Årsrapport JBV

On track in 2008

A brief look at the activities of Jernbaneverket

Director General Elisabeth Enger is preparing for record railway investments and recruiting more and more young people to Jernbaneverket, the Norwegian National Rail Administration

Jernbaneverket

Eks. 2 Årsrapporter JBV

Contents

155 years of Norwegian railway history

1854	Norway's first railway line opens, linking Kristiania (now Oslo) with Eidsvoll.
1890-1910	Railway lines totalling 1 419 km are built in Norway.
1909	The Bergen line is completed at a cost equivalent to the entire national budget.
1938	The Sørland line to Kristiansand opens.
1940-1945	The German occupation forces take control of NSB, Norwegian State Railways. Restrictions on fuel consumption give the railway a near-monopoly on transport. The railway network is extended by 450 km using prisoners of war as forced labour.
1952	Money is allocated for electrification of the railway network under the motto "Away with steam".
1969/70	The 1952 electrification plan is completed.
1996	Norwegian State Railway (NSB) is split into NSB BA (train company) and Jernbaneverket (infrastructure manager), and the Norwegian Railway Inspectorate (Statens jernbanetilsyn) is established.
1999	Norway's first high-speed line, from Oslo to Gardermoen airport, enters service with great success.
2000	The tragedy at Åsta, Norway's third-biggest rail accident in 50 years, leaves its mark on the railways at the start of the new millennium.
2004	NSB AS and Jernbaneverket jointly celebrate 150 years of Norwegian railways.
2005	Norway's largest onshore construction project, the new double-track line between Sandvika and Asker, opens to traffic.
2006	The railway enjoys growth in both freight and passenger traffic, and increases its market shares.
2007	The Ganddal freight terminal at Sandnes in Jæren is completed in December. In all, around 100 different construction projects valued at NOK 2.2 billion are under way.
2008	The Oslo Project to renew the railway network through Oslo starts in the spring. Introduction of a new travel guarantee scheme is approved.

Key figures

On 31.12.08 the national railway network comprised the following:

Total track length (km)	4 114
Electrified lines (km)	2 552
Single track lines (km)	3 887
Double track lines (km)	227
Tunnels	696
Bridges	2 517
Freight terminals with railway traffic [1]	44
Level crossings [2]	3 687
Stations/stops	357

For more key figures, definitions and explanations of individual figures please see our annual Railway Statistics publication at **www.jernbaneverket.no**

1 There are five types of terminal: intermodal (12), conventional wagon load (4), port (9), timber (13) and car (6).
2 Level crossings for private roads (3361) and public roads (326) on railway lines with ordinary scheduled services.

All aboard!

As Jernbaneverket's new Director General, I see a high level of commitment to the railways – both among our employees and others. Many people would like to see increased investment in the railway, which is why the strong political will to achieve a more robust railway system is both gratifying and inspirational. Increased demand for both passenger and freight transport is extremely positive because it is happening despite the fact that we have been unable to offer our loyal customers the product they deserve. Higher funding levels are now providing grounds for new optimism and – slowly but surely – we will improve quality, cut travel times and increase the capacity to transport more goods by rail.

Elisabeth Enger, Director General

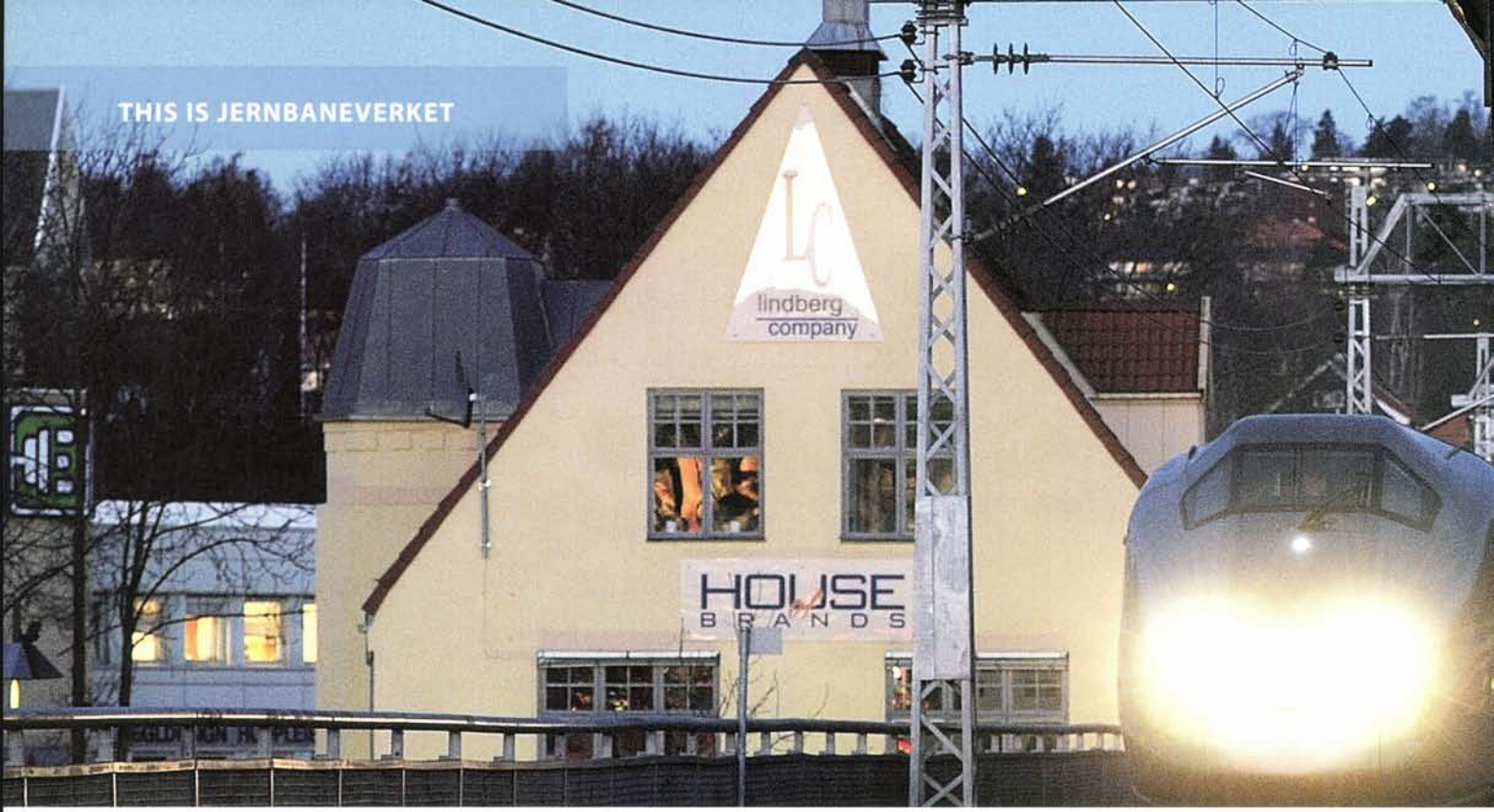
In its National Transport Plan 2010-2019 (NTP), submitted in March 2009, the Government proposes a significant increase in both investments and maintenance. This creates expectations and opportunities, as well as a number of challenges. In future our key task will be to provide an ever-improving infrastructure and document the effect of higher funding. To achieve this, we depend on having competent employees. Jernbaneverket already numbers 3,000 skilled co-workers, working in a community characterised by professionalism, commitment, openness and team spirit – but there is room for more!

This publication seeks to provide a brief look at our operations, with a particular emphasis on 2008. You will find useful information on many of our exciting activities, and hopefully you will be inspired to join the railway team. As part of Jernbaneverket you can help to build the railway of tomorrow; you will find more information on the opportunities available on page 8 onwards. You can also read interviews in which some of our employees explain why they opted for a future with Jernbaneverket.

Maintaining and building railways is both complicated and time-consuming. The planning processes involve many parties, and most of the work has to be done while trains are operating. In 2008 Jernbaneverket worked on the planning, designing and construction of around 100 projects, with a total cost framework of approx. NOK 2.4 billion. In line with political decisions, most of the construction projects have been concentrated around the largest cities, and this will be the case in the years ahead too. Over the next 10-year period there are plans to build 116 km of double track, 28 km of single track and around 45 new passing loops. Maintenance of the existing railway lines will also be strengthened significantly, providing better stability and punctuality.

Pursuant to the NTP, NOK 92 billion will be invested in the railways over the next 10 years. We have an enormous obligation to ensure that society gets the return it expects from use of public funds on this scale. Now it's time to get down to work, so all aboard! Our highly skilled employees can be sure of many exciting tasks in the years ahead.

Elisabeth Enger
Director General



Jernbaneverket gets things on track

Jernbaneverket provides Norway's train companies with a safe and efficient transport system. We plan, construct and maintain the railway network, including stations and terminals. We are also responsible for day-to-day traffic management.

With 59 million passenger journeys a year on the railway network and considerable volumes of freight being transported over long distances, the railway provides an efficient and environmentally friendly transport solution. Jernbaneverket's employees have expertise in a range of specialist fields such as civil and electrical engineering, telecommunications, social planning, scheduling and traffic management.

Jernbaneverket is a government agency under the Ministry of Transport and Communications.

The Norwegian parliament, the Storting, sets out long-term plans for developing the rail network in the National Transport Plan (NTP), as well as approving Jernbaneverket's annual budget.

Organisation of Jernbaneverket

Jernbaneverket comprises the following main units:

The Director General and her staff, Traffic Management, Infrastructure Management and Infrastructure Construction.

