IPENZ ENGINEERS NEW ZEALAND

ENGINEERING HERITAGE NEW ZEALAND

IPENZ Engineering Heritage Record Report

Horseshoe Bend Suspension Bridge

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Horseshoe Bend Suspension Bridge, March 2011. Photograph courtesy of J. Dee

Contents

A. General information 3

B. Description 5

Summary 5

Historical narrative 6

Social narrative 6

Physical narrative 11

C. Assessment of significance 15

D. Supporting information 16

Bibliography 16

A. General information

Name: Horseshoe Bend Suspension Bridge

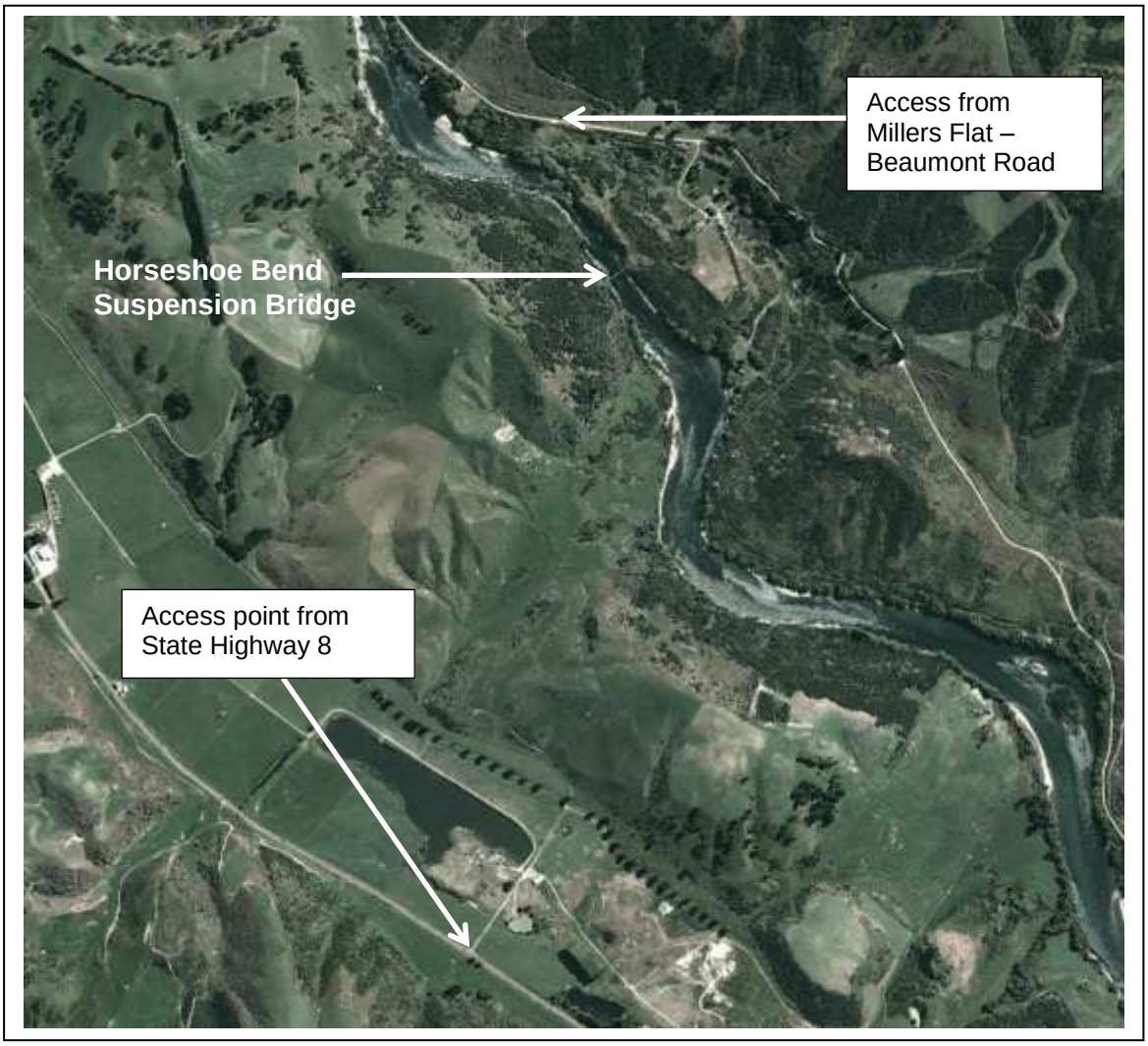
Alternative names: Horseshoe Bend Bridge

