

= Bergen Line =

The Bergen Line (Norwegian : Bergensbanen or Bergensbana) , also called the Bergen Railway , is a 371 @-@ kilometre (231 mi) long standard gauge railway line between Bergen and Hønefoss , Norway . The name is often applied for the entire route from Bergen via Drammen to Oslo , where the passenger trains go , a distance of 496 kilometres (308 mi) . It is the highest mainline railway line in Northern Europe , crossing the Hardangervidda plateau at 1 @,@ 237 metres (4 @,@ 058 ft) above sea level .

The railway opened from Bergen to Voss in 1883 as the narrow gauge Voss Line . In 1909 the route was continued over the mountain to Oslo and the whole route converted to standard gauge , and the Voss Line became part of the Bergen Line . The line is single track , and was electrified in 1954 @-@ 64 . The Bergen Line is owned and maintained by the Norwegian National Rail Administration , and served with passenger trains by Norwegian State Railways (NSB) and freight trains by CargoNet . The Flåm Line remains as the only branch line , after the closure of the Hardanger Line . The western section from Bergen to Voss is also served by the Bergen Commuter Rail , and was shortened following the 1966 opening of the Ulriken Tunnel .

= = History = =

= = = First step to Voss = = =

The first documented idea of building a railway between Norway 's two largest cities was launched by Hans Gløersen on 24 August 1871 in Bergensposten . The forest supervisor in Voss suggested building the railway via Voss and Hallingdal to connect with the Krøderen Line . Back in 1866 the same person had launched the idea of the Jæren Line . Within days of the launch of the Bergen Line the city council had assimilated support for the suggestion . In 1872 the railway director Carl Abraham Pihl and two engineers went on a survey tour to look at the suggested line . At the time it was common that proposals for railways came from local initiative , and that local municipalities and private investors would then pay about 20 % of the investments , the state covering the rest , mostly through foreign debt .

= = = = Political processes = = = =

On 20 October 1871 two engineers traversed the two possible routes from Bergen to Voss ; the one via Fana , Os and Hardangerfjord , the other via Dale and Sørfjord . Though covering a less populated area , the latter would be cheaper to build , and have less elevation . A railway committee was created on 25 January 1872 with a limited mandate , which was increased again 20 December . At the same time there was a dispute between the Ministry of Labour and Pihl about whether to prioritize the Bergen Line , but in July 1872 surveys were performed in person by Pihl and two engineers , and their report was positive . At the same time he launched the idea of a branch line up Valdres to Lærdal .

By 1873 agreement had been reached as to the right @-@ of @-@ way to Voss , but not onwards towards Oslo . On 13 January 1874 Bergen city council started issuing stock for the Voss Line , to begin with 400 @,@ 000 Norwegian speciedaler (NOK 1 @.@ 6 million) was issued . In the 1873 parliamentary election the railway supporter Peter Jebsen was elected , spending the next few years furiously defending the railway . Parliament chose to not issue new railway projects in the 1874 session , and instead make a complete plan for all railway construction in the country ? to be proposed by a committee . When the report was launched on 20 March 1875 , the Voss Line was not included since it could not show a higher profitability than 1 % . During the 1875 session there was not a majority for the Voss Line , partially due to the lack of capital available for local investors . This was based on a claim from Johan Jørgen Schwartz , the chairman of the committee , that the investment costs were underestimated . This was countered by Nils Henrik Bruun , a constructor

from Bergen , who was willing to construct all tunnels on the railway for less than the budgeted sum . When Jebesen in addition was willing to act as personal guarantee for Bruun in case of his death , the majority in the parliament shifted . On 9 June 1875 parliament voted with 61 against 42 to build Vossebanen .