Targets for the rail sector

The Ministry of Transport and Communication sets specific requirements for how Jernbaneverket should manage the resources it is allocated. Our achievement of performance targets for the 2008 fiscal year in the following focus areas is detailed in the Annual Report for 2008 at www.jernbaneverket.no

- Competitiveness and socioeconomic benefit
- Safety, punctuality and customer satisfaction
- Productivity and process quality
- Human resources and organisation

Skøyen station: a modern and functional station

Financial highlights for Jernbaneverket

	2008	2007	2006
Restructuring funds	0.4	10.6	40.5
Operation and maintenance	3 616.4	3 302.9	3 206.3
Operation and maintenance of the Airport line	76.3	67.2	80.4
Investment in new infrastructure	2 364.9	2 290.8	1 444.7
Grant-funded expenditure (NOK million)	**6 058.0**	**5 671.5**	**4 771.8**
Track access charges	94.1	100.1	106.6
Sale of electricity for train operations	240.3	181.2	247.5
Other revenue	251.5	215.08	218.3
Revenue to state accounts (NOK million)	**585.9**	**496.3**	**572.4**
Total operating revenue	3 917.1	3 526.1	3 521.9
Total operating expenses	4 112.7	3 814.4	3 429.9
Total interest and other items	4.4	(1.2)	119.1
Result for the year (NOK million)	**(200.0)**	**(287.1)**	**(27.0)**
Grant coverage (%)	83.5	84.9	83.4
Payroll as % of operating expenses	43.5	43.5	46.7
Full-time equivalent employees	**2 896**	**2 855**	**2 950**

The state accounts are based on cash accounting and follow the classifications in the national budget. The result for the year is in accordance with the accrual principle.

Read more about Jernbaneverket's finances and productivity on page 22.

DID YOU KNOW...

- 13 train companies have licences to operate on all or part of the Norwegian railway network[1]
- the Norwegian railway network is open to competition within freight transport
- the railway in the Oslo area is the busiest in the country
- 827 trains services Oslo S and 600 trains pass through the Oslo Tunnel every day
- a total of 59 million passenger journeys by train were made in Norway in 2008

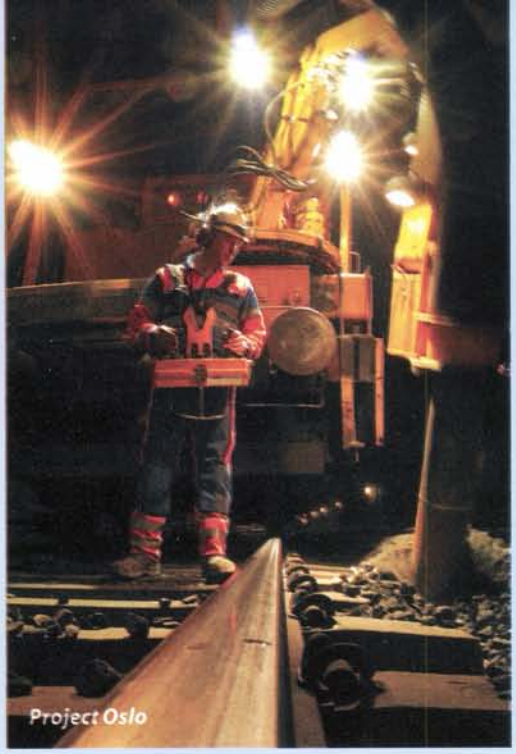
1 See www.jernbaneverket.no/Market

2008 IN BRIEF

JANUARY	2 January: The first freight train leaves the new Ganddal freight terminal in Sandnes municipality in Stavanger, heading for Alnabru freight terminal in Oslo. The Ganddal freight terminal is in operation! 21 January: Ganddal freight terminal is officially opened by Liv Signe Navarsete, Minister for Transport and Communications.
FEBRUARY	The start of the month sees heavy snowfalls on the high mountain plateau. Jernbaneverket has its own inspection teams ready at Myrdal as well as people stationed at Geilo to keep the high-mountain sections of the Bergen line open. An extensive NOK 150 million forest clearance programme is launched. 7,000 hectares of forest will be cleared over a five -year period to prevent trees falling onto tracks and overhead lines.
MARCH	Project Oslo starts work on renewing the railway through Oslo. A list of 17 measures to be implemented in 2008 is presented to the Ministry of Transport and Communications on 11 March. 28 March: Elisabeth Enger is appointed by the Council of State as the new Director General and head of Jernbaneverket, succeeding Steinar Killi, who had indicated in 2007 that he wished to stand down. Elisabeth Enger was previously chief municipal executive of Bærum Municipality and has broad management experience in the public sector.
APRIL	In its revised national budget proposal, the Government pledges NOK 100 million to renew the railway through Oslo. This enables Jernbaneverket to press ahead with the work on the Oslo Tunnel without having to reallocate funds from essential maintenance work elsewhere.
MAY	An unusually heavy spring thaw on the section of the Dovre line between Dovre and Dombås leads to several avalanches, landslides and track washouts. Inspectors and Jernbaneverket's Operations business, JBV Drift have their hands full ensuring safe traffic operations. Speed reductions and short periods of closure are necessary.
JUNE	Jernbaneverket takes part in a campaign to combat theft from passengers at public transport terminals and interchanges in Oslo and Akershus. 15 June: A new type of timetable is introduced at all Norway's 357 stations. The timetables show the departure times from the station for each hour of the day.
JULY	8 July: Rallarvegen opens to bikes earlier than usual as a result of light snow on the high-mountain plateau. Jernbaneverket carries out regular visits and controls to reveal landslide risks. The Flåm line is closed for a few hours on two days in July as a result of extraordinary rock-cleaning and -securing work at the Blomheller Tunnel, where there is a risk of large blocks of stone falling onto the track.
AUGUST	4 August: The new Director General, Elisabeth Enger, takes up her post. As early as 20 August she embarks on an extensive tour of the Norwegian railway network. By Christmas she has covered more than 5,000 km and visited a large number of employees. Traffic controller Atle Syverstad meets the Director General at Askim station.
SEPTEMBER	Passenger information is set to improve, with work starting to install the first 50 new monitors at stations in the Oslo area. The monitors will show standard service information and alternative information in the event of delays. The National Rail Inspectorate decides that the new Merkur signalling system cannot be put into service at Ganddal freight terminal with the current documentation. Director General Elisabeth Enger demands a full review of the system development process.
OCTOBER	7 October: In the national budget for 2009 the Government proposes an increase of Jernbaneverket's budget by NOK 1.2 billion. The proposal means increased investments in maintenance and rational progress on construction projects already under way. New landslide warning and prevention systems are taken into use. Most of the measures are implemented on the Bergen line, the Flåm line and the Nordland line. The majority of the railway network is surveyed, and plans are drawn up for preventive measures to be carried out in 2009. Jernbaneverket and NSB agree to introduce a travel guarantee scheme from 1 January 2009, giving passengers affected by cancellations or severe delays the right to claim compensation.
NOVEMBER	3 November: Blasting work on a road project immediately south of Steinkjer triggers a rockslide which closes the Nordland line until 8 November. The closure affects 16 of CargoNet's freight trains each day. Some of the freight is sent by train to Narvik via Sweden. 27 November: A report from Econ Pöyry on construction of high-speed railways in Norway is presented at an open seminar. The report is based on the traditional Norwegian calculation model and concludes that constructing high-speed railways in Norway is not feasible from a socioeconomic perspective.
DECEMBER	The construction plan for the new Hommelvik – Hell section with a tunnel through Gevingåsen is finished. The work is divided into three contracts, which are put out to tender. The contracts are scheduled to be signed in spring 2009.