Location: 10 km south-east of Millers Flat, Otago

Geo-reference: Latitude -45.722, Longitude 169.471

Legal description: Part river bed

Access information: The bridge is part of the Horseshoe Bend walkway in the Beaumont Millennium Track. On the eastern side of the Clutha River the bridge is accessible via a short walking track adjoining Millers Flat to Beaumont Road. Using a longer walking track, the bridge can also be accessed off State Highway 8, approximately eight kilometres south of Millers Flat.



City/District Council: Central Otago District Council

IPENZ category: Engineering Work

IPENZ subcategory: Infrastructure – Bridge

IPENZ Engineering Heritage number: 2273

Date registered: 2007

Other IPENZ recognition: N/A

Other heritage recognition: N/A

B. Description

Summary

Constructed in 1913, the timber pedestrian suspension bridge at Horseshoe Bend was built to replace a precarious wire and chair which had formerly transported residents across the Clutha River.

Like many 19th century gold mining settlements, the community at Horseshoe Bend was located in a rugged and isolated part of Central Otago. Separated by the river from the other settlements located along the main road from Lawrence to Alexandra, late 19th and early 20th century Horseshoe Bend residents relied on boats or a chair and wire if they wished to reach important facilities, such as the school at Raes Junction. After decades of seeking a solution, the community's desire for a safer means of crossing was finally met with the construction of a suspension bridge.

Horseshoe Bend Suspension Bridge was designed by John Edie (1856–1928), the Tuapeka County Engineer. Edie held this position from 1885–1888, and then again from 1903–1925. In the early 1920s he also branched out into politics and was elected the local Member of Parliament. His structure is a timber pedestrian suspension bridge, with rail iron transoms and tower bracing. The bridge has a single span of 70.2 metres (m), with 9.3m-tall timber A-frame towers at each end. The construction was undertaken by council labourers and overseen by Jimmy Doake.

Despite the community at Horseshoe Bend ceasing to exist by the mid-20th century, the bridge continued to be used by local farmers. After being restored by the Department of Conservation in 2001, the bridge was reopened in 2003 and incorporated into the Teviot Valley Walkway.

The suspension bridge stands as a reminder of the former community at Horseshoe Bend. It is a visually impressive structure which contributes to the surrounding landscape. The Horseshoe Bend Suspension Bridge also has value because of its association with important local engineer, surveyor, and later politician, John Edie.

Historical narrative

From its headwaters in Lake Wanaka to its final destination at Molyneux Bay in the Pacific Ocean, the Clutha River is the longest river in the South Island.[1] Its total water catchment, the largest in New Zealand, covers an area of 21,022 square kilometres. This causes the river to have the largest volume of water in New Zealand.[2] The geography of the river, as it winds its way south across Central Otago, consists of steep gorges and beaches. Over time these geographical features assisted in the formation of natural deposits of gold.[3]

Although run holders had already settled parts of Central Otago, it was the discovery of gold in 1861 by Gabriel Read, a Tasmanian prospector, which led to the development of many settlements in Central Otago. The news of his discovery resulted in a surge of prospectors descending on the region hoping to make their fortunes in the creeks and riverbeds of Central Otago.[4] In 1862 the goldfields at Dunstan (now the township of Alexandra) were settled.[5] In order to reach this new settlement, prospectors setting out from Dunedin were forced to traverse a rough trail known as the Dunstan Road.[6]

