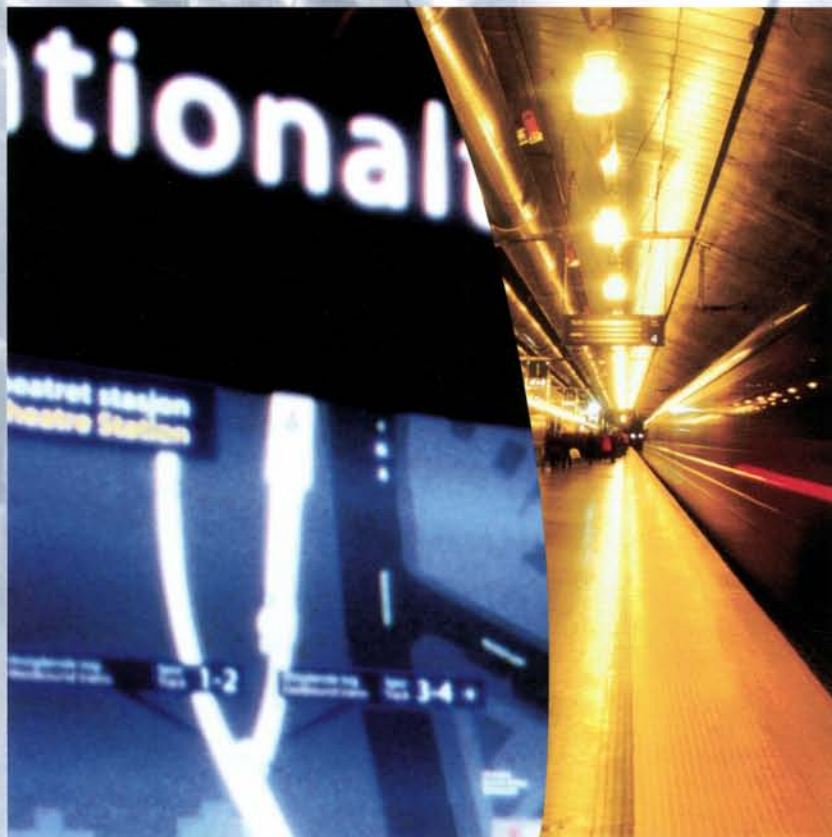




Annual Report 1999



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## The Year 1999

The Åsta accident on the Rørosbanen will necessarily cast a shadow over Jernbaneverket's report for 1999. This tragedy, which claimed 19 lives, took place four days into 2000 and will affect all of us who work for a safer and better railway in Norway for a long time. The accident itself is under investigation. Final answers and conclusions will have to wait until the investigations are finished. For that reason, the report for 2000 will be the time and place for a broader discussion of the reasons for and consequences of the accident.

The year 1999 was one of organisational changes and marked the end of many large and important building projects.

1 July marked the final organisational separation between NSB BA and Jernbaneverket. The arrangement with the same Managing Director and a partially overlapping Board of Directors for the two agencies was suspended. Jernbaneverket's board was disbanded from the same date. The new Railway Director is thus the CEO of Jernbaneverket and reports directly to the Ministry of Transport and Communications.

After almost a year's delay, NSB Gardermobanen AS opened the Romeriksporten tunnel for traffic on 28 August. Since the 14 kilometer long tunnel

between Etterstad and Lillestrøm is integrated with the rest of the railway network, this opening represented a small revolution for the flow of traffic in Oslo and eastern Norway. In addition to the Airport Express every 10 minutes, all long-distance, medium-distance and most local trains go through the Romeriksporten tunnel. The travel time between Lillestrøm and Oslo is dramatically reduced and punctuality greatly improved.

In addition, the new National Theatre station was opened on 28 November. This has led to a substantial increase in capacity through the Oslo tunnel – from 16 to 28 trains in each direction per hour. Since the Oslo tunnel and Oslo Central station are the very heart of the Norwegian railway net, the new National Theatre station has helped to relieve the bottleneck which the Oslo tunnel represented. His Majesty King Harald V's official opening of the station on 16 December was a formal and dignified celebration of this occasion.

27 November marked the completion of the new high altitude section of Bergensbanen with the opening of Gråskallen tunnel. This was combined with the celebration of the 90th anniversary of Bergensbanen. Since the building of the Finse tunnel at the beginning of the 1990s, practically the entire high altitude section has been renewed, one small stretch at a time. Because of this expansion, operational stability has improved and expenses for maintenance and snow removal have been reduced.

In addition to Bergensbanen's 90 years, the 75th anniversary of Raumabanen was celebrated on 29 November. In a year with many important milestones for modernising and renewing the railway, these anniversaries were valuable reminders of the role the railway has played in the development of Norwegian society.





1999 was the second year of extensive measures to prepare for NSB BA's new tilting trains – "Signature". Signature traffic started on 28 August on Sørlandsbanen. During 2000, traffic with the new tilting trains will also begin on Dovrebanen and Bergensbanen. Investments in the infrastructure primarily involve dismantling level crossings, extension and construction of new passing tracks, adjustments of curves and signalling facilities, and strengthening of electrical installations. Work on tilting train measures continues into 2000.

On the planning side, 1999 was a year of concentrated work on the proposed National Transport Plan. This work has taken place in close cooperation with the Directorate of Public Roads (Statens vegvesen), the Coastal Administration (Kystverket), and the Civil Aviation Administration (Luftfartsverket), both on the local/regional and national level. The suggestion from these agencies, which was sent to the Ministry of Transport and Communications in September, prescribes a new direction for transport policy in Norway. Central goals include promoting more environmentally friendly transportation throughout Norway, laying the groundwork for decreasing automobile traffic in the largest cities, and implementing measures which will considerably reduce serious accidents. These are exciting and challenging goals for Jernbaneverket in the years to come.

1999 was an economically demanding year for Jernbaneverket. Nevertheless we managed to eliminate the budgetary lag which had existed since 1996; by the end of 1999, Jernbaneverket's economy had been completely stabilised and the debt situation normalised. Cash accounts show a cost decrease of NOK 7.5 million, or 0.2%, with respect to Parliament's allocations.

1999 marked the end of what has been in many aspects, the century of the railway. During the first half of the 20th century, the different stretches of railway were gradually expanded and incorporated into a network. Perhaps the greatest achievement was the construction of Bergensbanen – in its time regarded as an engineering masterpiece of international format. King Haakon VII's opening of the railway in 1909 had great symbolic significance as a link in the building of the nation, four years after Norway regained its independence when the union with Sweden was dissolved. The railway became the backbone of the national transport system.

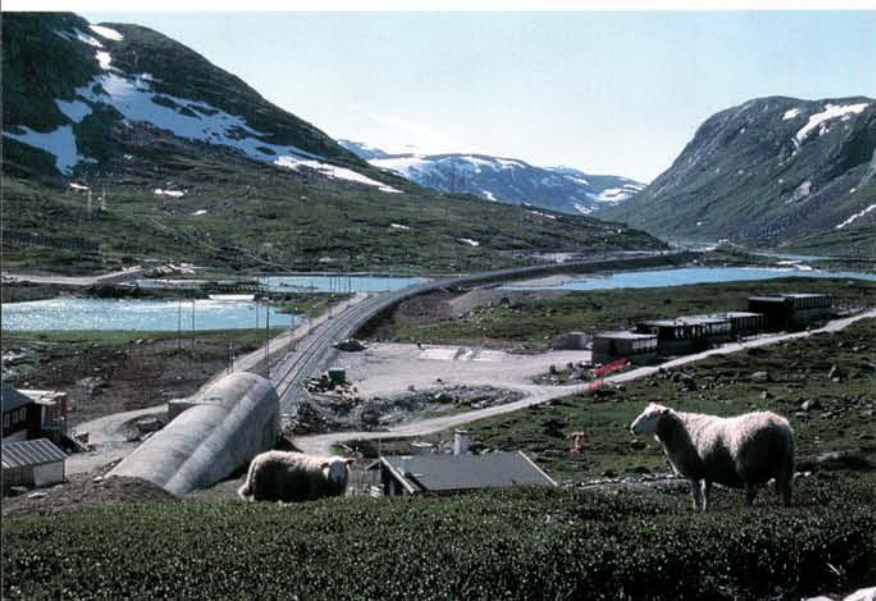
During the 1960s, 70s and 80s, the automobile and airplane gradually took over more of the transportation market. At the same time, there was less political will than before to concentrate on the railroad.

The 1990s have been a turning point. Concern for safety, environment and capacity have restored the railway to a central player in the transportation system of the future. The work with the National Transport Plan has emphasised how important it is to coordinate different

means of transportation and the need for effective hubs. This applies to both passenger and freight traffic.

In addition to Jernbaneverket's constant focus on safety, the work to further develop stations and hubs will be an important focus for the railway in the years ahead. This must take place in close cooperation with the other infrastructure managers, the transportation industry and local authorities. Customers demand safe, effective and punctual transportation services. As a public transportation agency, Jernbaneverket is obligated to work to satisfy these demands. Only in this way can the railway also play an important role in the new century we have just embarked upon.

Steinar Killi





“It’s good to be at Grefsen,” smiles traffic controller Lene Bøe (29). “I like it here, and what I do is meaningful and varied. That’s really what the railway is all about, isn’t it? Here we deal with customers as well as trains. We even sell newspapers,” says Lene, before she throws on her jacket and rushes out to meet the local train headed for Jaren. The red stripe on her uniform cap indicates that today she is on duty as traffic controller at Grefsen. Today is her day to run the business.

Lene has worked both as conductor and conductor apprentice, but she transferred to inside work at the



station in 1992.

“I was encouraged to apply, and a couple of years later, I finished my education. I was thrown out into the middle of it all at Lillestrøm during the 1994 Olympics, and I worked with ticket sales and access control, as well as the signalling system at the station.”

“Wasn’t that a bit of a trial by fire for a new traffic controller?”

“I didn’t get a big head over it, but it worked. I have good memories from my time at Lillestrøm,” smiles Lene. Three years ago, she was hired as a railway clerk at the station office at Oslo Central station. Meanwhile, Lene is part of the reserves, so she spends most of her time at Grefsen.

“And you want to continue here?”

“Oh yes. At any rate, as long as we can still serve our customers. Those who live around here think of Grefsen as their own station, and we hear a lot of kind words from satisfied customers who appreciate the job we do. For the time being, we have an agreement with NSB to sell tickets to passengers. If that arrangement ends, and we’re only left with responsibility for the flow of traffic, I may apply for a transfer. We’ll see,” says Lene. And that’s how it stands.