= = = Construction = = =

Vossebanen was built with narrow gauge , 1 @, @ 067 mm (3 ft 6 in) . The first parts of the construction started in December 1875 , while the largest part started in March 1876 . During the winter the engineers had done the last finesses on the plans . At any given time at least 800 men worked on construction , and at the peak 1 @, @ 800 men were employed . They worked 12 hours per day , for which they had a daily wage of NOK 2 @. @ 55 , the highest wage for navvies in the country . To a large extent the labor came from Sweden , who had just finished the Norway / Väneren Line and had an excess of skilled labor for construction . This import of labor had the effect of pumping money into the local economy , and several taverns were built along the line . There were some accidents , and several deaths among the workers .

The construction work was finished in 1882 and some test services began , though not scheduled until the spring of 1883 . Official opening commenced on 11 July 1883 . Many of the navvies settled on Vossebanen after construction , and started working for the NSB as part of the operation .

= = = Across the mountain = = =

By the time the Voss Line was completed Norway had plunged into recession . Parliament was not willing to give more money to railways , and the country had to make do with a transport plan launched in 1886 that did not follow up with any funding . On 1 March 1894 parliament after five days of debate chose , with 60 against 53 votes , to build the Bergen Line . Several different routes had been proposed , including over Krøderen , or down Numedal (which later would get the Numedal Line) . In the end Hallingdal was chosen , connecting to Hønefoss and via Sandvika . To save costs a preliminary line would connect Hønefoss to Roa with the branch Roa ? Hønefoss Line . The final stage would be along the Gjøvik Line to Oslo . The line would also connect to the system via the Randsfjorden Line at Hønefoss .

Local financing was ready within a year , yet it took six years to survey the line properly , and construction start had to wait until 1901 . Construction started with the building of roads to get in supplies to the construction sites , completed in 1902 . The construction was exceptionally challenging , at high altitudes in a region without roads and with a climate that saw many meters of snow in the winter and temperatures far below freezing . 113 tunnels , totaling 28 kilometres (17 mi) had to be built ; the longest being the 5 @, @ 311 metres (17 @, @ 425 ft) Gravehalsen Tunnel , alone costing NOK 3 million and the longest tunnel north of the Alps . It took six years to build , and had to be excavated manually through solid gneiss . Laying of track was started in 1906 , and in 1907 the two groups , both having started at their own end , met at Ustaoset . A small celebration was made at the spot (see image) .

It had been decided that the Bergen Line , unlike the Voss Line , was to be built with standard gauge . So the newly laid line from Bergen to Voss had to be converted in time for the opening of the Bergen Line . This was especially challenging because of the continuous traffic on the line , with 36 departures per day to Nesttun , six to Garnes and four to Voss . In preparation a few curves had to be straightened , the tunnels widened and the bridges strengthened . On the night of 10 / 11 August 1904 all the track was changed and in the morning the trains could operate on standard gauge to Voss .

The first services started on 1 July 1907 from Voss to Myrdal . An official opening train attempted to cross part of the line to Gulsvik on 9 December 1907 , but got stuck in heavy snow and had to return . It turned out that the railway had to close and it took one and a half month to clear it for snow . Even a rotary snowplow at 750 kW was not powerful enough to get rid of the snow . A new attempt to open the line in 1908 succeeded , and a train went from Gulsvik to Bergen . The line from Roa to

Gulsvik was still under construction , so passage was along the Drammen Line via the Krøder Line with ship over Krøderen to Gulsvik . The first scheduled train from Oslo West Station en route to Bergen departed 10 June 1908 .

On 25 November 1909 a train en route from Bergen rolled into Oslo Østbanestasjon , and two days later the railway was officially opened at Voss . King Haakon VII stated upon the opening that the line was the Norwegian engineering masterpiece of his generation .

= = = Steaming up = = =

World War II was a demanding time for the railway line , as the track was in heavy use for both civilian and military transportation , and much of the equipment and maintenance was lacking . On 28 February 1944 a descending eastbound freight train loaded with oil and petrol lost its braking power and became a runaway train , finally ploughing into a westbound passenger train at Breifoss , just east of Geilo . The crash and subsequent fire killed 25 civilians and an unknown number of German soldiers . Poor lubrication oil combined with the cold weather is believed to have caused the accident .

