



ENGINEERS
AUSTRALIA

The Conservation Project – *Restoration of the Barham-Koondrook Bridge*



The 2019 Colin Crisp Award for restoration works was made for the \$25 million restoration of the Barham-Koondrook Bridge, over the Murray River, about 90 km north west of Echuca. Transport for NSW (TfNSW), in partnership with Regional Roads Victoria, recognised the bridge's significant heritage value, with restoration work carried out in stages between 2012 and 2019.

The community now has a fully functioning lift-span bridge that is stronger, lower maintenance, more reliable and continues to be a local icon. This was a restoration project that is fully worthy of the Colin Crisp Award.

The Documentation Project – *The Hawkesbury River Railway Bridges*



The 2019 Colin Crisp Award for documentation was bestowed on William (Bill) Phippen OAM, a notable railway author and speaker, for his book *The Hawkesbury River Railway Bridges*, which was published by the Australian Railway Historical Society, NSW Division (ARHSnsw) in 2018. Bill's book covers the history of the two bridges at this site – the original one opened in 1889 and since demolished, and the replacement bridge completed in 1946. The Colin Crisp Award recognises that this book preserves, within NSW's rich rail heritage, the history of these two Hawkesbury River Railway bridges, ensuring that the important role they played in the development of NSW and its railways will always be remembered. In 2010 the book sprang from the locating of official New South Wales Government Railways (NSWGR) photo albums at the Australian Railway Historical Society NSW and the NSW State Archives and Records, together with the original American engineer's photo albums in the Library of Congress (Washington DC) in 2014.

The book delivers a detailed explanation of the projects, covering two important engineering structures that, to date, have been largely undocumented. The Hawkesbury River Railway Bridges are certainly a worthy topic for a book, with their respective histories across two ages, their engineering significance and their ongoing importance to the NSW rail network.

At the public launch of the book on 18 May 2018, at the bridge site, Sydney Trains' Executive Director Engineering and Maintenance, Stuart Mills, said that: The Hawkesbury River Bridge is to Sydney Trains what the Sydney Harbour Bridge is to the Roads and Maritime Services. The technique is described in two videos at: <https://www.rms.nsw.gov.au/projects/barham-bridge/index.html>

This book will remain a testimony to the engineers and workers that made it all possible, available as a definitive resource to all those interested in the engineering construction of these two bridges.

A Highly Commended Project – A History of Hudson Brothers

In 2019 professional engineer and author David Jehan published a history of the Sydney engineering firm Hudson Brothers – Carpenters, Engineers and Manufacturers: 1866 to 1898. This book was Highly Commended in the 2019 Colin Crisp Awards.

The Hudson business was founded when Plymouth cabinet-maker William Henry Hudson, arrived in Sydney in 1846 with his family and started a joinery business in Redfern, a suburb of Sydney. This became known as 'Hudson & Sons'. Hudson became one of the main builders in Sydney providing timberwork to many notable buildings including the Great Hall of Sydney University.

Twenty years later, in 1866, William Henry retired and left the business to his three sons Henry, Robert and William. The firm now took on the new name of 'Hudson Brothers' and a new direction, and this story is set out in David Jehan's book. Under the leadership of Henry Hudson, the firm imported the latest woodworking machinery from America and rebuilt the original Redfern joinery shop as the 'Steam Joinery Works'. They also operated their own sawmills in the Myall Lakes district of NSW and the suburb of Pyrmont – now part of Central Sydney. They also had depots in various NSW country towns such as Hill End, a famous Gold Rush town. Hudson Brothers introduced much new technology into Australia from the USA. They were also a major supplier of agricultural equipment including ploughs, chaff cutters, horse works, windmills, etc. A review of the book can be found in the September 2018 issue of the EHA Magazine.

Find it at: https://www.engineersaustralia.org.au/sites/default/files/resource-files/2018-09/EHA_Magazine_Vol2_No9_September_12018.pdf

The brothers moved into railway rolling stock manufacture after the collapse of PN Russell and Co. and greatly expanded their Redfern works. Their success required further growth resulting in the company building a massive industrial complex at Granville, in western Sydney, and acquiring a third plant in Wickham, an inner suburb of Newcastle. The firm was incorporated as Hudson Brothers Limited in 1882 and became the major rolling stock manufacturer at the time. Thousands of goods wagons, passenger carriages and tramcar trailers were built for the NSW Railways. These served the rapidly expanding NSW railway network, which increased about seven-fold during the period covered by this book, to around 5,000 km of rail.

Hudson Brothers Limited would ultimately become the iconic Clyde Engineering Company in 1898, but that is another story to be told. The timber supply business was split off from the engineering business in 1886 and survives nominally as Hudson Building Supplies, a name that Sydney readers may well identify with.