# Jernbaneverket's Responsibility for the Railway Network

Jernbaneverket manages the railway infrastructure on behalf of the Norwegian state and reports to the Ministry of Transport and Communications.

Jernbaneverket is responsible for allocating track access to qualified traffic companies in a non-discriminatory manner.



## Jernbaneverket's safety policy

Railway transportation shall not lead to accidents that may cause loss of life or serious injury, nor damage to the environment or equipment.

## Jernbaneverket's primary functions

### *Jernbaneverket shall*

- be the Norwegian state's competent body for the railway
- manage, maintain and develop the public railway network
- be responsible for traffic control
- assign access to the national railway network
- be the track access authority for the public railway network
- manage the national regulations for the Norwegian railway, including technical and traffic safety regulations
- safeguard public interests in the railway

### *Jernbaneverket's products are*

- a railway network which satisfies national and customer requirements for safety, accessibility, speed, axle load, train frequency, loading limit gauges, public information, comfort and experience, and environmental considerations.
- railway stations and terminals, including public areas, entrances, parking lots and other facilities deemed necessary to users of train services.
- schedules and individual routes, by allocating train paths and routes on the railway network.
- traffic control – operational supervision of train traffic on the railway network.
- regulations for the public railway network in regards to:
  - technical specifications for the railway network and standards for rolling stock
  - traffic control and safety
  - competency level of key personnel
- government reports, assessments and plans for the railway sector, including the railway's role in the development of Norwegian society, also seen in the context of other transportation sectors.

### Parties with interests in Jernbaneverket

- The Parliament (Storting), the Government and the Ministry of Transport and Communications.
- Users of the railway network (rail traffic companies).
- Customers and potential passengers of the rail traffic companies.
- The authorities, including regulatory and supervisory agencies.
- Employees of Jernbaneverket.
- Public opinion.

### The following criteria for success have been identified on behalf of those who hold an interest in Jernbaneverket:

- Safety
- Reliability
- Environmental considerations
- Control and monitoring
- Cooperation and commitment
- Development

## Jernbaneverket's Organisation and Management

Jernbaneverket reports directly to the Ministry of Transport and Communications, which follows up Jernbaneverket's activity through regular departmental meetings and Jernbaneverket's four-month reports.

The Railway Director is in charge of managing Jernbaneverket.

The Head Office has superior responsibility for coordinating Jernbaneverket's total operations. It is responsible for all regulations regarding the Norwegian railway network, as well as traffic and activities associated with this network.

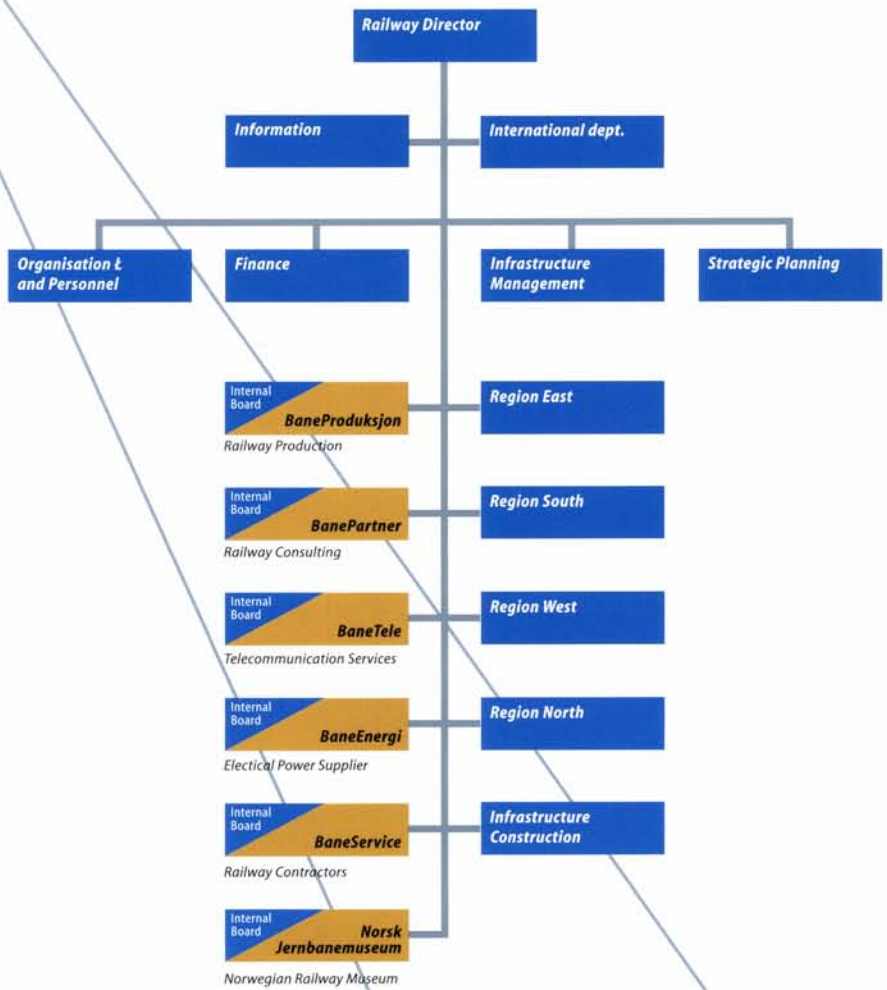
The four regions are responsible for the ongoing and daily operative management of the public railway network. They are responsible for all traffic control on the railway network.

Infrastructure Construction acts as owner in regards to major, new infrastructure constructions, from detailed planning to completed facilities.

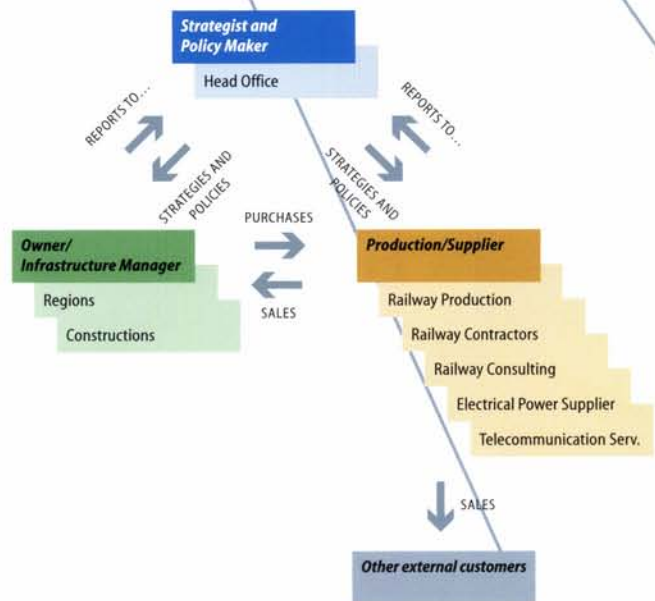
Jernbaneverket's internal service providers, who also supply products and services to external parties, are:

- Railway Production East, South, West and North provide railway-related contractual work based on the use of light machinery.
- Railway Contractor – Jernbaneverket's railway contractors, based on specialised, heavy machinery.
- Railway Consultants – Jernbaneverket's railway consultancy services.
- Electric Power Supply – Jernbaneverket's electrical power supplier.
- Telecommunication Services – Jernbaneverket's telecommunication services.

The Norwegian Railway Museum (Norsk Jernbanemuseum) is the caretaker of historical documentation and presentation of Norway's railway history.



Jernbaneverket's organisation per 1 January 2000



The interplay between Jernbaneverket's various units



“His great grandfather was the foreman of a construction crew that used explosives to build Nordlandsbanen, and one of his cousins is an engine driver in Vestfold. Knut Erik Kvarme himself is an operational supervisor in Oslo. He is originally from Steinkjer, but after almost 36 years in Drammen, he is a paying supporter of Strømsgodset football team. “And I pay it with pleasure,” laughs the 40-year-old who has lived the roving life of a railway man.

“I began as a traffic apprentice at Oslo West station in 1982 and worked there until the station was closed in the spring of '89. Later I worked with train dispatching at Filipstad, and eventually transport



management in Drammen. When that too was shut down, I applied for a job at Alnabru, but I didn't get it. Instead, there were long stretches as a traffic controller at different places along Østfoldbanen and Vestfoldbanen.”

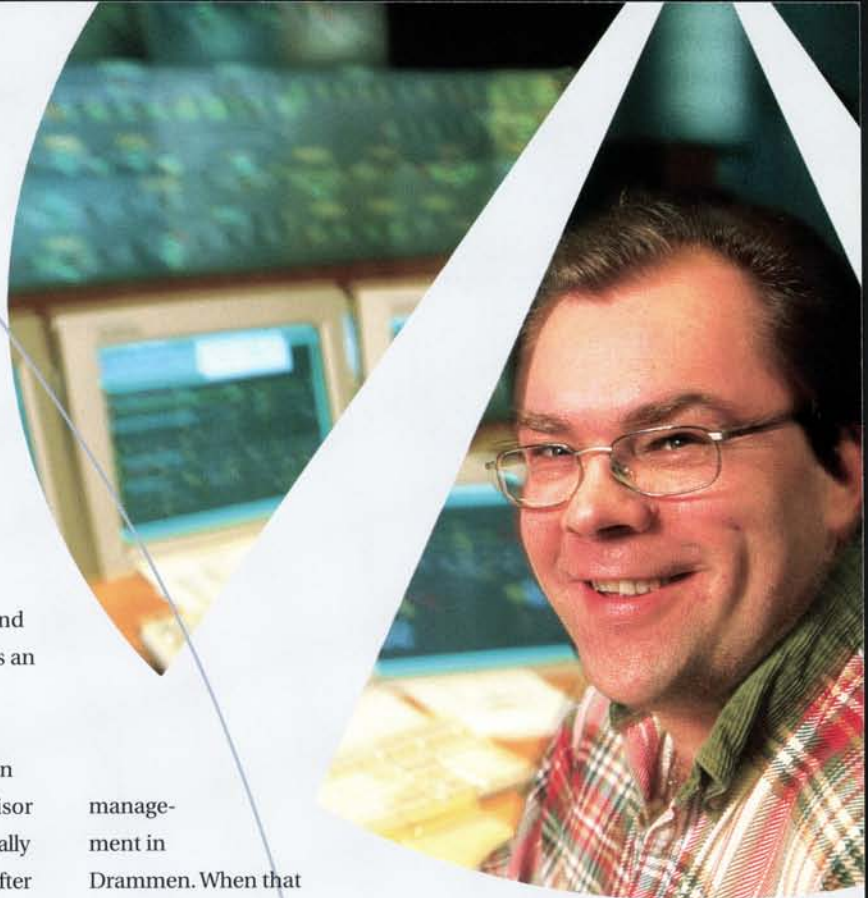
“Any special memories from that time?”