In that same year the settlement of Roxburgh was formed on the eastern banks of the Clutha, at its junction with the Teviot River, after Andrew Young and James Woodhouse discovered gold in the latter.[7] Although both sides of the Clutha were mined, the eastern bank returned better results. To the south of Roxburgh, at a point in the river named Horseshoe Bend, further traces of gold were discovered in 1863. The yield there was so successful that the settlement quickly swelled to a population of 300 miners. Like many other mining settlements, the population was only temporary and by 1865 most had moved on, reducing the number of inhabitants to

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[1] 'Clutha River', from *An Encyclopaedia of New Zealand*, edited by A. H. McLintock, originally published in 1966. *Te Ara - the Encyclopedia of New Zealand*, URL: http://www.TeAra.govt.nz/en/1966/clutha-river/1 (updated 23 April 2009)

[2] 'Clutha River,' Land and Water New Zealand, URL: http://landandwater.co.nz/councils-involved/otago-regional-council/clutha-river/ (accessed 28 December, 2012); 'The nature of New Zealand's water environment,' in State of NZ's Environment, Ministry for the Environment, URL: http://www.mfe.govt.nz/publications/ser/ser1997/html/chapter7.6.html (accessed 28 December 2012)

[3] Gerald Cunningham, *Illustrated History of Central Otago and the Queenstown Lakes District* (Auckland: Reed, 2005), pp.117-118.

[4] Cunningham, pp.43, 46

[5] Malcolm McKinnon, 'Otago places – Manuherikia,' *Te Ara - the Encyclopedia of New Zealand,* URL: http://www.TeAra.govt.nz/en/otago-places/15 (updated 26 November 2010)

[6] Cunningham, p.67

[7] Ibid., p.118

72.[8] Gold continued to be mined in the area, however, by the turn of the century the population at Horseshoe Bend had dwindled to 30.[9]

With the Dunstan Road being snowbound in winter a new route to the goldfields was required.[10] One of the alternatives was the Knobby Range Road. Connected to Dunedin via the settlement of Lawrence, this route crossed the Beaumont River, a tributary of the Clutha, and wound its way along the Clutha's east bank before crossing the Teviot. From there it continued northwards to the Dunstan goldfields. However, this route was also plagued by snow.[11] By 1864 a ferry crossing the Clutha had been established at Beaumont, which led to the creation of a new route along the western bank of the river. The success of this new route led to Roxburgh transferring its settlement to the western banks of the Clutha.[12] With the western route now the favoured means of reaching the Dunstan goldfields, the settlements on the eastern bank became isolated from the main route of traffic which ran between Lawrence and Alexandra.[13]

Although it possessed a small wattle and daub Union Church, the settlement at Horseshoe Bend did not have a post office or a school for its children.[14] The nearest school was at Raes Junction to the west of the river. With no proper means of crossing the Clutha many of the parents were forced to row their children across in dinghies. When faced with these difficulties, the community at the "Bend" requested that the Tuapeka County Council construct a wire and chair as a means of crossing the river, which they agreed to do in 1885. Completed in 1887, the wire and chair were originally situated upstream from the community, behind a farmhouse. However, the eastern wire anchor was higher than that on the western bank, causing the chair to travel at an alarming rate from that direction.[15] It was also problematic that it could only carry one person at a time, and the children had difficulty pulling the chair back up across the river.[16] Subsequently, the wire and chair were relocated several times in an attempt to alleviate residents' concerns.[17]

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[8] John Hall Jones, *Goldfields of Otago: an illustrated history* (Invercargill: Craig Printing, 2005), pp.55-56

[9] Department of Conservation, Horseshoe Bend Bridge interpretation panel, date unknown, located at east end of bridge in March 2011

[10] Cunningham, p.67

[11] Jones, pp.63, 65

[12] A.R. Tyrrell, *River punts and ferries of southern New Zealand* (Dunedin: Otago Heritage Books, 1996), p.86

[13] Department of Conservation, Horseshoe Bend Bridge interpretation panel

[14] Robin Marks, *Hammer and tap: shaping Tuapeka country 1876-1976* (Dunedin: John McIndoe Limited, 1977), p.122

