



# Biggest show yet for WA works

University of WA Biomedical Research Facility

This year's Steel Awards in Western Australia attracted big interest in keeping with the scale of projects submitted from that State.

The winners and the highly commended entries across a diverse range of categories were announced at the Burswood Resort on 31 August attended by over 200 delegates, including visitors from the South African steel industry, the biggest roll up so far for a steel awards night in WA.

This year added a Young Achievers category to acknowledge the hard work and exceptional

talent of engineering students, apprentices and other up and comers, that culminated in the awards presentations.

The sponsors for the evening were AGC Ausclad Group of Companies, OneSteel Steel & Tube, OneSteel Market Mills, Orrcon Operations, Pacific Computing and Smorgon Steel Distribution.

The evening also acknowledged the achievements of outstanding apprentices, young achievers and student engineers making positive contribution to their companies and industry.

**Apprentices Excellence Award**

**Michael Booth** (Pacific Industrial Company)

**David Morgan and Jarryd Pegg**

(AGC Ausclad Group)

**Toby Tobiassen** (United Group Resources)

**Young Achievers Excellence Award**

**Cesare De Bortolo and Josh Ward**

(AGC Ausclad Group)

**Jemma Edwards** (GRD Minproc)

**Excellence Awards for Engineering Students**

**Radoman Kitanovich** (Curtin University)

**Simon Lau and Alex Li**  
(University of Western Australia)

The evening's pace was propelled by the event's Master of Ceremonies, **Tod Johnston** and his band, *Love Peace and All That Stuff*.

The five main award categories this year were:

**Architectural Steel Design Award**

University of WA Biomedical Research Facility – Hames Sharley Architects (Winner)

Bale Port Douglas – Grounds Kent Architects (Highly Commended)

**Engineering Steel Design Award**

BlueScope Steel Handling Facility – Pritchard Francis (Winner)

Yongergnow Australian MalleeFowl Centre – Architectural Design Studio (Highly Commended)

**Metal Building Product Design Award**

Scotch College Dickinson Centre–Taylor Robinson Architects (Winner)

**Steel Fabrication Award**

Dampier Port Upgrade Parker Point Twin Cell Car Dumper (CD4) – AGC Ausclad Group (Winner)

**Steel Designers Award**

BHP Billiton Rapid Growth Area C Iron Ore Project – PDC Consultants (Winner)

**Judging Panel**

(Chair) **Peter Bruechle**, former Director and founding member of BG&E

**Tony Brand AM**, Director of Anthony Brand Consultant Architects

**David Dartnall**, former Production & Erection Manager, Fabricon Steel Fabricators

**Architectural Steel Design**

**WINNER – University of WA Biomedical Research Facility**

**Hames Sharley Architects**

The Biomedical Research Facility (BRF) for the University of Western Australia will be internationally accredited and accommodate all breeding requirements for small animals and provide a range of experimental zones. The BRF resolves the very complex and specialised brief to provide an approachable and effective functional design. The materials used and the detailing employed are serviceable and contemporary. The judges acknowledged the extremely high attention to detail in the use of steel in exposed situations. The sloping and tapered steel columns to the veranda take their cue from the landscape. Steel and timber have been used to complement each other, externally and internally. The brief was resolved through the development of flow and relationship diagrams. With the starting point being a sealed box keeping contaminants out and the valuable residents in, the final design sees this rigid envelope fractured with a series of connected, but separable zones, all under

one roof. This technically complex project involved widespread consultation with over 450 users and extensive research into available technologies and the latest facility design.

**Project Team**

**Architect:** Hames Sharley Architects

**Structural Engineer:** BG&E

**Head Building Contractor:** Perth Building Company

**ASI Distributor or Manufacturer:** CMC Coil Steels

**Steel Fabricator:** Kadan Engineering

**Steel Detailer:** Austruct Group

**Coating Supplier:** Zinco

**Metal Building Contractor:** Nicoll Engineering

**Structural Engineering Design**

**WINNER – BlueScope Steel Handling Facility**

**Pritchard Francis**

This 'design & construct' project consists of an integrated processing facility with transport and logistics operations which include road and rail links along with office facilities. This impressive industrial building consists of three building bays 105-metres long by 23-metres wide. The complex also includes a 175-metre by 30-metre bay containing two 20-tonne overhead high speed gantry cranes for offloading rail wagons. The client wanted a simple economical steel building structure to accommodate operational and craning requirements with internal columns kept to a minimum and to specified locations. Careful consideration was given to steelwork detailing to ensure compatibility to streamline onsite handling and erection. These results were assessed against section capacities to ensure roof purlin design and specifications were optimised. Extensive research and analysis were undertaken into the potential effects of thermal movement of the structure due to the length of the building. The building has performed to expectations over a number of seasons. Trussed crane runway beams spanning over large openings in external walls are an example of some of the innovations integrated into the design with the cantilevered external canopy roof being utilised as a horizontal truss to provide lateral stability for the crane beams. A trussed roof design was adopted for the 30-metre wide bay with portal framing selected for the remaining bays of 23 metres each. The height of the building induced significant wind loads



into the structure, particularly to the bay area, the full width of which was utilised to reduce the forces in the roof framing members by creating a full width horizontal roof truss system. The project was completed well within time and budget constraints.