“I will never forget the winter on the Skoger section. The makeshift quarters my crew lived in was without electricity and the generator usually needed a couple of hours to make it warm enough to take off your jacket. Yes, those were the days.” Knut Erik smiles, looks at his computer terminal to check that traffic is flowing as it should. “A quiet day on the job is a good day on the job. But it isn't always like that. When everything is hectic, I can get a lot of guff from the crews working the trains, but it's no worse than we can deal with.”

“Do you often think about the passengers?”

“It may sound rather intense, but sometimes we “bleed” for the passengers. Especially when there are major disruptions in service. We have to keep our heads cool and do everything to get traffic flowing again so that as few people as possible are affected by the delays. You've got to keep calm in stressful situations – that's very important in work like this,” says Knut Erik, who adds that he likes his job.

“I love it here. Varied work in a good environment is satisfying. Sometimes my co-workers and I also get together in our free time for different activities, such as bowling and skating. The only thing I have to complain about is that we have to get Strømsgodset football team back in the Premier League. When that happens I'll have everything a man exiled to Drammen could ask for.”



# Society and the Railway Infrastructure

The public railway network is a crucial part of the national transportation and communications infrastructure. The public railway is important to society as a whole. Its management and development must be seen in the context of other national infrastructures.

Further development of the railway must be prioritised in areas where it is deemed important for society as a whole; conversely, the railway should not be extended into areas where other means of transportation are more effective. Together with other infrastructures, the new railway infrastructure influences where and how our society develops.

Political decision-makers need an objective and well-founded basis in order to make their decisions. With this in mind, the socio-economic value must be calculated for all measures being considered for the railway network. Comparison of the socio-economic value with costs is essential to enable decision-makers to compare and consider the various national sectors.

In order to ensure optimal utilitarian value from funds spent on the railway, Jernbaneverket acts according to the following order of priorities:

- Management of existing facilities
- Maintenance/renewal of existing facilities
- Completion of ongoing investment projects
- Investments to improve operations of existing facilities
- Initiation of new investment projects

Jernbaneverket strives to complete individual projects at an optimal rate. Any irregularity, especially projects interruptions, increases costs considerably. It is therefore crucial to maintain the optimal rate and to complete ongoing projects before starting new ones.





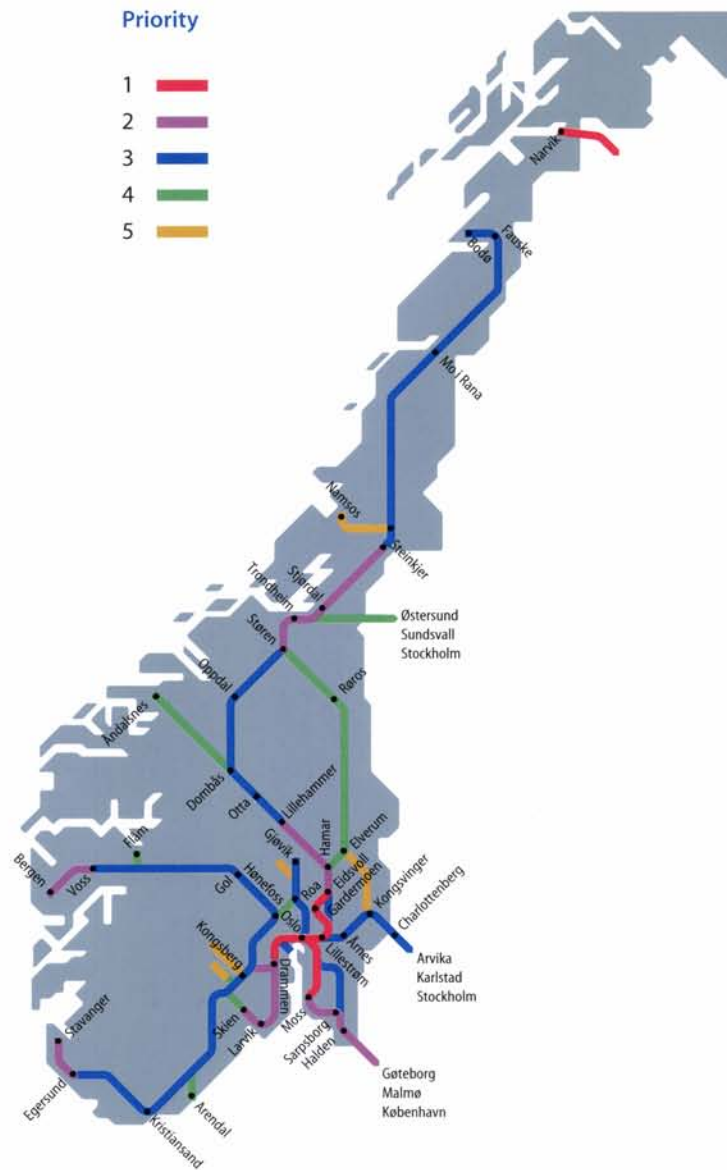
# Norway's Railway Network

The Norwegian railway is a first generation railway network. Most of the lines were established 100-150 years ago. There are few sections where modern rolling stock can operate at its speed potential.

In many places, the railway network has too little capacity to offer the optimal railway services according to market demand. Except for the bottleneck in the Oslo area, however, there is still available capacity that can be utilised for new or transferred traffic.

The railway network is classified into five priority groups, which are based on:

- present use of the railway network
- expected traffic developments
- national importance





Bergensbanen



Rørosbanen



Nordlandsbanen



Gardermobanen



Østfoldbanen



Sørlandsbanen

### Key figures for the railway network

|  | No. of km track | Km track > 100 km/h | Km track > 150 km/h | Km double track | Passing tracks > 600m | No. of tunnels | No. of bridges |
|--|-----------------|---------------------|---------------------|-----------------|-----------------------|----------------|----------------|
| ■ Nordlandsbanen   | 729             | 203                 | 0                   | 0               | 24                    | 156            | 361            |
| ■ Sørlandsbanen (Drammen-Stavanger)                                      | 545             | 131                 | 13                  | 0               | 17                    | 190            | 495            |
| ■ Dovrebanen (Eidsvoll-Trondheim)  | 485             | 186                 | 0                   | 0               | 36                    | 42             | 384            |
| ■ Rørosbanen (Hamar-Støren)  | 383             | 113                 | 0                   | 0               | 7                     | 6              | 291            |
| ■ Bergensbanen (Hønefoss-Bergen)   | 372             | 108                 | 21                  | 0               | 18                    | 155            | 192            |
| ■ Østfoldbanen left track  | 170             | 91                  | 22                  | 57              | 9                     | 16             | 190            |
| ■ Vestfoldbanen  | 149             | 40                  | 4                   | 0               | 0                     | 16             | 117            |
| ■ Gjøvikbanen  | 124             | 0                   | 0                   | 3               | 2                     | 7              | 102            |
| ■ Kongsvingerbanen   | 115             | 74                  | 0                   | 0               | 7                     | 0              | 49             |
| ■ Raumabanen   | 114             | 56                  | 0                   | 0               | 1                     | 6              | 100            |
| ■ Solørbanen   | 94              | 0                   | 0                   | 0               | 0                     | 0              | 31             |
| ■ Østfoldbanen eastern track   | 80              | 0                   | 0                   | 0               | 1                     | 2              | 42             |
| ■ Bratsbergbanen (excl./Nordag.-Hjuksebø)                                | 74              | 4                   | 0                   | 0               | 0                     | 29             | 69             |
| ■ Meråkerbanen (Hell-Storlien)   | 71              | 0                   | 0                   | 0               | 0                     | 1              | 64             |
| ■ Hovedbanen (Oslo Central-Eidsvoll)                                     | 68              | 44                  | 0                   | 21              | 6                     | 2              | 62             |
| ■ Randsfjordbanen (Hokksund-Hønefoss)                                    | 54              | 19                  | 0                   | 0               | 0                     | 0              | 27             |
| ■ Randsfjordbanen (northern section)                                     | 16              | 0                   | 0                   | 0               | 0                     | 0              | 5              |
| ■ Namsoslinjen   | 51              | 0                   | 0                   | 0               | 0                     | 5              | 22             |
| ■ Valdresbanen (Eina-Leira)  | 104             | 0                   | 0                   | 0               | 0                     | 2              | 14             |
| ■ Numedalsbanen (Kongsberg-Rødberg)                                      | 92              | 0                   | 0                   | 0               | 0                     | 18             | 22             |
| ■ Drammenbanen (Oslo Central-Drammen)                                    | 42              | 30                  | 0                   | 42              | -                     | 11             | 58             |
| ■ Ofotbanen  | 42              | 0                   | 0                   | 0               | 1                     | 20             | 6              |
| ■ Arendalsbanen  | 37              | 0                   | 0                   | 0               | 0                     | 3              | 16             |
| ■ Roa - Hønefosslinjen   | 32              | 0                   | 0                   | 0               | 0                     | 3              | 25             |
| ■ Flåmsbanen   | 20              | 0                   | 0                   | 0               | 0                     | 21             | 2              |
| ■ Gardermobanen (Gardemoen-Eidsvoll)                                     | 17              | 17                  | 16                  | 13              | -                     | 2              | 12             |
| ■ Spikkestadlinjen   | 14              | 4                   | 0                   | 0               | 0                     | 0              | 12             |
| ■ Breviksbanen   | 10              | 0                   | 0                   | 0               | 0                     | 1              | 0              |
| ■ Hortenlinjen   | 7               | 0                   | 0                   | 0               | 0                     | 0              | 0              |
| ■ Alnabru - Loenga   | 7               | 0                   | 0                   | 0               | 0                     | 0              | 3              |
| ■ Stavne - Leangen   | 6               | 0                   | 0                   | 0               | 0                     | 1              | 2              |
| ■ Alnabru - Grefsen  | 5               | 0                   | 0                   | 0               | 0                     | 0              | 5              |
| ■ Gardermobanen (Etterstad-Gardemoen)<br>(owned by NSB Gardermobanen AS) | 49              | 47                  | 47                  | 49              | -                     | 1              | 2              |
| <b>Total public railway network</b>                                      | <b>4178</b>     | <b>1167</b>         | <b>123</b>          | <b>184</b>      | <b>129</b>            | <b>716</b>     | <b>2782</b>    |

■ Electric railway network

■ Non-electric railway network

# How the Railway Functions

The operation of trains involves a complex interplay between rolling stock and the railway network. The key elements of the railway network are:

- substructure
- overbygning
- power supply facilities
- signal facilities
- telecommunication facilities

Construction costs are generally distributed as follows:

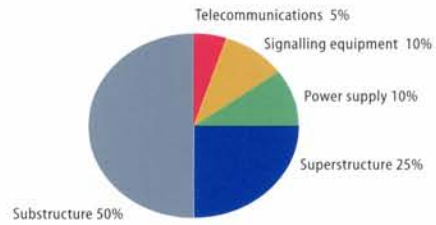
- substructure 50%
- superstructure 25%
- power supply 10%
- signalling equipment 10%
- telecommunications 5%

The substructure is the foundation upon which the track rests, consisting of embankments and cuttings, bridges or tunnels. On many old sections, the embankments are too narrow to satisfy modern requirements.

