

Name & Qualifications: Ros MacKinlay, BE(Hons), Certificate in Arbitration, CPEng
Position: Senior Design Engineer
Memberships: Member of the Institution of Engineers, Australia

GENERAL CAREER EXPERIENCE

EXPERIENCE, 2002-present:

Mrs MacKinlay joined the firm in 2002, and has since completed numerous designs, verifications, load ratings, construction designs, and various other bridge consulting tasks to a high level of complexity. She is now a recognized Senior Design Engineer in civil structural engineering. In addition to her design skills she is also very adept at collecting and collating information and writing up overall technical reports for assessments or feasibilities, as she did for many years in the resource industry. She has the experience and broad project perspective which ensures that she can be relied on to deliver a total package.

BRIDGES, CIVIL STRUCTURAL DESIGN

- **Seaford Rail Extension, South Australia. 2010 ongoing.** Wyche Consulting provides technical advice on all superstructure construction issues and does temporary works design for this 1200m long incrementally launched single cell box girder rail bridge. The project is made more complex because the bridge is launched simultaneously from each end of the alignment, and internally contains three spans, which must be split and made into single simple spans after the completion of launching. The principle construction design/ advice is the development of the sequencing for launching to meet in the centre, and the sequencing for splitting and setting in final bearings. The temporary works designed include the launch girders, the cast bed and intermediate pier, the side guides and temporary bearings (where required), the pulling system to get initially started, and a separate one for the completion, a temporary restraint system for between launch parking once the bridge is well advanced, and a clamp bearing and temporary sliding bearing system for when launching is completed and the deck splitting sequence starts. Ros MacKinlay principally designed the cast bed and worked out the initial basis for the launching sequences, and Joe Wyche principally designed most other items and systems.
- **Strengthen 2 Bridges, ACT, 2011.** Strengthening design for two similar haunched, skewed, void former prestressed concrete bridges was carried out by SMEC, and verified by Wyche Consulting. The analysis was complicated, and information had to be assembled from very old drawings, which were at times difficult to interpret, and used now obsolete materials. The work was principally carried out by Ros MacKinlay but there was some key input and interpretation from Joe Wyche.
- **Ravenswood bridge, NSW. 2010.** Verification of design of skewed voided slab post-tensioned bridge designed by GHD. Work done by Ros MacKinlay.
- **Gorgon Jetty Caissons. 2010 ongoing.** Carried a range of support work for Leighton on this large project, which involves building over 50 25m diameter circular concrete caissons down at Henderson, and loading them onto barges which float them up for installation for the jetty on the Gorgon project. Wyche Consulting work comprised (a) looking at precast alternatives to the original design, which did not eventuate, done by Joe Wyche and Ros MacKinlay (b) verification of the ground support slab on which the caissons are built and on which they are jacked up onto load platforms and moved to the barge, done principally by Ros MacKinlay, (c)

numerous verifications of falsework and support systems for various construction processes, done by Ros MacKinlay.

