

# SYSTEMS FACTFILE

No. 159 Appenzell/St. Gallen,  
Switzerland

Mike Ballinger explores the fascinating gathering of metre-gauge urban and interurban rail services in eastern Switzerland.



**T**o the east of Zürich, the consolidation of a network of metre-gauge railways and tramways provides the backbone of the local transport system that serves mainly rural communities. The individual routes of this network have seen significant investment in both new vehicles and infrastructure to enhance the service for the future.

The canton (district) of St. Gallen and the two half-cantons of Appenzell Ausserrhoden and Appenzell Innerrhoden (combined population 580 000) comprise mainly rolling rural countryside, although there are a number of high peaks, including some above 2000m. Following a somewhat complicated history, the two cantons were merged with the formation of the Helvetic Republic in 1798. When this agreement fell apart just five years later, Switzerland reverted to a confederation of cantons.

The narrow-gauge railway network's origins began with the opening of

the first section of the Schweizerische Gesellschaft für Localbahnen in April 1875 between Winkeln and Herisau (extended to Urnäsch in September), funds being unavailable to complete the necessary bridge that would take the route into St. Gallen.

The line was gradually extended to Appenzell, although the original section was replaced by a standard-gauge railway and the line diverted from Winkeln to Gossau, giving a total length of 25.9km (16.1 miles). In the 1920s two one-man operation diesel railcars were acquired, with electrification undertaken in 1933.

Meanwhile, in 1889 an unusual steam tramway, the Appenzeller Strassenbahn Gesellschaft, was built from St Gallen to Gais (19.5km/12.1 miles). Although mainly street-running, the authority in St. Gallen would not allow steam-powered vehicles to run through the narrow, hilly streets out of the city, and so a reserved track alignment through Ruckhalde, an area to the south-west

▲ **Stadler Tango 4003/4130 arrives at Trogen terminus. The former station and adjacent goods shed are still present, although no longer used for tramway purposes. The track layout is a simple stub, the former loop having been disconnected.**

of the town, was provided. With a gradient of 9.2% and a radius of 30m this required unique locomotives with the ability to climb the grade by rack and deal with the sharp curves. In 1904 the line was extended by 6km (3.7 miles) to Appenzell, and further rack sections were needed. The line was electrified at 1500V dc in 1931 and renamed Elektrische Bahn St. Gallen-Gais-Appenzell.

From 1903 the line was joined at St. Gallen station by a 9.8km (6.1-mile) rural tramway, the Trogenerbahn, which ran through the city over the urban tramway and climbed steeply to offer views over the urban area and the Bodensee (Lake Constance) to Speicher and Trogen. The steepest gradient on this line was 7.6%, giving the line the accolade as the steepest adhesion-worked narrow-gauge line in Switzerland for a time. Electrified from the beginning at 750V dc, the voltage has been gradually upgraded to 1500V dc; there is an exception in St. Gallen where 600V dc

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## THE FLEET

### Trogen - St. Gallen - Appenzell

For this service and the short working to Teufen, operations are provided by 11 Stadler 12-axle (eight powered), six-section double-ended *Tango* LRVs. They are 52.6m long and built at the manufacturer's Altenrhein facility.

The 2.4m width has been forced upon the operators by the clearances on the former *Trogenbahn*. This initially caused some criticism from passengers of the former St. Gallen-Appenzell section, used to wider vehicles and having armrests, coat hooks etc. It is planned to improve clearances on the former *Trogenbahn* so that in future 2.65m vehicles can be used. For the moment 35mm retractable plates are used to bridge the platform gap on the St. Gallen - Appenzell section.

All eight passenger doors (four each side) are situated in the low-floor sections; retractable steps provide step-free access. There are 12 first and 133 standard class seats.

Each vehicle can operate as two single-ended trams, but this is unlikely in practice as no reversing facilities exist on the network. However it does give the opportunity to swap sections around when maintenance or repair work is necessary.