The superstructure consists of ballast/ crushed rock, sleepers, tracks and track switches. The ballast is cleaned regularly, track placement is adjusted continually, and track grinding is carried out regularly. In Norway, the standard gauge is 1 435 mm.

Stations are considered part of the railway network. In general, single-track sections have passing tracks at stations.

Electrical power is transmitted from the electrical companies' high voltage lines to the railway's own power supply stations and then distributed to contact lines. The amount of train traffic on any particular railway section determines the size and number of power stations needed.



Division of construction costs

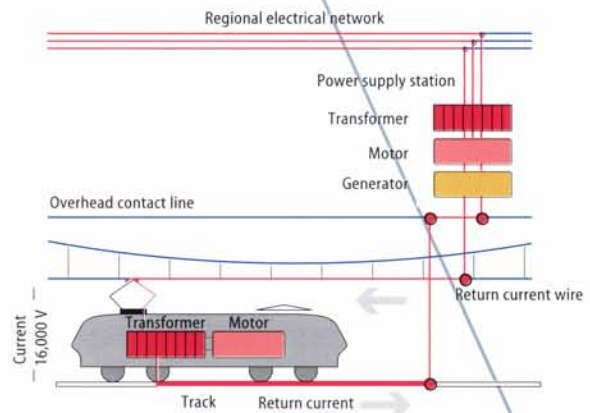
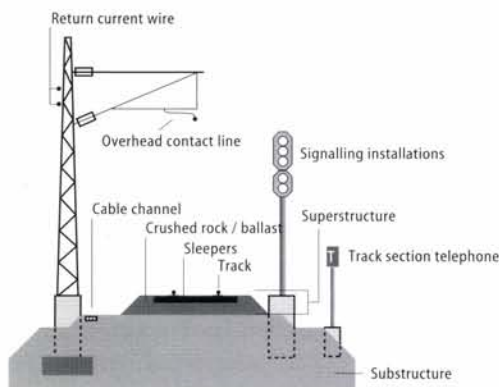
Electrical power is converted into 16 000 Volt alternating current of 16 2/3 Hz at the power supply stations. Contact lines must keep a constant height and run zigzag above the tracks so that locomotive pantographs are evenly worn. The reverse current is led back to the power supply stations through the railway track or through separate lines.

Signal facilities ensure safe train traffic and the optimal use of railway line capacity, so that trains reach their destinations as quickly and punctually as possible. Traffic controllers use remote control to monitor and regulate train traffic. Signal facilities monitor the direction and track on which a train is moving. Most railway sections in Norway are equipped with automatic train control, which means a train is automatically braked if it passes a key signal showing "stop". Some sections are automated; in other words, a train brakes automatically if it reaches too high a speed.

The railway's telecommunications include facilities which handle:

- communications for traffic control
- public information systems for passengers
- internal telecommunication for voice and data transmission

Jernbaneverket has a nationwide fibre-optic transmission network.



“

A few years ago, Susanne Lerberg had no idea that there even was such a job as signal installer. Now she is an apprentice in the trade and she enjoys her job in the signal department at Hokksund.

“After I finished school, I had no idea what I wanted to do with my life. I started college, but mostly because everyone else did. I thought it was boring,” laughs Susanne. After two years I had had enough and I applied for a basic course in electricity at the Tinius Olsen Vocational School in Kongsberg. I passed the basic course, but then I took two years off.”

“Did you stay at home and loaf around?”  
“No, one year I worked



as an au-pair in the US, and the other year at a factory in Hokksund. In 1997, I went back to my studies, and it was during that year I found out about the job of signal installer,” says Susanne and adds that the tip came from her teacher. “He also helped me to get a short internship at Jernbaneverket. During that work week, I got a good idea of what the job of signal installer entailed and got a positive impression of Jernbaneverket as a workplace.”

The work of a signal installer is both varied and stimulating, and according to Susanne, it is ideal for anyone who likes to work outside. “We install and connect different signalling systems, and it is our responsibility to make sure they work properly. The job is important and full of responsibility – it is our job to make sure that the trains are able to transport people and freight safely and securely.”

“And the job is suitable for both men and women?”

“Absolutely. Sometimes we have heavy loads, but no worse than a girl can keep up with,” says Susanne, who feels that more girls should be schooled in electricity. “There aren’t very many female signal installers at Jernbaneverket either, for that matter.”

Susanne hopes to pass her qualifying examination and has to admit that she is dreading it. “I hate tests, but I’ll get through it. The exam is the final step. If everything works out, I plan to continue in Jernbaneverket. In the long run, I am interested in furthering my education. As a qualified signal installer, I have all kinds of options.”

# Objectives and Results



## Safety

### Jernbaneverket's safety policy

The established level of safety for railway transportation in Norway shall be maintained. Any changes made shall be done so as to ensure improved safety.

Railway transportation shall not lead to accidents that may cause loss of life or serious injury, nor damage to the environment or equipment.

### Derailments and collisions

In 1999, there were 14 derailments, compared with twelve in 1998. Two derailments were due to faulty tracks, six were due to technical faults in rolling stock, one was caused by a combination of faulty track and the condition of the stock, one was due to a combination of faulty track and load distribution, one was caused by snow and ice obstructing the track, and three were due to other established causes.

#### Derailments caused by faulty infrastructure are discussed below:

- On 6 May, freight train no. 45152 derailed with one freight car near Ljan station on Østfoldbanen. The causes of the derailment were distorted track and the freight car's construction.

- On 15 August, freight train no. 9748 derailed with nine freight cars between Gudå and Kopperå stations on Meråkerbanen. The derailment was caused by a high degree of internal tension in the track and probable track buckling.
- On 17 August, freight train no. 45553 derailed with one freight car near Moss station on Østfoldbanen. The derailment was caused by warped track and imbalanced load distribution on the freight car.
- On 19 November, freight train no. 4959 derailed with two freight cars at Loenga station on Østfoldbanen. The cause of the derailment was increased gauge between the tracks.

There were ten collisions in 1999. This is eight more than in 1998. On 27 January, an empty train collided with a passenger train at Skøyen station on Drammenbanen. The driver of the empty train was lightly injured.

In two collisions between service trains, a total of nine service personnel were lightly injured. There were two collisions between trains and road vehicles (not at level crossings), one collision between a moving train and stationary rolling stock, and four collisions between trains and other objects on the track (stones, soil etc.).

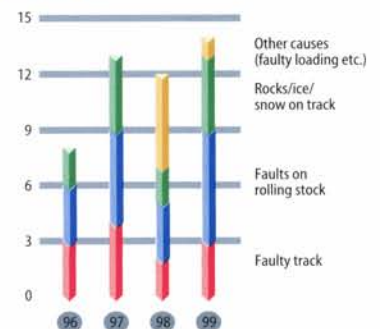
### Level crossings

In 1999 there were 17 collisions between trains and vehicles at level crossings, five more than in 1998.

Regrettably, there were fatalities in two of these accidents. On 28 May, there was an accident 1 km south of Stokke station on Vestfoldbanen in which one person died. On 8 September, there was another accident between Elverum and Rudstad stations on Rørosbanen in which one person was killed.



### Derailments







### Punctuality

Punctuality statistics are given as the percentage of trains that reach their destination on time. For Intercity trains, the Airport Express and local trains, a three minute margin is allowed, while for other trains there is a five minute margin. Punctuality was an area of priority in 1999. Punctuality improved for most types of trains and on most railway lines, compared with 1998, thus continuing a positive trend.

For Jernbaneverket, the main causes of punctuality disturbances are faults in the infrastructure.

#### Faults that cause punctuality disturbances

Jernbaneverket registers the number of instances when faulty contact lines or signal faults cause punctuality disturbances. In 1999, the number of such faults increased and exceeded the target by 7.5%.

#### Speed reductions

Speed reductions are sometimes made necessary by the quality of the railway network or by planned work which is in progress. Planned speed reductions are incorporated into train scheduling, and hence do not influence train punctuality. Delays do, however, occur as a result of unplanned speed reductions. These may be caused by track buckling, track breakage, poor track quality, avalanches or slides, etc. There was no increase in the number of unplanned speed reductions (approx. 200) from 1998 to 1999.

Compared with 1998, the number of occurrences of track breakage has been reduced, while the number of instances of track buckling and slides/avalanches increased.

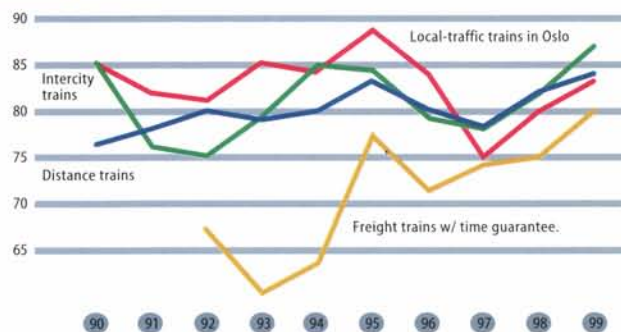
#### The accidents occurred as follows:

- three at level crossings secured with a barrier
- four at level crossings secured with half-barrier
- one at a level crossing secured by a road signal
- one at a level crossing secured by a warning light
- eight at level crossings secured by unmanned gates

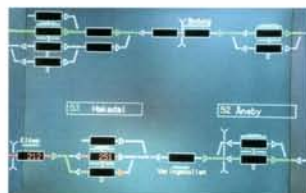
One pedestrian was killed and another seriously injured after being struck by a train.

In 1999, 218 level crossings were eliminated. Jernbaneverket continues its work to reduce the number of level crossings in 2000.

#### Punctuality of train traffic



% of trains reaching destination within 0-3 min. of schedule (lokal-traffic) or 0-5min. (other trains).



## Productivity

Jernbaneverket is, in consultation with the Ministry of Transport and Communications, working to define suitable monitoring parameters and efficiency targets that can be used to improve productivity.