2008 IN BRIEF

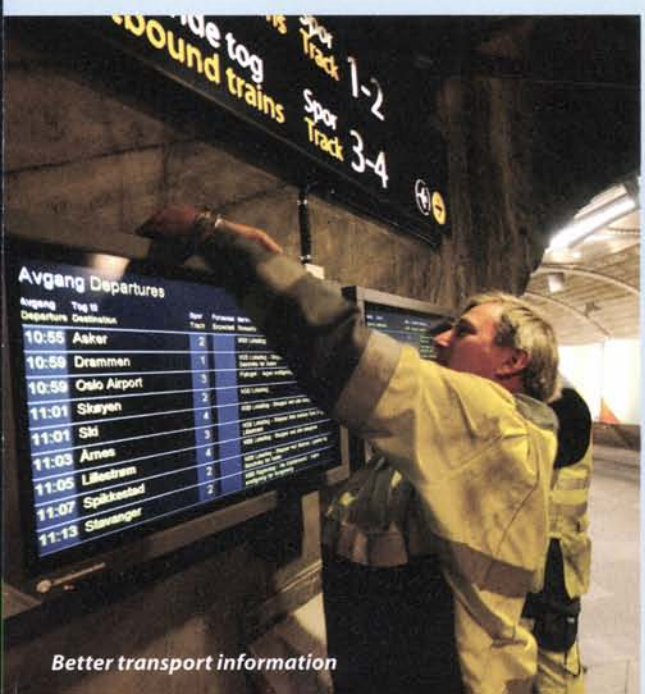
Ganddal freight terminal in operation



Project Oslo

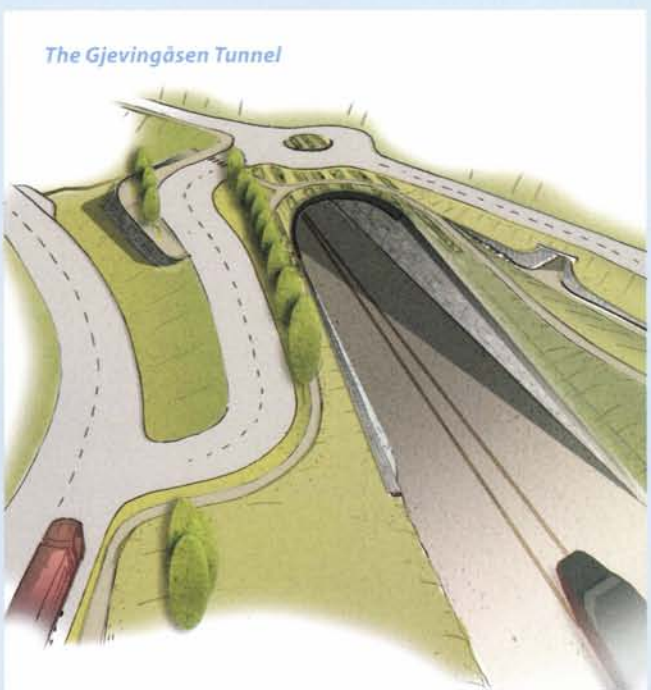
Landslide prevention

Welcoming the new Director General



Better transport information

The Gjevingåsen Tunnel



Working for Jernbaneverket

Jernbaneverket offers you the opportunity to help build the railway of tomorrow. If you're interested in working in multidisciplinary teams on demanding and exciting assignments, Jernbaneverket could be the place for you. We work both on renewal of the existing railway and construction of new infrastructure.

DID YOU KNOW...

- you can earn a salary while training with Jernbaneverket
- Jernbaneverket is an inclusive workplace
- Jernbaneverket offers practical placements to students from upper-secondary schools
- we can help with dissertations for master's degrees
- Jernbaneverket is seeking candidates for trainee management positions in construction projects

In Jernbaneverket you will find 3,000 skilled co-workers in a community characterised by professionalism, commitment, openness and team spirit.

The work of Jernbaneverket is increasingly high-tech and characterised by international collaboration. This makes the working day even more challenging, and will require ongoing recruitment of both newly qualified and experienced engineers and skilled workers. New technology is embraced at all levels of the organisation, requiring all employees to undertake further training and continuous development.

Recruitment

An "interesting" year

With the recruitment of 70 engineers of various grades and as many apprentices on the agenda, we think Elisabeth Enger is right when she says 2009 will be an "interesting" year. Jernbaneverket has been allocated more resources to renew the railway, and the corporate culture is due for renewal too.

Apprentices

More resources for the railway also mean a greater emphasis on taking on apprentices. In 2009 we will recruit more than 70 new apprentices, and the challenges involved in transferring expertise from one generation to the next are huge. The young people bring in new knowledge too; even the 'old hands' have something to learn. This is where the 'new' Jernbaneverket is taking shape – at the interface of old and new knowledge, and of old and new methods of communication and collaboration.

Want to know more about our apprenticeships? Go to www.jernbaneverket.no and the National Training Office for the Railway Sector, www.okj.no. Here you will find information on training courses, admission requirements and training companies in the sector.

Student?

Are you interested in railway engineering, the consequences of climate change on the railway network, and traffic management? Then why not join forces with us to write your dissertation? On our website you will find a number of suggestions for dissertations suitable for projects and bachelor's/master's degrees.

If you're interested in a summer job, these are advertised on our website and at www.nav.no

Newly qualified engineers/ graduate engineers

Every semester we visit a number of schools and training institutions to tell students about the exciting work we do and the specialist skills we need. On our website you will find a recruitment calendar showing where and when you will find us.

Trainee programme

Jernbaneverket's Infrastructure Construction division offers newly qualified engineers and graduate engineers a unique opportunity to forge a career

in railway engineering. Our trainee programme combines basic project management theory with practical experience of project work. Candidates are monitored closely via the supervision and mentoring programmes and seminars over the two years of the traineeship. During this period the candidates will complete four practical modules within four different projects in different phases.

Training and personal development

Jernbaneverket depends on everyone developing their expertise, so that new technology, tools and methods can quickly be adopted by the organisation as a whole. We therefore offer good opportunities for learning new skills, through formal training, courses and European collaboration. Many skilled workers also go on to become engineers through their work with us.

The Norwegian Railway School

The Norwegian Railway School is a skills-development centre for the railway sector. The school offers vocational training for locomotive drivers and basic training for traffic controllers. It also conducts traffic safety courses, vocational courses for apprentices, and continuing education and training for the entire railway sector.

The school collaborates with almost all players in the railway sector. The instructors are specialised practitioners from the railway companies.

Pupils from Ole Vig upper-secondary school in Stjørdal on placement with Jernbaneverket

Looking forward

Name: Monica Fors
Age: 30
Education: Graduate engineer, Communications and transport systems
Works as: Trainee construction and project manager
Joined Jernbaneverket: August 2008

Why did you decide to join Jernbaneverket?
Jernbaneverket is involved in a large number of major construction projects of varying complexity, involving a large number of disciplines in both the planning and construction phases. I'm keen to work in project management.

What jobs in Jernbaneverket are open to graduates in communications and transport systems engineering?
Planning and capacity calculation of new railway projects.

What's the most exciting thing about being a trainee?
The trainee programme is very good, particularly when it comes to gaining an overview of the entire process from planning to execution of railway projects.

What are you most looking forward to about working for Jernbaneverket?
It's hard to say what my 'dream job' would be. I'd like to work on the railway and hope to grow into a management position.

Interested in relationships

Name: Marius Ertshus Mathisen
Age: 27
Education: Graduate in land consolidation, the Norwegian University of Life Sciences
Works as: Trainee construction and project manager
Joined Jernbaneverket: June 2008

Why did you decide to join Jernbaneverket?
I applied for the trainee programme because I want to develop the expertise to become a construction or project manager.

What jobs in Jernbaneverket are open to graduates in land consolidation?
As a graduate in land consolidation, I can help ensure that acquisition of land is an item on the agenda and dealt with using an important and thorough process in line with other processes in the projects. Expertise in the area of rights to compensation together with a knowledge and understanding of the relationship between landowner and property can be crucial to project implementation. This is why I think graduates in land consolidation can be deployed in various roles within Jernbaneverket.

What's the most exciting thing about being a trainee?
The steep learning curve and the opportunity to be involved in exciting construction projects.

What are you most looking forward to about working for Jernbaneverket?
My goal is to be the project or construction manager on a major railway project, for example the new Oslo S – Ski or Minnesund – Kleverud double track.

Holistic view

Name: Jasmin Jahre
Age: 29
Education: Graduate engineer, Industrial economics and technology management
Works as: Trainee construction and project manager
Joined Jernbaneverket: September 2008

Why did you decide to join Jernbaneverket?
Jernbaneverket can offer a large number of interesting challenges associated with large and complex construction projects. The trainee programme provides a good opportunity to become familiar with the breadth of the projects and project phases, and, as I want to work in project management, this is a good place to start.

What jobs in Jernbaneverket are open to graduates in industrial economics and technology management?
Lots! Industrial economics and technology management is a multidisciplinary course providing a basic understanding of both technology and economics. There is also specialisation within other disciplines, and the holistic view is important when it comes to completing projects on time, on budget and with the right level of quality.

What's the most exciting thing about being a trainee?
Over the two-year period I'll gain an overview of how large projects are implemented from planning to final construction. The trainee period is all about moving around the entire organisation and acquiring as much knowledge as possible. I'm absolutely certain that I've made the right choice with the opportunities the trainee programme offers.

What are you most looking forward to about working for Jernbaneverket?
I think the social perspective combined with project management in complex projects is really exciting – being involved in developing the best possible railway for Norway. That's why my ambition is eventually to be a project manager in a major project or have a management position which fits my level of expertise.

Happy as a tracklayer

Name: Patrick Austvik
Age: 20
Education: Building (basic), Construction and Mining (advanced 1), apprenticeship with Jernbaneverket, machine operator licence for several classes, mountain equipment safety course, safety supervisor certificate.
Works as: Tracklayer
Joined Jernbaneverket: 2006

Why did you decide to join Jernbaneverket?
I gained a really good impression of Jernbaneverket while on a school work placement and wanted to work in an interesting area such as track laying. And I'm interested in railways too.

What type of background is required to be a tracklayer?
Good health and good eyesight, advanced course 1 in building and construction, advanced course 2 in construction, plus an apprenticeship and a good understanding of the rules and regulations.

What does a tracklayer do?
Builds and maintains track: everything from clearing snow to building points and tracks.

What is the most exciting thing you've done in the last year?
Definitely the apprenticeship exam, but with rock control on a 28-metre lift on the mountainside on Saltfjellet a close second!

What are you most looking forward to about working for Jernbaneverket in 2009?
There will be a lot of work this year now we have been allocated extra resources. I hope to be able to do more rock control and securing, which I find really exciting. Apart from that, I'm looking forward to travelling. I enjoy travelling around the region, and am happiest 'on the road'! You get to see and experience a lot when you're travelling, so I hope to have the chance to do that again this year.

DID YOU KNOW...

- Jernbaneverket was named Training Company of the Year 2008
- Jernbaneverket will take on 70 apprentices in 2009
- The apprentice scheme offers a certificate of completed apprenticeship in five different trades (tracklayer, signal technician, power technician, telecommunications technician, electrician)

Operations manager Kristine Jessen and Joacim Kristiansen, Head of Operational and Maintenance Services, celebrate the Training Prize 2008. The naming of Jernbaneverket's Infrastructure Management Division, Northern Region as training company of the year by Sør-Trøndelag municipality the Training Council, is an inspiration to continue the focus on recruiting skilled workers throughout Jernbaneverket.

