the finish was of a high standard.”

Since 1992 CWC have been providing high quality results for South Australian projects, with major showcases of their skills including Adelaide Oval Western Grandstand, M2 at University of South Australia, the Australian Taxation Office Fitout, Fort Largs Policy Academy and the Rundle Place Office Tower including the Bendigo Bank and Adelaide Bank Fitout. Their expertise includes specialist packages including acoustic systems, Barrisol ceilings, timber and carpentry packages, fire-rated systems and insulation.

The company employs an average of 50 onsite staff, including 10 apprentices, and also has a highly skilled administration, logistics, project management, costings and estimating team. Their approach to projects is founded on integrity, teamwork, quality and the time-tested method of combining a strong work ethic with high standards of safety and ingenuity.

For more information contact Ceiling and Wall Contractors Pty Ltd, 32 Maple Avenue, Forestville SA 5035, phone 08 2929 0755, fax 08 8297 0895, website www.ceilingandwall.com

PROFESSIONALISM DELIVERS RESULTS

Having worked on all the recent major hospital projects around Adelaide, Italia Tiling is familiar with the exacting quality requirements a project like the SAHMRI requires. Their scope comprised the supply and installation of approximately 1500m² of tiling over nine levels, including screeding to falls and waterproofing to Australian standards prior to tiling.

There were two main challenges – managing manpower and materials flexibly across different levels to meet project timeframes, and the nature of the tiles themselves, which were imported from Europe.

“Whereas the trend today is to use large format tiles, the Architect went against this trend to create a new look instead with tiles which had a small format of 75x150 mm. To lay so many metres with this format required the team to be both meticulous and have a lot of patience,” said Italia Tiling spokesman Rajan Chieran.

Italia Tiling's team of up to six tilers and waterproofers used MAPEI waterproofing and adhesives throughout the project, due to the products' low VOC indicators. All the waterproofed floors were flood tested prior to tiling, to ensure they would meet the high standards required.

“This was a very prestigious project, and we had an extremely cooperative relationship with the Builder and the Architects,” said Rajan.

“We have worked with most major builders and believe we bring a quiet competence to the projects we are involved in to minimise the stress levels

of the all involved. We have a professional, dedicated team who ensure we meet the exacting standards required for projects in a timely manner.

“We work around South Australia on all sorts of commercial projects like hospitals, apartment complexes, residential care facilities, hotels and even shop fit outs.”

Italia Tiling specialises in supply and fixing of both natural and manufactured Stone and porcelain products for projects ranging from kitchen bench tops through to complete solutions in tiling and sealing. The company also provides a complete bathroom renovation service through a separate residential division. With a wide supplier network, and specialised team of tiling and waterproofing subcontractors, they have the resources to complete demanding and complex projects effectively.

The company's team, including Directors, Interior Architectural Designer Supervisors and Quality Assurance Manager have been working together for over 12 years, and purchased the business in 2011 to give it new impetus.

Other recent Italia Tiling projects have included the Port Lincoln Airport with Mossop, Flinders Medical Centre Redevelopment with Baulderstone, and the Flinders Cancer Innovation Centre with Hindmarsh.

For more information contact Italia Tiling Services Pty Ltd, 73 Grange Road, Welland SA 5007, phone 08 8340 0016, fax 08 8340 0039



STUPENDOUS FEATS WITH STEEL

An entirely remarkable project like SAHMRI challenges everyone involved, and gives a company like SA Structural an opportunity to showcase exceptional design, fabrication, installation and project management expertise. SA Structural were engaged by Hindmarsh, Managing Contractor, to undertake a number of various structural steelwork packages within the SAHMRI Building and by Yuanda Australia, Head Façade Sub-contractor, for the delivery of the Diagrid Façade Steelwork package.

Some of the works undertaken for Hindmarsh on the project included the manufacture, fabrication and erection of the Feature Lift Steel Structure, Link Bridges, Animal House Structure housed in the basement, and the geometrically complex feature Spiral Stair Structure.

Yuanda Australia engaged SA Structural to undertake 2 structural steelwork packages for this project, the first being the supply, manufacture and erection of the Conventional Steelwork Package which included the curved BMU space-truss support structure, roof steelwork and western walkway structures. The second packaged involved the fabrication, re-assembly and erection of the feature Diagrid Façade panels to which were particularly complex and the level of precision required for their delivery extraordinary.

“There were significant design challenges and constructability issues faced during the shop drawing, initial design, fabrication and re-assembly process of the Façade diagrid panels” said SA Structural Spokesman, Andrew Kantzavelos.

“The majority of the frames were unique in size, shape, position and location. The tight tolerances specified required the engagement of full time surveyors using 3D technology throughout the processing, fit-up, welding and re-assembly process to ensure adjacent panels would match-fit without expensive trail assembly of all frames. These unique model coordinates were also transposed by 3D survey onsite to verify that the erections tolerances were within the specified allowable deviations.”

SA Structural took a leading role in the implementation of the rigging techniques to facilitate the erection of the diagrid panels. Creative thinking and innovation was required to find the most efficient and unique rigging techniques to install the diagrid panels to the various elevations of the SAHMRI façade, namely the East and West Atriums, underbelly and noses. Each area required a different approach to provide efficiencies in handling, delivery and installation. Safety in design and pre-planning involving well thought out temporary engineering solutions was an integral part in mitigating risk in the procurement and erection process for all the pre-glazed diagrid panels. This process also resulted in minimal clashes with interfacing trades and ensured that tight scheduling timeframes were achieved.

Fabrication was undertaken in SA Structural’s facilities, with Strucad 3D software used for all pre-fabrication modelling. The company has a staff of 110, with skills including 3D shop detailing and modelling, Boilermaking and welding, Quantity Surveyors, Steelwork Erection, Crane Hire and Project Management. “SA Structural’s ability to work collaboratively with Hindmarsh, Yuanda and the project team to deliver this truly unique structure was paramount for its successful delivery,” said Andrew.

SA Structural commenced operations in 2002. The company’s high level of expertise is backed by Certified Quality Management Systems to ISO 9001:2008, Occupational Health and Safety Management Systems to OHSAS 18001:2007 and AS/NZS 4801:2001, and Environmental Management Systems to AS/NZS ISO 14001:2004.

Other landmark projects the company is currently working on include the New Royal Adelaide Hospital, the Adelaide Oval Redevelopment and the Adelaide Convention Centre Redevelopment.

For more information contact SA Structural Pty Ltd, Head Office 9-11 Playford Crescent Salisbury North SA 5108, phone 08 8285 5111, fax 08 8285 5122, email reception@sastructural.com.au