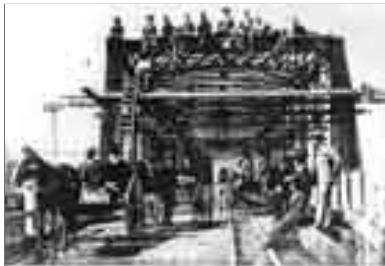


Historic Bridges

of the Hunter Valley

Starting and ending at Maitland in the Hunter Valley, 200 km from Sydney, this day tour shows a comprehensive selection of the types of road bridges built in New South Wales in the second half of the nineteenth century.

Extending the basic tour to include a drive to Dungog allows you see good examples of all the four main types of historic timber truss bridges of which there were at one time over 400 in New South Wales. Now only around one fifth of this total remain, and their number declines each year.



*Opening of the Dunolly Ford bridge (8),
Singleton 9 September 1905*

Self-guided tour by car



The Institution of Engineers, Australia Sydney Division
Engineering Heritage Committee

Crossing the rivers

In the early 1800s access was by sea to Newcastle at the mouth of the Hunter River then upstream to Morpeth where wharves were built and a branch railway connection was made in 1864. The smaller craft plied the northern tributaries, the Paterson and Williams Rivers.

By land, first access was well to the west by Howes Line (Putty Road) via Bulga (1820) followed by the shorter convict-built Great North Road (1830) via Wollombi to Singleton and Morpeth.

The earliest industry was cedar-getting, with logs being floated down the rivers. Soon after this, farming the rich alluvial soils began and pastoral properties were established in the Upper Hunter and in the North West of NSW, hence the need for better roads and river crossings to move produce and wool to ports and markets.

The main road (New England Highway) kept to the south side of the Hunter River and the first bridges, in the 1820s, were over Ironbark Creek near Hexham and over Wallis Creek near Maitland.

The railway from Newcastle reached Maitland in 1858 and Singleton in 1863 where it crossed the Hunter River in 1866 on a five-span laminated timber arch bridge, sharing one half with the main road.

Progressively, bridges were built to give access to the other sides of the Hunter, north at Maitland via the Belmore Bridge in 1899 and west of Muswellbrook in 1881.

From the 1860s a variety of bridges, mostly timber, were built across the Paterson and Williams Rivers and their tributaries to eliminate the hazardous fords and toll-paying punts.

Timber truss road bridges

Timber trusses were the mainstay of the NSW road system from 1860 to 1920 because iron and steel were expensive imports, and the indigenous hardwoods were three to five times stronger and far more durable than the pines used in the USA.

During that 60 year period over 400 timber truss bridges were built, which gave the name the 'Timber Bridge State' to NSW.

There were five stages in the development of these trusses, from the traditional to the scientific:

- The Old PWD truss (1860–86) was virtually a copy of the European truss, based on the designs of architect Andrea Palladio c. 1550.



*Old PWD timber truss
bridge, Clarence Town (11)*

Their main faults were the use of large single pieces of timber, the double depth chords at mid span and no allowance for shrinkage of the Australian hardwoods, which caused the truss to sag.

- J A McDonald's design between 1886 and 1894 had some useful improvements.

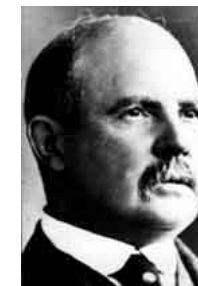


*This large 1899 timber truss
bridge at Woodville (3) is
one of only two overhead
braced Allan trusses in
service; the other is the
nearby Morpeth bridge (1).*

- Percy Allan completely rethought the whole process in 1894. Using the American Howe truss layout and with proper structural design, he achieved a truss that was simpler to build, used shorter timbers and with better joint details was easier to maintain. The vertical iron rods could be screwed up regularly to keep the joints tight and rain water was more readily shed from his trusses. Allan trusses were built until 1930.

