

The Plan.

It was as early as 1815 that Francis Greenway proposed or introduced the thought of building a bridge from the northern to the southern shore of the harbour. It took some time for this to become a reality with design entries invited in 1900. All the submissions were considered unsuitable and so the momentum for the bridge crossing stopped.

However, after the First World War more serious plans were made, with a general design for the Sydney Harbour Bridge prepared by Dr J J C Bradfield and officers of the NSW Department of Public Works. The New South Wales Government then invited worldwide tenders for the construction of the Bridge in 1922 and the contract was let to an English firm Dorman Long and Co of Middlesbrough.

Introduction of the Bridge

The Sydney Harbour Bridge is the world's largest, but not longest steel arch bridge. The Harbour Bridge is one of the most famous landmarks in Sydney. Completed in 1932, the construction on the bridge began in December, 1926 and was an incredible achievement and a huge engineering accomplishment. Prior to the bridge being built, the only links, roads or transport between the city centre in the south and the residential north were by ferry or by a 20 kilometre road trip that involved the crossing of five bridges.

Sydney Harbour Bridge & its Construction

The contractors set up two workshops at Milsons Point on the North Shore. Here 79% of the steel was imported from England and 21% used from Australian sources was used into the making of this full steel arch bridge. The foundations for the four main bearings, which carry the full weight of the main span were dug to a depth of 12.2 metres and filled with special reinforced high-grade concrete laid in hexagonal formations.

Four giant 89 metre high pylons are made out of concrete, faced with granite, quarried near Moruya, where about 250 Australian, Scottish and Italian stonemasons and their families lived in a "temporary settlement". Three ships were made specifically to carry the contents of 18,000 cubic metres of cut, dressed and numbered granite blocks, 300km north to Sydney.

After the spans were constructed the work began on the hardest and most vital part of the bridge, the main arch. Two half-arches were built out progressively from each shore, each held back by 128 thick cables anchored underground through U-shaped tunnels. Steel members were fabricated in the workshops, placed onto barges, towed into position on the water out from the harbour and lifted up by two 580 tonne loads of electrically operated 'creeper cranes', which erected the half-arches before them as they travelled forward.

Joining of the Arches

On the 19th of August 1930 the arch of the bridge was successfully joined at 10pm at night. The steel decking was then hung from the arch and was all in place within nine months, being built from the centre outwards to save time moving the cranes.

As the project neared completion, the last of (approximately) six million Australian made and hand driven rivets were pushed through the deck on 21 January 1932. In February 1932 the Bridge was test loaded using up to 96 steam locomotives placed in various configurations.

The Sydney Harbour Bridge, which is now known by typical residents as the "Coat Hanger", was built by 1400 workers, 16 of whom were killed in accidents during construction. The surface area of this huge bridge is that of 60 sport fields and requires approximately 80,000 litres (21,000 gallons) of paint (which is required for each coat!). Before Paul Hogan (from the movie Crocodile Dundee) became famous, he worked on the Sydney Harbour Bridge as a painter.

The deck is 59 metres (194 feet) and was officially opened on 19 March 1932. The total cost of the Bridge was approximately 6.25 million Australian pounds (\$A13.5 million), and was eventually paid off in 1988 by a plan of using what is known as toll charge. The initial toll for a car was 6 pence (in our time 5 cents) and a horse and rider was 3 pence (2 cents). Today the toll costs \$3.00. The toll is now used for bridge maintenance and to pay for the Sydney Harbour Tunnel. The annual maintenance costs are approximately \$5 million. More than 150,000 vehicles cross the bridge each day.

Opening Celebrations

The official opening day on Saturday 19 March 1932 was a momentous occasion, drawing remarkable crowds (estimated between 300,000 and one million people) to the city and around the harbour foreshores. The NSW Premier, the Hon. John T. Lang, officially declared the Bridge open. However, before Premier Jack Lang arrived to cut the ribbon, there was a sudden commotion as Captain Francis de Groot rode forward on his horse. He was an active member of the New Guard, a strongly pro-monarchy political party, and believed that the bridge should be opened by a member of the Royal Family (or at least the Governor General, the King's representative in Australia).

Slashing through the ribbon with his sword, de Groot declared the bridge open in the name of "the decent and respectable people of New South Wales".

De Groot was promptly arrested and removed from the scene, later to be fined five pounds and charged with offensive behaviour in a public place. Meanwhile the ribbon was tied together again, and the ceremony went ahead.

The opening celebrations included a vast cavalcade of decorated floats, marching groups and bands proceeding through the city streets and across the deck in a pageant of surprising size and quality, considering the economic depression.

The celebrations continued with a gun-salute, a procession of passenger ships under the Bridge, a 'venetian' carnival, a fly-past, fireworks, sports carnivals and exhibitions. After the pageant the public was allowed to walk across the deck...an event not repeated until the 50th anniversary of the Bridge in 1982.

Now the Sydney Harbour Bridge links Sydney's two major commercial centres (other being the opera house) and forms a daily transpoint for millions. It is a living landmark, a tourist experience and an essential transport line for Sydney siders or residents.

It is a cultural landscape that people actively experience through driving, walking, sailing, flying, cycling, ferry and train commuting, as well as passively observe – from the foreshores, from a distance, as a distinctive landmark – or examine in detail as a marvel of engineering technology.

“For such a familiar icon, the extent of the bridges cultural significance is amazingly obscure to locals; its accessibility is too often frustratingly mysterious to visitors, yet this is a site that has been included in a nomination for World Heritage listing with the Sydney Opera House in its harbour setting (1996).” *Road Authority- my qoute*

Length of arch span	503 metres
Height of top of arch	134 metres above mean sea level
Height to top of aircraft beacon	141 metres above mean sea level
Width of deck	49 metres
Clearance for shipping	49 metres
Height of pylons	89 metres above mean sea level
Base of each abutment tower	68 metres across and 48 metres long (two pylons rest on each abutment tower)
Total length of bridge	1149 metres including approach spans
Bearing pins	Each of the four pins measures 4.2 metres long and 368 millimetres in diameter
Thrust on bearings tonnes	Under maximum load approximately 20,000 on each bearing
Number of rivets	Approximately 6,000,000
Largest rivet long	Weighed 3.5 kilograms and was 395 millimetres
Longest hanger	58.8 metres
Shortest hanger	7.3 metres
Total weight of steelwork approach spans	52,800 tonnes including arch and mild steel
Weight of arch	39,000 tonnes
Rock excavated for foundations	122,000 cubic metres
Concrete used for bridge	95,000 cubic metres
Granite facing used on pylons and piers	17,000 cubic metres
Allowance for deck expansion	420 millimetres
Allowance for arch expansion	The arch may rise or fall 18 centimetres due to heating or cooling
Number of panels in arch	28, each 18.28 metres wide
Record tonnage erected	589 tonnes of steelwork was erected on the arch in one day on 26 November 1929

Paint required

272,000 litres of paint were required to give the Bridge its initial three coats

Info and research came from:

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<http://sydney-harbour-bridge.bos.nsw.edu.au/bridge-syllabus.php>

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<http://www.australiangeographic.com.au/journal/on-this-day-in-history-opening-of-the-sydney-harbour-bridge.htm?printmode=true>