Rails Through the Wilderness

David Jehan BE(Hons), MIE(Aust)
Railway Engineer & Author
Rail Technical Society of Australia

Introduction

Rail systems can be used as an effective high capacity method of transporting people through environmentally sensitive areas. There are numerous examples world wide of railway technology being used in this sort of application. Three case studies are presented, these being :-

- Skitube Alpine Railway – Kosciuszko National Park, NSW.
- West Coast Wilderness Railway, West Coast, Tasmania.
- Postojna Caves, Slovenija.

Skitube Alpine Railway

The Kosciusko National Park in the Snowy Mountain Ranges of New South Wales is home to Australia's most popular ski fields. Each Winter between June and October there is a huge influx of skiers to the resorts at Perisher Valley, Thredbo, Smiggin Holes, Guthega and Charlotte Pass.

Private car and charter bus have been the traditional access to the mountains for skiers but during the late 1970's it became apparent that the road and parking facilities existing at the time were inadequate for the steadily increasing demand being placed on them. Traffic problems were particularly severe on the Kosciusko road, which gives access to the major resorts of Smiggin Holes and Perisher Valley from Jindabyne. Long delays caused by snow, ice, collisions and lack of parking space were all too common.

The National Parks and Wildlife Service of N.S.W. (N.P.W.S.) commissioned a "Draft Plan of Management" for the park in 1981. This document was produced in order to address the problems created by the increasing number of visitors that were using the area. This was estimated to be in excess of 2 million people annually in 1981 and was expected to double by 1990. A major section of the document dealt with the problem of visitor access to the park, especially the management of day use by skiers.

Various road based proposals were put forward as an alternative means of access to the park during the ski season. However rail transport was not considered even though it is quite common on the snow fields of Europe. Therefore, in response to this omission two rail based proposals were then presented.

The first being a tunnel based system that connected the Alpine Way (below the snow line) with Perisher valley and the proposed new ski field of Blue Cow. The second was a surface railway that linked the NPWS headquarters with Smiggin Holes and on to Perisher Valley. The NPWS favoured the tunnel based solution and after various

investigations and environmental impact studies were performed this project was given the green light.

The Perisher Skitube Joint Venture was formed in 1984, with another supporting consortium formed for the railway specific aspects of the project. Construction took from 1984 to 1987 as some tunnelling problems were experienced.

The railway starts at Bullocks Terminal, where the large station building containing the facilities for the passengers, platforms for the trains, administration offices and train control room are located. The station is near the entrance of the National Park and is surrounded by a large car and coach park, capable of holding 3,500 cars and 250 coaches. From the terminal the line crosses Bullocks Flat, crosses the Thredbo River and climbs the range up to the mouth of the 3.3 km long Bilston tunnel. After climbing the ruling grade of 1 in 8 (12.5%) in the tunnel the line reaches Perisher Station. The station building is located above the tracks at ground level and in the middle of the skifields.

The railway continues towards Mt Blue Cow in the 2.8 km Blue Cow tunnel which dips downward in order to travel under the Perisher Creek before ascending up the mountain range. Blue Cow Station, approx 8.4 km away from Bullocks Terminal, is a single line dead end design. Upon leaving the platform passengers are greeted by the spectacular view of the Australian mountains and instant access to the ski fields. It is interesting to note all supplies to Blue Cow are brought in by rail and all waste removed by rail.

Approximately 250,000 people travel on Skitube each year, which drastically reduces the number of cars and buses entering this fragile alpine environment. Today the railway is part of the Perisher Blue Resort.

West Coast Wilderness Railway

The West Coast Wilderness Railway is built on the track bed of a very historic line built by the Mt Lyell Mining and Railway Company. The original railway operated between 1897 and 1963 connecting the mining town of Queenstown with the port of Strahan on Macquarie harbour on Tasmania's rugged west coast.

Although an industrial railway, the railway passes through some spectacular scenery that is inaccessible by any other means than on foot or kayak. Steeped in history, the line passes through placed named by the Tasmanian Aboriginals such as Rinadeena, Dubbilbarril, Teepookana and Lowana.

After many proposals to rebuild the line, the project received a grant from the Millennium Fund which allowed the railway to be rebuilt substantially following the old route. This was followed by further assistance from both the Tasmanian state government and private industry.