[15] Tyrrell, p.90 ; 'Evening Sitting,' *Tuapeka Times*, 14 March 1885, p.3

[16] Department of Conservation, Horseshoe Bend Bridge interpretation panel

[17] Tyrrell, p.90; Marks, p.125

By 1909 pressure for a bridge seems to have been gathering momentum to replace the wire and chair, "a not-to-be-regarded-as-by-any-means-safe method for school children to cross [the river]".[18] The Council had approved the idea several years earlier but nothing had happened as yet.[19] In 1911 P. Madden, John Cullen, William G. Meyer and John H. Meyer wrote to the Council to replace the old and degraded wire and chair with a proper footbridge.[20] They were assisted by the manager at nearby Beaumont Station, who was willing to give the Council £50 if they agreed to construct a bridge that would allow for the crossing of sheep.[21] The Government was also prepared to share construction cost with the County Council.[22]

A year later, plans for the bridge were finally confirmed in the *Tapanui Courier*.[23] The bridge was designed by John Edie (1856–1928), the Tuapeka County Engineer.[24] Edie had come to New Zealand from England as a child, being educated here before entering the public service as a surveying cadet in 1874. During this time he worked predominantly in Southland and Central Otago, gaining the skills which led to him becoming the Tuapeka County Engineer in 1885. This only lasted a few years until the Council's financial situation saw his position disestablished. From 1888 to 1903 he worked for the Survey Department and privately, specialising in surveying water courses, before returning to his former role with Tuapeka County. In the early 1920s he was also the local Member of Parliament.[25] Edie was a foundation member of the New Zealand Institute of Surveyors, as well as the New Zealand Society of Civil Engineers (now IPENZ).[26]

The construction was undertaken by council employees, overseen by Jimmy Doake.[27] The bridge was finally completed in 1913. Although a celebration had been intended to accompany the opening, the weather caused it to be cancelled and

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[18] 'Horseshoe Bend,' *Tuapeka Times*, 3 November 1909, p.4

[19] Tyrrell, p.90; Marks, p.125

[20] Marks, p.127

[21] 'Horseshoe Bend'

[22] 'Public Works Estimates,' *Otautau Standard and Wallace County Chronicle*, 24 October 1911, p.7

[23] Marks, p.127

[24] Geoffrey Thornton, *Bridging the gap: early bridges in New Zealand 1830 – 1939* (Auckland: Reed, 2001), p.202

[25] F. W. Furkert, *Early New Zealand Engineers*, Wellington, Reed, 1953, p.160; 'Tuapeka Count Council,' *Tuapeka Times*, 19 September 1888, p.3

[26] C. A. Lawn, *The Pioneer Land Surveyors of New Zealand, Part IV: Biographical Notes*, New Zealand Institute of Surveyors, 2005, p.355. URL: http://www.surveyors.org.nz/sites/all/files/PART%20IV%20THE%20PIONEER%20LAND%20SURVEYORS%20OF%20NEW%20ZEALAND.pdf (accessed 30 January 2013); W. L. Newnham, *Learning Service Achievement: Fifty years of engineering in New Zealand*, Wellington, New Zealand Institute of Engineers, 1971, p.374

[27] Thornton (2001), p.202

instead the councillors received the thanks of the community at a meeting held in September.[28]

Throughout the first half of the 20th century the settlement at Horseshoe Bend continued to decline and by 1948 only a few residents remained.[29] The decline continued until there was no settlement left at the "Bend". Despite this, farmers occasionally used the bridge to transport stock across the river.[30]

In 1997 the Roxburgh Community Board incorporated the bridge into the Teviot Valley Walkway. As a result, the Department of Conservation commissioned a pre-condition report in 1998. The report found that the bridge was in a derelict state. The dugout rock which surrounded the ground anchors had allowed for water to pool, which had led to corrosion of the cables, while the timber frames were suffering from rot. Damage had also been caused by debris during high flooding in 1995.[31] In 2000 temporary decking was overlaid on the bridge. Following an engineer's report in 2001, further restoration was done in order for it to meet safety standards.[32] In 2003 the bridge was officially reopened by David Parker, the Member of Parliament for Otago.