= = = Electrification = = =

Norway is a country with abundance of hydroelectricity and NSB saw huge amounts of money burning up with the imported coal . Plans for electrification of the line is as old as the railway itself , and in 1912 the line from Nesttun to Bergen was proposed electrified and rebuilt to double track , having seen the Thamshavn Line open with electric traction in 1908 . During the planning of the Hardanger Line and the Flåm Line during the 30s the suggestion again arose , and both the branch lines were built with electric traction , but not the main line . Countersuggestions were raised proposing a conversion to the locomotives running on oil or coal dust . In 1939 a plan for national electrification was launched , and the Voss Line was top priority . But the breakout of World War II set the plans back , and not until the 50s was it again possible to afford such investments . Vossebanen took electric traction into use on 2 July 1954 .

In 1952 a new plan was launched by parliament to electrify 1 @, @ 153 kilometres (716 mi) of railway , with the line from Voss to Hønefoss prioritized fourth . The following year NSB launched the " away with the steam " -campaign , that would replace all steam locomotives with electric or diesel traction . Since electrification was not imminent , NSB introduced diesel traction on the Bergen Line in 1958 , predominantly using Di 3 stock . Travel time between the two termini was reduced by about one hour . During summer the Class 66 diesel multiple units were put into service , but they were not heavy enough to cope with winter and thus only served during the summer months . The line was electrified in four stages , from Roa to Hønefoss on 1 February 1961 , from Hønefoss to Ål on 1 December 1962 , from Ål to Ustaoset on 15 December 1963 and finally from Ustaoset to Voss on 7 December 1964 . As the point of electrification moved across the mountain , so did the point NSB changed locomotive on the train . The new locomotive EI 13 was put into service on the electric parts . The electrification cost NOK 143 million .

The express trains have as one of the main lines always been allocated the newest locomotives by NSB . When the EI 14 was delivered in 1968 , it was put into service on Bergensbanen , as was the EI 16 in 1977 , the EI 17 in 1981 , and finally the EI 18 in 1996 . The older locomotives have been relegated to freight service . In 2000 electric multiple units were put into service with the Class 73 tilting trains , branded as Signatur and capable of 210 kilometres per hour (130 mph) . However , they cannot be used at those speed on any part of the Bergen Line , and only some parts of the Asker Line and around Finse can they operate quicker than the locomotive hauled trains . There has also been reason to doubt their winter capability on the very demanding Bergen Line . Occasionally they have been stuck in the snow , and on February 21 , 2007 a multiple unit derailed after running into a pack of snow . As refurbished carriages become available , the multiple units will be removed from the line , and replaced by traditional locomotive @-@ hauled trains .

== Through the first mountain ==

The first 32 kilometres (20 mi) from Bergen to Takvam represented a very roundabout way , and it was clear that it would be possible to reduce the line by 21 kilometres (13 mi) with the construction of three tunnels , Ulriken Tunnel (7 @, @ 660 metres or 25 @, @ 130 feet) , Arnanipa Tunnel (2 @, @ 177 metres or 7 @, @ 142 feet) and Tunestveit Tunnel (40 metres or 130 feet) . The idea was approved by parliament in 1956 , based on private financing from the businessman Fritz Rieber . Construction started in 1959 with the tunnels being finished in 1963 while the tracks were finished laid on 29 May 1964 when the first train entered the tunnel .

Rieber has suggested a package for the politicians , where he would create a company that would borrow money to build both the Ulriken Tunnel , a shortening of the line from Hønefoss to Sandvika (the Ringerike Line) and electrify the railway . Since NSB based their fares on the route length traveled , financing would be covered by a surcharge equal to the distance saved ; ticket price would remain the same and within twenty years the debt would be covered . The government opposed the suggestion ? Trygve Bratteli commenting that even though the financing was private , it would still have to use the same funding as government debt , and would jeopardize other projects , like the Nordland Line .