Visibility generated new applicants

In 2008 Jernbaneverket appointed a dedicated recruitment manager. The aim was to increase Jernbaneverket's visibility as an employer and attract more good applicants.

Since April, recruitment manager Bente Tangen has read numerous job adverts, prepared promotional materials and produced campaigns, and maintained a high level of energy and commitment in bringing the right people into Jernbaneverket. Jernbaneverket has taken part in 25 events, including careers fairs, trade and industry days, and company presentations.

"I'd like to help increase publicity about Jernbaneverket and the job opportunities we offer. The units are recruiting candidates as before, but I'm involved and have an opinion on how we present ourselves and the fora in which we should be visible," says Tangen.

The financial crisis and companies downsizing have made the job easier. "There is investment in the railway, and we can offer exciting work tasks and, not least, a secure workplace undergoing rapid development. Now we have the opportunity to become outstanding at building our reputation as an employer, while other companies are scaling back slightly," Tangen says. But the battle for skills isn't over; there will always be competition for the best people. "It isn't a case of 'job done' when someone starts work with us. We have to give our employees the work tasks, responsibility and working environment that will encourage them to stay with us," she says.

A more transparent railway administration

"I was given the challenge of making us more visible, encouraging more candidates to choose Jernbaneverket, and better equipping us to compete on the job market. Without recruitment, Jernbaneverket would grind to a halt," she says.

"I think we need to increase awareness of how we present ourselves, but this is a never-ending job," Bente says. "New skilled workers and engineers are being trained, and have new preferences and interests. Our job is to show that Jernbaneverket does exciting work and needs their expertise."

Recruitment manager Bente Tangen (left) and assistants at Careers Day 2008 at NTNU, the Norwegian University of Science and Technology

Building for the future

Planning new railway infrastructure is a long process, involving central and local authorities and many different stakeholders. The process takes place both within Jernbaneverket and through close collaboration with other players.

DID YOU KNOW...

- the Alnabru terminal is the hub of the railway's container transport network
- redevelopment of the Alnabru terminal in 2008 increased the terminal's capacity by 30%
- NOK 92 billion will be invested in the railway over the next ten years in accordance with the National Transport Plan 2010-2019

Billions of kroner worth of new railway infrastructure

Jernbaneverket's Infrastructure Construction Division is responsible for the planning, project design and construction of new infrastructure, and employs approx. 300 people. A further 120 persons are hired in from various consultancies for specialist jobs within projects. The actual construction assignments are put out to tender to major contractors and companies that supply railway equipment such as overhead line systems, signalling systems, rails, etc. The Infrastructure Construction Division manages the construction work and checks that the contractors and all the other companies perform the work as agreed.

100 projects

In 2008 the Infrastructure Construction Division worked on the planning, designing and construction of around 100 projects worth a total of NOK 2.4 billion.

The big railway construction projects under way around the major cities such as Oslo and Stavanger are being carried out in line with political decisions. The first stage in a major modernisation project for the freight terminal at Alnabru was also implemented in 2008.

From two to four tracks in Bærum

Jernbaneverket is expanding from two to four tracks between Lysaker and Asker. Construction of Lysaker station and the new double track section from Lysaker to Sandvika proceeded at full tempo in 2008. The section between Sandvika and Asker was finished in 2005.

Lysaker station is now undergoing full renovation and is being expanded from two to four tracks, with two new platforms and a wide walkway beneath the tracks. The station will be a modern public transport hub with a new bus terminal, organised for easy transfers. The station will be finished in August 2009.

Among other things, the rock cutting alongside Lake Engervannet between Lysaker and Sandvika (6.7 km) is being extended: this involves a 150 m concrete tunnel being driven through the deposit west of Lysaker and a 5.5 km tunnel being driven through the rock (Bærum Tunnel).

When this section opens in 2011, it will remove the bottleneck on the railway network west of Oslo, providing space for twice as many trains. This will significantly improve suburban services and make it possible to expand the range of both freight and passenger services on the long-distance sections.

Four tracks enable trains with different stopping patterns and speeds to use different tracks, something which will mean a significant improvement in punctuality on the section. Journey times for the fastest trains will be reduced by five minutes, saving each commuter around 40 hours a year.

Alnabru freight terminal

The north end of Alnabru freight terminal in Oslo was redeveloped in 2008. This has increased capacity by 30% and prepared the terminal to cope with growing freight traffic by rail over the next few years. Work is also under way to develop solutions to handle further growth in freight traffic in the longer term.

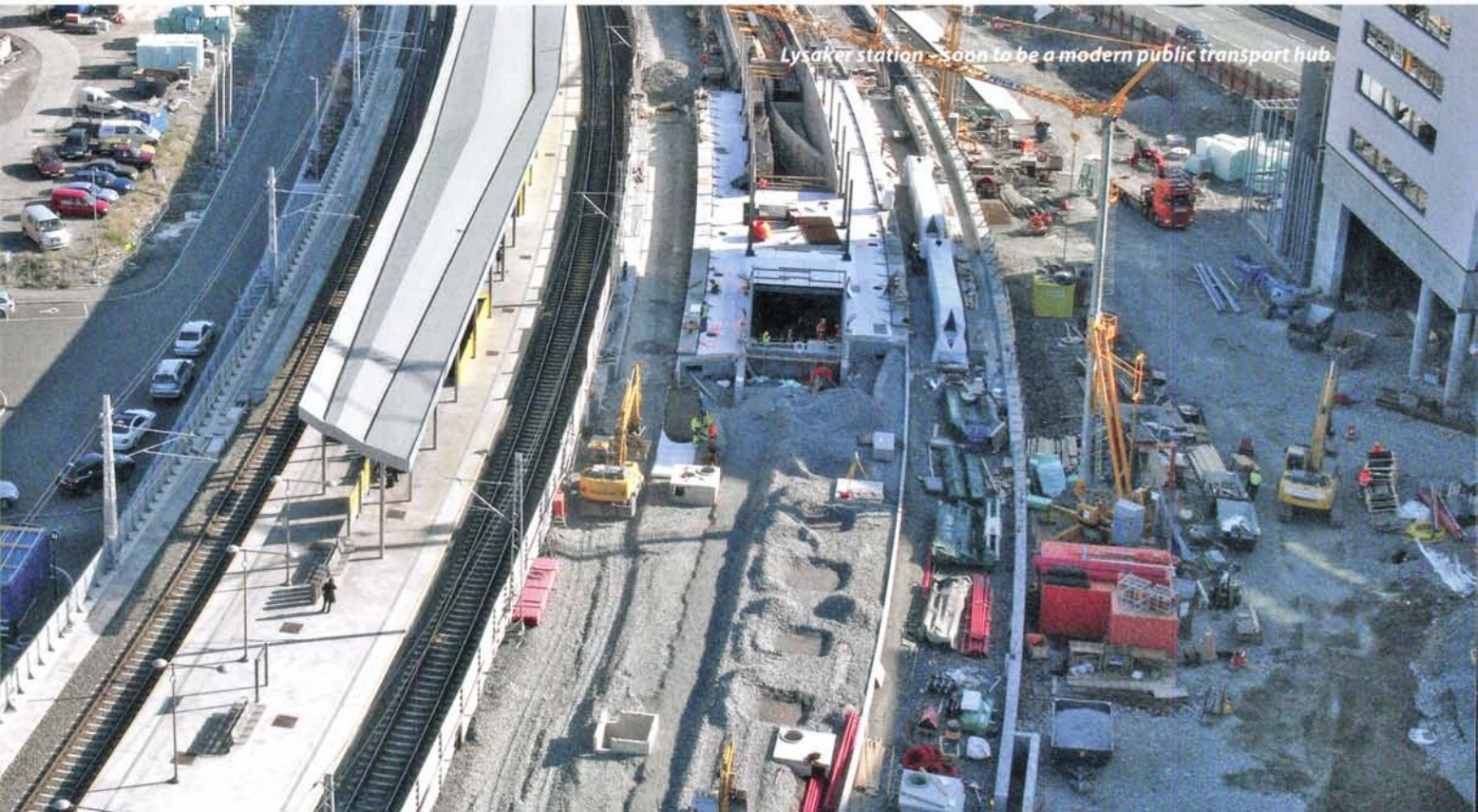
The phases of a major construction project

Planning railways

First of all, Jernbaneverket considers where the need to build new railway infrastructure is greatest. Various construction concepts are considered before Jernbaneverket selects the one on which it will proceed.

The technical and public planning processes then proceed hand in hand. Jernbaneverket cannot expedite the technical project design without a land use planning decision from the municipalities involved, because the technical planning work involves finding the best solution for reconciling local land use preferences and railway engineering requirements. The public planning process takes place in cooperation with the municipalities, and normally takes three to four years.

The construction work can then begin if the project is allocated funding by the Storting. The timeframe depends on the scope of the project. First the land must be prepared, either by driving tunnels or by replacing and stabilising masses in open-air zones. This is followed by ballast, rails, telecommunications systems and power installations. Finally, the infrastructure must undergo safety checks before it can be put into service.



Lysaker station – soon to be a modern public transport hub

New track to Ski

The 24 km section between Oslo and Ski is a bottleneck, with capacity stretched to the limit at rush hour. Although chokefull trains show that demand exceeds supply, it is not possible to drive more trains on the Østfold line than at present.