The Department of Conservation continued to manage the bridge until the responsibility was passed to the Central Otago District Council. Today it remains in use and is a feature of a walking and cycle track.

[28] Marks, p.128

[29] A.H.H. Webster, Teviot tapestry: a history of the Roxburgh-Millers Flat District (Dunedin: Whitcombe and Tombs, 1948), p.46

[30] Webster, p.96

[31] Department of Conservation, 'Certificate of inspection and test: Horseshoe Bend Suspension Bridge' (May 23 2001)

[32] Geoffrey Thornton, 'Heritage Assessment Programme: Horseshoe Bend Bridge Clutha River' unpublished report written for IPENZ (2007), p.2

Social narrative

The rugged terrain of New Zealand meant that the construction of bridges, many of which were in remote areas, was always going to be a challenge for colonial engineers.[33] Many early bridges were simply washed away by flash floods, and in regions that were sparsely populated, such as Central Otago, travellers often had to go to great lengths to find a suitable crossing. The dangers posed by river crossings were such that drowning came to be known as "the New Zealand death".[34]

Near Horseshoe Bend there stands a poignant reminder of the dangers early colonial settlers faced when crossing turbulent rivers such as the Clutha. Just south of the bridge, on the eastern bank, are two headstones. They mark the graves of two men. The first is that of an unknown man whose drowned corpse was found on the western beach of horseshoe bend prior in the 1860s. The second is that of William Rigney, who was later found to be responsible for carving the word's "somebody's darling lies buried here," into the anonymous grave marker.[35]

Cut off from the main public amenities, such as schooling and postal services, the community at Horseshoe Bend were aware of the risk the river posed each time they were forced to cross it. The school children who had to cross the gorge using the 1887 wire and chair displayed courage lacking in councillors and county engineers who inspected it but were unwilling to use it.[36]

The Horseshoe Bend Suspension Bridge therefore made life for the small community's residents much easier, as it offered a quicker and safer route of access. They also would have no longer felt so isolated from the communities on the western bank.

Despite connecting them with the western communities, the footbridge could not halt the gradual reduction of the population at Horseshoe Bend. Although the settlement eventually ceased to exist after the mid-20th century, the bridge was still used by nearby farmers to transport their livestock across the Clutha River. Other than this, the bridge remained largely unnoticed by people who had no incentive to cross the

[33] Jock Phillips, 'Bridges and tunnels - Building bridges and tunnels,' *Te Ara - the Encyclopedia of New Zealand*, URL: http://www.TeAra.govt.nz/en/bridges-and-tunnels/2 (updated 26 November 2010)

[34] Eileen McSaveney, 'Floods - New Zealand's number one hazard,' *Te Ara - the Encyclopedia of New Zealand*, URL: http://www.TeAra.govt.nz/en/floods/1 (updated 2 March 2009)

[35] McKinnon

[36] Department of Conservation, Horseshoe Bend Bridge interpretation panel

Clutha at such a remote location. Even those travelling on State Highway 8 would remain unaware of its existence due to it being obscured from the road by a row of hills.

However, it was the interest in the development of walking and mountain biking trails in the Central Otago region in the last decade of the 20th century which saw the bridge eventually incorporated into the Teviot Valley Walkway and restored in 2001.

The bridge is now part of a section of the walking route known as Horseshoe Bend Track.[37] Therefore, although the settlement at Horseshoe Bend may have long since vanished, the bridge still continues to play an important role in the leisure activities of the wider Roxburgh community and visitors to the area.