A flaw with these trusses was the timber bottom tension members, where steel would have been better.

Allan's first design had a maximum span of only 27.3 m and these trusses were not tall enough for overhead bracing. By 1895 he had produced designs for tall timber truss bridges spanning up to 47 m.



*Percy Allan
(1861–1930) was
involved with more than
600 bridge projects.*



*E M de Burgh
(1863–1929) designed
bridges and Burrinjuck
Dam.*



A typical de Burgh truss



A typical Dare composite truss, at Bulga

- E M de Burgh produced a composite Pratt truss in 1899, in which all tension members were made of steel and all compression members remained timber. It had the diagonals in tension, using iron rods, with timber for the short vertical compression members. Along the bottom chord he used steel pins to engage the looped ends of the diagonal rods. These trusses were built up to 1905.
- Harvey Dare reworked Allan's design to produce a composite truss without pins, and this successful Howe truss design was built from 1905 to 1936.

In the Basic Tour you will see Allen trusses at Morpeth (1), Hinton (2), Woodville (3) and Vacy (5), and a de Burgh truss across Webbers Creek on the Gresford–Singleton road. To see the Old PWD truss (11) near Clarence Town and the Dare truss (12) at Dungog you will need to take the Tour Extension.

Iron lattice bridges

Despite the dominance of timber bridges, there were rivers whose sizes and flood histories required much larger spans in order to maximise the clear waterway. From 1870 to 1893 lattice bridges from England and Belgium were the choice for these major bridges both for road and rail. The spans varied between 27.4 m and 55.5 m. The Hunter Region has more than any other area of New South Wales, four over the Hunter River and one over the Paterson River. In this tour you will see three of them, at Paterson (4), Redbournberry (7) near Singleton and Elderslie (9) near Branxton.

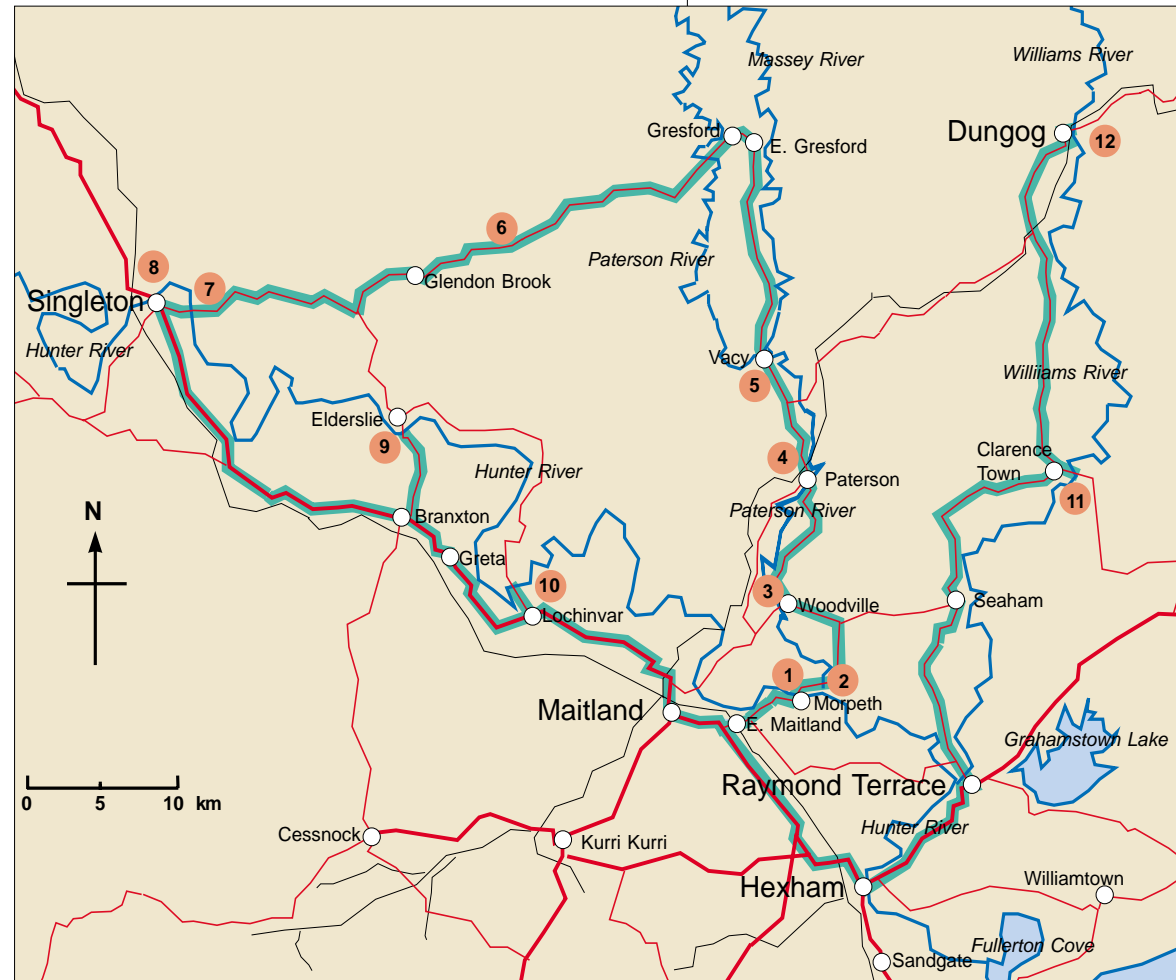
There were only two styles built; up till 1886 the bridges were deep and had vertical ends; then J A McDonald revised



