

Structures



About EIC Activities

EIC Activities is CIMIC Group's engineering and technical services business.

Our engineering and risk mitigation expertise provides CIMIC Group with a competitive advantage for winning and delivering profitable projects that also generate value for clients.

EIC Activities ensures the Group's collective experience, technical capabilities, innovations and leading-edge technology applications are leveraged to deliver our client's objectives.

EIC Activities services

EIC Activities is an integrated multidisciplinary business specialising in:

- structures and construction engineering (temporary works)
- geotechnical and tunnels
- civil
- mechanical and electrical
- parametric design and digital engineering

About CIMIC Group

CIMIC Group is an engineering-led services, construction and natural resources leader with a history dating back to 1899.

Powered by 39,000 people, and pioneering technology and engineering, we deliver high-value and sustainable solutions across the lifecycle of assets, infrastructure and resources projects in around 20 countries.

CIMIC Group comprises our engineering and construction businesses CPB Contractors and Leighton Asia, our integrated solutions providers UGL and Sedgman, our natural resources company Thiess (60% ownership), and our development and investment arm Pacific Partnerships – all supported by our in-house engineering consultancy EIC Activities.

Our mission is to generate sustainable returns by delivering innovative and competitive solutions for clients and safe, fulfilling careers for our people. We strive to be known for our principles of Integrity, Accountability, Innovation and Delivery, underpinned by Safety.





Structures services

As a member of CIMIC Group, EIC Activities provides services to CIMIC's Operating Companies exclusively. Our engineers are dedicated to work in the best interests of our clients in order to mitigate risk and identify opportunities to create value.

To achieve this, EIC Activities' Structures team provides the following services:

- advice on selection of engineering partners and major vendors
- technical design and analysis (integrated permanent and temporary works)
- construction methods development and asset value-for-money assessment
- design review and optimisation
- automated design and parametric modelling.

Our Structures capabilities

EIC Activities Structures expertise includes:

Major civil structures

Cut and cover tunnels, stations, bridges and water retaining structures.

Building structures

Including steel, concrete and timber.

Durability and thermal effects

Materials

Including steel fibre and Glass Fibre Reinforced Polymer (GFRP).

Critical temporary works design

(Refer to Construction Engineering Capability Statement)

Case studies

Candaba 3rd Viaduct - Leighton Asia

Three lane infill viaduct

Challenge

Design and construction of an independent 5.3km bridge between the existing northbound and southbound lanes of the viaduct, and new pedestrian walkway bridge across the Pampanga River. The site is in an active seismic zone in the Phillipines and there were additional constraints of zero disruption to the existing tollway and the long lead time for a launch gantry.

Solution

EIC Activities and Leighton Asia devised an innovative solution involving cranes on deck. The girder has a full-depth deck incorporated, with a 900mm stitch pour and no onsite formwork for the deck.