In 1980 the Oslo Tunnel was opened , allowing trains along the Drammen Line to go to the new Oslo Central Station , an upgrade of the former Oslo Ø . As a consequence of this , passenger trains were since the late 1980s rerouted via Drammen instead of via Roa , following the Drammen Line and the Randsfjord Line to Hønefoss . This allows the trains to pass through more densely populated areas and on trackage with more capacity . However , the change of route actually increased the length between the two termini with 23 kilometres (14 mi) . But the better track standard via Drammen results in about the same travel time . Freight trains still goes via Roa .

== Lowering the peak ==

During winter NSB had large costs keeping the line snow @-@ free . Large diesel @-@ electric snowploughs were stationed at Finse , and tens of kilometers of snow sheds were built on the most vulnerable parts . Especially the 22 kilometres (14 mi) part between Finse Station and Hallingskeid was a tear on resources , and heavy snowfall and drifts regularly closed the entire line . A solution was proposed by NSB 's director Robert Nordén in 1984 , involving construction of a 10 @. @ 5 kilometres (6 @. @ 5 mi) tunnel between the two stations .

In 1989 the Parliament of Norway approved the plans , including the upgrade of part of the line east of Finse . In total NOK 750 million was invested in rebuilding 32 kilometres (20 mi) of line , shortening it by 4 @. @ 5 kilometres (2 @. @ 8 mi) . At the same time the permitted speed could be increased from 70 kilometres per hour (43 mph) to 170 kilometres per hour (110 mph) . The tunnel opened on 16 June 1992 while the rest of the upgrades opened in five steps in the period 1995 ? 98 . The highest point of the line was reduced from 1 @, @ 301 metres (4 @, @ 268 ft) to 1 @, @ 237 metres (4 @, @ 058 ft) ? located inside the tunnel . After the opening the base for snow removal was closed at Finse .

== Operation ==

The Bergen Line as a through line is used for up to five express trains operated by Norwegian State Railways , as well as freight trains by CargoNet . From Myrdal to Bergen there are commuter rail services operated by NSB .

== Line ==

The total distance from Oslo to Bergen via Drammen is 493 kilometres (306 mi) , while the Bergen Line proper is 372 kilometres (231 mi) . The line has 182 tunnels , totaling ca . 73 kilometres (45 mi) , of which ten are over 2 @. @ 0 kilometres (1 @. @ 2 mi) . Finse Station remains the highest

elevated station at 1 @, @ 222 @. @ 2 metres (4 @, @ 010 ft) , while the highest point is in the Finse Tunnel at 1 @, @ 237 metres (4 @, @ 058 ft) .

= = = Commuter rail = = =

NSB operates a commuter rail service from Bergen with two hourly departures to Arna , plus fourteen daily departures to Voss , of which up to six continue to Myrdal . Rolling stock is the Class 69 multiple units . The first part to Arna represents an important part of the public transport in Bergen , since the rail direct line through the mountain Ulriken is considerably faster than driving around .

= = = Express service = = =

Express trains operated by NSB have always been the primary passenger service on Bergensbanen . Passenger trains follow the Drammen Line and the Asker Line to Drammen , before heading north to Hønefoss on the Randsfjord Line . The express trains offer both transport from villages along the line to either Bergen or Oslo , as well travel between Norway 's two largest cities . Up to two day trains are provided with Class 73 multiple units , while the remaining services are with locomotive hauled trains . Six nights a week there is a night train service . Several parts of the line service places without road access , such as Finse and Myrdal . Operating deficits are covered by the Norwegian Ministry of Transport and Communications .