- **Gorgon 3300 man camp. 2010 ongoing.** Client is TDK JV. Work comprised various temporary works such as cradles for lifting pipe groups, temporary supports for prefabricated buildings, access platforms for loading trucks. Generally the design is in structural steel. Work is intermittently on going. Joe Wyche directed and work principally carried out by Ros MacKinlay.
- **Great Eastern Highway Roe Interchange 2010.** Tender design for Leighton working with AECOM. Wyche Consulting designed a haunched precast bridge over the rail route. Work carried out by Joe Wyche and Ros MacKinlay. Unsuccessful tender.
- **Redcliffe Bridge Perth. 2009 ongoing.** Wyche Consulting has carried out an ongoing series of studies into this large box girder bridge over the Swan River on Tonkin Highway, to determine its capacity to carry rail traffic as well as various road traffic combinations, and also examining the possibility of an adjacent bridge and other infrastructure modifications. This is part of a large overall planning study for the airport rail link for the PTA, but also involves other transport planning study in the area. Principal important work is establishing pile and superstructure capacity. Piles used space frame soil spring interaction models, with second order analysis. and superstructure a sophisticated finite element model. Ros MacKinlay principally worked on the piles.
- **Reid Alexander Interchange 2009.** Tender design for Leighton working with AECOM. Straightforward Super T design. Joe Wyche directed, and work carried out by Ros MacKinlay. Unsuccessful tender.
- **Gauteng Freeway Improvement Project, Johannesburg, 2008-9.** Client Structural Systems and G5. Designed launch girders for Elands Bridge, which is 400m long and curved. Designed cast bed for Elands bridge.
- **Woodmans Point Sewerage Expansion Project, Perth, 2008.** Client W2WA. Design of footings for overhead pipework. Although ultimately the footings were relatively simple, Ros MacKinlay played a key role in showing the client how to understand and relate parts of design from various foreign consultant sources, and also to relate to existing infrastructure and extract data from a variety of old drawings, especially by making a key assembly of information in CAD. This “kick started” the final footing design.
- **Conveyor Tower and Pile Verification for Boddington Gold Project, WA 2008.** Client ACMCR. Two conveyor towers including pile groups structurally verified. Piles extend through ore stock pile, making the analysis and design complex.
- **New Perth Bunbury Highway, Perth WA, 2007-9.** \$500m Alliance contract with Main Roads, GHD, Leighton and WA Limestone – Southern Gateway Alliance. 17 bridges worth \$110m at 9 sites, including two incrementally launched pairs of bridges over rivers, and T-roff bridges generally in pairs over water and road crossings. T-roffs are large, some in excess of 100 tones and spanning 35m. Widespread soft foundation conditions mean piling and design for staged preloading and large differential settlement. Severe acid sulfate in a number of locations. Ros MacKinlay carried out a variety of design tasks including abutment and foundation design, and extensive temporary works design for the incrementally launched bridges.

- **Cooperook to Herons's Creek Project, NSW 2007.** Clients Parsons Brinckerhoff and Thies for RTA NSW. Advice for construction design of cast bed and various ancillary items for two incrementally launched bridges.
- **Champion Lakes Project, Perth WA, 2006.** Clients Tabec and Benchmark for Armadale Redevelopment Authority. Concept development and design of two bridges to island in Champion Lakes Rowing course. Investigated several solutions, including precast concrete and steel composite for cost comparisons. Design and drafting completed mostly by Ros MacKinlay.
- **Wollongong North Distributor Extension, NSW, 2005.** Verification for SMEC of RTA NSW project. 13 bridges and culverts structures including plank bridges, Super T's, cast in situ voided slab, and steel truss pedestrian bridge. Organised work flow and information handling as well as carrying out substantial actual Verification work.
- **Narrows Bridge and Other Structures, Package E, South West Metropolitan Rail Project 2004-7.** SW Metro Rail project Package E works, include the new Narrows Bridge, strengthening the existing second Narrows bridge for rail and other structures such as an overpass bridge at Leach Highway, and barriers and rail impact structures on existing bridges and are about \$20 m of the total package. The D&C contractor is Leightons, and design partners, GHD, who are the design directors. Senior Designer of Leach Highway Overpass which is a very complex shaped small bridge.
- **Mt Henry Bridge and Canning Br Relocation, Package E, South West Metropolitan Rail Project 2004-7.** SW Metro Rail project Package E works include the new Mt Henry Bridge, the strengthening works on the existing Mt Henry Bridge, and the relocation of Canning Bus Bridge. These works are about \$40 m of the total package. The D&C contractor is Leightons, Wyche Consulting are Design Directors, and design partners are GHD. The new bridge is an incrementally launched single cell concrete box girder nestled around the existing 660 m long bridge. This new structure will carry three lanes of traffic and release capacity in the existing bridge for two railway lines and the remaining three traffic lanes. It will be incrementally launched with temporary piers at half points of the 76 m spans. The existing bridge will be strengthened for the new rail loads and to carry much heavier vehicle loads in the three remaining traffic lanes. This will be achieved with stress bar diagonal hangers over about 5 m of bridge length at each pier, all inside the box, and extra external prestress. Main Senior Design roles have been design of the incremental launching operation and casting area for the new bridge and overall design of Canning Bridge relocation, which involved shifting a 110m long sharply curved concrete box girder bus bridge 9m sideways.
- **Conveyor Belt and Vehicle Bridge, Yandi Expansion Project, WA, 2003.** Designed by Wyche Consulting for Barclay Mowlem/ Rio Tinto. Conveyor belt and light vehicle bridge over flood prone Marrillana Creek, 320 m long, 8m high piers. Bridge is steel composite, and has been successfully built. It incorporates prefabricated steel and concrete deck segments built in Perth and assembled on site, to minimise on site labour and skills. The piles and cross heads were a simple arrangement of tall large circular sections, eliminating the need for bracing, and detailed to allow simple site erection and adjustment for driving tolerance. Mrs MacKinlay carried out verification work and organized drafting.
- **Verification of Superstructures, Canning River Bridge, Tonkin Highway extension, Perth 2003.** Wyche Consulting carried out a specialist sub-consulting role for BG&E, analyzing and checking this complex structure. Mrs MacKinlay developed and set up the three dimensional computer model, which included four steel trough box girders and double end diaphragms with skews which varied across the width of the structure.

