

= Gardermoen Line =

The Gardermoen Line (Norwegian : Gardermobanen) is a high @-@ speed railway line between Oslo and Eidsvoll , Norway , running past Lillestrøm and Oslo Airport , Gardermoen . The line is 64 kilometres (40 mi) long and replaced the older Hoved Line as the main line north @-@ east of Oslo . The older Hoved Line now handles commuter and freight traffic , while the Gardermoen Line handles high @-@ speed passenger trains and freight trains laden with jet fuel for the airport . Both lines are owned by the Norwegian National Rail Administration .

The line was opened in 1998 , at the same time as the airport that gave the line its name . It is used by the Flytoget airport express train service as well as express trains by Norges Statsbaner . It is the only high @-@ speed railway in the kingdom , with a maximum permitted speed of 210 km / h (130 mph) . Most of the line between Oslo and Lillestrøm is through the 14 @,@ 580 @-@ metre (47 @,@ 830 ft) long Romeriksporten tunnel ? the longest railway tunnel in Norway . The decision to build the line was made in 1992 ; construction started two years later . The line was subjected to severe criticism during construction when the Romerike Tunnel sprung severe leaks due to hurried construction . As a result , the tunnel was opened a year after the rest of the line .

= = History = =

When the Parliament of Norway decided on 8 October 1992 to build a new central airport for Eastern Norway , they also decided that the main mode of ground transport to the airport should be by railway . While the previous airport , Oslo Airport , Fornebu , was located just outside the city limits ; the new Oslo Airport , Gardermoen , would be located some 50 kilometers north of the city , outside the reach of the existing public transport systems . The political agreement to build the airport stated that the costs of construction should not be borne by the tax payers . As a result , the entire airport was financed with money borrowed through Oslo Lufthavn AS , a subsidiary of the Norwegian Airport Administration . The same principle was chosen for the airport rail link . The Norwegian State Railways (NSB) created the subsidiary , NSB Gardermobanen AS , on 24 November 1992 to perform the construction of the line . This company would be able to charge train operators using the railway line ; and could use this income to cover its down payments and interest on the debt created to pay for the infrastructure investment . It was planned to give a profit margin of 7 @.@ 5 % .

In 1996 NSB Gardermoen stated that they expected to charge commuter and intercity trains 100 million Norwegian krone per year to use the new line . County politicians in Akershus stated that it was not reasonable for commuters to have to pay for the new railway . Early estimates showed that this would almost double to price from Oslo to Eidsvoll , and that passengers would have different prices , depending on which route they followed . Stor @-@ Oslo Lokaltrafikk , which was responsible for buses in Akershus , stated that they had no way to influence NSB 's prices , but that they would consider starting a coach service along the route , which would not charge the surcharge .

= = = Construction = = =

Construction of the railway started on 1 August 1994 . Gardermoen is located about 50 kilometres (31 mi) north of Oslo , but is not located on the Hoved Line . A different right @-@ of @-@ way had to be chosen north of Kløfta . The Hoved Line has heavy traffic , with many small stops until Lillestrøm , and continues northwards from Lillestrøm as single track . Therefore , an all @-@ new railway would have to be built ; it would bypass the intermediate railway until Lillestrøm , running through a tunnel , and continue northwards to the airport and onwards to Eidsvoll . This northernmost part is 16 kilometres (10 mi) used to allow trains operating on the Dovre Line to Lillehammer and Trondheim to use the Gardermoen Line .

The Gardermoen Line was the second attempt to build a high @-@ speed railway in Norway . The first was the 35 km line from Ski to Moss on the Østfold Line . However , operational speeds in

excess of 160 kilometres per hour (99 mph) could not be achieved due to the short distances and limitations on rolling stock . The Gardermoen Line , therefore , became the first real high @-@ speed railway line in Norway . Due to the domination of single track in Norway , the 64 kilometres (40 mi) Gardermoen Line increased the total length of double track in the kingdom by more than 50 % .

The projected costs of the railway line were NOK 4 @.@ 3 billion \pm 20 % . Total costs ended at NOK 7 @.@ 7 billion , including 1 @.@ 3 billion extra used on extraordinary expenditures on the Romeriksporten . On 1 October 1996 it was decided that the construction company , NSB Gardermobanen , would also become the operator of the airport express train . However , due to limited profitability with the company , from 1 January 2001 the ownership of Gardermobanen was transferred to the Norwegian National Rail Administration , who also owns the rest of railway lines in Norway . The operating company changed its name to Flytoget AS .