Early issues with premature wheel wear affected initial operations; these LRVs employ a wheel profile based on that used by tram-trains at Karlsruhe and the Appenzellerbahn has acquired a wheel lathe to ensure that the correct profiles are maintained. Issues of 'curve squeal' have been virtually eliminated by fitting automatic track lubrication equipment to the cars.

### Gossau - Appenzell - Wasseraun

Five new air-conditioned railcars have been purchased from Stadler; these 58.8m 2.65m-wide *Walzers* have with a top speed of 80km/h (50mph). Each has capacity for over 300 passengers - including 15 first class and 161 standard seats, and multi-purpose areas for luggage, cycles, prams and wheelchair users - plus an accessible toilet. They are capable of multiple operation.

### Gais - Altstätten

This service is worked by two bogie motor passenger/baggage cars equipped for Strub rack and adhesion working, built by SWA/SIG/SL in 1993, along with bogie control trailers of the same make and vintage. At certain times a cycle wagon and/or an open trailer can be added.

▼ *Stadler Tango* 4002/4102 in St. Gallen's Bahnhofstrasse, heading first for the station and then on to Appenzell.



▲ ABOVE: Cars 4002/4102 at Appenzell station; note the complex overhead. The new depot and maintenance facility, due to open in 2024, is to be located nearby.

▼ BELOW: 4004/4104 passes the Anker Hotel in Teufen Dorf; it has been suggested that this section should be converted to a double-track alignment.



is used as the line interfaces with the local trolleybus system which replaced the tramway in the 1950s.

In late 1911 an electric 7.65km (4.75-mile) electric rack and adhesion line was inaugurated from Gais to Altstätten, a town on the state railway in the Rhine Valley. Originally the railcars ran through the streets over a short section of the Rheintalische Strassenbahn, which operated a rural tramway from Altstätten Stadt to Altstätten station. The last trams were withdrawn in 1973 and the Gais-Altstätten trains were cut back to Altstätten Stadt two years later.

The final line in this network was the Santisbahn, a 6.2km (3.85-mile) rural electric tramway from Appenzell to Wasseraun, which opened in 1912 and ran by the roadside. Envisaged as the first part of a scheme to reach the top of the Santis mountain, these plans never quite matured. It was easy to build along the valley bottom, but both engineering and financial constraints led to the







▲ ABOVE LEFT: 4010/4110 on the gutter-running section alongside Hauptstrasse, leaving the Stofel stop for Appenzell.  
 ◀ Twin set 24/25 at Speicher on a snowy March day in 2003.

## NETWORK FACTS

- ▶ **Opened:** 1875 (electrification from 1903)
- ▶ **Lines:** 3
- ▶ **Depots/works:** 3
- ▶ **Line frequency:** Currently 30 minutes
- ▶ **Gauge:** 1000mm
- ▶ **Power supply:** 1500/600V dc OLE
- ▶ **Operator:** Appenzellerbahn - [appenzellerbahnen.ch](http://appenzellerbahnen.ch)
- ▶ **Tourist information:** [www.appenzell.ch/en/footer/contact/tourist-info.html](http://www.appenzell.ch/en/footer/contact/tourist-info.html)  
[st.gallen-bodensee.ch/en/about-us/tourist-information.html](http://st.gallen-bodensee.ch/en/about-us/tourist-information.html)

▲ ABOVE: Tangos 4010/4110 near Marktplatz. The somewhat intrusive overhead here is necessary as trolleybuses run parallel and across the route.

▼ BELOW: Twin set 24/25 (Schindler Waggon AG Pratteln 1977) with a parcels trailer at St. Gallen station in 2003. These cars are now on the Rittnerbahn/Trenino Del Renon between Soprabolzano and Collalbo in north-east Italy.



▼ BELOW: Tangos 4010/4110 leave the top end of the tunnel at Riethüsli. This 725m addition to the system opened in October 2018.