- **Tender Design Mt Henry Bridge widening, Package E of the South West Metropolitan Rail Scheme, Perth 2003.** This is a very complex design for widening a major bridge which stretches 660 metres across the Canning River. The bridge must be widened symmetrically about 6 metres on each side, and with 76 metre spans and the requirement to incorporate a lower level footway, the Tender design is in itself a major challenge. Wyche Consulting worked in partnership with GHD for Leighton, and Mrs MacKinlay was involved as team member in developing the analysis and design for the widening section, as part of the construction design. The bid was successful, although during the course of the Tender the design changed to a separate bridge.
- **Tender Design of Structures for the Geraldton Southern Transport Corridor, 2003.** This project has 5 bridges with spans ranging from 15 to 23 metres, with some quite tall abutments, and a tunnel which could be in excess of 150 m in length. Mrs MacKinlay worked in the analysis and preliminary design of the bridge superstructures.
- **Verification of Spearwood Avenue Bridge, 2003.** This is a single span steel/concrete composite bridge over a rail alignment. It was designed by GHD for the City of Cockburn. It has quite tall abutments at about 9 metres with a limited space for the toe. Mrs MacKinlay carried out the Verification check, which included a three dimensional analysis of the abutment.
- **4 Bridges in Kimberley region of WA, 2002.** Mrs MacKinlay was a Design Engineer for Wyche Consulting, who are lead bridge designer in the Worley team, which is to design a suite of 4 bridges ranging in length from 80 to 120 metres. The client is Main Roads WA. These bridges just north of Hall's Creek will improve the flood trafficability of the Great Northern Highway in this area.
- **PT Terminal Petokemas, Surabaya, Indonesia, 2002.** In partnership with SKM, Wyche Consulting gave advice to client P&O about cracking in the 1600 m long container terminal access bridge in Surabaya. A further outcome is that a load rating of the bridge was carried out as an extension of the brief, and Mrs MacKinlay acted as a Design Engineer capacity for this work.
- **Liverpool Parramatta Transitway Barriers, Sydney 2002.** Design Engineer work on several kilometres of bridge barriers for a bus transitway for Abigroup. The barriers are to be slip formed, either on the ground surface in cut, or on top of a reinforced soil retaining wall. The solution developed offers significant savings to the client and provides a high degree of assurance to RTA of the performance of the barriers. Ongoing at the time of writing.
- **End Details and Gabion End Walls, Precast Arch Tunnel, Pacific Highway Upgrade, Yelgun to Chinderah, NSW, 2002.** On this project there are two locations each of which has a twin pair of road tunnels 40 to 45 m long, and each tunnel has a 15 m span arch roof. The tunnel is made of precast concrete arch pieces designed by Wyche Consulting. Working as a Design Engineer with Wyche Consulting, Mrs MacKinlay analysed and checked the capacity of the end arch segments to carry the gabion end wall loads and also checked other construction loads being applied to the tunnel elsewhere.