Having four tracks on the section will provide passengers with shorter journey times, fewer delays and more departures. The increased capacity will make it possible to transfer far more freight from the roads to the railway.

In 2008 Jernbaneverket considered a number of alternatives for the new double track, the Follo line, between Oslo and Ski. The project includes a new double track between Oslo S and Ski, and a new station at Ski. A link between the Østfold line and the new line will ensure efficient and flexible transport.

Two tracks along Mjøsa

Eidsvoll-Lillehammer is one of Norway's busiest single-track sections, and there is growing demand for a better passenger and freight transport service. Jernbaneverket has therefore recommended construction in stages of double track alongside the current railway. The new E6 road is also to be built alongside Lake Mjøsa, and Jernbaneverket has therefore worked with the National Public Roads Administration, Statens Vegvesen, on joint planning of the Minnesund-Kleverud section. In February 2009 it was decided to co-ordinate construction of the road and railway on the Minnesund – Kleverud section. This will mean an overall reduction in investment costs of NOK 300-400 million.

Hectic construction activity in Rogaland

In Jæren Jernbaneverket is building a new double track with four new stops between Sandnes and Stavanger. The 14.5 km section is divided into four construction subsections: two are already complete, the third is almost finished, and intense work is under way on the last subsection between Sandnes and Lurahammeren. The new double track will open in October 2009.

Four new, modern stops are being built between Sandnes and Stavanger. The new Jåttåvågen stop is complete and partly open. The Gausel stop still requires some finishing touches. Construction of new stops has begun at Mariero and Paradis.

Modernisation of the Vestfold line

The construction of the new Barkåker – Tønsberg double track started in March 2009. A 5.8 km section of double track, including a 1.75 km tunnel through Frodeåsen, is to be built from Barkåker northwards to Tønsberg. The cost is NOK 1.4 billion, including the railway engineering work required at Tønsberg station. The new double track is scheduled for completion in autumn 2011.

In addition to work starting on the Barkåker – Tønsberg section, two new subsections are now planned on the Vestfold line, including new double track on the Holm – Holmestrand – Nykirke sections. Construction of the section from Holm to Holmestrand is scheduled to begin at the end of 2009/start of 2010, and should be finished in 2013. If the Storting allocates the funding required, the section from Holmestrand to Nykirke will be started just over a year later and completed in 2014.

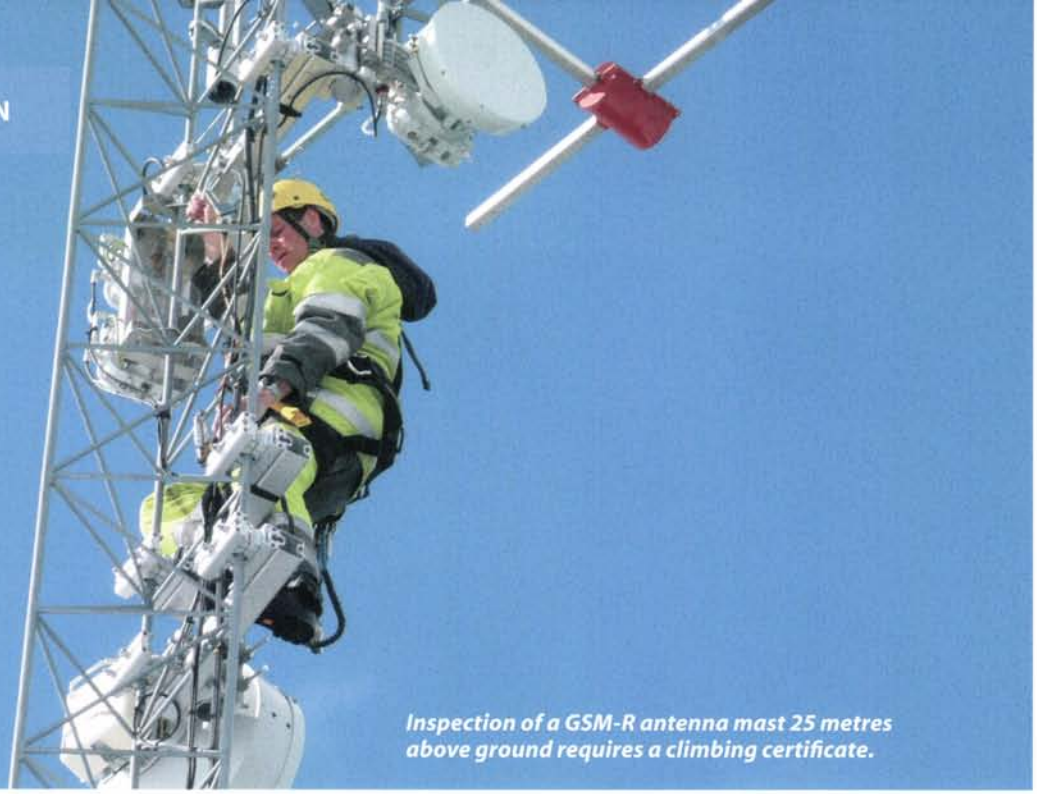
Plans have also been drawn up for a new single-track line from Farriseidet to Porsgrunn. The area development plan for the area from the Telemark border to Porsgrunn has been approved, while the plan covering the area from Farriseidet to Telemark was submitted to Larvik Municipality in May 2008. Work on the detailed plan and construction plan begins in 2009. If funding is allocated, construction can begin at the end of 2010/start of 2011. The expected construction time is approx. five years.

Excavation for the tunnel at Lysaker station

Tunnel workers

Drilling rig in action

The stop at Gausel on the double track between Sandnes and Stavanger is almost finished



Inspection of a GSM-R antenna mast 25 metres above ground requires a climbing certificate.

Safe communication throughout the Norwegian railway network

The GSM-R communications system[1] provides trains with mobile phone coverage throughout the railway network, including tunnels. All components in Jernbaneverket's GSM-R equipment were checked in 2008. In the event of an accident, you can therefore be confident that important messages will reach their destinations.

GSM-R

GSM-R uses GSM technology, which most people are familiar with from their own mobiles. The extra letter R stands for 'Railway' and offers a number of extra functions useful in managing railway traffic. GSM-R has been in full use in Norway since November 2007.

Among other things, the system makes it possible to prioritise some types of call over others. In an emergency situation, critical messages will take precedence over all other calls in the network. This ensures rapid emergency communication between the traffic controller and train driver.

The new system also makes it possible to group calls. This means that GSM-R enables several people to participate in calls at the same time. In the event of an accident, a message can be sent simultaneously to all traffic on the section and others needing information. Calls of this type have top priority.

Tangible feeling of security

"Feedback from users indicates a much greater feeling of security," says Terje Langaas, senior engineer with Jernbaneverket. "Previously, some sections of line and the vast majority of tunnels did not have radio coverage. On the Nordland line for example, the old analogue radio system was never replaced. Here people had to make do with the ordinary mobile phone network, and all the limitations that entailed. In some places communication was totally impossible. GSM-R has, however, been developed with railway traffic in mind, and provides coverage for the entire railway network," Langaas says.

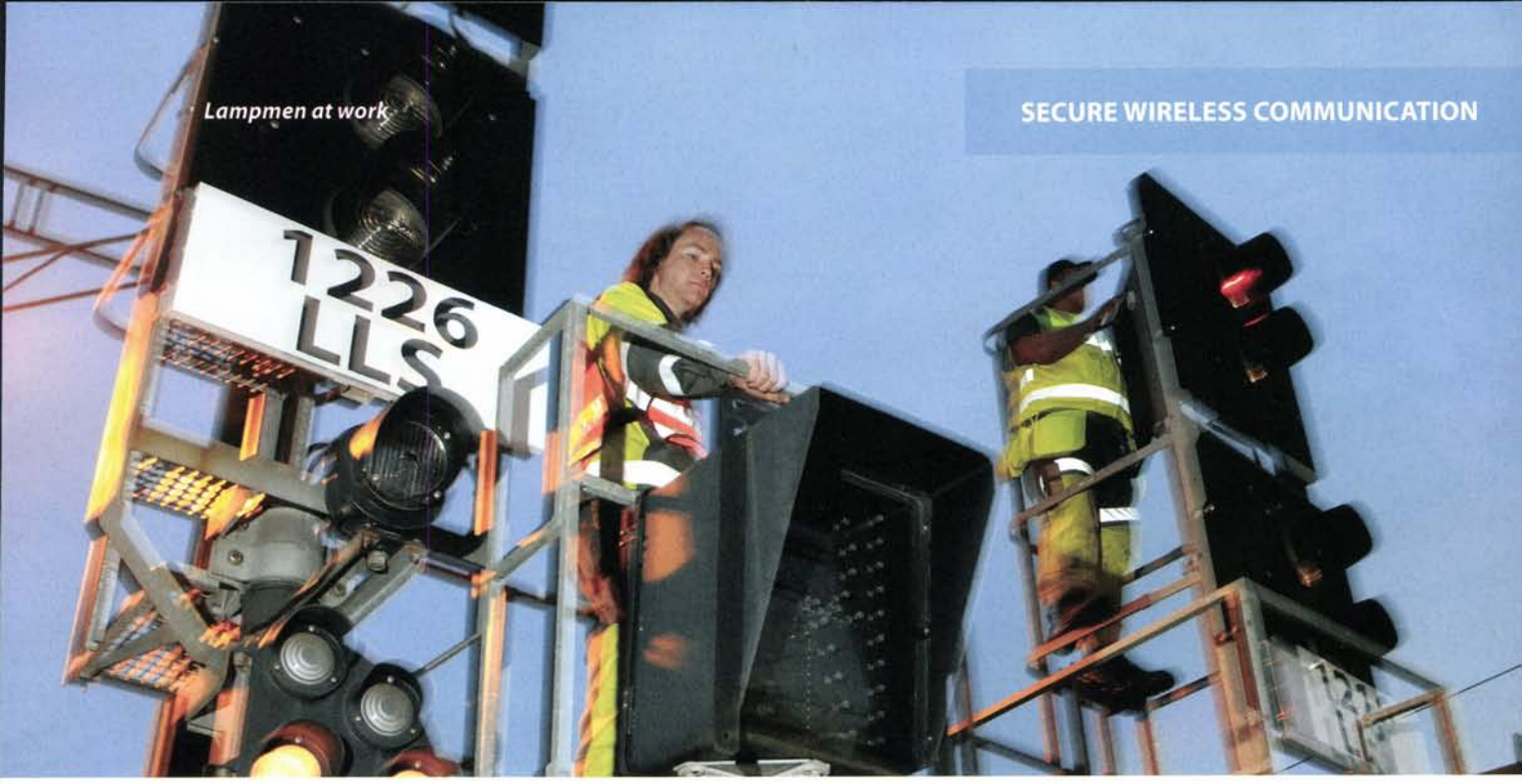
"There are always a number of teething problems whenever people have to get used to using new technology, but I think the positive gains outweigh these," Langaas finishes.