= = = Construction challenges = = =

The most challenging part of the construction was the 14 @,@ 580 metres (47 @,@ 830 ft) railway tunnel from Etterstad , just east of Oslo S , to Lillestrøm . Romeriksporten is the longest railway tunnel in Norway , and is underneath the recreational area Østmarka , in geologically highly unstable ground . During the construction in 1997 , the water level in some of the lakes above the tunnel , including Lutvann and Nordre Puttjern , fell dramatically . After they were discovered on 3 February 1997 sanctions were initiated by the Norwegian Water Resources and Energy Directorate requiring leakage prevention measures in the tunnel . At the worst , 3 @,@ 000 liters of water per minute leaked into the tunnel .

The substance Rhoca @-@ Gil was used to fix the leakages , but the substance failed to work properly . Not only did it fail to polymerize and stop the leaks , it also contaminated the surroundings with acrylamide . The entire process of fixing the leak and cleaning up the toxicity delayed the process of building the tunnel by one year ; and it was first opened on 22 August 1999 . Further complications arose due to conflicts between NSB Gardermobanen and the construction company . Retrospective surveys showed a lack of control and reporting procedures during incidents that should have been addressed in 1995 , and were never taken seriously . About sixty houses received damage due to the construction of the tunnel . An evaluation performed by the Ministry of Transport and Communications showed that NOK 500 million was used on fixing the leaks ; however , the report claimed this was , to a large extent , a waste of money due to inefficient engineering procedures . The same report criticized the planning and organization of the entire construction of the railway .

= = = Opening = = =

When the new airport opened on 8 October 1998 , and the Flytoget airport express train service started operations with sixteen Type 71 multiple units . Trains had to use the old Hoved Line from Oslo S to Lillestrøm , but could use the new high @-@ speed line from Lillestrøm to Gardermoen . Regular operations using Romeriksporten started on 22 August 1999 . To be able to use the new Gardermoen Line infrastructure , Norges Statsbaner had to buy new trains capable of higher speeds . Twenty @-@ two locomotive designated EI 18 , based on the Swiss lok 2000 , where delivered in 1996 . They are capable of speeds of up to 200 kilometres per hour (120 mph) . However , the B7 passenger carriages used are not permitted to operate at more than 150 kilometres per hour (93 mph) . Full speed utilization of long @-@ distance trains is only possible with the Type 73 units that started operation on Dovrebanen in 2000 . These trains are nearly identical to those used by the Flytoget airport express train company , and capable of 210 kilometres per hour (130 mph) on the Gardermoen Line . They are equipped with tilting technology allowing quicker operation on the rest of the line to Trondheim . Other trains used on the line by NSB are only capable of 160 kilometres per hour (99 mph) .

== Future expansion ==

Plans for an expansion of the high @-@ speed line to Hamar have been launched , but have not been incorporated into any specific plans . This suggestion would increase the length of the high @-@ speed rail north of Oslo with 62 kilometres (39 mi) ? almost a doubling . The project may or may not incorporate a further high @-@ speed line to Trondheim .

== Operations ==

The railway is used by both Norges Statsbaner , Flytoget and SJ for their passenger services , as well as freight trains with jet fuel for the airport .

== Airport express train ==

The Flytoget airport express train service is the largest user of the Gardermoen Line , with six departures from Oslo Central to Oslo Airport per hour . The trains only use the line as far as Gardermoen , and not the northernmost sixteen kilometers . Service is provided using sixteen Type 71 three @-@ car units , which together transported 5 @.@ 4 million passengers in 2007 . Direct services to Oslo S take 19 minutes . Half of the services make an intermediate stop at Lillestrøm , and continue on past Oslo Central to Asker Station . Flytoget has a 34 % market share on ground transport to Oslo Airport .

== Norges Statsbaner ==

NSB uses Gardermobanen for express and some regional trains north of Oslo . This includes five daily departures to Trondheim (including one NSB Night Train) . There are two regional services northbound along the railway , including the Type 70 service between Lillehammer and Vestfold , as well as Type 72 used between Eidsvoll and Kongsberg . Both these have one hour headway , and are only capable of 160 kilometres per hour (99 mph) on the line due to limitations with the rolling stock . The southernmost part of the line is used by commuter trains heading to the Kongsvinger Line . These trains divert from the Gardermo Line at Lillestrøm . Also the commuter trains operating to Dal along the Hoved Line use the Gardermoen Line until Lillestrøm .

== Other services ==

Because there is a parallel line , the Hoved Line running all the way from Oslo S to Eidsvoll , some trains can choose to use this line instead . This is primarily done by some commuter trains , as well as all freight trains . The only exception to this are trains hauling jet fuel to the airport , who have to use the Gardermoen Line from Kløfta . This service is provided by CargoNet .

The Swedish state railways , SJ also operate on the southern part of Gardermoen on their intercity services X 2000 . This was for some years provided by Linx , a joint venture between SJ and NSB , using X2 stock , but the company was later dissolved .

== Stations ==