The railway is 34.5 km long and follows the King River for the bulk of its length. Construction took place between 1999 and 2001, the line commencing operations in December of 2002. Once again the views of the isolated King River gorge were able to be taken by rail.

Today the line allows for people of any age and physical condition, including the disabled persons, to enjoy this incredible wilderness area by a means that causes minimal environmental damage. The steam locomotives use diesel fuel for combustion instead of coal and so the risk of bush fires from sparks is eliminated.

Approximately 62,000 people travel on the railway each year and patronage is growing. Today the railway is owned by Federal Hotels and Resorts, who have other interests in the area including the Gordon River Cruises.

Postojna Caves

The Postojna caves are an enormous limestone cave system located in Slovenia, which was part of the old Yugoslavia. The cave system includes some 20 kilometres of limestone caverns. The most interesting and spectacular part of the caves is located some two to three kilometres underground from the cave entrance.

The cave environment, like most limestone caves, is very fragile. It is also home to numerous unique animals and insects such as the "human fish" (Proteus Anguinus) which have evolved in the absence of light. The environment inside the caves is damp and has a constant temperature of 10 degrees Celsius.

The caves have been a tourist attraction for over a hundred years. Important guests used to be conveyed through the caves in two-seater carriages, then later a light railway was laid along the carriage route with the small four wheel wagons being pushed along by hand. Small petrol locomotives were later used, however this introduced a pollution problem into this fragile environment.

In 1964 battery electric locomotives were introduced in order to eliminate the dangerous fumes in the caves and thus reduce the damage done by the increasing number of visitors. These locomotives are similar to those used in coal mining and are a proven safe method of providing locomotive tractive effort to railways in confined and dangerous places. They have proven very successful in the Postojna Caves Light Railway.

Today five kilometres of the cave system is open to visitors and access is gained by the three kilometre double track narrow gauge railway. This allows some 340,000 visitors to access the cave with minimal damage to the environment. Experienced guides accompany the visitors on the train and then take them for a walk through the most spectacular sections. A visit takes an hour and a half.

It is worth noting that a similar light rail system utilising battery electric locomotives operates in the Llechwedd Slate Caverns in North Wales. This is done in this application both from a heritage perspective and also that the train allows tourists to view the mines without risk of rock falls due to people walking or climbing in the wrong areas.

Railways of Fraser Island

Railways are not new to Fraser Island, three railways (or tramways) were built to haul logs for the timber industry. All three ran from the west coast which was used as the loading point for the barges, which transported logs back to the mainland.

The three main lines built on the island were :-

- The northern tramline ran to a log dump near Bogimbah Creek and was 13 km long with two branch lines each about 5 km long.
- The central tramline ran to McKenzie's sawmill and wharf at White Cliffs, and was about 10 km long with a terminus near Lake McKenzie and had two short branches.
- The third line roughly followed Woongoolba Creek, also ending at a log dump.

All three lines used steel rails and were 3'6" (1067 mm) gauge. They operated at various times from 1905 to 1935 and used a variety of small steam locomotives. Some remnants of these lines can still be found. The history of these old rail lines is covered in detail in the FIDO fact sheet titled "A History of Fraser Island Tramways" by the late John Kerr.

Light Rail as a possible low impact transport option for Fraser Island.

The 1991 Prefeasibility Study performed by Gutteridge Haskins and Davey for FIDO identifies the Bogimbah Track Route as the best option for any light rail system, the report states :-

"The Bogimbah route has been identified as it does not impact on existing vehicle movement so does not inconvenience any road users, particularly along key routes. Constructing the light rail over an existing road will greatly minimise environmental impacts as minimal vegetation clearing will need to be undertaken. The route will provide a novel and historic tourism opportunity and will provide the passengers with a varied environmental introduction into the Island, where issues such as conservation, sandmining and logging can be easily discussed in a comfortable and stable environment.

The proposal is that some (or all) of the existing ferry services from Hervey Bay would be redirected to the proposed Unrang Creek Jetty, where passengers would cross the Island by train to meet bus/4WD services at Poyungan Valley. In addition, the train service could also offer freight transport to resorts on the eastern side of the Island. A deep water jetty and ferry terminal would be constructed over the mud flats on the northern side of Urang Creek. The current proposal is to replace the existing Bogimbah Road with the rail line.