Jernbaneverket owns a great deal of machinery, primarily rail-bound equipment used for work on the railway network. Cost-effective operation and maintenance of this machinery is a priority, as well as the training of Jernbaneverket's personnel to carry out simple maintenance. Open competition for maintenance jobs is another key measure to achieve Jernbaneverket's productivity targets.

## Capacity

The capacity of the railway in eastern Norway increased significantly in 1999, after the Romeriksporten tunnel and the new National Theatre station were opened. The railway network's potential train frequency is closely related to the number of passing tracks, lengths of double tracks, and power supply. When the Romeriksporten tunnel was opened, capacity increased by more than 100%, and when the two new tracks at the National Theatre station were put to use, capacity in the Oslo tunnel increased from 16 to 28 trains per hour. As a result of the tilting train programme, capacity and punctuality will be further improved as passing tracks are extended and their number increased.

## Loading limit gauges

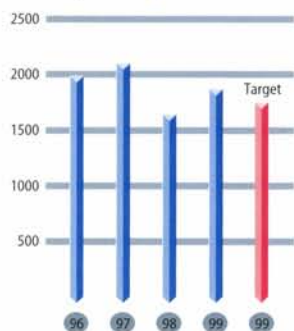
The loading limit gauge refers to the maximum allowable height and width of fully loaded rolling stock. Jernbaneverket is working to remove some of the profile limitations in order to meet the needs of freight shippers. Jernbaneverket is now introducing the distinct international loading limit gauge, UIC P407, which entails full compatibility with the largest allowable sizes for container transport on Norwegian roads. At the end of 1999, the following railway lines have been upgraded to UIC P407:

- Sørlandsbanen
- Dovrebanen
- Kongsvingerbanen
- Østfoldbanen
- Ofotbanen (P403)

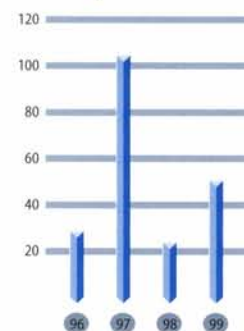
In addition, the plan is to open Raumbanen for UIC P407 in autumn 2000, Nordlandsbanen in 2002, and Bergensbanen by autumn 2003. UIC P407 entails that semitrailers may be loaded directly onto freight cars (piggy-back), a development that should make the railway a much more competitive alternative to freight carriers.

The increase in loading limit gauges also means improved conditions for future double-decker passenger trains, which will increase the railway's capacity without requiring an increase in train frequency.

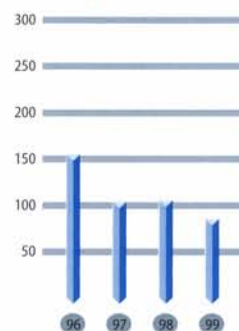
Punctuality disturbing faults



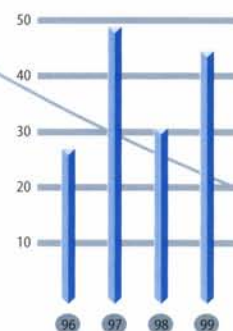
Track buckling



Track breakage



Avalanches







### Statistics for Transportation on the Public Railway Network

In the 1990s, there has been an increase in railway transportation for both passenger traffic and freight traffic. Some of the increase has been in the form of increased train frequency, and some in the form of a greater demand for the capacity available on the individual train.

1999 saw a considerable increase in train frequency in eastern Norway. In August 1999, NSB Gardermobanen AS started operating the Airport Express at 10 minute frequencies, an increase from four to six trains per hour – in each direction. In addition, a new route of commuter trains has been introduced between Oslo and Eidsvoll, with 30 trains per day. Also in 1999 the first tilting trains started trafficking between Oslo and Kristiansand.

The introduction of new schedules in eastern Norway has contributed to an increase in passenger traffic. There was a decrease in freight transport in 1999. This was a result of fewer trains transporting metal ore on Ofotbanen, which in turn was due to the decline in the steel market in 1999. The company that transports metal ore on Ofotbanen is Malmtrafikk AS.

#### Transportation on the Public Railway Network

| Year | Passenger traffic             | Freight traffic           |
|------|-------------------------------|---------------------------|
|      | Sum, passenger-km in millions | Sum, tonne-km in millions |
| 1992 | 2 256                         | 2 161                     |
| 1993 | 2 316                         | 2 872                     |
| 1994 | 2 398                         | 2 678                     |
| 1995 | 2 381                         | 2 715                     |
| 1996 | 2 449                         | 2 834                     |
| 1997 | 2 561                         | 3 005                     |
| 1998 | 2 595                         | 3 010                     |
| 1999 | 2 880                         | 2 910                     |

NSB BA Freight, however, experienced a modest increase in the amount of freight carried, as measured in tonne-kilometres, from 1998 to 1999. This reflects the company's positive development with combined transport of freight and passengers, which in 1999 saw increased traffic on all major railway lines, i.e. Oslo-Bergen, Oslo-Stavanger, Oslo-Trondheim, and on Nordlansbanen. Another area of priority for NSB BA Freight is combined transport between countries; the company operates freight shuttle trains to Trelleborg and Gothenburg in Sweden, which also carry containers and semitrailers. These shuttle routes were established in the summer of 1999 to transport containers between these destinations and Alnabru.

NSB BA Freight's transport on customer-dedicated trains showed a stable development in 1999, while freight which was handled conventionally at freight terminals showed a slight decline compared with 1998.

In 2000, NSB BA Freight will continue to prioritise combining its freight transport with the continuous commuter trains that run between the major cities and towns. A positive market development is expected in this sector, partly as a result of loading limit gauges being increased on the main part of the railway network (excl. Bergensbanen) in 1999. This opens up new possibilities for improving logistics between railway and road transportation.

The increase in railway transportation will require Jernbaneverket to increase the efficiency of railway traffic, and to further improve its management of operations. Increased traffic and transportation will require an increase in maintenance efforts, while access time to carry out such maintenance will be reduced. This new situation will challenge Jernbaneverket to improve the efficiency of its maintenance.

The general increase shown in transportation statistics during the 1990s will require major investments to increase

capacity further in the near future, especially in the Oslo area. An effective development of existing infrastructure will also require numerous minor infrastructure measures, such as building and lengthening passing tracks.

### The Railway and the Environment

#### Environmentally friendly transportation

The transportation sector is a considerable source of pollution and environmental problems. From a socio-economic perspective, the railway has environmental advantages that makes it a good alternative. The challenge is to utilise the capacity of the existing infrastructure and to further develop the railway where it is deemed advantageous. The railway has a considerably larger unexploited potential than the existing road network. While a single-lane highway has a maximum potential of approx. 2000 passengers per hour in each direction when used for cars, a double track railway can offer transportation for more than 20 000 passengers per hour in each direction.

In 1999, the Institute of Transport Economics (TØI) completed a study for Jernbaneverket about the environmental cost of different transport modes. Environmental costs must be carried by society at large, rather than by the individual users. While the short-term goal of the study was to quantify air pollution for different types of transport relative to selected destinations, the long-term goal was to build up an environmental database for the transport sector.



### Jernbaneverket's environmental policy

Environmental friendliness is one of the competitive advantages and success criteria for Jernbaneverket. In 1999, Jernbaneverket released its environmental management system. It is based on the principles of ISO 14001, which provide guidelines for strongly prioritising environmental work in the years ahead.

### A Green State Administration

Jernbaneverket is one of ten agencies that participate in the Government project called "Green State". Its objective is to integrate environmental considerations into public projects and works. This project was initiated in the summer of 1998 and continued throughout 1999. In spring 1999, Jernbaneverket formulated a plan of action for "A Green State" administration.

### Environmental impact and measures taken

Jernbaneverket continually strives to improve its environmental efforts. The status of environmental goals and measures, including Jernbaneverket's environmental impact and use of resources, has been studied carefully in the course of formulating the annual Environmental Report. An environmental audit was carried out on the basis of 1999 reports from Jernbaneverket's main units; the focus has been on how these units gather environmental data, assure their quality, and report them to Jernbaneverket's Head Office. Jernbaneverket's 1999 Environmental Report contains a chapter titled Environmental Accounting which describes this in greater detail.

### The Ministry of Transport's system for reporting results

The three infrastructure managers, Jernbaneverket, the Directorate of Public Roads (Statens Vegvesen) and the Civil Aviation Administration (Luftfartsverket), have participated in a work group to prepare a national system for management in accordance with the Ministry of Transport and Communication's Environmental Action Plan. This work continued throughout 1999 and is expected to be completed in 2000. The system will require annual reports from the infrastructure managers based on parameters for impact on cultural landscapes and wilderness areas, impact on cultural monuments and outdoor recreation, as well as pollution, which can affect health and environment. (See Parliamentary report no. 8, 1999–2000.)

### Serviceable tunnels and the environment

Due to the increasing need for tunnels through densely populated areas, and the experiences with building the Romeriksporten Tunnel, the Norwegian Research Council has initiated a number of research projects on tunnels. The goal is to provide a better basis for project decisions, particularly in order to reduce the risk of environmental damage, and to improve communication with affected parties and the public at large.

In 1999 a preliminary project was carried out to establish areas of priority, as well as the strategy and budget for a three to four year project which will be commenced in the first quarter of 2000. Jernbaneverket is participating in the preliminary project which is headed by the Directorate of Public Roads (Statens Vegvesen).

### Historic monuments and areas of cultural interest

Jernbaneverket is establishing a National Plan for the Preservation of Railway Monuments, in cooperation with the Directorate of Historical Monuments (Riksantikvaren). All Norwegian railway lines and sections, including museum railway lines and lines

that have been closed, are being evaluated during this work. In cooperation with NSB Property (Eiendom), this preservation plan will be coordinated with a pre-existing plan for the preservation of railway buildings. The goal is to preserve environments that are as complete as possible and which are typical of various periods of railway history.

### The visual environment

The railway is very visible in the Norwegian landscape and occupies large areas. The pioneers who built the first railways emphasised good design of buildings, and architectural and landscape settings. Today we still want new facilities, and the upgrading of old ones, to reflect both aesthetic and functional considerations.

In January 1999, the designs and guidelines for fixed information signs were distributed to the units of Jernbaneverket. Guidelines for electronic information boards and screens were completed during 1999. Prototypes of service elements such as benches, bicycle racks, bins for various types of rubbish, platform lighting, information boards showing the wagon order of the train, and displays for train schedules were installed at Bø station in autumn 1999.

### Disposal of waste

One of the goals of Jernbaneverket's environmental action plan is to reduce the amount of waste produced and to treat this waste matter as a resource. In 1999, Jernbaneverket resolved that waste at passenger terminals and stations is to be sorted. This measure is being coordinated with the start-up of waste-sorting in the various municipalities, and with the traffic companies that use the public railway network.



