INDUSTRIAL WORLD HERITAGE UNDER CONSTRUCTION

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Abstract

The means of transportation in the age of industrialization was the railway; as such, railways are part of the word’s industrial heritage. Since the mid-1990s certain railways have been inscribed by UNESCO as World Heritage Sites. The usual UNESCO criteria were adapted to make them applicable to the special case of railways. The first railway to be inscribed was the Semmering Railway in Austria, which is now being supplemented by the construction of a base tunnel. The aim of this paper is to show the measures that have been applied to ensure the quality of structural interventions in the landscape, necessitated by the building of the New Semmering Base Tunnel.

Keywords: Semmering Railway, Austria, Industrial Heritage, World Heritage
Although the UNESCO World Heritage Convention came into force in 1975, it was some years before industrial heritage was also taken into consideration as part of this programme. In 1986 Ironbridge Gorge in the United Kingdom was the first industrial monument to be inscribed by UNESCO as a World Heritage Site. In 1995 the discussion about railways as UNESCO World Heritage Sites took a step forward with the Semmering Railway in Austria.

The Historic Semmering Railway

In the mid-nineteenth century, railway tracks were built around Vienna, leading out of the city and heading in all directions. The first major goal was to create a strong infrastructure connecting Vienna with Trieste and, on a European level, connecting the Baltic Sea with the Adriatic Sea. In 1842, the railway line from Vienna to the south reached Gloggnitz, a small town at the foot of the Semmering, which is one of the last offshoots of the Austrian Alps. Two years later, in 1844, the railway line from Mürzzuschlag at the other side of the Semmering was continued further south to the city of Graz. (Dinhobl 2003:20) The Semmering Railway was built between 1848 and 1854.

Figure 1: Railway line from Vienna heading south between 1844 and 1854; the Semmering Railway had not yet been built
The landscape, marked by an extreme topography, was not the ideal place for this new means of transportation, as it seemed to be insuperable. (Ghega [1854] 1989:15) The main railway principle, which is to connect two destinations over the shortest possible route, was not suitable for this mountainous topography. In order to climb over the range and achieve an elevation of 459 metres, the line was lengthened on the basis of two main parameters: a minimum curve radius of 190 meters and a maximum gradient of 2.5 per cent. With sixteen major viaducts and fifteen tunnels, the Semmering railway line crosses the Alps on a double track. As a pioneer work of its time, it was the first railway crossing the Alps, and Semmering station was the highest railway station in the world. The line was accompanied by fifty-five lengthman’s cottages, forty-seven of which still exist today (cf. Tusch 2014). Today, the Semmering Railway is known for the harmonious embedding of the line within the landscape as well as many other masterpieces of engineering like tunnels and viaducts.

![Figure 2: Topographic map of the Semmering Railway with lengthman’s cottages and stations](image)

What was the situation in the mid-nineteenth century when the historic railway was built? What role did design play in the station buildings and lengthman’s cottages, the engineering structures, and the landscape? While the architecture of the station buildings and the lengthman’s cottages is comparatively plain in accordance with the style of carriage houses, depots, and subordinate buildings, there was a debate about the style of the engineering buildings. For the viaducts, which are constructed with
round arches, there are also alternative sketches with pointed arches. The tunnel portals were built in quarry stone masonry in a simple style. The alternative drafts show antique (for example, Egyptian) styles. The modelling of the terrain is causally related to technical requirements.

The excavation material from the tunnel was deposited on site and over time the heaps of earth and gravel were covered with trees. The line in the landscape is a result of the main parameters used in the construction – minimum radius and maximum gradient – which led to its harmonious integration in the topography. Design concerns were of major importance in planning the engineering structures for the historic Semmering Railway.

**Railways as World Heritage**

In the early 1990s a process of discussion started which led to the official submission of the nomination dossier for the Semmering Railway as a World Heritage Site in 1995. A non-governmental organization drove the process to generate awareness for the application. “Railways as World Heritage” was a new topic for UNESCO. To gain insight into this, Anthony Coulls was appointed, under the guidance of ICOMOS (the International Council on Monuments and Sites), to conduct a study on this topic. He compared eight cases around the world to demonstrate the applicability of the usual criteria for World Heritage Sites to the particular case of railways. (Coulls 1997:24) Four criteria were proposed (ibid:8 ff.) to identify and to value potential World Heritage railways:

i. A creative work indicative of genius
ii. The influence of, and on, innovative technology
iii. Outstanding or typical example
iv. Illustrative of economic or social developments

In 1998 – one year after it had become a listed monument under Austrian federal law – Semmering Railway was the first railway in the world to be inscribed as a UNESCO World Heritage Site. The inscription on the World Heritage List was based on two criteria.

- Criterion (ii): The Semmering Railway represents an outstanding technological solution to a major physical problem in the construction of early railways.
- Criterion (iv): With the construction of the Semmering Railway, areas of great natural beauty became more easily accessible and as a result these were developed for residential and recreational use, creating a new form of cultural landscape.¹

Railways are dynamic systems that are in a constant process of development (Häfliger 2010:8). Adaptations to technical and security needs are crucial for the operation of railways. Today, celebrated railways not only represent a historical monument but also bear witness to the process of modification and development over time. ‘No operating railway can be wholly authentic from a strictly historical point of view’ (Coulls 1999:7). A railway without trains can hardly be preserved as a monument. It is now the challenge to find the right balance between the conservation of the historic structure and the ongoing development of the railway system.