= = = Freight = = =

Freight trains are operated by CargoNet , hauled by EI 14 and EI 16 locomotives . Most transport is from the terminal at Alnabru in Oslo to the terminal at Bergen Station . Freight trains use the Roa @-@ Hønefoss Line instead of going via Drammen since it is shorter ? distance is more important than speed for freight trains . CargoNet operates up to four daily trains from Oslo , plus one from Drammen . Rail freight on Bergensbanen increased by 80 % from 2001 ? 05 , but further growth is not possible without better infrastructure ; CargoNet has indicated they want five more passing loops , as well as extending them to increase train length from 400 metres (1 @, @ 300 ft) to 600 metres (2 @, @ 000 ft) , claiming they could double freight traffic with adequate infrastructure .

= = = Heritage = = =

Parts of the closed sections of Vossebanen , from Midttun to Garnes has been converted to a heritage railway ? the Old Voss Line ? that is operated with steam trains by the Norwegian Railway Club during the summer . At Finse there is a navy museum , and the old navy road has become a cycle track .

The branch Flåm Line has been converted to a tourist route . The railway has spectacular scenery and a vertical descent of 864 metres (2 @, @ 835 ft) or 5 @. @ 5 % along the 20 kilometres (12 mi) route from Myrdal to Flåm . Operation is still performed by NSB , but marketing is performed by Flåm Utvikling . The stock used on the railway are EI 17 hauling B3 wagons , all painted green .

= = Future propositions = =

= = = Closing = = =

In 2002 the Norwegian National Rail Administration warned that lack of funding might lead to a closure of all long @-@ distance passenger trains in Norway , including the Bergen Line . Torild Skogsholm , Minister of Transport and Communications assured that it was not the government 's policy to close railway lines . In 2004 the Progress Party suggested closing down the railway line

and replacing it with a motorway between Bergen and Oslo , arguing that the railway was unprofitable , and that bus transport was cheaper while easier truck transport would aid business . Other political parties rejected the proposal pointing out the better environmental performance of the railway and that the railway transports large volumes of freight . On 16 June 2011 , a welding accident caused a fire at Hallingskeid Station , causing the complete destruction of the platform . This caused a temporary closure of the line until 23 June 2011 .

== Upgrades ==

Ulriken Tunnel represents the largest bottleneck on the Bergen Line , due to the commuter trains to Arna . Building double track on the westernmost part of Bergensbanen would free up capacity not only of that part of the line , but the whole line across the mountains .

The original plans for Bergensbanen from 1894 included the construction of a new line ? the Ringerike Line ? from Hønefoss to Sandvika just west of Oslo . This line would reduce the distance on Bergensbanen by 60 kilometres (37 mi) and 50 minutes travel time . There has been a continual decision to build this railway line , but it has never received any funding . These plans were discussed more after 2000 , and a detailed plan has been done . Combined with other improvements totaling investments of NOK 7 billion , travel time could be reduced to four and a half hours . The project is scheduled to be built between 2019 and 2024 .

== High @-@ speed rail ==

Several suggestions for high @-@ speed rail from Oslo to Bergen have been launched . Preliminary studies performed for the National Rail Administration with positive cost @-@ benefit ratios on building high @-@ speed rail from Oslo to Bergen . The most suitable route would approximately follow the existing route (but a new tunnel Oslo ? Hønefoss) . Oslo ? Trondheim and Oslo ? Halden are assumed to be built earlier because of lower cost . Two lobbyist suggestions to the route have also been launched . The one involves a " high @-@ speed ring " from Oslo , via Numedal to Geilo , then following Bergensbanen to Bergen and continuing south to Stavanger and back to Oslo via Kristiansand . Norsk Bane has launched the idea of building a common line from Oslo to Haukeli and then from branching off to Bergen and Stavanger .

Such long @-@ distance high @-@ speed railways are not included in the preliminary long @-@ term plan for 2010 ? 2040 , and it is likely that railways Hamar ? Trondheim and Drammen ? Kristiansand will be built first since they are easier to build . It is likely that a high @-@ speed railway to Bergen will be built sometime in the period 2030 ? 2060 .

== Stations ==