## Noise

For people living along the railway, noise is the greatest disadvantage. A comprehensive study of the noise level in homes and buildings along the railway was started in the autumn of 1998 and was completed in 1999. This study is part of the efforts of environmental authorities to define national targets with regards to noise. The results of this study will form a basis for evaluating further noise-reduction measures to be carried out before 2005, as part of the new National Transport Plan for 2002-2011.

Noise-reduction measures in Gamlebyen, Oslo were completed in 1999. These measures were carried out along a 1.2 km section to ensure that average indoor noise levels do not exceed 35 dB(A), and that outdoor levels do not exceed 60 dB(A) during a 24-hour period. The cost of the measures was approx. NOK 123 million.

Jernbaneverket has completed a supplementary assessment of possible tunnels through Gamlebyen. This report will be submitted to the Ministry of Transport and Communications.

In 1999 the National Institute of Public Health (Folkehelse) has, in cooperation with Jernbaneverket, the Civil Aviation Administration and the Directorate of Public Roads, formulated a proposal for a project that aims to:

- Chart the relationship between various evaluations of sleep quality and exposure to noise from airplanes, trains and road traffic

- Investigate the effect of noise-reduction measures on subjective sleep quality and physiological parameters on sleep
- Investigate the relationship between subjective and objective evaluations of sleep quality and how these are influenced by individual sensitivity to noise

The project, which will last four years starting in 2000, is being financed by the Norwegian Research Council, Jernbaneverket, the Civil Aviation Administration and the Directorate of Public Roads

## Energy consumption

Efforts to develop environmentally friendly transportation systems focus in large part on reducing energy consumption, especially in regards to energy derived from non-renewable sources. A considerable part of Jernbaneverket's energy consumption goes to heaters at track switches. Guidelines require that all installations done by Jernbaneverket after 1 January 1999 include temperature regulators, resulting in potential energy savings in excess of 50%.

## Polluted soil

In a number of places in Norway, the use of wood impregnation has resulted in creosote pollution of soil and groundwater. At the former creosote impregnation plant at Nygården in Hommelvik, a test site has been established to evaluate the effectiveness of various methods of cleaning creosote contaminated soil. This project, which was started in 1996 and will be completed in 2000, is being financed

by Jernbaneverket and the Norwegian Research Council. SINTEF and Jordforsk are participating in the project, which is being coordinated by NGI (The Norwegian Geotechnical Institute).

The clean-up of creosote contaminated ground has high priority. Since the measures required are very expensive, it will take some years before the clean-up is completed.

Regulations for the use of pesticides along the railway are becoming more and more restrictive. Jernbaneverket's goal is to use as little pesticide as possible while still ensuring a safe and passable track.

## Training

Jernbaneverket has established a number of fora with the aim of strengthening the exchange of information and improving the skills and expertise of its personnel. The focus of these groups, which each held three or four meetings in 1999, includes noise, weed control, landscape maintenance, and the environment. In addition, each unit in Jernbaneverket is carrying out training efforts to improve environmental awareness and knowledge.

## Environmental Report for 1999

A more detailed description of Jernbaneverket's environmental policies, and the status of environmental measures, is provided in the Environmental Report for 1999.



### *International Work and Obligations*

Jernbaneverket participates in several international fora. In 1999, the Community of European Railways (CER) and European Infrastructure Managers (EIM) have continued to focus on contributing toward, and lobbying for, good alternative wordings of the three EU directives dealing with infrastructures, which the European Commission plans to revise or replace. Enactment of these directives will result in a further liberalisation of the market for transportation services and products, and lead to increased competition on European railways.

Jernbaneverket has worked to establish a Norwegian network for freight transport which will be valid under the EU's Trans-European Rail Freight Network (TERFN). In 1999, Jernbaneverket began to evaluate the European Commission's proposal for a directive on interoperability on conventional railways, as well as the proposed directive on safety.

This work will be given high priority in 2000. In the first six months of 1999, CER and EIM have evaluated how infrastructure managers, traffic companies and integrated railway companies can best cooperate to further the railway as a means of transportation. This evaluation has resulted in specific suggestions for improving CER's organisational structure, which are expected to be enacted in 2000.

The three expert groups established for Traffic, Technology and Strategy by the Nordic Infrastructure Managers (NIM) have concentrated on projects that have a Nordic angle and objective, but the political and technical frameworks for the transportation sector take into account the European dimension. The objective of NIM is to enhance Nordic cooperation on international issues, to ensure that the technical framework furthers the use of the railway as a means of transportation between countries, and to contribute toward ongoing standardisation processes. NIM also functions as a network for exchanging experience and furthering the development of expertise. In 2000 NIM's Directors General will evaluate the current model for cooperation and make recommendations as to how the work can best be furthered in the future.

In 1999 as well, most of Jernbaneverket's work within the UIC has been connected to its Infrastructure Commission. This commission carries out infrastructure projects in cooperation with its members or by hiring expertise from ERRI, other European research institutions or consultancy firms.

Jernbaneverket also participates in the work of the European standards organisations CEN and CENELEC.

In 1999, Jernbaneverket has, in cooperation with the Ministry of Transport and Communications, completed the work on revising the international convention which regulates laws and regulations on passenger and freight transportation (COTIF). These rules were adopted in 1999 but are not expected to become effective until 2003.

A decision was made to establish an international section at Jernbaneverket's Head Office. This staff unit, which reports to the Railway Director, was established on 1 January, 2000.

## Working Environment

### Overtime

In 1999, paid overtime amounted to 9.3% of regular salary. This is a modest increase from 1998.

### Illness

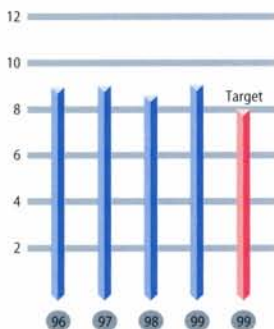
The level of absence due to illness rose from 5.0% in 1997 to 6.1% in 1998. This increase was entirely due to increased long-time illness. In 1999, a number of specific measures were taken to reduce long-time illness, including a closer follow-up of those reporting ill. The first six months of 1999 still saw an increase, but this tendency was turned in the last six months of the year, when there were clear signs of reduced levels of absence due to illness. The statistic for 1999 as a whole was 6.2%, which represents a stabilisation compared with 1998. A comparison of these figures with those of society at large, which experienced a dramatic rise in the level of absence due to illness, shows that the measures Jernbaneverket initiated had a positive effect. Efforts to reduce the level of absence due to illness will continue in 2000.

### Injuries

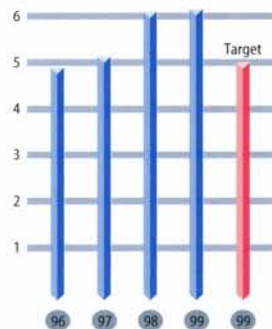
There was one fatal accident amongst Jernbaneverket's employees in 1999. The accident occurred during work on noise-reduction measures along Gardermobanen. In 1999 there were 62 injury-related absences. This gives an H-value (injuries resulting in absence, per million work hours) of 9.0, which is a considerable reduction compared with 1998.



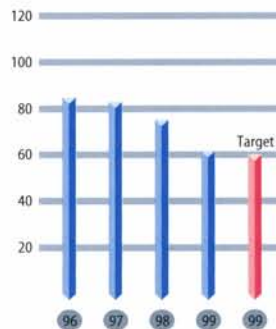
Overtime



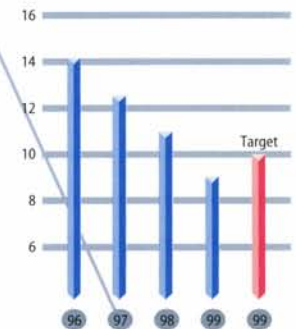
Absence due to illness



Injuries resulting in absence



H-value





“

Group leader Yngvar Fossheim is responsible for troubleshooting and maintenance on the track between Fåberg and Otta. This native of Gudbrandsdal valley heads a staff of 20, spread out at Ringebru, Vinstra and Fåberg. Yngvar works out of an office in his home town of Tretten, where his grandfather was foreman for the rail section many years ago.

“Are you satisfied with things in your area?”

“I think we’ve accomplished a lot. During the last few years, we have replaced all the old tracks in Gudbrandsdal, and this summer we will continue the work of laying a cable duct. The work we do is important. If the tracks are not in order, both safety and regularity are affected.”



Yngvar has worked on the railway for nearly 30 years, and a lot has changed since he started as an apprentice at Grefsen in 1971. “We had to do a lot more hard physical labour earlier. I still remember those years when we hammered railway spikes into wooden sleepers. We used shovels to pack the rails by hand, and God help the bloke who couldn’t keep up,” smiles Yngvar.

“You followed in your grandfather’s footsteps and eventually became foreman yourself, didn’t you?”

“That’s right, and I know the stretch between Tangen and Eidsvoll better than most. There were long days when we covered many miles by handcar. Those days are over. For a long time, now, machines have been doing the toughest jobs, but it’s people that make the workplace what it is. The crew seems to enjoy working here, and that’s good, because when you are in a good mood, you work more efficiently – and it’s important to maintain a light tone in the morning.”

“Can you really say that when you sing second bass in a mixed choir?”

“Well, singing does put me in a good mood. Singing in a choir is fun. We are often singing in different places, and soon we will take part in the national choral competition in Namsos, the high point of the year. Last year it was in Fredrikstad. That was good fun,” says Yngvar, laughing.

He also enjoys hunting and fishing, and neither grouse nor trout can feel quite safe when Yngvar takes to the hills with his dog. And he likes to cook what he catches. Fossheim the hunter tells us that he’s taken courses and knows about smoking and marinating, and that he can pluck a ptarmigan, but once the dirty work is finished, his wife takes over and turns his catches into festive dishes.

## Projects and Activities

### Operations and Maintenance

Operations and maintenance of the permanent way is important to ensure stable train traffic. As infrastructure manager, Jernbaneverket's key tasks include traffic control, visual track inspection, preparedness, trouble-shooting, snow clearance, monitoring and auditing.

In 1999, Jernbaneverket's total operating costs were NOK 1.5 billion. Most of these expenses are associated with staff costs or the purchase of goods and services.

Jernbaneverket used NOK 650 million on maintenance of the permanent way, so as to ensure safe and reliable train operations on the railway network. Measures taken to deal with wear and tear caused by traffic and climate included changing tracks and sleepers, cleaning ballast, maintaining bridges, preventive measures against avalanches and slides, contact line facilities, and new safeguards. In the short term, maintenance is based on conditions reported during controls, and in the long run, it is evaluated on the basis of expected life cycle of the equipment or infrastructure in question. A certain level of maintenance and renewal is required to ensure the safety and function of the railway.