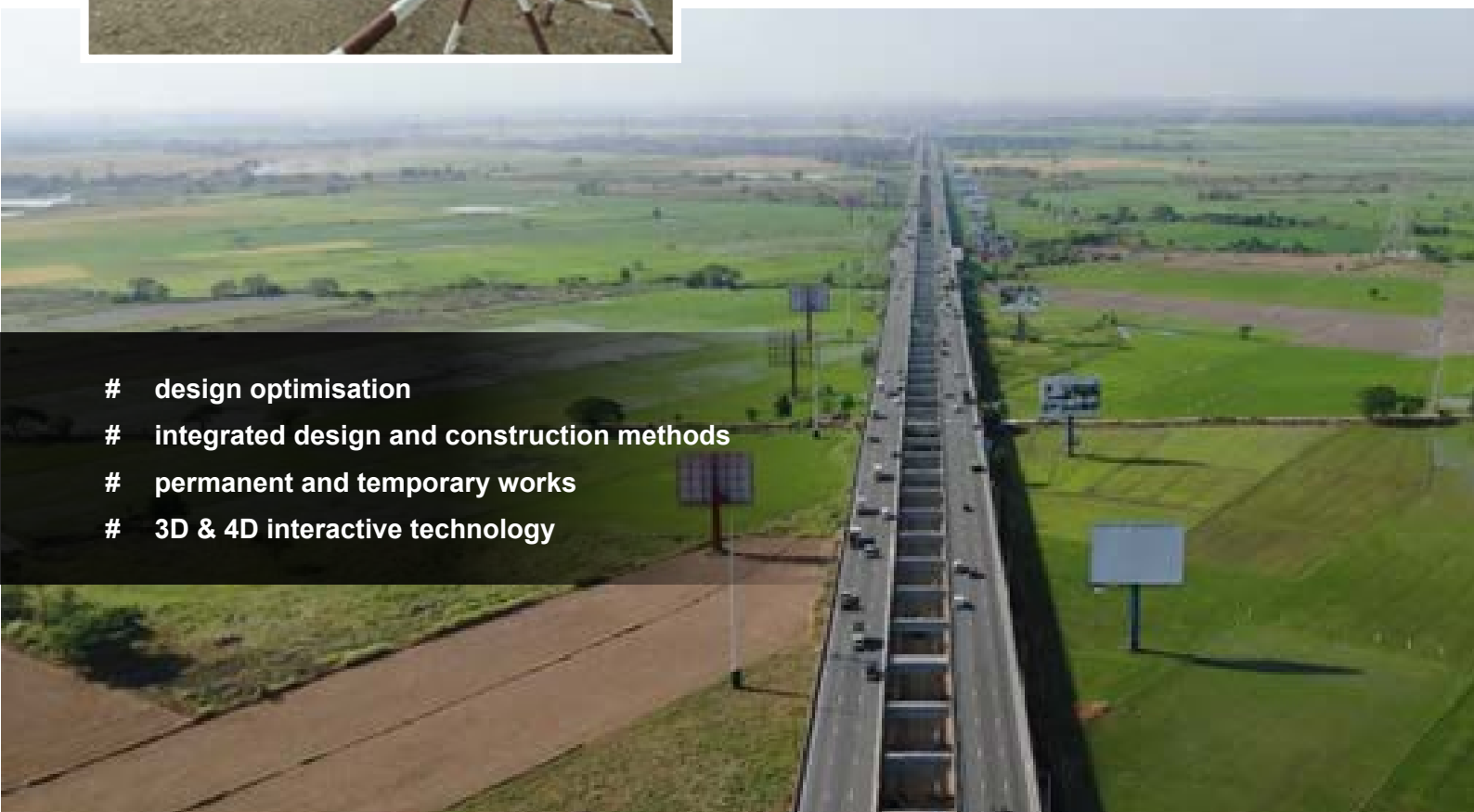
The ten-span modules are fully integral, resulting in minimal maintenance and the use of only 40 elastomeric bearings across the entire bridge.

The 64T double Tee girders are made of reinforced concrete, not stressed, to simplify production as there are no pretension stress beds large enough in the market. The girder design is governed by the 120T crane load. The client also required a relocatable precast barrier designed for a 500kN impact load.

EIC Activities also designed the 180m temporary crane and access jetty across the Pampanga River.



- # design optimisation
- # integrated design and construction methods
- # permanent and temporary works
- # 3D & 4D interactive technology



Case studies

West Gate Tunnel Project Bridge 83 - CPB Contractors John Holland JV

Assessment of existing bridge for construction loads and truss transport

Challenge

The existing Dynon Road rail over bridge is a dual carriageway located north-west of North Melbourne station. The overpass comprises three separate structures built in 1967. The 325m long bridge has 27 spans and various foundations.

The WGTP Bridge 83 works proposed to widen the bridge to provide an outbound diverge, upgrade the barriers and install parallel shared-use-path (SUP) Bridge 84.