Earlier type of iron lattice bridge; the 1881 bridge at Muswellbrook



Later type of iron lattice bridge



Locations of bridges

Timber Truss Bridges

Old PWD design

- 11 Williams River at Clarence Town on the road to Limeburners Creek, 1880

Allan design

- 1 Hunter River at Morpeth, 1898
2 Paterson River at Hinton, 1901
3 Paterson River at Woodville, Dunmore Bridge, 1899
5 Paterson River at Vacy, 1896

de Burgh design

- 6 Webbers Creek, Singleton to Gresford Road, 1902

Dare design

- 12 Williams River at Dungog, Cooreei Bridge, 1906

Iron Lattice Bridges

- 4 Paterson River, south of Paterson, 1887
7 Hunter River, Singleton west, Redbournberry Bridge 1891
9 Hunter River, north of Branxton, Elderslie Bridge, 1891

Lift Bridges

- Hunter River at Hexham, steel truss, 1952
2 Paterson River at Hinton, 1901
3 Paterson River at Woodville, Dunmore Bridge, 1899

Steel Truss Bridges

- 10 Hunter River, NW of Lochinvar, Luskintyre Bridge, 1904
8 Hunter River at Singleton, Dunolly Ford Bridge, 1905

the design and produced a shallower depth and introduced graceful curved ends .



The Dunmore Bridge designed by Percy Allan (3)

Lift bridges

Lift bridges, where a horizontal deck segment is raised vertically between towers, are one way of providing passage for ships on navigable waterways. The Hunter River was navigable as far as Morpeth by the early 1800s. The Paterson and Williams Rivers were also navigable.

Toll ferries were common for crossing navigable rivers, but where traffic volume demanded a bridge, it had to have a movable span. The first such bridge was the Dunmore Bridge, a sliding span bridge at Woodville on the Paterson River opened in 1864. Its replacement (3) which opened in 1899 was designed by Percy Allan.

The next lift bridge (2) was opened in February 1901 a short distance downstream at Hinton.

