ENGINEERS
AUSTRALIA

AUSTRALIAN
ENGINEERING
EXCELLENCE
AWARDS

ICONIC INNOVATION

Celebrating Extraordinary Engineering

AUSTRALIAN ENGINEERING EXCELLENCE AWARDS

NEWCASTLE ENTRANTS 2018

AUSTRALIAN
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AWARDS

These awards recognise and promote new and innovative ideas that are brought to life in ways that bring fundamental change to our society.

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OVERVIEW

Engineers Australia recognises outstanding achievement in engineering and the invaluable contribution engineering makes to the economy, community and the environment.

The Australian Engineering Excellence Awards (AEEA) inspire and encourage engineering distinction through teamwork, innovation, and technical excellence.

The AEEA is an integrated program resulting in awards at National level once local finalists are determined. To enter the AEEA, entrants are required to submit project nominations at the relevant local level, depending on the project's location.

Excellence, distinction, merit, perfection and quality are the characteristics that winning entries exhibit. View the 2018 entrants.

ENGINEERS
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Newcastle

Suite 3

Tonella Business Centre

125 Bull Street

Newcastle West NSW 2302

NEWCASTLE
PRESIDENT'S MESSAGE

The Newcastle Division represents engineering professionals, technologists and associates from the Hawkesbury to the Tweed, and from Coonabarabran to the Tasman Sea. This region is the home of some of Australia's earliest engineering excellence. The Tamworth Street Lighting Project, Walka Water Works and Great Northern Railway are just a few examples. This heritage has established a culture of innovation in engineering that has continued to flourish.

The 2018 Engineering Excellence Awards celebrate that great tradition, while showcasing contemporary engineering ingenuity and technology that will help shape a sustainable future.

This year's entries demonstrate the breadth and depth of engineering expertise across our region. Our engineers in industry, academia and government are working to improve our environment, contribute to our economic prosperity, and enhance the quality of life of our community.

Congratulations to all of this year's entrants. Thank you for sharing your projects, for inspiring our future leaders, and for expanding the horizon of excellence in engineering.

Dr Alice Howe FIEAust
Newcastle President

CHIEF JUDGE'S MESSAGE

The "practice of professional engineering" means any act of planning, designing, composing, evaluating, advising, reporting, directing or supervising that requires the application of engineering principles and that concerns the safeguarding of life, health, property, economic interests, the public welfare or the environment, or the managing of any such act. The projects nominated in the Australian Engineering Excellence Awards (AEEA) embrace these attributes.

The AEEA program is the most significant event that Engineers Australia undertakes at Division and National level as it demonstrates the achievements, contribution and role our profession makes to the economy, environment and well-being within the communities of Newcastle Division.

Whilst the awards have a greater significance to the role of the engineering team within the wider community at Division level, to be announced as a winner at Division level puts those firms and members within Newcastle Division onto the National stage. Our Division has over the years had great success at the National awards and have won the coveted Sir William Hudson 'winner of winners' award several times.

The judges this year had a difficult task in coming to a result. The quality and excellence in the projects was outstanding. We had to decide between the small projects and very large projects. The innovation and attention to creating sustainability within each project stood out.

To the winners, congratulations and to the finalists, well done. You should all be proud of the achievements you and your firms have made - to be recognised in the AEEA awards program indicates the excellence in engineering achieved within Newcastle Division.

Ian Pedersen HonFIEAust CPEng
EngExec NER APEC Engineer IntPE(Aus)

Chief Judge

JUDGING
CRITERIA

Actual or potential contribution of the work to the economy

Contributes to the local, regional or National economy by reducing whole of life costs or adding to the efficient use of existing engineering construction, manufacture, maintenance or application.

Impact of the work on the quality of life of the relevant communities

Contributes positively to the communities using it in respect of cost, time, environment or general amenity of the community.

Significance of work as a benchmark of Australian Engineering

Sets new benchmarks or continues current high standards thereby raising the standard and standing of Australian Engineering.

Extent to which the work represents world best practice

Can be matched against similar engineering achievements to represent world best practice.

Other considerations

The environmental impact of the work, the sustainability of the project and the work health and safety consideration. These must outline the effect on those directly or indirectly involved and members of the community in general.

JUDGES
2018

Ian Pedersen
HonFIEAust CPEng EngExec NER APEC Engineer IntPE(Aus)

Paul Reynolds
BEng Mechanical (Hons. 1) MIEAust
Business Manager - Ampcontrol CSM Pty Ltd
Ampcontrol

Barry Finlay
BE (Elect, Hons), MEngSc, MBA, CPEng, FIEAust
Director
Finlay Solutions

Dr David Wainwright
BE (Civil, Hons I), PhD (Coastal Engineering) MIEAust CPEng NER APEC Engineer IntPE(Aus)
Director
Salients Consulting

Thank you to our panel of judges who generously volunteered their time and effort to review all entrants and select our finalists.