There are 15 rail tracks and a stabling yard beneath the bridge that provide a critical link in Melbourne's rail network. Cranes

undertaking the works were not able to lift over live rail lines and occupations of rail lines were unable to be taken concurrently.

Bridge 84 (Br84), a shared-use-path (SUP), runs parallel to the existing Dynon Rd. The 200T steel trusses of Bridge 84 are required to be crane lifted into position and are transported along the existing bridge.

Solution

EIC Activities provided bridge assessments for construction loads, construction design services and construction methods assessments to support the CPBJH team. EIC Activities supported the review of methodology and determined a placement location of a crane on the existing structure that allowed the construction team to work within the rail and structural constraints of the existing structure. EIC Activities provided guidance to the transport and crane suppliers to ensure the loads and arrangements would not have an adverse impact on the structure.

The bridge assessment included:

- swept path travel route assessment of the 400T crane and the 200T trusses to the lift locations
- pier temporary propping
- design of special bogmats to distribute the outrigger loads to the structure
- assessment of the bridge for the temporary loads
- assessment of the concurrent loads associated with the works and the crane
- assessment for the up to 200T SPMT delivery of the trusses for Bridge 84.



- # integrated design and construction methods
- # permanent and temporary works
- # 3D & 4D interactive technology
- # heavy lift
- # load rating



Integrated Digital Planning

Our proprietary Integrated Digital Planning (IDP) software, developed in-house by EIC Activities design and planning engineers, allows design solutions to be engineered, modelled and visualised (using [IDDTech's](#) proprietary [ToBe Builder](#) (TBB) software – also developed inhouse at EIC Activities) in near-real time – complete with critical time and cost related data such as quantities, rates, plant and equipment and resources. Linking designs directly to TBB through the IDP software allows design and construction teams to collaborate and align on proposed solutions and documentation requirements early in the design process, ensuring that IFC designs are fit for construction purposes.

Further, the TBB models used during the design phase can be handed over directly to construction teams, allowing them to fully develop their construction methodologies and Work Packs, including key details such as access and logistics, traffic management, exclusion zones, critical crane lifts etc.



Contacts



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Summary

- over 30 years' experience in the design and construction of bridges and civil structures
- MEng - Engineering, Economics and Management - Oxford University
- MICE, CEng.

Relevant experience

- worked in a variety of countries including UK, Malaysia, Vietnam and Australia
- design experience including cast-in-situ, precast segmental, launched segmental viaducts, cable stay bridges and cut and cover tunnels
- experience in design delivery on major projects.



Clinton Lourens

Group Manager - Structures and Construction Engineering

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Brisbane

Summary

- 30 years' design and construction experience in the delivery of complex multidisciplinary major infrastructure projects in Africa, Asia and Australasia from concept through to commissioning phase in transport, infrastructure, offshore marine and resource markets
- Bachelor of Science, Engineering - University of Natal, South Africa
- MIEAust, CPEng, RPEQ.

Relevant experience

- technical lead bridges (consultant experience) including cable stay, balanced cantilever or in-situ box girder, deck unit or steel composite bridges
- significant design and construction experience including bid development, early contractor involvement and alliance management
- strong working relationships with a variety of stakeholders across all project delivery phases.

Contacts



Jeff Roper

Principal - Major Projects, Structures and Construction Engineering

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Melbourne

Summary

- 22 years' experience in design, consultancy and construction in the infrastructure, commercial building, industrial, HV infrastructure and water sectors
- BE Hons (1st Class) University of Canterbury, NZ
- MIEAust, CPEng, NER, RPEV.

Relevant experience

- heavy civil construction including bridges, tunnels, cut and cover
- specialist design and construction - integration of permanent works, construction methods and temporary works
- critical temporary works design
- structural steel and heavy industrial structures
- commercial and institutional buildings
- construction methods
- civil structures - rail, roads and marine
- experienced engineering and design manager.





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