Ironically, the busiest ferry crossing was the last to be bridged, over the Hunter River at Hexham. A high level bridge with adequate clearance at high tide would have required long approach ramps, as expensive as the bridge itself, and so was delayed for many years. Eventually the heavy traffic flow on the Pacific Highway up the North Coast required a bridge but colliers supplying coal to Sydney used the river. The compromise was a low-level bridge with a lift span, opened in December 1952. You will cross it if you take the Supplementary Tour. Although the colliers have been superseded by rail haulage, the lift bridge still operates to allow tourist cruisers to pass through at high tide.

Steel truss bridges

In the 1890s the railways began to use steel trusses for new lines and replacement bridges even though they were an expensive import, and again for the major bridges on the North Coast Railway 1910–22. Road bridges were still dominated by timber but two pioneering steel road trusses were built over the Hunter River at Singleton (8) and at Luskintyre (10). Both bridges were completed in 1905 and were built to the Pratt system. These two trusses were light

but strong, with spans of 46.9 m at Singleton and 60.1 m at Luskintyre.



The Luskintyre Bridge (10)

Basic Tour

This tour starts and ends at Maitland, about 200 km from Sydney. The round trip tour itself is approximately 200 km. You will see four timber truss bridges of the Allen type, and one of the de Burgh type, three iron lattice bridges, two lift spans and two historic steel truss bridges.

From Maitland, take the New England Highway towards Newcastle, and at East Maitland turn left into Melbourne Street and proceed to Morpeth. Stay on the main street and the three-span timber truss bridge (1) over the Hunter River will be on your left. Cross the Hunter River, turn right and proceed to Hinton. Cross the bridge (2) over the Paterson River. To view the bridge, park in the area on the right.

Leave Hinton with the hotel and main street on your right and head north via Wallalong until a you reach a T-intersection at the top of a rise. Turn left and proceed to the Dunmore Bridge (3), marked 1899, over the Paterson River.

Retrace your track for a short distance and turn left for Paterson. Proceed to the iron lattice bridge (4) over the Paterson River.

After crossing this bridge turn right and enter Paterson, turn left and cross the railway line noting the 60 m steel Pratt truss, then continue on to Vacy.

After inspecting the half-through Allan truss bridge (5) at Vacy continue to East Gresford and turn left for Singleton. A short distance out of East Gresford there is a modern stress laminated deck timber bridge at Pounds Crossing over the Paterson River.

Eventually you will come to a single span de Burgh truss bridge (6) over Webbers Creek and a little while later a good example of a timber beam bridge.

Continue to Singleton where you will cross the Hunter River on the Redbournberry iron lattice truss bridge (7). Continue into Singleton via the rickety timber viaduct.

At Singleton the road passes under a concrete bridge over the Hunter River and the 1905 steel truss bridge (8) over the river will be on your right.

Take the New England Highway back towards Maitland.

After passing through Branxton be ready to turn left for Elderslie. Follow this road to the largest of the iron lattice bridges (9) over the Hunter River.

Retrace back to the New England Highway and turn left. Proceed through Greta and down a steep hill. At the bottom, turn left for Luskintyre and follow the road to the steel Pratt truss bridge (10) over the Hunter River.

Return to the New England Highway and proceed to Maitland.

If that has taken up your available time then resume your planned trip or return home.

Tour Extension

An extension from Maitland to Dungog, 85 km one way, will allow you to see two more historic timber bridges of different kinds; an Old PWD timber truss and a Dare truss.

From Maitland take the New England Highway to Hexham, then the Pacific Highway to Raymond Terrace. The 1952 lift bridge is in your right as you cross the Hunter River at Hexham. At Raymond Terrace, take the left turn to Dungog crossing the Williams River by a new concrete bridge.

When you come to Clarence Town make a short detour to the right on the road to Limeburners Creek and Stroud to see the oldest timber truss bridge (11) in New South Wales, over the Williams River. Then return to the Dungog road.

At Dungog, cross the railway line and turn left into the riverside park. The Dare truss bridge (12) is there before you across the Williams River.

Return by the same route.



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