Super human effort
Congratulations to all of the finalists tonight ...
for your engineering excellence
for your contribution to our profession
and for serving our communities
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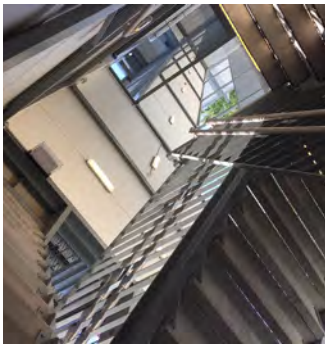
PROJECT ENTRIES

ALEXANDRIA PARK 3 STOREY MODULAR SCHOOL

Northrop Consulting Engineers P/L



Alexandria Park Community School involved the design of a three-storey modular rapid build school to relieve the current shortage of teaching spaces.

This is the first fully weathertight, fully interchangeable, three story structure, that includes fully modular stairs, in Australia. It sets a new benchmark in speed of delivery of school buildings and the ultimate flexibility in relocating and reusing these buildings on other sites in the future.

The project delivered an asset that is adaptable, energy efficient and modern. It provides an increased resilience to our communities for future growth, natural disasters and changing community needs. The efficiency, and the speed of design and install has been both world class and outstanding.

BANLAW "GTX" GREASE TRANSFER COUPLINGS

Banlaw Pty Limited

Continuous investment in R&D and its own "smart manufacturing" capability, Banlaw has progressively expanded its product line - whether new products, or the continuous improvement of existing products.

Research and Development (R&D) of the new Banlaw "GTX" dry-break liquid transfer couplings specifically designed for the transfer of greases within the mining, rail and other heavy industries.

BYRON BAY RAILROAD COMPANY WORLD'S FIRST SOLAR TRAIN

Byron Bay Railroad Company

Lithgow Railway Workshop

Nickel Energy

Elmofo

Byron Bay Railroad Company has restored and converted a sixty-nine year old diesel train to become the world's first solar powered train.

The innovation, achieved with no government funding or support, shines a 4.6 billion year old light on modern travel. The design brief was to modify heritage carriages to operate by electric traction supplied from solar PV panels and batteries rather than diesel engines, without substantially altering the heritage value of the carriages.

The design challenge was doing something that had never been done before. Carts and trolleys have run on solar power, but never a full size train. Further, working with a heritage train as opposed to custom designing a solar train brought significant design hurdles. The train is net carbon positive, with one third of the energy generated used to run the train and the remainder exported to the grid.

MR108 DUPLICATION - TOURLE STREET TO CORMORANT ROAD

Roads and Maritime Services

GHD Pty Ltd

WBHO McIlwain

The MR108 Duplication-Tourle Street to Cormorant Road-Stage 2 project delivered the bridge duplication over the Hunter River, and upgrade to dual carriageway.

This highly complex and challenging project posed significant constraints, including ensuring continuity of coal export operations, soft soils, heavy contamination, working around utility infrastructure under high traffic, and identifying, designing and constructing around remnant timber piles used in the old bridge's construction. Also, at the 50% design stage, the bridge design was taken from 8 to 11 spans to mitigate the risk of transporting contaminants between aquifers.

The project's significant benefits to the local economy and communities include: improving arterial road access to/from Newcastle Airport and Port Stephens to cater for predicted increases in commercial, industrial and domestic traffic; improving road safety, including for on-road cyclists; and minimising environmental impacts. With 243,107 total person hours worked on site, the project has achieved no lost time injuries.

NeW SPACE

Aurecon

NeW Space is a $95 million landmark education precinct in Newcastle's CBD. The visually striking geometric form of NeW Space realises the intent to create a bold physical heart for the city of Newcastle, a world-leading learning facility and a gathering space to connect the University of Newcastle with the city.

Aurecon's state-of-the-art structural engineering solutions met the geometrical demands of the unique vertical campus for the University of Newcastle. Elegant raking columns support external viewing rooms that appear to hang from the sides of the building. Lightweight construction, clever fixing designs and energy efficient structural materials have contributed to the 5 Green Star rating achievement and enable the architectural intent for the building to be achieved.

NeW Space provides a bridge between today and tomorrow by maintaining the significant heritage aspect of the precinct while improving the amenities and built environment.

NeW SPACE, UNIVERSITY OF NEWCASTLE, BUSINESS & LAW SCHOOL

AECOM

NeW Space is a transformational building and catalyst for Newcastle's revitalisation. AECOM proudly designed the building services and audio-visual attributes of this facility which blends student and academic spaces - enabling collaboration, connectivity and sustainability.

The design combines striking architectural and structural features with high quality services, as well as the key differentiator for NeW Space – its audio-visual systems. AV transforms the learning experience through technology rich platforms, fostering formal and informal group collaboration.

The immersive teaching spaces encourage active participation with students engaging with content in a number of ways, enriching the learning experience through contribution and discussion.