Jernbaneverket's numerous maintenance projects vary greatly in extent and cost. On the whole, they are crucial for maintaining the current technical standard and enhancing safety. Some of the largest projects are described below.

| Project  | Cost estimate<br>1999 prices | Allocations<br>1999* | Accounts<br>1999* |
|--|------------------------------|----------------------|-------------------|
| <b>Project</b>   |                              |                      |                   |
| Østfoldbanen, Ski-Sandbukta  | 1 615.9                      | 19.1                 | 6.1               |
| Østfoldbanen, Sástad-Haug  | 531.7                        | 150.0                | 102.5             |
| Gardermobanen property purchases                                     | 183.3                        | 30.9                 | 16.0              |
| Connecting track between Hovedbanen and Gardermobanen                | 447.0                        | 25.9                 | 73.2              |
| New National Theatre station   | 915.6                        | 290.0                | 300.0             |
| Drammenbanen, Skøyen station   | 271.7                        | 18.6                 | 14.5              |
| Noise-reduction measures in Gamlebyen, Oslo                          | 122.7                        | 49.2                 | 26.8              |
| Vestfoldbanen, Skoger-Åshaugen                                       | 443.4                        | 94.0                 | 136.2             |
| Vestfoldbanen, Åshaugen-Sande-Holm                                   | 509.1                        | 98.0                 | 52.2              |
| Vestfoldbanen/Bratbergbanen, new servicing yard at Skien             | 117.0                        | 10.7                 | 2.6               |
| Bergensbanen, Gråskallen   | 278.6                        | 60.0                 | 43.4              |
| Bergensbanen, Tunga-Finse  | 188.0                        | 15.5                 | 0.9               |
| Tilting train measures on Sørlandsbanen, Bergensbanen and Dovrebanen | 1 694.7                      | 310.0                | 308.7             |
| <b>Sum, specified projects</b>                                       | <b>7 318.7</b>               | <b>1 171.9</b>       | <b>1 083.1</b>    |
| Detailed planning  |                              | 30.0                 | 64.2              |
| Investments in existing infrastructure                               |                              | 147.1                | 189.4             |
| Transferred **   |                              | 11.2                 |                   |
| Reduced allocations 1999**   |                              | -30.0                |                   |
| <b>Sum</b>   |                              | <b>1 330.2</b>       | <b>1 336.7</b>    |
| Cash adjustment  |                              |                      | 100.8             |
| <b>Sum Post 30</b>   |                              | <b>1 330.2</b>       | <b>1 437.5</b>    |

The table shows actual costs in 1999, while state accounts shows actual allocations for the year.

\* The figures listed under Allocations 1999 and Accounts 1999 are based on different accounting principles and are therefore comparable. Before 1999, Jernbaneverket's accounting system was not able to distribute cash amounts on the individual investment projects.

\*\* Transfers and reduced allocations for 1999 was distributed on the various investment projects in connection with the work on revising the National Budget during the spring of 1999.

### Changing the track in Gudbrandsdalen

Due to metal fatigue, the track between Fåberg and Otta in Gudbrandsdalen is being changed, whereas track grinding has been done between Otta and Dombås to delay the need for changing this section of track. Total cost estimates for the project are approx. NOK 175 million. The project is in its final stages and will require only minor expenditures in 2000.

### Upgrading Sandbukta-Moss

The Sandbukta-Moss section of Østfoldbanen is being upgraded. A 1345 metre long concrete support wall will be built to replace temporary concrete sleepers which keep the gravel and crushed stone in place. The entire superstructure, as well as the contact lines, are being replaced. The project includes safety measures in the form of a fully equipped ATC system. Work on the project started in 1999.

## Development of the Railway Network

### Major investment projects

The table shows total cost estimates, allocations for 1999, and figures from the accounts of the investment projects specified in Parliamentary proposition no. 1 (1989-99).

### Østfoldbanen. Såstad-Haug

This project, which consists of building a 7 km long passing track, is part of the ongoing modernisation of Østfoldbanen. Relatively few changes will be necessary to incorporate this passing track into a future double track. The construction project allows more crossing trains and will help improve punctuality on Østfoldbanen. The new section is to be opened in the summer of 2000.

### Property purchases required for Gardermobanen

The property purchases needed to build Gardermobanen are to be covered as part of Jernbaneverket's budget. This process is to be completed in 2000.

### Connecting track between Gardermobanen and Hovedbanen

The construction of Gardermobanen for the Airport Express train is also an advantage for ordinary train services in the area. The connecting track between Hovedbanen and Gardermobanen allows NSB BA to offer its customers renewed and more effective schedules. Total capacity will be increased and the facilities as a whole can be used in a more flexible manner. The project was completed in April 1998, but the final costs were covered in the 1999 budget.

### New station at the National Theatre

The facilities at the existing station are being expanded by four tracks running in a new tunnel, as well as new facilities for the public. It was necessary to upgrade the station in order to satisfy increased traffic in the Oslo area in coming years. The facilities were officially opened on 16 December 1999. Some supplementary work will be completed in 2000. The final financing of the project will be done in 2000.

### Drammenbanen. Skøyen station

Skøyen station was upgraded with a fourth track, south of the existing ones. These three tracks were rebuilt on new bridges across Drammensveien highway. 250 m long platforms were built for all four tracks. The work was completed on schedule in 1998. Supplementary work continued throughout 1999 and will be completed in 2000.

### Noise-reduction measures for Gamlebyen in Oslo

Noise-reduction measures are being taken, and ventilation systems are being installed in residences in Gamlebyen, Oslo, to satisfy demands made by the County Commissioner for Oslo and Akershus counties, in connection with the Land Use Plan for Gardermobanen. Measures will satisfy requirements to reduce average indoor noise levels to 35 dB(A) for a 24-hour period, and the outdoor noise level to 60 dBA. All planned work was completed by the deadline of 1 April 1999. For a few properties, measures have been postponed until 2000, at the request of owners who wished to coordinate this with their own plans for upgrading their properties.

### Vestfoldbanen. Åshaugen-Sande-Holm and Skoger-Åshaugen

The projects Åshaugen-Sande-Holm and Skoger-Årshaugen consisted of upgrading a 6.9 km and 5.8 km long high-speed double track sections. These two projects on Vestfoldbanen must be seen in conjunction with each other. In the short term, they will increase traffic capacity, reduce travel time and contribute to better punctuality on one of Norway's most heavily trafficked lines. A long-term goal is to establish a continuous high-speed double track between Drammen and Larvik. The two sections are to be completed in October 2000.





### Vestfoldbanen / Bratsbergbanen. New servicing yard at Skien

New infrastructure measures were taken due to NSB BA moving its primary service yard for Intercity trains (BM 70) to Skien. Measures included new track layout, platforms, changes in track area, new power supplies, signalling and safety installations, and new train washing facilities. The actual servicing facility was financed by NSB BA. The project was completed in June 1999. Some maintenance work has been carried out after the facilities were completed.

### Bergensbanen, Gråskallen

The 27 km long railway section between Haugastøl and Finse was the longest stretch on Bergensbanen without a passing track. Investments in a new passing track inside a tunnel at Gråskallen will improve punctuality and reduce travel time, as well as reduce winter operating and maintenance costs. The facilities were opened on schedule in October 1999. Supplementary work will continue in 2000.

### Bergensbanen, Tunga – Finse

The railway between Tunga and Finse is the highest altitude section of Bergensbanen, and the section which receives the most snow. The project involved straightening and elevating the track, and the new facilities were opened for traffic in 1998. Supplementary work has been carried out in 1999 and will be completed in 2000.

### Tilting train measures for Sørlandsbanen, Bergensbanen and Dovrebanen

Measures to increase capacity and allow greater speeds are necessary to prepare for tilting train operation on Sørlandsbanen, Dovrebanen and Bergensbanen. These measures, which have a high priority, include:

- upgrading track standard by adjusting or grinding tracks, and cleaning ballast
- eliminating level crossings or installing safeguards moving traffic signals
- moving traffic signals
- changing bridges that lack ballast
- constructing new passing tracks and extending existing ones
- strengthening the power supply and changing contact lines

Investments in tilting train measures are important for railway transportation to destinations in districts along the Trondheim-Oslo, Bergen-Oslo and Stavanger-Oslo railways. Measures will improve conditions for passenger and freight transport, reduce travel time and increase train frequency. Tilting train measures are to be completed in 2001. However, the first tilting trains were put into service on Sørlandsbanen (as far as Kristiansand) in the autumn of 2000. In early 2000, tilting trains will traffic Dovrebanen, and Sørlandsbanen all the way to Stavanger.

### Research and development

Jernbaneverket's research and development efforts are strongly linked to international collaboration within the framework of the UIC (International Union of Railways) and ERRI (European Rail Research Institute). A high priority has been to promote interoperability and safer, more effective railway transportation in Europe.

On the national level, Jernbaneverket works closely with numerous research institutions and organisations to improve transport quality, improve safety, reduce noise, and to reduce the costs of constructing and operating railways. Projects in progress include the introduction of GSM-R, production of quieter track switches, and railway construction on soft ground. An important environmental project has been to clean up the creosote contamination by Hommelvik through the use of biological methods. This project will continue in 2000 and be completed by the end of the year.

In cooperation with the Norwegian Directorate of Public Roads and the Institute for Transportation Economics (TØI), Jernbaneverket has developed new guidelines for cost-benefit analyses of public transport. TØI has carried out a number of assessments in conjunction with work on the National Transport Plan. Preparation of the National Transport Plan, which is a joint effort of Norway's four infrastructure managers, will strengthen cooperation on R&D as well; concrete planning of a R&D programme started toward the end of 1999.



# Developing the Organisation and Workforce

## Personnel

Jernbaneverket had 3,650 employees at the end of 1998. The staff was reduced by 45 employees during the year.

Reductions were greatest amongst track personnel. This development will continue in the next few years; track staffing will be reduced by natural departures and retirement, and staff reduction measures. Track personnel will be given the opportunity to gain additional expertise in the fields of traffic control, freight and electrical work, in order to qualify for other jobs and tasks within Jernbaneverket.

In Railway Production these reorganisation measures will be intensified in the next few years. Staff reductions will facilitate open competition as an effective measure for a growing part of Jernbaneverket's production.

## The establishment of Railway Production

In 1997, Jernbaneverket separated production from regional management, a reorganisation which was fully implemented during 1998. In 1999, the next phase of reorganisation commenced, where the four regional production units were separated from the rest of the regional organisation and gathered in a new unit, Railway Production. The organisational model of Railway Production will be fine-tuned in cooperation with employee representatives during the first six months of 2000.

