

NEW HISTORICAL REINFORCEMENT GUIDE

The use of reinforced concrete in Australia began when the contract to build the Johnstons Creek Sewer Aqueduct in Annandale, Sydney was awarded to Carter, Gummow & Co. in 1895. The aqueduct is still in service today and is a testament to the durability of reinforced concrete structures. Combined with the Fyansford and Anderson bridges in Victoria (by John Monash) and the Lamington bridge in Queensland (1896), reinforced concrete was established as the new building material.

Since its introduction, there have been significant advances in the manufacture and properties of steel reinforcement, from the initial mild steel bars, which were covered by various company patents over shape and anchorage method, to the modern high strength deformed reinforcement available today. The way reinforcement is detailed has also significantly changed over the years, from the challenges of how to anchor plain round or square bars into the concrete in order to utilise the full tensile capacity of the reinforcement, to minimum anchorage requirements to achieve the yield strength of the bar.

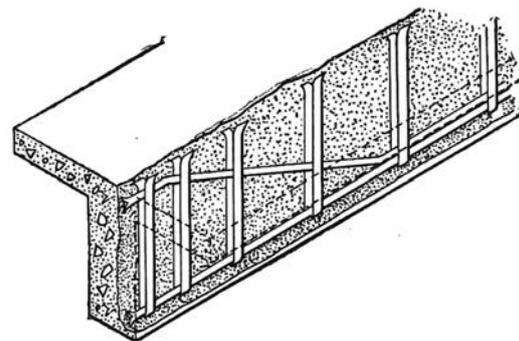
Many older buildings and structures need to be assessed for their load carrying capacity as part of upgrade or refurbishment works, or simply to ensure the existing structure is capable of carrying specific loads. In order to allow analysis of the reinforced concrete structure, the design properties of the steel reinforcement must be known. By knowing when the structure was built, it is possible to determine the type of reinforcement that was available at the time, and hence the design properties of the reinforcement incorporated in the structure for use in the design check or analysis.

As many of the older printed Standards and publications providing this information are either no longer publically available or very difficult to obtain, the Steel Reinforcement Institute of Australia (SRIA) has been working on a new publication to try and capture this important reinforcement information while it is still accessible, and make it available to engineers in a single comprehensive Guide. The Guide is being developed as questions concerning the properties of historical reinforcement are the most common technical enquiry received by the SRIA, and the Guide will be available later this year. While information is provided, care should be exercised when applying modern design practices to older structures due to the variability of materials. For example, ready mixed concrete was not introduced in NSW until 1939.

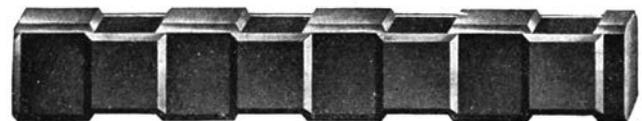
In the beginning, reinforced concrete was often referred to by the patented system, named after the person that developed it. For example, the main systems used in Australia up until the early 1920s appear to be the Monier, Kahn, Hennebique, Ransome and Thacher systems **Figure 1**. Details of these old reinforcing systems are still available in some older textbooks of the period, and extracts will be brought together into the new Guide.



Kahn Trussed Bars (Kidder and Nolan, 1911)



Hennebique System (Hool and Johnson, 1918)



Indented Steel Bar Co. (CRSI, 2014)



Cold-twisted Ransome Bars (Reid, 1908)



Thacher bulb (or rolled) bars (Buel and Hill, 1904)

Figure 1 Some historic bar systems used in Australia

Along with details of the historic reinforcement properties, the publication will also trace the history of the relevant building Codes and Standards, from AS A.1 in 1928 to AS/NZS 4671 in 2001 covering reinforcing materials, and concrete design Standards CA2 in 1934 to AS 3600, providing relevant information on the changing requirements for design and materials over the years. Sample drawings will also be included to indicate typical detailing practices as steel reinforcing materials developed.

INDUSTRY ASSISTANCE WELCOMED

To ensure the new publication *Guide to Historical Steel Reinforcement in Australia* is as comprehensive as possible, we would welcome anyone wanting to contribute to the publication by providing or sharing historic photographs of projects and reinforcement that they may have been involved with, along with lending the SRIA old textbooks and drawings indicating typical detailing practices. If you have material that you think is suitable, please contact the SRIA by phone or email, as provided in the contact details below.

INDUSTRY NEWS

AS 3600 Concrete structures

The BD-002 Standard Committee's consideration of public comments occurred in November 2017 and January 2018. A further public review period is expected early 2018 for the changes incorporated.

AS/NZS 4671 Steel reinforcing materials

A project proposal was lodged with Standards Australia in the September round and conditionally approved. Additional information on the scope has been provided and a final decision is expected early 2018.

SEISMIC DESIGN AND DETAILING OF REINFORCED CONCRETE BUILDINGS IN AUSTRALIA

For those interested in learning more about this essential topic, the SRIA has produced the *Guide to Seismic Design and Detailing of Reinforced Concrete Buildings in Australia*. The publication is available as a free download from the SRIA website, or for purchase as a hardcopy for a nominal cost of \$37.00 including delivery anywhere within Australia.



A webinar covering this topic, which is based on a successful National Seminar Series with the CIA and AEES, is also available from the CIA website (www.concreteinstitute.com.au)

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