Special conditions pertain to railways as World Heritage Sites. To meet the requirements of today’s transportation needs (e.g. security legislation, customer demand), railways have to be modernized frequently. Change is inherent to a railway system. Railway heritage lies in an area of conflict between technical innovation, economic consideration, and the care of historical structures. A significant aspect in railway construction is the sequence of structures along the line, the chain of buildings – often from different periods – that make up a railway. Sometimes historical monuments have to be adapted or even torn down. If it is necessary to build new structures, one should aim to achieve high architectural quality, which has always been the tradition in the construction of railways (Häfliger 2010:8–9).
The New Semmering Base Tunnel

Over time, the Semmering Railway has constantly been adapted to meet technical needs. For more than 160 years, it has served as one of the main lines in Austria. Modifications have for the most part been done with respect to the historical monument. At the beginning of the twenty-first century, the Trans-European Networks (TEN) were planned as a high-performance railway network for Europe. One route – the Baltic-Adriatic Corridor – crosses the Semmering Pass. As the historic Semmering Railway does not meet the needs of the new high-performance railway, a base tunnel has been planned. The new track branches off the historic line, crosses the valley, and enters the tunnel. The construction of a high-performance track is now producing massive changes to the landscape, especially at both ends of the tunnel. As part of the preparatory work for building the tunnel, a line of single-family houses and a lengthman’s cottage had to be torn down. (cf. Tusch 2014) These buildings had to be removed in order to create space for the embedding of the new infrastructure in the landscape.

Is the New Semmering Base Tunnel compatible with the World Heritage Site? What is the impact on the outstanding universal value of the UNESCO World Heritage Semmering Railway? The Federal Ministry of Education, the Arts and Culture of the
Republic of Austria (BMUKK) asked the World Heritage Centre of UNESCO to study the impact on the basis of the preliminary design project. Toni Häfliger, former head of the Office for Conservation Issues of the Swiss Federal Railways (SBB), was appointed by ICOMOS to carry out this task and to examine the impact of the project. The measures will mainly affect the buffer zone of the World Heritage, while the core zone will be only marginally affected. The report focused on the design impact of the new measures on the World Heritage Site. (Häfliger 2010:4) The preliminary design project of the Austrian Federal Railway (ÖBB) was of high quality and sensibly planned. In some parts, it lacked clarity and could be designed more simply and more modestly. The assessment pointed out areas where the design could be improved in order to minimize the impact on the World Heritage Site. The report came to the conclusion that the New Semmering Base Tunnel does not call the site’s World Heritage status into question (Häfliger 2010:4). A design advisory board was implemented to supervise the further detailed planning stages and to discuss them in meetings every three to six months. The board included international experts from all fields of design, architecture, engineering, technology, landscape architecture, regional planning, and the conservation of historical (technical) monuments.

Conclusions

Infrastructure changes landscape on a large scale. The historic Semmering Railway is the result not only of technical conditions but also of a strong design intention. Although the Semmering Railway was finished in 1854, the design of the line and its surroundings was not considered as a main focus until 2010. However, with the New Semmering Base Tunnel scheduled to be built in the buffer zone bordering the World Heritage Site, design became an issue of major importance. To achieve the high design standards that are expected for buildings in the areas surrounding World Heritage Sites, several measures have now already been taken.

- Preliminary design project by the Austrian Federal Railway
- Design assessment with concrete suggestions for improvement
- Interdisciplinary and international design advisory board with meetings every three to six months
- Supervision of all further detailed planning stages by the advisory board
As a World Heritage Site, Semmering Railway is of public and cultural significance and should thus be preserved as an industrial monument. It was the subtle aim of the non-governmental organization that drove the process for the application of the Semmering Railway as a World Heritage to prevent the projected base tunnel, which was expected to replace the “old” line. (Dinhobl 2009:42) But things turned out differently. After a long process of discussion, construction work began on-site in 2012 (Figure 5). The Industrial World Heritage Semmering Railway is under construction. While in the future the base tunnel will be used for high-performance transit, the historic railway will be used for regional transport and as an alternative route during the weekly tunnel service. Today the base tunnel and the historic line are seen as two complementary contributions to one railway system coming from different generations. The base tunnel will relieve the historic line and, by doing so, contribute to the maintenance of the heritage site. (Gobiet 2013:686)

The ongoing operation is significant for railways as industrial monuments. As such, they are subject to constant change, which is a major challenge for World Heritage Sites. Most of the contemporary infrastructure systems suffer from the increasing standardization that creates very similar infrastructure landscapes all over the world. (Mossop, 2006: 171) Specific solutions need to be found to suit the site and the surrounding landscape. Regardless of whether one is dealing with a historic monument or a contemporary project, all interventions in the landscape should be understood as an act of cultural responsibility. The process implemented at the New Semmering Base Tunnel shows one way of dealing with massive changes in the immediate surroundings of a World Heritage Site.

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References


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