As a consequence of this reorganisation, the four regional units will concentrate on infrastructure management and traffic control of the Norwegian public railway network.

## Operating parameters for Railway Contractor and Telecommunication Services

In 1999, Jernbaneverket recommended to the Ministry of Transport and Communications that Railway Contractor and Telecommunication Services be vested as separate companies, wholly owned by Jernbaneverket. These recommendations are being considered by the Ministry.



## Information technology

Information technology is an essential strategic aid for Jernbaneverket. An extensive standardisation of Jernbaneverket's IT infrastructure was carried out in 1999. The most important measures in 1999 were:

- The transition to the year 2000 was successfully carried out without any malfunctions. Almost 500 micro-processor-based systems were tested, upgraded or phased out in order to prepare for Y2K. No safety or security related errors were found.
- The platform for the administrative IT infrastructure was upgraded, and is now based on Microsoft's NT operating system. This will enable Jernbaneverket to utilise improved, modern hardware and software. System management has been outsourced to Getronics AS.
- A preliminary project for renovating the database for Jernbaneverket's infrastructure elements was carried out. A strategic partner was chosen and the project itself commenced before the end of the year.
- New systems from Agresso for economic management, wage and personnel were introduced. The implementation of additional modules will continue in 2000.

“

In 1996, Per Iversen was hired to work on the Skøyen project. His job was to coordinate the planning of technical solutions and constructions.

“It was interesting work and I had great people to work with,” say Per, and admits that permanent work in Jernbaneverket seemed more tempting for every day. The job offer came. Today, Per is a full-time planning manager, responsible for the substructure and track on the Blommenholm-Jong section of the Skøyen-Asker project.

“The challenges we now face in Sandvika remind me of those on the Skøyen project. New bridges have to be built in a densely populated area and near frequently trafficked rails,” says Per. Train traffic has to continue uninterrupted throughout the construction period, a challenge which will be decisive for the organisation and progress of the project.

“Have you always been fascinated by bridges?”

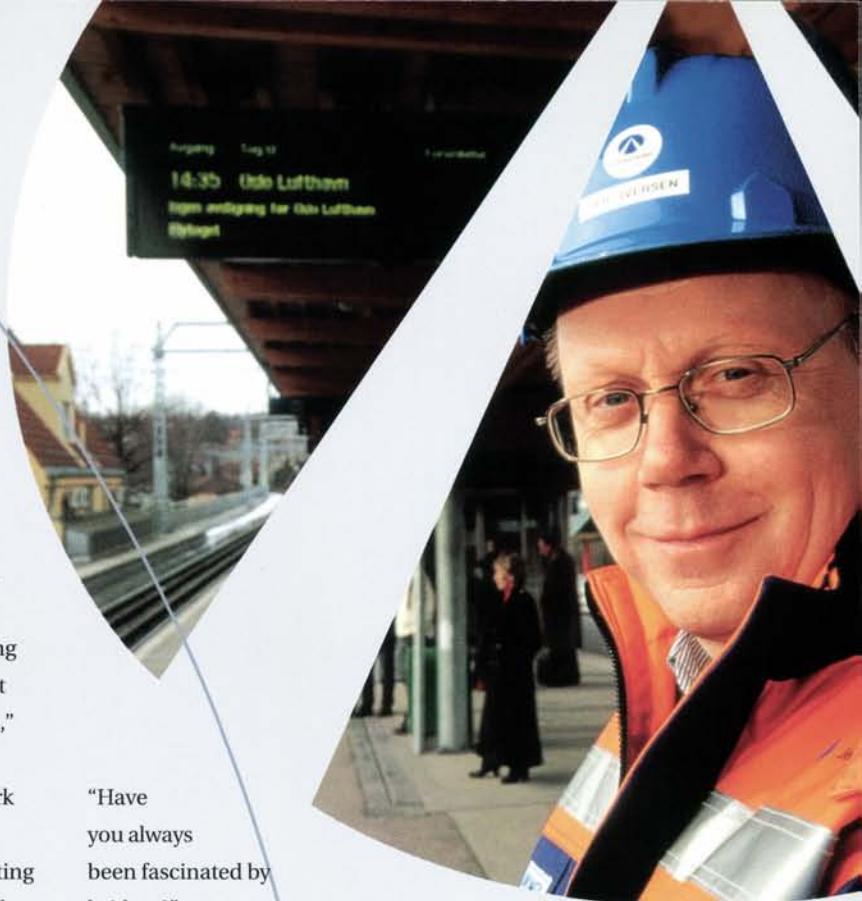
“There is no need to exaggerate, but I do have some interest in them,” says Per, before admitting that as a child he spent many hours watching the building of a new bridge in his home town, Halden. During the many years he has worked in a consulting engineering firm, Per has participated on many bridge projects, large and small. He’s got his favourite, too.

“Skarnsund bridge between Mosvik and Inderøy in Nord-Trøndelag county. I helped plan it and coordinated the work during all phases of construction,” says Per, stealing a glance at what was once the longest cable-stay bridge in the world. In 1992, this sleek and elegant bridge was given an award for its excellent design. In 1999, the Hølandalen bridges received the same special award, which is reserved for constructions in reinforced concrete.

“Form and aesthetics are clearly very important to you. Perhaps you should have become an architect?”

“I do sometimes envy architects for their creative ability, enthusiasm and commitment, but I myself prefer a job where I have to deal with mathematics, calculations and the Laws of Nature. It is very exciting and challenging to work as an engineer,” says Per, well aware that many people think of engineers as sturdy and dependable, but rather boring people compared to architects.

“That is hardly the case,” smiles Per. After all, he reminds us, it is engineers who transform the dreams and visions of architects into solid constructions.







# 1999 State Accounts

The following accounts were initially set to zero in 1999: Sale of properties, Work for external customers, Sales to NSB Gardermobanen AS, Sales of electricity, and Reimbursements. Parliament enacted a National Budget that authorised Jernbaneverket to exceed 1999 allocations for Operating and maintenance costs (section 1350, item 23), and Investments (item 30), by amounts corresponding to incomes from Sale of properties etc (section 4350, item 02), and Work for external customers (item 03), by up to 6% of the total allocations in section 1350.

When Parliament was considering its Proposition no. 9 / Resolution no. 63, (1999-2000), Parliament resolved to increase Jernbaneverket's authorisation from 6% to 8% of said allocations, incomes from Sale of properties and Work for external customers.

Under Operating and maintenance costs, Parliament also authorised Jernbaneverket to exceed allocations for Investments (section 1350, item 30) by sums corresponding to Sales to NSB Gardermobanen AS (section 4350, item 05) and Sale of electricity to rail traffic companies (section 4350, item 06).

The Track access fee (item 01) is not taken into account when calculating the reduction or increase in consumption relative to budget. Jernbaneverket does not have authority to exceed the budget on this item.

## Kap. 1350 Jernbaneverket

| Item                       | Designation                     | Budget 1999   | Changes/<br>transferred | Approved<br>budget | Accounts      |
|----------------------------|---------------------------------|---------------|-------------------------|--------------------|---------------|
| 23                         | Operating and maintenance costs | 2229.0        | 1.6                     | 2230.6             | 2634.6        |
| 30                         | Investments                     | 1319.0        | 11.2                    | 1330.2             | 1437.5        |
| <b>Total, section 1350</b> |                                 | <b>3548.0</b> | <b>12.8</b>             | <b>3560.8</b>      | <b>4072.1</b> |

## Kap. 4350 Jernbaneverket

| Item                       | Designation                             | Budget 1999  | Changes      | Changes     | Accounts     |
|----------------------------|---|--------------|--------------|-------------|--------------|
| 01                         | Track access fees                       | 56.7         | 0.0          | 56.7        | 41.7         |
| 02                         | Sale of properties etc.                 | 0.0          | 0.0          | 0.0         | 15.5         |
| 03                         | Work for external customers             | 0.0          | 0.0          | 0.0         | 305.9        |
| 04                         | Rental income                           | 50.0         | -48.0        | 2.0         | 3.3          |
| 05                         | Sale to NSB Gardermobanen AS            | 0.0          | 0.0          | 0.0         | 38.6         |
| 06                         | Sale of energy for train operation      | 0.0          | 0.0          | 0.0         | 124.1        |
| 15                         | Reimbursement of labour market measures | 0.0          | 0.0          | 0.0         | 0.1          |
| 16-1                       | Reimbursement of wages                  | 0.0          | 0.0          | 0.0         | 7.0          |
| 16-2                       | Reimbursement of payroll tax            | 0.0          | 0.0          | 0.0         | 0.9          |
| 17                         | Reimbursement for trainees              | 0.0          | 0.0          | 0.0         | 2.3          |
| <b>Total, section 4350</b> |   | <b>106.7</b> | <b>-48.0</b> | <b>82.3</b> | <b>539.5</b> |

|   |               |
|---|---------------|
| Section 1350- Costs, item 23 and 30                     | 4072.1        |
| Section 4350- Incomes, item 02-17                       | 494.4         |
| Section 5700- Payroll tax, Item 72 (added income, 1999) | 24.4          |
| <b>Sum</b>  | <b>3553.3</b> |
| Section 1350- Accounts                                  | 3560.8        |
| <b>Cost decrease</b>                                    | <b>7.5</b>    |

All figures in NOK mill.





**Section 1350, item 23.  
Operating and maintenance costs**

In accordance with the National Budget for 1999, Parliament allocated NOK 2 229 million for Jernbaneverket's Operating and maintenance costs in 1999 (section 1350, item 23). In addition, NOK 1.646 million were transferred from 1998.

**Section 1350, item 30.  
Investments**

Jernbaneverket received allocations of NOK 1 319 million for Investments (section 1350, item 30). In addition, NOK 11.157 million were transferred from 1998, equal to that year's decreased consumption.

**Section 4350, item 01.  
Track access fees**

Jernbaneverket received income allocations of NOK 56.7 million in the form of Track access fees (section 4350, item 01).

**Section 4350, item 04.  
Rental income**

Jernbaneverket received income allocations of NOK 50 million in the form of Rental income (section 4350, item 04). Parliament later reconsidered and found that Jernbaneverket's budgeted figures were too optimistic. Until autumn 1999, it had not been possible to obtain sufficient volume of sales; at the same time, the price competition on the telecommunications market had been stronger than expected. With this in mind, Parliament resolved to adjust its estimate of net sales from the excess capacity of Jernbaneverket's nationwide fibre-optic transmission network to NOK 2 million.

**Section 4350.  
Other items**

The other income items in section 4350 were initially set to zero in 1999.





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