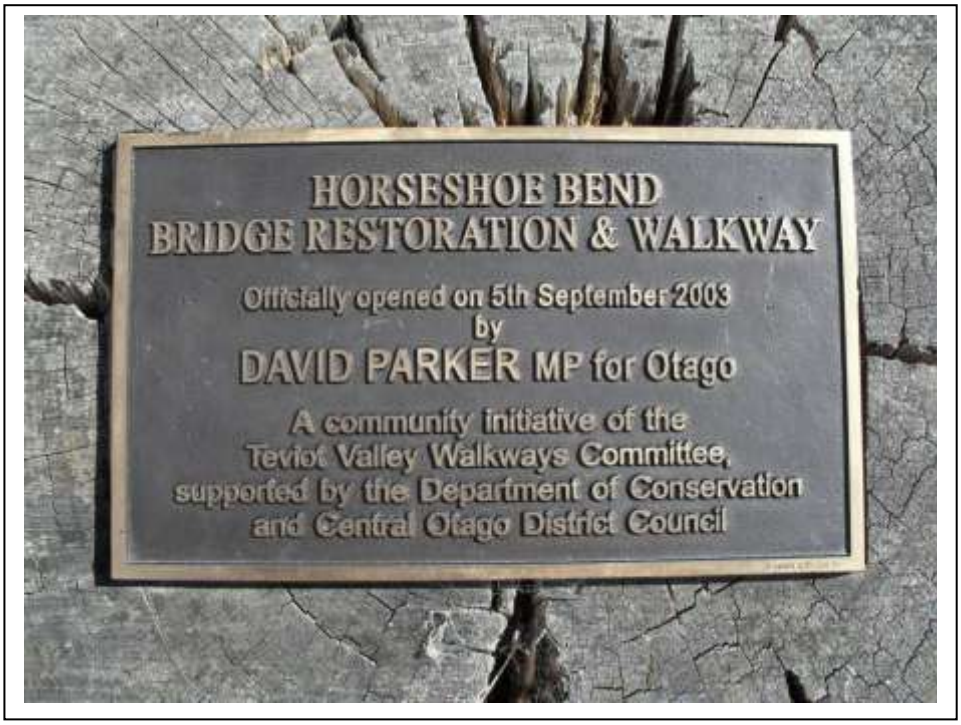

Figure 1: Plaque commemorating the restoration and opening of the walkway in 2003, 2011. Photograph courtesy of J. Dee.

[37] 'Horseshoe Bend Track,' Central Otago – A world of difference, URL: http://www.centralotagonz.com/horseshoe-bend-track (accessed 28 December 2012)

Physical narrative

Suspension bridges were particularly popular in Central Otago in the late 19th and early 20th centuries, with some well-known examples including the Kawarau Gorge Suspension Bridge (1879–1880), Alexandra Bridge (1879–1882), and the Skippers Canyon Suspension Bridge (1898–1901).

When confronted with swift rivers like the Clutha, a suspension bridge was a practical choice because, if constructed as a single span structure, they do not require midstream piers, which were susceptible to scouring, and sometimes failure during floods.[38] Another attractive feature of suspension bridges is that they were relatively cheap because they could be constructed reasonably quickly, leading to savings on labourers' wages.[39]

Figure 2: Timber A-frame towers of the suspension bridge, 2011. Photograph courtesy of J. Dee

Constructed in 1913, the Horseshoe Bend Suspension Bridge crosses the Clutha River with a span of 70.2m. The timber decking is set upon transoms made out of

[38] Thornton (2007), p.1

[39] Thornton (2001), p.176

former railway irons bent into a U shape.[40] This shape means the transoms also form the posts which support the timber handrails.

Edie's structure is a departure from the traditional late 19th century form of Central Otago suspension bridge which was characterised by pairs of masonry, or later concrete, towers. At each end of the bridge, standing at a height of 9.3m, is a timber A-frame tower. Each tower has two sets of diagonal bracing made from former rail irons. Steel rod hangers, 50 in total, support the deck, connecting it with the pairs of two suspension cables. The cables are anchored in the bedrock at an elevation set higher than deck level.[41]

The 2001–2003 restoration saw changes to the bridge so it would meet contemporary safety standards. The rotten timbers have been replaced and wire grills between the lower steel flat and the timber decking now run the length of both sides of the bridge.

Figure 3: Anchorage of catenary cables, 2011. Photograph courtesy of J. Dee.