NEWCASTLE 500 SUPERCARS STREET CIRCUIT

Northrop Consulting Engineers P/L

The Newcastle 500 Supercar Street Circuit involved the design of a new street circuit through the heritage area of Newcastle East.

The challenge was to deliver a world-class race track that would integrate with normal city activities for the remainder of the year. The primary objectives were to maximise the use of existing road and service infrastructure, minimise construction activities and impact, whilst maximising improvements to the road and utility services infrastructure.

This was to be achieved in a cost-effective manner, that would leave a significant legacy for the local community and greater Hunter Region.

The time from inception to running of the event took only 14 months and involved bringing forward ten years' worth of infrastructure upgrades. The event has had a considerable positive impact on the economy of Newcastle with over 190,000 people attending the three-day event.

PACIFIC HIGHWAY WYONG ROAD INTERSECTION UPGRADE

Aurecon

Roads and Maritime Services NSW

Seymour Whyte

The new Pacific Highway and Wyong Road Intersection opened in November 2017, one year ahead of schedule. Roads and Maritime Services, Seymour Whyte and Aurecon have delivered an intersection that reduces congestion and improves safety for the 55, 000 vehicles using it daily.

To alleviate the intersection's history of crashes and traffic congestion, the $84 million project, funded by the NSW Government, was undertaken to replace the existing roundabout with traffic lights. Significant works included the duplication of an existing bridge over the Main North Rail Line, with digital engineering tools used to expedite construction and reduce safety risks.

PLANT PROTEINS FOR THE REMEDIATION OF PFOS AND PFOA FROM GROUNDWATER

ARC Centre of Excellence for Geotechnical Science and Engineering, The University of Newcastle

Used at airports globally, foams containing PFASs (Perfluoroalkyl and polyfluoroalkyl substances) were highly effective at fighting jet fuel fires. With 90 sites in Australia confirmed as being contaminated with PFASs, the potential global extent of soil and groundwater affected is immense given that there are over 575 military fire training facilities, and approximately 41,820 civilian airports around the world. PFASs however, are non-biodegradable, highly mobile, and difficult to remediate.

As the long-term health effects of PFASs are unknown, the remediation of these sites is critical. Patented by Dr Brett Turner and the University of Newcastle, research undertaken at the Centre for Geotechnical Science and Engineering with Laureate Professor Scott Sloan, demonstrated for the first time that plant proteins (in particular hemp proteins) are an excellent means for the remediation of PFAS contamination.

ResTrack RMS - RESOURCE MANAGEMENT SYSTEM

Banlaw Pty Ltd

Banlaw has provided industrial fuel management systems to the mining Industry for over 20 years. Over this period, Banlaw FuelTrack™ systems worldwide have provided effective management, reconciliation and security to countless millions of litres of diesel fuels and other liquid assets in the mining, rail, ports and heavy construction industries.

In response to growing number of asset management requirements and the exponential growth in technology such as IoT, there has recently been a need to rethink the approach to asset management and improve the platform that was developed over this time. With resources – not just fuels - in mind, the Banlaw Engineering team has developed a completely new platform that would allow Banlaw to easily scale more complex industrial IoT solutions to demanding customers with the delivery of new features.

Banlaw is positioning itself not just to manage fuels but to help customers measure commodities like Palm Oil, Energy and Water.

STINGRAY CREEK BRIDGE REPLACEMENT

Port Macquarie Hastings Council

Replacement of the existing concrete bridge on Ocean Drive over Stingray Creek between Laurieton and North Haven was a $26M project spanning 18 years in pre-planning and was constructed over an 18 month period. The project culminated in the switch of traffic onto the new bridge on 10 February 2017.

The construction delivery by Port Macquarie Hastings Council's contractor Smithbridge/Waterway involved a number of innovative techniques resulting in a shorter construction duration, competitive price and significantly reduced environmental impacts while at the same time meeting all development consent conditions and consistency with the existing EIS.

The project reinstated the vital heavy vehicle link between the townships of Laurieton and North Haven, that had been restricted to an 18 tonne load limit since 2001 and improved the pedestrian links between these two communities.

THE WORLD'S FIRST EXPERIMENTAL FACILITY FOR LARGE-SCALE TESTING OF VAM ABATEMENT SYSTEMS AND COMPONENTS

The University of Newcastle

This 24 month project was part of a $25M research program on the safety aspects of mitigating ventilation air methane (VAM) emissions from gassy underground coalmines. The project was specifically concerned with the prevention and mitigation of hybrid methane/coal dust explosions and involved with the design, construction, commissioning and operation of the world's first 100m long detonation tube facility. This $10M National facility is dedicated to large-scale testing of VAM abatement systems and components, including VAM capture ducts, explosion prevention/mitigation measures, and thermal oxidisers. The project involved four partners, three principal contractors and 48 sub-contractors.

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