

SYDNEY HARBOUR BRIDGE - Bruce Judd

Sydney in the Mid 1920s

- Population 1 million
- North Sydney was rapidly expanding and the railway from Milsons Point to Hornsby opened in 1893.
- Gladesville Bridge (2 lanes) was opened in 1881 and had become a bottleneck.
- Ferries linked Milsons Point to the city. Passenger numbers peaked during the early stages of the Bridge construction in 1927 at 47 million, and were still 43 million during the depression in 1931. During construction, the harbour had to remain open at all times to ferry and shipping traffic.

Harbour Crossing Proposals

- There were many proposals for bridge and tunnel crossings. In 1815 the emancipated convict and Government Architect, Francis Greenway, proposed a bridge but did not prepare any drawings. In 1896 the immigrant English architect John Sulman supported a tunnel proposal. Sulman also advocated for tunnels into the 1920s, stating that a bridge would be too huge to be aesthetically pleasing.
- The Minister for Public Works, E. W. O'Sullivan, called tenders for competitive designs and in 1903 appointed an Advisory Board which recommended a 411m cantilever bridge designed by local engineer Norman Selfe. This did not proceed, as NSW was then in a minor recession.
- In 1922 both Labor and the Nationalists supported the bridge proposal, the main opposition being the Progressive Party (a precursor to the Country Party). It is interesting that "Progress Parties" are often those who oppose projects!
- A crossing between Dawes Point and Milsons Point was the centrepiece of Dr John Bradfield's railway plan.
- Although he originally supported a cantilever structure, in the early 1920s he was convinced that an arch structure as used on the Hells gate Bridge in New York would be more effective. When tenders were called in 1924, an arch structure was included.
- Dr John Job Crew Bradfield was the main driving force in achieving the bridge crossing. He was born 1867 in Sandgate, Queensland and won a

scholarship to Sydney Uni and graduated in Engineering in 1889 with the Uni Gold Medal. Worked as a draftsman in Brisbane – retrenched in 1891 during a depression, and joined the NSW Public Works. Obtained a Masters Degree (1st Class Honours) in 1896 at Sydney Uni.

- In 1909 he put forward his first scheme for the Sydney City railway, and in 1912 was appointed in charge of the newly created SHB and City Transit Branch. Refined his rail and bridge proposals during study tours of Great Britain, Europe and North America. He was Chief Engineer for Metropolitan Railway Construction, and was responsible for supervision of the Bridge on behalf of the NSW Government. In 1930, Bradfield disagreed with the Railway Commissioners who wanted to economise on both the bridge and the city railway, and was "retired" from his position. The Government re-engaged him as their representative and preserved his status in the Dept. of Public Works, and his salary of £3,000.

Bridge Construction

- The arch is a 503m span, 49m wide, with a navigation clearance of 56.2m.
- The winning tender was one of seven alternatives submitted by Dorman Long. Bradfield's assessment criteria gave equal weight to aesthetics, strength and price. He complimented Dorman Long on the excellence of "the plans, calculations and material submitted". A positive aspect of Dorman Long's proposal was to fabricate all steelwork in Australia, as they already had established fabrication yards in Sydney.
- The winning tender price was £4,217,722. The Government was responsible for all wage increases, the provision of all construction sites and free access to the Moruya Quarry. Wage increases amounted to approx. £800,000, so naturally Dorman Long did not actively oppose wage increases.
- Dorman Long's designer was Ralph Freeman, a British consulting engineer who prepared the tender design and most of the technical Drawings. Dorman Long threatened to sue the Government if Bradfield was named as Designer, and a plaque on the Bridge names both as the Designers. Dorman Long's Director of Construction, Lawrence Ennis, supervised all of the construction.
- The main span contains 39,017 tons of steel, 80% being sent from Dorman Long's yards in England, with the remainder being supplied from the BHP

Steelworks established in Newcastle in 1915. All fabrication was performed by the Australian workforce at the Lavender Bay yards.

- The completed structure is a two-hinged arch. Each of the hinges are 330t steel pins manufactured in England. When the bottom chord closed on 13th August 1930, the structure acted as a three-hinged arch until the top chord was closed on the 8th September, 1930. Before closure of the bottom chord, a severe gale caused lateral movement between the two arms of only 8cm. The structure was officially opened on the 23rd March, 1932.
- During the 7 year construction period, a total of 16 workers were killed. Although this was terrible, it was not an unusually high number considering the duration and type of work. (It should be recalled that 35 were killed on the construction of the Westgate bridge in Melbourne in the early 1970s.) The work included driving 6 million semi-molten rivets and also the quarrying of granite at Moruya for the facing of the Pylons. The Pylons were 87m high in a city where buildings were limited to 150 feet (46m).
- On the North Shore, 438 houses were demolished, with over 800 being demolished for the total project. In 1926 a delegation of waterside workers from Milsons Point who were to lose their homes, was received by the Minister for Justice, William McKell (in the absence of the Premier Jack Lang). Other delegations were also received, but no action was forthcoming. This may have haunted McKell, as one of his first acts on becoming Premier in 1941 was to establish the Housing Commission, whose first large high-rise project after the war was the Greenway Flats at North Sydney. (Perhaps Greenway would not have supported the architecture of this building!)
- The cantilever method of construction was best captured by the Australian artist Grace Crossington Smith in her painting "The Bridge in Curve". This clearly shows the strength of the temporary cables anchoring the arch during construction.
- Jack Lang became Premier of NSW for the second time in 1930. He was initially a real estate agent from Auburn and appreciated the employment benefits to the State that construction of the Bridge provided during the Great Depression of the late 1920s -- early 1930s and also the opportunities for real estate development on the North Shore. At the official opening in 1932, Francis de Groot, an Irish born member of the New

Guard, attempted to up-stage Lang by cutting the official ribbon. Lang should be remembered as a driving force securing funds for the bridge.