Key physical dates

[40] Ibid.

[41] Duffill Watts and King Limited to Field Centre Manager, 24 April 1998, Department of Conservation

1913	Constructed
2000	Temporary decking overlaid on bridge
2001–2003	Restoration

C. Assessment of significance

Built in 1913, the suspension bridge at Horseshoe Bend has historical value as one of the few physical reminders of that settlement established during the Central Otago gold rush. It was socially important because its construction finally offered the isolated community a safe means of crossing the dangerous waters of the Clutha River.

The Horseshoe Bend Suspension Bridge has some engineering value as an early 20th century adaption of the popular type of Central Otago bridge from the 19th century. Being designed by John Edie, the Tuapeka County Engineer, it is also closely associated with this important local engineer and surveyor and later politician.

Now a feature and means of accessing the Horseshoe Bend Track, the bridge continues to have some social value facilitating the leisure activities of the Teviot Valley Walkway. Situated in a picturesque river gorge, the bridge is also an interesting visual element of the landscape.

Therefore, Horseshoe Bend Suspension Bridge is of sufficient engineering heritage significance to merit inclusion on the IPENZ Engineering Heritage Record.

D. Supporting information

Bibliography

Archival/Primary sources

Department of Conservation, Certificate of inspection and test: Horseshoe Bend Suspension Bridge, 23 May 2001

Department of Conservation, Duffill Watts and King Limited to Field Centre Manager. 24 April 1998

Department of Conservation, Horseshoe Bend Bridge interpretation panel

Thornton, Geoffrey, 'Heritage Assessment Programme: Horseshoe Bend Bridge Clutha River,' Unpublished report, IPENZ, 2007

Published sources

Cunningham, Gerald, *Illustrated History of Central Otago and the Queenstown Lakes District.* Auckland: Reed, 2005

Jones, John Hall, *Goldfields of Otago: an illustrated history.* Invercargill: Craig Printing, 2005

Macnicol, Duncan and Margaret Trotter, *I, Duncan, from Skippers*, Invercargill, D. & Nancy Macnicol, 1988

Marks, Robin, *Hammer and tap: shaping Tuapeka Country 1876 – 1976*, Dunedin: John McIndoe Limited, 1977

Thornton, Geoffrey, *Bridging the Gap: early bridges in New Zealand, 1830 – 1939*, Auckland: Reed, 2001

Tyrrell, A. R., *River punts and ferries of southern New Zealand*. Dunedin: Otago Heritage Books, 1996

Webster, A. H. H., *Teviot tapestry: a history of the Roxburgh-Millers Flat District*. Dunedin: Whitcombe and Tombs, 1948

Electronic sources

'Clutha River,' Land and Water New Zealand, URL: http://landandwater.co.nz/councils-involved/otago-regional-council/clutha-river/ (accessed 28 December, 2012)

'Horseshoe Bend Track,' Central Otago – A world of difference, URL: http://www.centralotagonz.com/horseshoe-bend-track (accessed 28 December 2012)

'The nature of New Zealand's water environment,' in State of NZ's Environment, Ministry for the Environment, URL: http://www.mfe.govt.nz/publications/ser/ser1997/html/chapter7.6.html (accessed 28 December 2012)

Available from Papers Past, URL: http://paperspast.natlib.govt.nz/cgi-bin/paperspast

Otautau Standard and Wallace County Chronicle, 24 October 1911

Tuapeka Times, 14 March 1885, 19 September 1899, 3 November 1909

Available from Te Ara – the Encyclopedia of New Zealand, URL: www.TeAra.govt.nz

'CLUTHA RIVER.' from *An Encyclopaedia of New Zealand*, edited by A. H. McLintock. Originally published in 1966

McKinnon, Malcolm, 'Otago places'

McSaveney, Eileen, 'Floods - New Zealand's number one hazard'

Phillips, Jock, 'Bridges and tunnels - Building bridges and tunnels'

Swarbrick, Nancy, 'Country schooling - Wider options: 1900s–1930s'