Norway's GSM-R system has been developed in accordance with the European standard drawn up by UIC[2]. GSM-R is also being developed in accordance with the same standard in countries outside Europe.

Scope for data traffic

The system can also be used for data traffic. In future this may open up possibilities for much more advanced communication for monitoring systems, remote-controlled evacuation functions and passenger information.

1 GSM-R: Global System for Mobile communication for Rail
2 UIC: International Union of Railways



Lampmen at work

Light signals to be replaced

Increased safety, fewer delays and cancellations, and a positive environmental impact are among the important gains to be made when Jernbaneverket starts phasing in a new signalling system from 2014. The system will spell the end of line-side light signals alongside railway tracks in Norway.

New standard for signalling systems for Norway

The aim of standardising signalling systems in Europe is to ensure that, in future, there is no barrier to trains crossing national borders. European railway legislation is also applicable in the EEA, which is why ERTMS/ECTS is the signalling system of the future in Norway too.

New technology increases punctuality

In 2008 many people were annoyed by delayed trains. The problems were often caused by errors in signalling systems. The current system provides train drivers with critical information on traffic via ordinary light signals. Among other things, this means they must have a green light in order to pass main signals along the line. The system is old fashioned and vulnerable; only one single element needs to fail to obstruct railway traffic and cause delays for passengers. The new system can be built in such a way that an individual element that fails does not necessarily cause traffic delays," explains Geir Hansen, ERTMS co-ordinator at Jernbaneverket.

ERTMS also has the advantage that it is possible to cut the time between two trains following each other in the same direction.

Welcome renewal

The costs of introducing the new system are estimated to a total of NOK 14.3 billion, and the implementation will take place on all railway lines over a periode of fifteen years. Jernbaneverket's calculations show that it would be more expensive to implement the required renewal based on current technology.

"Sixty per cent of the infrastructure on Norway's railway network is currently more than 40 years old and has to be replaced anyway. Financially, this means tough challenges for both Jernbaneverket and the train companies," Hansen says.

By introducing the new signalling system, we will – gradually – be able to remove most of the signals, signal masts and bases, cables and other components in the infrastructure. Fewer sources of error and a more robust system will have a number of positive effects. We anticipate much lower consumption of materials and energy, and the visual environment along the track will also improve.

After the changeover, train passengers will experience considerably fewer cancellations and delays in railway traffic. The system also enables more trains to operate on the railway network.

ETCS stands for "European Train Control System". This is a European standardised system for speed control of trains. ETCS uses GSM-R for communication between infrastructure and trains. The designation ERTMS stands for "European Rail Traffic Management System".

The train – an environmental winner

The environmental benefits it offers mean the railway can contribute to environmentally friendly transport. This is why we are working systematically to reinforce the railway's environmental benefits and tackle environmental challenges.

Definitions:

Passenger kilometre
Transport of one person one kilometre

Tonne kilometre
Transport of one tonne of freight one kilometer

DID YOU KNOW...

- electric railways, underground railways and trams are the most energy-efficient means of passenger transport in Norway
- full trains would further increase the railway's environmental advantage
- CO_2 emissions per passenger journey between Oslo and Bergen are 212 times less by train than by plane
- electric trains are the most energy-efficient means of freight transport and have the lowest emissions of greenhouse gases
- diesel trains are the second most environmentally friendly method of freight transport (after electric trains)

(Source: Report from Statistics Norway/ CIVITAS)

Environmental benefits of the railway

Journey time, frequency, punctuality and price are important factors in enabling the train to compete effectively with driving or flying. This means that we have to combine a number of different measures to make the train the first choice – out of consideration for the environment.

A new report from Statistics Norway and the consulting company Civitas on energy consumption and greenhouse gas emissions from the transport sector shows that electric railways are the form of transport with the lowest energy consumption and lowest emissions of greenhouse gases per passenger kilometre. Electric trains use only a quarter as much energy to transport one passenger one kilometre as a scheduled aircraft. The report is based on actual figures for energy consumption, emissions, passenger occupancy and freight volumes for the years 1994, 1998 and 2004.

The report calculates the train's emissions on the basis that Norway imports power from coal- and gas-fired power stations in other countries equivalent to around seven per cent of the country's total power requirements. Despite this, the train still came out much better than other forms of transport in the calculations. As is widely known, Norwegian electric trains use only 'green electricity', i.e. electricity guaranteed to come from renewable energy sources. This means that electric trains in Norway actually performed even better than the report suggests. NSB's environmental accounts for the years since 2004 also show a further improvement in the railway's figures over the last few years, probably as a result of various energy-saving measures.

And the picture is the same where freight transport is concerned: the train is the environmental winner. In the case of freight transport this applies to both electric and diesel trains. Diesel trains are clear winners over diesel trucks.

Systematic environmental work

Although railway transport is one of the most energy-efficient forms of transport, there is still potential for saving energy . Jernbaneverket considers it important to continue working on various energy-saving measures, not least in the light of the challenge of climate change.

Since 2003 Jernbaneverket has implemented energy-saving measures linked to the operation of the public railway network. This work has enabled us to achieve significant savings.

The measures implemented include automatic regulation of point heating, installation of heat pumps in waiting rooms and engine sheds, and assorted measures for heating, ventilation and cooling in various buildings. We have also phased out old oil boilers in favour of CO_2-neutral bio-boilers. Analyses and measures in Narvik's workshop and engine shed will be a major focus in 2009.

Environmental challenges

Noise affecting people living along the railway is one of the biggest environmental challenges we face. Like the other public transport bodies, Jernbaneverket is required to survey indoor noise from its facilities under Section 5 of the Pollution Regulations. An updated survey submitted to the county

commissioners early in 2008 showed that there are no homes with average railway-related indoor noise levels above the threshold of 42 dBA over a 24-hour period.

Statistics Norway has also carried out a census of homes with railway-related indoor noise levels down to 35 dBA. This provides an overview until a new and more detailed indoor survey is complete.

The most important source of noise from railway traffic is the contact between rail and wheel. Jernbaneverket has financed a research project to investigate the effect of track grinding on railway noise over time. Measurements have been taken, both before and after grinding, on sections of the Østfold line south of Oslo. A final report on this project is expected early in 2009.

At international level the focus is on replacing cast-iron brake blocks on freight trains. New types of brake block made of composite materials are under development and will replace the old type in a few years. This is a cheap and effective way of reducing noise from freight trains.

Animal fatalities represent another environmental challenge.

Jernbaneverket's goal is to reduce the number of animals killed by trains by 25 per cent by 2009 compared with the peak year of 2003. This goal is proving difficult to achieve because the number of animals killed by trains rose significantly in 2006 and 2007. In 2008 a total of 1,877 animals were killed by trains, roughly as many as in 2007.

In 2008 Jernbaneverket started a project to clear vegetation along the railway. The main purpose of this is to improve security and reduce the number of trees falling onto overhead lines, but research has shown that removing vegetation along the track can also reduce the number of animals killed. NOK 45 million has been earmarked for clearing vegetation in 2009.

Jernbaneverket has a responsibility to clear up residual soil pollutants on its land, e.g. residues from creosote impregnation. In 2008 work started on an action plan for two locations in Malvik municipality contaminated by creosote.

Jernbaneverket's environmental report 2008 reports on the status of environmental work within Jernbaneverket. The environmental report is available [in Norwegian] on Jernbaneverket's website: www.jernbaneverket.no

European Railway Energy Settlement System (ERESS)

Jernbaneverket is out in front among European railways in terms of energy rationalisation.

Jernbaneverket has been the initiator and driving force behind ERESS, the system which meters, settles and invoices trains for actual energy consumption across national borders. The metering system enables significant reductions to be made in electricity consumption. The system has been developed by the Scandinavian infrastructure managers: Jernbaneverket, Banverket and BaneDanmark. In summer 2008 the Belgian infrastructure manager Infrabel NV joined the partnership. Test solutions were also delivered to several European countries.

