ORBOST & DISTRICT HISTORICAL SOCIETY INC.

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NEWSLETTER

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SNOWY RIVER BRIDGE - 1922 to 1934

- by Lois Crisp

The second major flood in the Snowy River at Orbost, since the marker was installed at the Butter Factory, occurred 80 years ago. Along with a huge loss of trees, crops, fences, animals etc., was the closure of the very substantial bridge opened in June 1922. This 1934 flood was indeed devastating, destroying not only a section of the 1922 Orbost bridge, but also a section of the just completed and 'thought to be indestructible' bridge across the Snowy at McKellar's Crossing (McKillops Bridge).

The *Snowy River Mail* of January 10th 1934 reported much of the happenings and it also published a detailed description of the building of the "1922" bridge (which had replaced the first bridge across the Snowy, completed in 1893). This is how the 1922 bridge was built, as reported in the *S R Mail* in 1934.

LEFT:

The 1922 bridge soon after its construction.

LEFT:

Damage caused by the 1934 flood.

Particulars regarding the erection of the bridge over the Snowy River were published in the ***Engineer*** on September 1st 1922 and are herewith republished.

A new bridge over the Snowy River at Orbost was opened for traffic on June 20th 1922. It is designed for future joint use by road and railway [1] traffic, but pending the extension of the railway it has been brought into use for road traffic only. The location and levels will suit the extension of the railway, which at present terminates on the Melbourne side of the river.

During the last few years the condition of an old suspension bridge [the 1893 bridge] which was the only vehicular crossing between the town of Orbost and the railway station, has caused much concern. The structure is of timber, except for the wire suspension cables of its central span of about 100 feet.

A design was prepared in 1914 for a permanent bridge with five spans of 85 feet composed of plate girders on concrete piers. With great increase in the price of steel work during the war, the cost of this design became prohibitive, and the need for a new structure becoming urgent, alternative proposals were investigated. As a result the present design was adopted as providing a semi-permanent bridge at moderate cost.

NEW POSITION

The new bridge spans the river about 160 feet upstream from the old bridge on a slight skew, the piers being at an angle of 80 degrees with the centre line of the bridge. It has a camber of about 2 feet 5 inches in its total length of 527 feet.

SUB-STRUCTURE

The piers are composed of yellow stringy bark piles, 12 to a pier, with a cutwater [2] pile added for the central spans, and from 4 to 8 smaller spans. All piers have rolled steel joist crossheads. The larger piles are 55 feet long with a 22 inch head and 16 inch toe. The riverbed is composed of sand, gravel and clay on hard rock, which was indicated by bores to be at a depth of 24 to 26 feet at the six central spans. As the river is subject to sudden floods with high velocity, which scour out the sandy bed, the piles were fitted with special heavy shoes and driven to rock.

UNEVEN ROCK BOTTOM

Although bores put down at five points along centre lines showed rock at fairly uniform depth, it was found, after construction was well under way, that jagged ridges of rock protruded above the general level at piers 9 and 10, extending to within a few feet of the surface and with shelving sides. The rock was 10 feet deeper at one end of the pier than at the other, so that probably the nearest bore had struck a low point. Driven piles were out of the question here, and it was decided to build concrete pedestals to a point above summer level at these two piers and to complete the upper portion with piles planted thereon.

DAMMING THE RIVER

Coffer dams formed of three thicknesses of 9 inch x 3 inch Oregon planks were used, but at pier 9 great difficulty was experienced in dewatering. The services of a diver were obtained, and two logs 12 inch and 15 inch were discovered embedded in a cleft in the rock. After removing and sealing by diver no further difficulty was experienced, the surface of the rock being so rough and irregular that when cleaned no further bond was required to prevent the pier from sliding on its steeply inclined foundation.

During floods the velocity of the river is estimated at over 7 feet per second and large quantities of timber, fallen trees, and debris, are brought down, so the sides of piers were covered with lagging to prevent a logjam being built up by timber catching between the piles.

SUPERSTRUCTURE

As mentioned above, the cost of new plate girders became prohibitive during the war. However, the renewal of the Flinders Street viaduct to carry heavier engines had recently been completed and careful investigation showed the possibility of obtaining sufficient girders for six central spans, varying from 50 feet 10 inch to 72 feet 5 inch in length. These girders having formed portion of a complex cantilever structure were of various sections and depths, and considerable detail work in alterations was necessary, as there were scarcely two similar types throughout. They were cut to similar length and new end stiffeners provided in most cases. The whole of the girders were closely examined and scraped at Newport, and all loose rivets replaced. The spans are unsymmetrical, but this is hardly noticeable in the completed bridge.