SUMMARY OF EXPERIENCE PRIOR TO JOINING WYCHE CONSULTING

EMPLOYMENT HISTORY

Feb 2000 to November 2001:

Total contracts management through the office of **Keith Dodd Consulting Engineer** for the building of a new shiploader and land based materials handling facilities for the Port Hedland Port Authority, Western Australia. Functions included writing of technical specifications and contracts, issuing of enquiries, contract negotiation with the tenderers, awarding of contracts, liaison with the client, the designers and the contractors, cost control of the complete project and the writing of the manuals for the facility. Project Value \$11 Million

March 2001 to October 2001:

Contracts and specification writing through the office of **Keith Dodd Consulting Engineer** for the installation of an additional ball mill for the Calcrete plant at the Anaconda Nickel Cobalt Mine at Murrin Murrin, Western Australia. Project Value \$5 million.

Nov 1996 to August 2000:

Total contracts management through the office of **Allied Mining & Processing Ltd** for the design and construction of relocatable base metals processing plant . The facility was manufactured offsite during 1997 and 1998. Part of the facility was hired to Tectonic Resources for the RAV8 Nickel project and installed on site during April 2000 to August 2000 with major contracts assistance from Mrs MacKinlay. Her functions included writing of technical specifications and contracts, issuing of enquiries, contract negotiation with the tenderers, awarding of contracts, liaison with the designers and the contractors and cost control of the complete project as well as writing detailed manuals for the plant. Project Value \$8 Million

April 1997 to October 1998:

Total Contract management through the office of **Keith Dodd Consulting Engineer** for the installation of the Calcrete Crushing and Grinding plant at the Anaconda Nickel Cobalt Mine at Murrin Murrin, Western Australia.

Plant owned and operated by Brambles Western Australia at the time of implementation of this installation. Mrs MacKinlay's functions included writing of technical specifications and contracts, issuing of enquiries, contract negotiation with the tenderers, awarding of contracts, liaison with the designers and the contractors and cost control of the complete project as well as writing detailed manuals for the plant. Project Value \$13 million.

October 1995 to March 1997:

Project Engineering through the offices of **Minenco / RTZ-CRA Group** on detailed feasibility studies and pilot plant installation and test programmes on the following deposits:

Kintyre Uranium Project(Western Australia). Project did not proceed.

South West Kaolin Project (Western Australia)..Project did not proceed

November 1994 to September 1995:

Contracts and specification preparation through the offices of **Wood & Grieve** for the building of a new shiploader and land based materials handling facilities for the Bunbury Port Authority, Western Australia. Mrs MacKinlay's functions included writing of technical specifications and contracts and issuing of enquiries.

January 1994 to October 1994:

Contracts and specification preparation through the offices of **Senior Consulting** for the expansion of the crushing plant at the Zapopan Gold Mine in the Northern Territory.

May 1990 to December 1993:

Contracts management through the office of **Minenco, Western Australia** for the manufacture and construction of key process components (core plant, high temperature installation) for the Hismelt Research and Development Facility at Kwinana in WA for the direct reduction of iron ore.

1984 to April 1990:

Project engineering and contracts management for a number of mineral processing projects through the offices of **Keith Dodd Consulting Engineer.**
Projects included:

- Major Expansion for St Barbara Gold Mines, Western Australia
- Limestone crushing and grinding plant in Indonesia
- Crushing treatment plant for White Range Gold, Northern Territory
- Expansion for EON Metals, Western Australia
- Expansion for Golden Valley RadioMine, Western Australia
- Gold Heap leach project at Parker Range, Western Australia
- Thames Mining Talc materials handling system.
- Complete crushing and gold treatment plant for Broken Hill Metals, Southern Cross, Western Australia
- Complete crushing and gold treatment plant for Astrik Resources, Queensland
- Complete gold treatment plant for Julia Mines, Western Australia
- Gold treatment plant for Julia Mines Western Australia
- Gold treatment plant for Forsayth Mining services, Mt Gibson, Western Australia
- Gold treatment plant for Forsayth Mining Services, Lawlers, Western Australia
- Stage 1 & 2 of the Sons of Gwalia Gold plant, at Gwalia, Western Australia

Prior experience:

Project engineering and preliminary design work on the Boddington Gold Mine for the offices of Kinhill Stearns.

Project engineering on the Broome Grain Handling Facility for the offices of Keith Dodd.

Project and design engineering on a number of heavy media mineral processing projects in Australia for the offices of Mitchell Cotts / Fraser and Chalmers Group of South Africa.