◀ LEFT: Stadler Walzer 1004 at Wasserauen. This farming village attracts tourists for mountain walking, climbing and other alpine sports.



scrapping of this scheme. If you want to reach the summit take the Appenzellerbahn railcar to Umasch, the connecting bus to Schwagalp, and the cable car from there. It is a great pity the railway was not built to the summit as it would have been a mixture of rack and funicular operation. You can take a cable car from Wasserauen to Ebenalp (1640 m) from opposite the station.

All of these lines were consolidated into one organisation by 2005. Gradual modernisation removed much of the street track, and whilst there are still such sections, mainly in St. Gallen and Teufen, most of the former tramways are on segregated roadside alignments. At the same time, realignment reduced the number of rack sections to two; on the aforementioned climb out of St. Gallen and the Altstätten - Gais line.

Nothing much could be done about the latter, but with the former plans were advanced to build a 725m single-track tunnel that would negate the use of the rack system and ease the curvature. This project was necessary to enable a 15-minute service.

Following approval in late 2013, preparatory works began in December 2015 ahead of an official groundbreaking ceremony in April 2016. At a cost of CHF63m (EUR58.3m), the Ruckhaldetunnel was inaugurated in October 2018. In an interesting feature, one of the walls has been decorated with 250 graffiti-drawn figures that depict an alpine procession of herdsmen.

The grade is still steep, the steepest section being 8%, so taking the title of steepest adhesion narrow-gauge railway from the Trogenerbahn. Building of the tunnel, using both mining and cut-and-cover techniques, meant that six level crossings and a shared section of overhead wire with a St. Gallen trolleybus route could be dispensed with. This has allowed a cross-city service, the Durchmesserlinie (diameter line), from Trogen through St. Gallen to Appenzell to be worked. The two other workings are Gais - Altstätten, and Gossau - Appenzell - Wasserauen.



The routes are mainly single-track, with passing loops at various stations as needed, although the tramway through St. Gallen uses a double-track alignment throughout. To provide modern interlocking signalling, the Appenzellerbahn commissioned Siemens to provide its new Simis Interlocking as a Service (SlaaS) system, which controls the interlocking of points and signals, including traffic lights, from a central unit at a Siemens data centre. This has replaced seven signal boxes between Teufen and Trogen.

The 2005 merger saw the integration of two other railways: the

▼ **BELOW LEFT:** A railcar and trailer with cycle and open trailer at Gais. This will run on an hourly service down to Altstätten.

▼ **BELOW RIGHT:** 4001/4101 leaves the gutter running track alongside Hauptstrasse as it enters the village of Teufen. The short section of ballasted track will take it round to the station in Teufen Dorf.

Rorschach - Heiden Bergbahn, and the Bergbahn Rheineck - Walzenhausen.

The future of the three rack railways of the Appenzeller Group is under discussion as the farebox recovery rate is currently less than 30%. While the local population values the rail service, the long-term future of at least two of the lines appears distinctly shaky. The two cantons, along with the Federal Government and the Appenzellerbahn, have reacted to independent studies carried out on the lines, drawing a number of conclusions:

- The Bergbahn Rheineck - Walzenhausen, with its sole







▲ ABOVE: SGA 5 (Schweizerische Locomotiv-und Maschinenfabrik AG/Schweizerische Industrie-Gesellschaft 1931) on a heritage service in 1989 climbs the steeply-graded curved Ruckhalde; this section has since been replaced by a 725m tunnel.

< ABOVE LEFT: Strassenbahn Gais Altstetten 2 at Wasserauen museum.

## ESSENTIAL FACTS

**Local travel:** Tickets and information from customer service centres at Appenzell; Heiden; post at Waldstatt; bakery/café Bohi at Speicher; Mecato shops at Teufen, Buhler, Gais, Appenzell, Heidem and Walzenhausen. Ticket machines are also located at stops. The various Swiss passes are valid on all lines, as are the Appenzell Holiday Card, the Lake Constance experience card and Oskar - the Eastern Switzerland guest card.