The girders as altered can carry 120 ton locomotives. Double the number are used for a single line of way as compared with the viaduct from which they were removed. Generally there are four to a span, but in span No.5 two heavy girders are used, and in span No.3 three girders. Depth over-all varies from 4 feet 9 inch to 5 feet 4 inch Spans 3 and 10 have lighter girders 3 feet 0 inch depth, and the two land spans at each end have rolled steel joists.

Sway bracing is of K type designed so as to be easily adjustable between girders of different depths, all holes in girders being drilled on the job. Girder flanges being of varying thickness, seasoned grey box packing pieces 4 inch to 8 inch wide were laid along the top of each girder cut to the necessary depths (1 inch to 4 inch) to form a uniform bed for the cross-beams. These pieces and the girders were covered with strips of 24 gauge galvanised iron to protect them from seepage through the deck.

Timber cross-bears 12 inch x 6 inch and 18 inch apart carry a floor of 7 inch x 4½ inch decking laid diagonally. When the railway is extended 100 lb. rails will be spiked to this deck and the top of these rails will be level with the surface of the tarred metal, which is 6 inch thick at centre of roadway.

Cast iron scuppers are provided at kerb lines. The roadway is 18 feet 6 inches wide between handrails, with a footway of 5 feet 0 inches on the upstream side. The roadway is not central, being 15 inches off centre line of piers and girders. This lessens the overhang of the footway. The rails will of course be laid centrally.

For the larger spans the erection of girders was facilitated by temporary piers at mid span length, trollies running on rails being used to transport girders, of which the heaviest weighed 15 tons. Construction Foreman, J. French [3] suggested the methods used and carried out the work in a very efficient manner. All metal work was given two coats of tar, lime and cement composition, which has been found to give a very satisfactory protection.

APPROACHES etc.

In order to obtain a clearance 5 feet 9 inches above the highest recorded flood level at centre of bridge, considerable earthwork was needed for the approaches. It was necessary to give access to the bridge from four different directions. About 14,000 cubic yards of filling was placed, the bulk of it being obtained from a sandbank in the riverbed near by during periods of low water. This was covered with 18 inches of soil, which is quickly being overgrown with grass. Salient points of embankments are beached with stone up to above flood level. Roadway openings under the bridge, with about 12 feet headway are provided along the river bank at each end of structure.

LEFT:

After the damage of 1934, the bridge was repaired with this new section in the middle. This bridge remained largely unchanged until its final demolition in 1975 after construction of the new concrete bridge and Orbost by-pass which we have today.

This photo was taken during a time of very low water in the river.

Vehicular loads requiring greater headway can pass over the raised approaches. When the railway is extended across the bridge, the approaches will be shut off by gates during the passage of trains.

The construction of this bridge has taken a little more than two years to complete. Very considerable delays were experienced through a frequent freshets and a number of floods in the river, there being only four months during 1921 in which work was not delayed by this cause. The bridge was opened for traffic four months after the difficulties in connection with foundations for piers 9 and 10 were overcome.

COST AND BUILDING

The total cost will be about £17,500, including about £3,500 for the approaches. The work was carried out by the railway construction branch (Board of Land and Works), of which Mr. M. E. Kernot, M. Inst. C. E., (Member of the Institute of Civil Engineers), is the chief engineer, the Country Roads Board sharing the cost. The design was prepared by Mr. C. H. Perrin, MIE Australia, Assistant Chief Engineer for railway construction, and the construction was supervised by Mr. D. Craig, Associate M I C E, Inspecting Engineer.

Notes

1 The planned extension of the railway across the river never eventuated.

2 A cutwater pile means the lower portion of the pier of a bridge, formed with an angle or edge directed up the stream, so as to more effectually to resist the action of the water etc. (see Webster's dictionary et al.)

3 J. French, Foreman. Possibly a member of The French family who were well known builders and architects based in Bairnsdale, from the late 1800s well into the 1900s. As part of their business, they owned a lime works at Wy Yung for many years. (see "Path Among the Years" by John Adams).

Metric conversion:

12 inches = one foot = approx. 30 centimetres.

£1 = $2 (this does not account for inflation).

ABOVE: This 1970s image is very near to being the final photo taken of the still largely intact 1922 bridge just before its demolition. At the right of this photo is the railing of the newly completed concrete road bridge and Orbost by-pass. Photo taken from the Newmeralla side.