The western end of the route would cover the old tramline route used for logging between 1905 - 1913. An alternative starting point would be along Bogimbah Creek which would have additional scenic values. From the existing junction of Bogimbah and Postanís (Poyungan) Roads, the route would travel east along the Bogimbah Road route. The final descent on to the eastern beach at Poyungan Valley would require surveying to determine the exact location."

The report also describes the proposed train as *"The proposal is for a light rail system consisting of probably 3 cars, each capable of seating 50 adults. These would be pulled by a small diesel locomotive."*

Drawing up a basic specification for a light rail system in this environment, we have the following main points :-

Light Rail System Specification

- Minimal infrastructure
- Maximum capacity
- Disabled access
- Flexible
- Cost effective
- Reliable
- Reasonable transit times
- Engage the environment

A solution that meets these criteria is a vehicle that has the following features :-

- Narrow gauge – either 2'0" (610 mm) gauge or 3'6" (1067 mm) – the use of either of these track gauges allows for various second hand equipment to be purchased at reasonable cost. In the case of 610 mm gauge, ex-canefield equipment can be utilised and in the case of 1067 mm gauge ex-Queensland Rail equipment can be used. However, the author's preference is for 610 mm gauge as there are many second hand locomotives from some of the cane fields that are now surplus to requirements, whilst any available from Queensland Rail would probably prove to be too large for the application. Also, the 'right of way' or path where the track would go will be narrower for 610 mm gauge.

- Low floor rollingstock - a low floor vehicle allows for passenger platforms to be dispensed with and a simple strip of pavement forming the 'station' with appropriate sign to be used. This minimises the infrastructure required for passenger access. This also allows for the legal requirement for disabled access to be satisfied by using portable ramps at the station.

- Locomotive hauled – a fleet of small locomotives can be used and carriages added to accommodate the changes in demand. For example when boats arrive and leave the trains will need to be at maximum capacity, however in the middle of the day fewer people will be using the system.

Rollingstock

A vehicle that meets all of the criteria discussed is operated by the Sydney Olympic Park Authority on the old Newton Armaments Depot railway, which transports visitors around the park on its internal 610 mm gauge system. See Figure 1.

The vehicle is a ‘four pack’ articulated design having four low floor bodies and five small bogies. The capacity of the vehicle is 48 including space for wheel chairs. The structure is two seats wide, however this was done specially for the narrow structure gauge that the railway passes through. As Fraser Island has no such restrictions the vehicle could be made three seats wide giving a capacity of 72. The flexibility of the design allows for another body to be added to either boost capacity further or add space for luggage. It is worth noting that if this design was built to the wider track gauge of 1067 mm, then the vehicle could be four seats wide thus further boosting capacity.

Figure 1 – Sydney Olympic Park Light Railway

Small second hand sugar industry locomotives could be utilised, however their applicability to the application would depend on the grades of the final route chosen and the ultimate train size nominated.

Track

Although the tramways of the past laid their track directly on the sand it is doubtful that this will be allowable under the rail safety regulations of today. Thus, more work is needed in this area to ascertain what ‘base’ the track will be laid on. However, the use of nominally 60 lb/yd (30 kg/m) rail would suffice using either steel or concrete sleepers. It is not recommended to use timber due to the long term maintenance costs that will be incurred later.

A full detailed track design will be required by qualified track engineers and surveyors.

Safeworking.

As more than one train will be operating at one time, a train control system will be necessary. The most effective system in this application would be a simple radio based system where each driver reports his movement to a centralised control station.

Conclusion

Light rail represents a viable solution to a major part of the transport problems experienced on Fraser Island. As the case study on the Skitube railway showed, rail can and has been used as a high capacity transport system in environmentally fragile

environment that allows for increased visitor numbers to be achieved with minimal environmental impact. Also, if the operation can be linked in with the island's resorts then its viability would be assured.

References

Gutteridge Haskins and Davey Pty Ltd, 1999. Fraser Island Light Rail Prefeasibility Study. Fraser Island Defenders Organisation.