### What is there to see?

One of the best reasons to visit the region is the magnificent countryside. The first Pestalozzi Children's Village was set up at Trogen in 1945, and at Heiden there is a museum to Henri Dunant, founder of the Red Cross. At St. Gallen are the Abbey and Abbey library; textile museum; Roterplatz and trolleybuses. Various cable cars run throughout the region. Wasserauen has a museum - open Saturdays and Sundays between April and October - with volunteer-prepared rolling stock. This includes a rack and adhesion railcar from the Altstätten-Gais line, one of the diesel electric railcars from the Appenzellerbahn, and a tram and two trailers from the Santisbahn, although the tram has been rebuilt into a locomotive. There are some excellent displays relating to the development of the various railways: [appenzellerbahnen.ch/de/index/erlebnisse/nostalgiefahrten/museum-wasserauen.html](http://appenzellerbahnen.ch/de/index/erlebnisse/nostalgiefahrten/museum-wasserauen.html)

The Appenzellerbahn itself retains two bogie railcars for nostalgia operations and an assortment of rolling stock to go with them.

There is also an ex-Trogenerbahn railcar from which you can buy a beer in the station forecourt.

life-expired 1958 railcar, needs to be replaced by something cheaper to operate; the Appenzellerbahn is looking at options and as increasing traffic seems to be an impossibility, a St. Gallen Traffic Director recently made an 'off the cuff' comment that a cable car might be more economical.

This 1.96km (1.22-mile) railway started life as a funicular in 1896, but when passengers complained about the distance between the foot of the funicular and the railway station, a short tramway was built to link the two. In 1958 the entire route was converted to a 1200mm-gauge rack and adhesion railway which has been worked by a single vehicle since then. It was overhauled in 2013-14 and this was hoped to extend its life for another 20 years.

- The Altstätten - Gais railway would probably need replacement equipment by 2035, and it is thought that the sensible option at that time would be bus replacement. The lack of connection to the SBB state railway station is a hindrance, and reinstalling the former connection is not economic. Increased traffic again is unlikely.
- The future of the Rorschach - Heiden Bergbahn line looks more promising. This 7km (4.3-mile) standard-gauge rack and adhesion railway opened in 1875 with steam traction. Electrification in 1920 at 15kV 16.7Hz ac enabled it to work over the state railway system to Rorschach Hafen. It is now generally worked by Stadler-built articulated railcar BDeh 3/6 number 25.

It is recognised that the tourist value of rail operation on this line is higher than if it were converted to bus operation, and it is hoped that improved long-distance connections will be introduced

from 2022. A new bus/rail station is planned for Heiden. On a further positive note it is possible that the Appenzellerbahn will merge with the Frauenfeld - Wil metre-gauge railway, which it already manages.

Further reconstruction is required at some stations to make the whole network fully-accessible - this needs to be completed by the end of 2023 to comply with Federal law - but the largest current project is the building of a central maintenance centre at Rothus in Appenzell, situated on the Wasserauen line.

Although designs for this facility were first proposed in 2018, construction on the CHF55m (EUR50.9m) project is now slated to begin in 2021 for completion in Spring 2024 when the current operations at Herisau and Gais will close, releasing the land for redevelopment.

The new workshop will employ 80 staff and have four tracks, as well as a washing plant, stores, offices, catering facilities and an underground car park. CHF31.5m (EUR29.1m) of the cost is to be borne by the Federal Government, with the remainder funded by the cantons. The facility at Speicher will be retained for maintenance and minor repairs.

Two further projects are to be completed first: replacing the signal box in Appenzell and modification of the Schopfhalde intersection.

In Teufen, the council has shown interest in replacing the gutter-running section with a double-track street alignment, although a local group attempted to persuade residents that a tunnel would be a better idea. This did not get the backing it needed, but supporters of the tunnel and the council still seem to be at loggerheads. **IRAUT**

➤ Thanks are due to Hans Rudolf Ryffel for information included in this article.



▼ BELOW: Unidentified railcar and trailers in the St. Gallen suburbs.