David Jehan has provided a comprehensive account of the Hudson brothers and their firm's role in the development of manufacturing and engineering in Australia in the late 19th Century, and its contribution to the growth of our country. Thus, his book really merits the Highly Commended Colin Crisp Award, as it is increasingly important to document these achievements and contributions to Australia before their history is lost. It would seem appropriate to record that in 2019 David Jehan was awarded the **Engineers Australia John Monash Medal** for his outstanding contribution to engineering heritage for more than 30 years. This medal is given to an individual who has made an outstanding contribution to the cause of engineering heritage over a considerable time. Nominations were received from across Australia.

David was described as a passionate advocate for recording, preserving and celebrating engineering heritage, for leadership in the profession and tireless effort in raising public awareness of the work of engineers and the importance of engineering to the community.

2017 Winners of the Colin Crisp Awards

2017 winner of the Colin Crisp Award for Documentation Project: Roads and Maritime Services, Environment Branch and GHD Newcastle have been awarded a Colin Crisp Award for the Documentation: RMS Movable Bridge Study.

Roads and Maritime Services (RMS) currently manages 26 movable span bridges in NSW, of which 14 are still operational. Between 1802 and 2005 there were five distinct types of movable bridge types built which included pontoon, vertical lift, bascule, swing and sliding spans. In total 66 movable span bridges were constructed in NSW, of which the majority (48) were of the vertical lift or the bascule type, but many of these have now been demolished or are permanently closed.

RMS Movable Span Bridge Study documents the overarching history and individual past of the vertical lift span bridges, bascule bridges, and the sole remaining Roads and Maritime swing bridge in NSW, along with the only vertical lift table bridge in Australia. The study provides extensive research and background information utilising numerous documents and sources to establish each bridge's history, integrity and enable their engineering heritage significance to be evaluated and assessed.

Through comparative analysis of the lifting mechanisms of all 66 bridges, the study built a classification system that identifies each bridge as belonging to one of 13 sub-types. This classification provides a better understanding of performance and shortcomings of those movable span bridges that are still operational as these issues are common to all bridges within a type. Another benefit of this classification is that it enables the standardization of replacement components across each type and the development of more consistent maintenance schedules. The RMS Movable Span Bridge Study has been completed by GHD in conjunction with the Environment Branch of the Roads and Maritime Services. The study will play a vital role in assisting Roads and Maritime Services in managing their heritage movable span bridges into the future.

The Study closely follows the Burra Charter process in its sequence of investigations, decisions and actions recommended.

The combination of rare RMS archival photographs and stored bridge plans enables a better technical understanding of each bridge's operation than has been previously achieved, forming a valuable reference within Australia and overseas. This is particularly important for the 22 bridges that have been replaced and are no longer available for inspection.

2017 winner of the Colin Crisp Award for Conservation Project: Sydney Trains and Ventia Utility Services - Macdonaldtown Gasworks Remediation: Restoration of the Heritage-Listed Southern Gasholder.

The Southern Gasholder is the only Victorian-era gasholder still standing in New South Wales. Ventia Utility Services Pty Ltd undertook its restoration for Sydney Trains. The conservation work was part of the Macdonaldtown Gasworks Remediation within the former Eveleigh Gasworks.

The Southern Gasholder, listed on the State Heritage Register as part of the Eveleigh Railway Workshops, was an integral element of the former Gasworks, which was built in 1892 to meet

increased demand for gas lighting of railway carriages, stations and railway yards. The Southern Gasholder was operational until 1977.

The gasholder, measuring approximately 20 metres in diameter, has two nested internal steel lifts. It also has a steel superstructure that measures up to 13 metres in height. The superstructure supported and guided the two-stage lift of a steel bell, forming the containment tank that stored the manufactured gas.

Sydney Trains had originally intended the restoration of the gasholder to be carried out in-situ; however during early investigations, Ventia recognised that restoring the gasholder's superstructure offsite would achieve a better long-term conservation outcome. Subsequent offsite restoration minimised the structural risks and allowed protective treatment of all metal-work and the reuse of most of the original fastenings. The remaining bell structure was restored onsite under controlled conditions before the superstructure was reinstated.

Significant challenges were faced because the remediation of the site required soil to be excavated to depths of up to 6 metres around the gasholder's substructure. Ventia engaged geotechnical consultants Coffey Geotechnics, alongside structural and conservation consultant Bill Jordan & Associates, to develop an excavation sequence that would not have any adverse impacts on the below-ground brick annulus of the gasholder. The security of the gasholder's substructure was also maintained during remediation excavations by dewatering its brick annulus and steel bell.

The replacement of the Southern Gasholder's only missing components, its decorative finials, was achieved by casting them from the similar parts of the disassembled Molong Gasholder. The new finials were placed atop the gasholder's columns in February 2017, enhancing the structure both technically and aesthetically, and completing its authentic restoration to a high standard.