**Project Team**  
**Principal Consultant:** Pritchard Francis  
**Structural/Civil Engineer/Project Manager:** Incoll Management  
**Architect:** BCM Architects  
**Building Contractor:** Doric  
**ASI Distributor:** OneSteel  
**Steel Fabricator:** ItalSteel Structural Steel WA  
**Steel Detailer:** ItalSteel Structural Steel WA  
**Coatings Supplier:** ItalSteel Structural Steel WA

**Metal Building Product Design**

**WINNER – Scotch College Dickinson Centre**  
**Taylor Robinson Architects**

This new multi-purpose all-steel structured auditorium adds a new physical heart for the senior campus at Scotch College by successfully transforming the under-utilised concrete roof deck of the 1980s Physical Education Centre into a vibrant and contemporary environment for performing and visual arts tuition. The building is designed to provide a variety of flexible seating configurations up to a capacity of 1100 that can be easily contracted into a more intimate 400-seat venue with retractable tiered seating which can also be used as a gallery space. The steel framed structural system transfers loads to the perimeter of the existing post-tensioned concrete structure and dictated the use of a variety of external lightweight walling systems to clad the existing building envelope. Steel roof trusses designed to span

30 metres across the full width of the existing post-tensioned structural slab were supported by exposed steel columns anchored on one side on top of the existing diaphragm retaining wall and on the other extended down over two levels to finish at natural ground level below the level of the existing college swimming pool. All internal wall framing was constructed in lightweight steel stud sections and lined with multiple layers of plasterboard sheeting to meet required acoustic and fire ratings. The steel frame system ensured the existing dead load on the post-tensioned building slab was minimised and the required live loads for the new building could be achieved. The steel frame design enabled a new facility to be created on top of an existing structural deck in the heart of the college campus. The outer shell of the building is folded into segments (armadillo-like) to allow the scale of the building to respond to both the internal functional requirements (stage, auditorium, foyer) and the height of adjoining buildings and passive recreation and transitional spaces. The roof is designed as a faceted top with 100mm steps at changes in roof pitch to provide relief over the 30-metre span.



**Project Team**  
**Architect:** Taylor Robinson Architects  
**Contractor:** Loxam Developments  
**ASI Distributor:** One Steel/SmorgonSteel  
**Steel Fabricator:** Mills & Hassell  
**Steel Detailer:** MacCad Drafting  
**Metal Coatings Supplier:** Fielders Steel Roofing  
**Metal Roofing Contractor:** Thommos Roofing

**Steel Fabricator**

**WINNER – Dampier Port Upgrade Parker Point Twin Cell Car Dumper (CD4)**

**AGC Ausclad Group**  
 The twin-cell car dumper is capable of unloading two rail cars simultaneously in 80 second cycles, can unload 94,500 tonnes per hour, has an overall diameter of 11 metres by 10.5 metres and weighs 190 tonnes, unloaded. A positioner arm engages the rail cars and indexes the cars in position for the unloading. The positioner mainframe plate thickness of 20 to 100mm posed several challenges for AGC in maintaining the camber that was designed into the structure over the 15-metre span whilst avoiding shrinkage from the complex welded joints in the mainframe top and bottom plates. The car dumper and positioner were fabricated using AS 3678 Grade 250 L15 plate and designed to withstand high fatigue cycles during operation. The main body of the car dumper consists of three major components: two end-rings attached to the cage by large pivot-bearing blocks that also support and rotate the car dumper and the main cage supporting the two end rings. The end rings are fabricated from plate 20 to 80mm thick. After the dimensional survey, the fabricated end rings were placed in a large purpose-built gas-fired furnace to be heat treated at a



temperature of about 650°C to relieve any fabrication and welding stresses in the structures before delivery to the machining subcontractor. The machining of the 11.5-metre diameter end rings outer face was made possible by the construction of a purpose-built rotating low-bed lathe. The cage was then set up for face machining of the main bearing connection locations and line boring/machining of all main clamping arms pivot points. This critical phase required AGC to fully assemble the twin cell car dumper and the 13-drive positioner with Metso engineers as witnesses along with verifying the actual dimensions achieved. The car dumper was transported to the Australian Marine Complex (AMC) by road, seldom attempted through a WA metropolitan area with a structure of this size. Each fully assembled car dumper weighing 200 tonnes was jacked up and loaded onto a heavy duty platform self-jacking trailer. It took eight hours to load and transport both car dumpers from AGC's Kwinana workshops to the AMC where they were then loaded onto a heavy lift ship and transported to Dampier.

**Project Team**  
**Structural Engineer:** Metso Minerals  
**ASI Distributor:** OneSteel  
**Steel Fabricator:** AGC Ausclad Group  
**Steel Detailer:** PDC Consultants  
**Metal Coatings Supplier:** TCC Group

**Steel Detailers**

**WINNER – BHP Billiton: Rapid Growth Area C Iron Ore Project**

**PDC Consultants**  
 BHP Billiton's Rapid Growth Three Area C Iron Ore Project in Western Australia involved construction of a new primary crusher building, secondary and tertiary crusher buildings, a five-bay screening building, a scalping and screening building, 38 conveyers and associated



transfer stations and sample station buildings, representing in excess of 7000 tonnes of steelworks. PDC's 3D modelling process combined NavisWorks proprietary software and other 3D modelling packages which allowed the production of intelligent models and information to assist with the design, fabrication and construction phases of the project. PDC's technology proved economical by increasing productivity both at the drafting stage and onsite. Improvements to the project were observed through a higher control over project purchasing, more accurate fabrication and delivery of materials, shorter construction times and reduced rework. PDC's expertise ensured that all steel connections were consistent, detecting clashes and eliminating mistakes in joints which could cause delays and additional costs during fabrication and site construction. PDC specialises in 3D modelling, supplies shop detail drawings for the mining, resources and hydrocarbons industries.

**Project Team**  
**Structural Engineer:** Mine and Port Development Joint Venture  
**Head Building Contractor:** Monadelphous Engineering  
**Steel Fabricator:** Monadelphous Engineering  
**ASI Distributor or Manufacturer:** OneSteel Steel & Tube  
**Steel Detailer:** PDC Consultants