Big savings

NSB AS, which has been involved in the project from the start, can already point to big savings when it comes to driving behaviour, consumption by stationary trains and air conditioning. The estimated savings potential at international level is between ten and fifteen per cent. This makes the railway sector more competitive, as well as providing a significant environmental gain.

European Railway Energy Settlement System:

ERESS is operated on a 'non-profit' basis, with all partners having the same rights and obligations. Purchase and operation of ERESS is based on and regulated by a collaboration agreement between the parties. ERESS went into operation on 1 January 2007.

ERESS is organised as a partnership and is led by a steering group. A common administration and operating organisation has been established, led by the 'Electric Power Supply' section within Jernbaneverket. As the number of partners and users increases, the unit cost for each individual party will be reduced. Jernbaneverket will therefore reduce its internal costs as more countries adopt the system. The same will apply to the train companies.

ERESS anticipates harmonisation requirements among the various railway managers in the future and makes it simpler for trains to cross national borders in Europe.

Valuable assets

Jernbaneverket had operating revenues of NOK 4.1 billion in 2008, an increase of 17% from 2007.

In 2008 Jernbaneverket invested NOK 3.1 billion in new constructions and renewal of old infrastructure. This is an increase of around NOK 400 million from 2007.

Productivity development

The political change in 2005, meant an end to operation and maintenance of the infrastructure being exposed to competition. This fact, as well as the subsequent political requirements, strengthened the need for increased investments within:

- Organisation development
- Process development
- Result measurement methods

Using standardised activity and volume concepts, Jernbaneverket is now able to measure the cost of the activities carried out by the operating organisation, but there is also a strong focus on productivity and efficiency in the rest of the organisation.

From cash to accrual accounting

With effect from 1 January 2005, Jernbaneverket was one of several public sector enterprises to switch from pure cash accounting (recording payments received and made) to accruals in a pilot scheme. Accrual accounting will form the basis for control and monitoring of the enterprise. This will provide a better overview of assets and values. Loss of value as a result of wear to infrastructure over time will be apparent and investments will be depreciated successively.

Valuation of assets and liabilities at the time of transition, or the opening balance sheet, will form the basis for the accrual accounting. This work was completed in 2008, contributing to an increase in depreciation of NOK 226 million.

The accrued accounts for 2008 show a loss of NOK 200 million.

Cash accounting

Cash accounting measures income and expenditure on the basis of when the payments are made; in many ways this is similar to people's household accounts. Major purchases (investments) are dealt with in the same way as ordinary operating costs, i.e. they are expensed when the payment is made.

Accrual accounting

Accrual accounting is a public-sector approximation of ordinary business accounts pursuant to the Accounting Act. Revenue and costs are recognised when the work is performed. In the case of major purchases for infrastructure, machines, vehicles, etc., wear over a periode of time is recognised as depreciation.

	NOK million
Result before allocations	**-200.0**
Investments financed by operating assets	631.1
Depreciation and write-downs	-846.2
Treasury balance	15.1
Total allocated	**-200.0**

More financial highlights can be found on page 5.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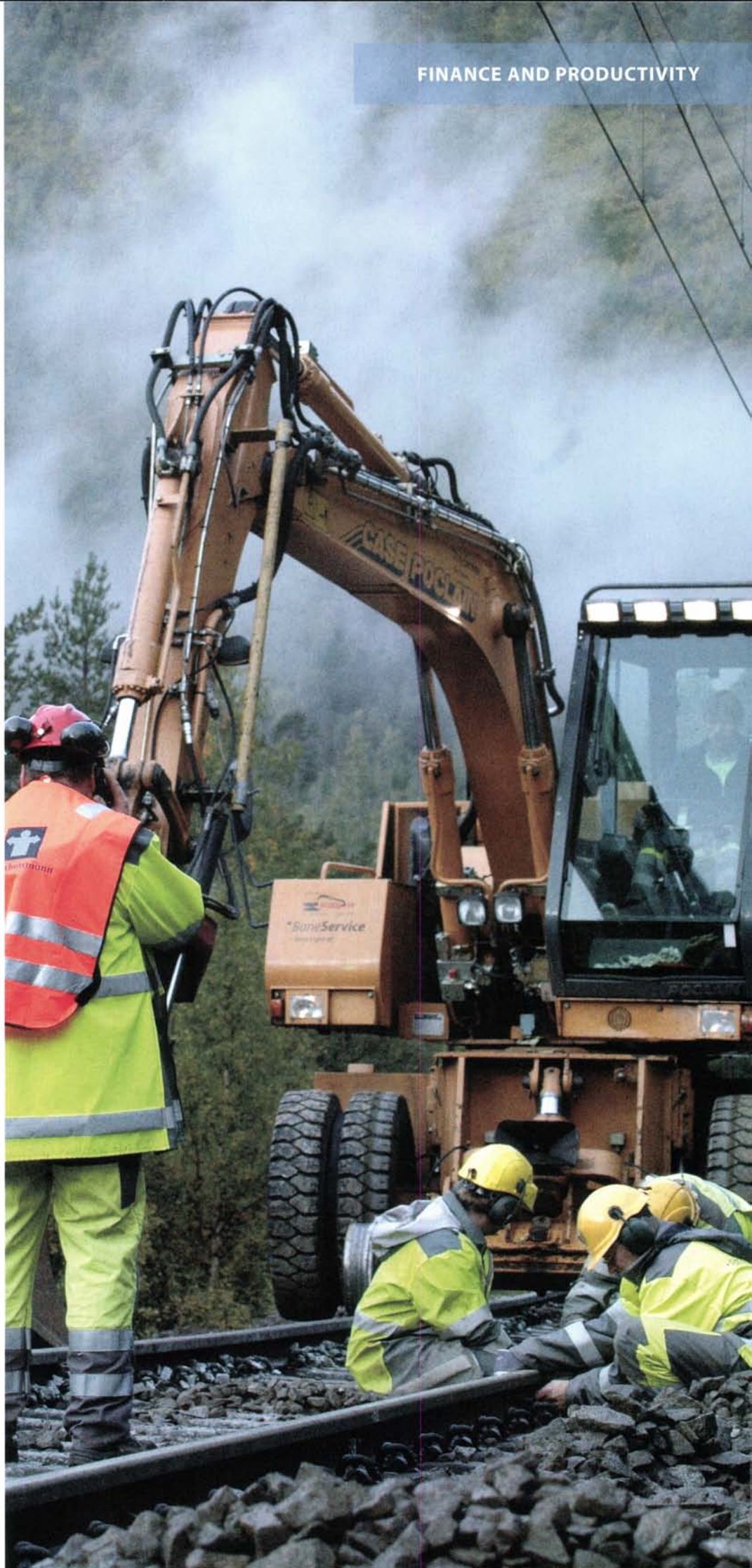

BaneService

Efficient maintenance

Jernbaneverket is a pioneer of new methods and tools for maintenance management.

> **"Inspectors with local knowledge, specialists in all fields of railway engineering and BaneData – an unbeatable combination"**
>
> *Hans Jørgen Bjorvatn*
> *Technical manager,*
> *the Sørland line and*
> *BaneData 'super user'*

Knowing what the problem is

"Keeping the number of breakdowns low and uptime on ageing railway infrastructure at peak level is a challenge. However, good data solutions mean that we have a better overview than ever of the condition of infrastructure objects. We know where vulnerability is highest, and where the maintenance budget achieves the best return. This makes it easier to prioritise work, and enables us to get started on troubleshooting and maintenance more quickly." So says Hans Jørgen Bjorvatn, technical manager of the Sørland line.

Wireless inspectors

Small, advanced PDAs have replaced notebooks and paper forms out on the track. These pocket PCs enable Jernbaneverket's inspectors across the entire railway network to use wireless systems to communicate with technical managers and all members of the railway engineering community within Jernbaneverket using BaneData, Jernbaneverket's database for maintenance control and management.

The transition from paper- to computer-based status reporting has exceeded all expectations. "It has been great to see how inspectors of all ages and with different attitudes to computers have been learning to use fairly advanced information technology," says Hans Jørgen Bjorvatn.

Mobile control by PDA along the track

Spring is a hectic time for Jernbaneverket's section managers and inspectors. This is when faults and defects are reported after a long winter; work out on the track must be followed up and new inspections planned. From Easter through to the autumn they work their way through a long checklist of control points to ensure that all railway-engineering aspects of the network are in good condition and fulfil the requirements for safety, accessibility and quality.

Thermography

A heat-sensitive camera (thermography camera) can be used to show the heat from components transporting electrical energy. The infrared radiation is displayed on the image in different colours, depending on the temperature of the objects.

Regular thermography of the railway's electrical systems can reveal faults at an extremely early stage, often before they cause operational problems and bring

BaneData:

- BaneData is Jernbaneverket's system for maintenance control and management.
- In the course of a year BaneData handles approx. 400,000 work orders and contains exact geographical details, histories and updated status descriptions for 640,000 infrastructure objects (tracks, sleepers, power supply and safety systems). This equipment is subject to regular inspections.
- PDAs (personal digital assistants) are used to check all the objects registered in Jernbaneverket's BaneData infrastructure database.
- 350 inspectors currently use PDAs.
- Jernbaneverket is saving NOK 10-15 million a year as a result of this transition.
- Jernbaneverket carries out maintenance in accordance with the RCM method (RCM - Reliability Centered Maintenance), which originated in the aviation industry and is also used in the nuclear power industry, the hydropower sector, the process industry and offshore.

rail traffic to a stop. Jernbaneverket has two different types of thermography camera. The larger camera is used to check overhead line systems and is installed on the roof of our work trains. The other is a handheld camera which is used for easier access to components in the track, switches, earth connections and similar, which may be inconveniently located for the fixed camera. The handheld camera is also suitable for checking junction cabinets indoor and outdoor, and point heating systems.

The equipment allows more targeted maintenance, which may save significantly on operating costs. Our technical regulations require the systems to be thermographed every five years.

New ballast

Customers need information and punctual trains

Railway customers expect trains to arrive and depart on time, and to be able to find train information easily.

Definition of punctuality

Percentage of trains arriving at their destination on time

On time = 0-3 minutes delay for local, Airport Express and regional services
On time = 0-5 minutes delay for all other trains

Definition of regularity

Percentage of scheduled train services that actually operate

Definition of 'uptime'

Jernbaneverket's operational stability is measured as 'uptime'.
All delays (in hours) for all trains operated as a proportion of total scheduled operating time in the timetable.

Better quality information means fewer complaints

Good quality information is one of the keys to more satisfied customers, and is a mandatory requirement both in normal conditions and when problems occur.

The majority of the complaints made to Jernbaneverket concern missing timetables and lack of information in the event of delays. The number of complaints in 2008 was up four per cent on the previous year. One important task for Jernbaneverket is to improve the quality of information for passengers, and a number of measures have accordingly been taken. Jernbaneverket has started the work to improve the announcement system at 70 stations around the country. These are stations which currently have outdated or in part unreliable systems. The stations in question are on the Ofoten line, the Bergen line, the Nordland line and the Sørland line. The work started in autumn 2008 and is scheduled to run through 2009.

A total of 50 new monitors showing train traffic information have been installed in the Oslo area. The monitors show standard service information when the trains are running normally, but are also able to display alternative information messages when there are problems. More monitors will be installed on a number of lines in 2009. In addition, more people will be employed to help improve the quality of information (train information officers), and the training given to these employees will be improved.

Conditions at many stations are also unsatisfactory, however the number of complaints was down slightly in 2008. Station upgrades therefore have high priority, and in 2009 access to a number of platforms and station areas will be improved.

Ever-improving infrastructure

Jernbaneverket carries out an annual customer survey among the train companies. We do this to gain a picture of how the train companies perceive the performance of Jernbaneverket. In the January 2009 survey the infrastructure category came out slightly lower than last year. A functional infrastructure is crucial to achieving satisfactory punctuality and regularity, and the message from the train companies is that Jernbaneverket needs to step up efforts in this area.

In other respects the survey shows that a higher number than before consider that Jernbaneverket is doing a better job in terms of station maintenance. However, the train companies too think that information at stations is not good enough.

Jernbaneverket's goal is for customers to be satisfied with our performance. Therefore implementation of improvement measures is high on the agenda for the future.

Kolbotn station

More trains will come on time

Jernbaneverket's goal is for 9 out of 10 trains to arrive at their destination on time, but figures from 2006 to 2008 show that both punctuality and regularity have deteriorated over the last two years.

Punctual trains – a challenge

Renewal work gathered pace in 2008 in and around Oslo, where technical systems have been characterised by an unreasonable number of faults. Faults and improvement measures in Oslo meant that the number of punctual trains decreased for large parts of the country.

The building of new double track between Oslo and Asker has resulted in major construction work on the Drammen line (Oslo-Asker). This line is used by trains to towns all over Eastern, Southern and Western Norway, and is key to the punctuality of trains throughout the Norwegian railway network.

Moreover, construction work in connection with the building of the double track on the Jæren line resulted in delayed trains in the Stavanger area, and poor-quality track has led to a large number of speed restrictions on the Dovre line and the Bergen line. However, increased funding has led to greater investments in improved punctuality in 2009.

2008 saw a number of operational problems as a result of bad weather causing damage to overhead lines, power outages, floods, landslides and derailments. In order to maintain safety, it is sometimes necessary to reduce speed through vulnerable areas, which in turn affects punctuality.

Follow developments online

Jernbaneverket seeks to be open about its figures for punctuality and regularity. The latest figures for all services can be found [in Norwegian] on Jernbaneverket's website; select "Punktlighet og regularitet" from the menu.

Passenger trains

Compared with 2007, the number of punctual passenger trains was generally lower in 2008. The Oslo-Halden and Oslo-Gjøvik lines achieved the target, as did the local services Porsgrunn-Notodden, Bergen-Arna, Oppdal-Steinkjer and Bodø-Rognan. The Airport Express maintained a good level of punctuality on trains to Gardermoen at 96%. Regularity for passenger trains was 98.1%.

Freight trains

The Nordland line achieved the target in 2008. Green Cargo achieved an improvement in all its services.

"Capacity cannot be significantly increased until new infrastructure is built. This will permit both higher speeds and resulting in turn in better punctuality"

Elisabeth Enger
Director General

Project Oslo: New life in the Oslo Tunnel

The railway network through Oslo is undergoing an extensive renewal process. Since summer 2008 major work has been carried out on short-term measures in the Oslo Tunnel. Project Oslo covers the Etterstad-Lysaker section.

Extensive night-time work in the tunnel has reduced the number of faults and made the infrastructure in the area more stable.

"The measures we have carried out have quite clearly had a positive effect, particularly in the Oslo Tunnel," says regional director Johnny Brevik. The infrastructure remains vulnerable but greater robustness will be achieved as a result of the long-term measures to be initiated in summer 2009. These measures will continue until 2012. The aim is to significantly raise the standard so as to achieve the best possible stability in the heavily trafficked area. We have high expectations of the introduction of axle counters to replace track circuits. Almost half of the faults in the Oslo area are signalling faults linked to track circuits. It is important to emphasise that extensive work is also required on adjacent sections in the Oslo area – the InterCity area – in order to reduce the number of trains cancelled and achieve the punctuality and predictability we require.

Short-term measures 2008–2009:

Worn-out systems together with grime and layers of dirt on technical installations can conduct electricity, leading to faults in the signalling system. Old and black ballast have been replaced with new ballast, and insulators and other components cleaned. Earth wires have been laid and a number of worn rails replaced.

One important measure in 2008 was the establishment of dedicated service teams which, among other things, have inspected all connectors on Skøyen and in the Oslo Tunnel. There are approx. 100,000 connectors in the tunnel and station areas. Components are being replaced in overhead line systems at Oslo S and in the Oslo Tunnel, and in the track superstructure at Oslo S and Skøyen.

Work to improve the railway infrastructure around Oslo S is in full progress

Examples of the long-term measures June 2009 to 2012:

Superstructure[1]
- replacement of 14 track switches
- new superstructure on the Skøyen–Lysaker section

Substructure[2]
- new guide bushings for cables to be established in the Oslo Tunnel
- drainage measures in Brynsbakken and on the Skøyen–Lysaker section

Signals
- establishing axle counter systems for train detection in the Oslo Tunnel (to go into operation by June 2010). Axle counters are to replace the current system of track circuits[3]

Electricity
- establish new negative boosting transformers[4] in the Oslo Tunnel and for inner approach signals from the Østfold line
- replace feed cables between the Oslo S switching substation and the Østfold line, Loenga and Lodalen
- replacement of components in the overhead line system at Oslo S and in the Oslo Tunnel
- establish longitudinal/sectioned earth wires on the Oslo Tunnel–Lysaker, Oslo S–the Østfold line approach signal and Brynsbakken sections
- new main distributors at Oslo S

Telecommunications
- new fibre optic cable Oslo S–Lysaker
- information system (platform display) on the Oslo S–Lillestrøm and Oslo S–Ski sections

Miscellaneous
- two service teams which will continue to check track connectors in the project area and on suburban train sections

The main plan was completed by the end of March 2009.

1 The superstructure comprises ballast/crushed stone, sleepers, rails and points.
2 The substructure comprises the mass on which the railway track – sleepers and rails – rests.
3 When a train passes from one demarcated section of the track (track circuit) to another, this is recorded in the safety system.
4 Device which 'sucks' the return current from the earth and 'presses' it into the rails or return line.

"Only when the long-term measures have been implemented will the quality of the infrastructure through Oslo achieve the target level"

Johnny Brevik
Regional director

New timetables provide overview

Hourly based timetables
'Hourly based' means that the train departures are displayed in chronological order by departure/arrival time for each individual station.

Hourly based timetables will come into use when the schedules change in June 2008.

The new timetables are now like the timetables used elsewhere in Europe and make it easier for passengers to gain an overview of when trains arrive and depart.

Timetables with departure times will be displayed at all stations and stops where trains stop for people to embark/disembark, while timetables with arrival times will be displayed at terminuses and other busy stations.

Feedback from customers shows that they are largely positive about the change. However, we still face challenges in terms of installing sufficient timetable display stands of satisfactory quality.

Public transport for all

Universal design
Universal design means designing products and environments in such a way that they can be used by everyone to the greatest extent possible without the need for additional adaptation.

Stations' public areas are the arena where Jernbaneverket faces challenges and demands for universal design. Jernbaneverket's strategy is to employ the principles of universal design whenever new stations are built. A long-term plan has also been drawn up for gradual upgrading of accessibility at existing stations in line with universal design. With a network of approx. 360 stations for passenger traffic, built over a period of 150 years to different standards, the upgrade will be a long-term and resource-intensive undertaking.

During 2008 Jernbaneverket worked actively to plan and facilitate universal design of the public areas in a number of stations. This work includes:

- access to the station, within the station area, and from the platform onto the train.
- traffic information
- other travel services

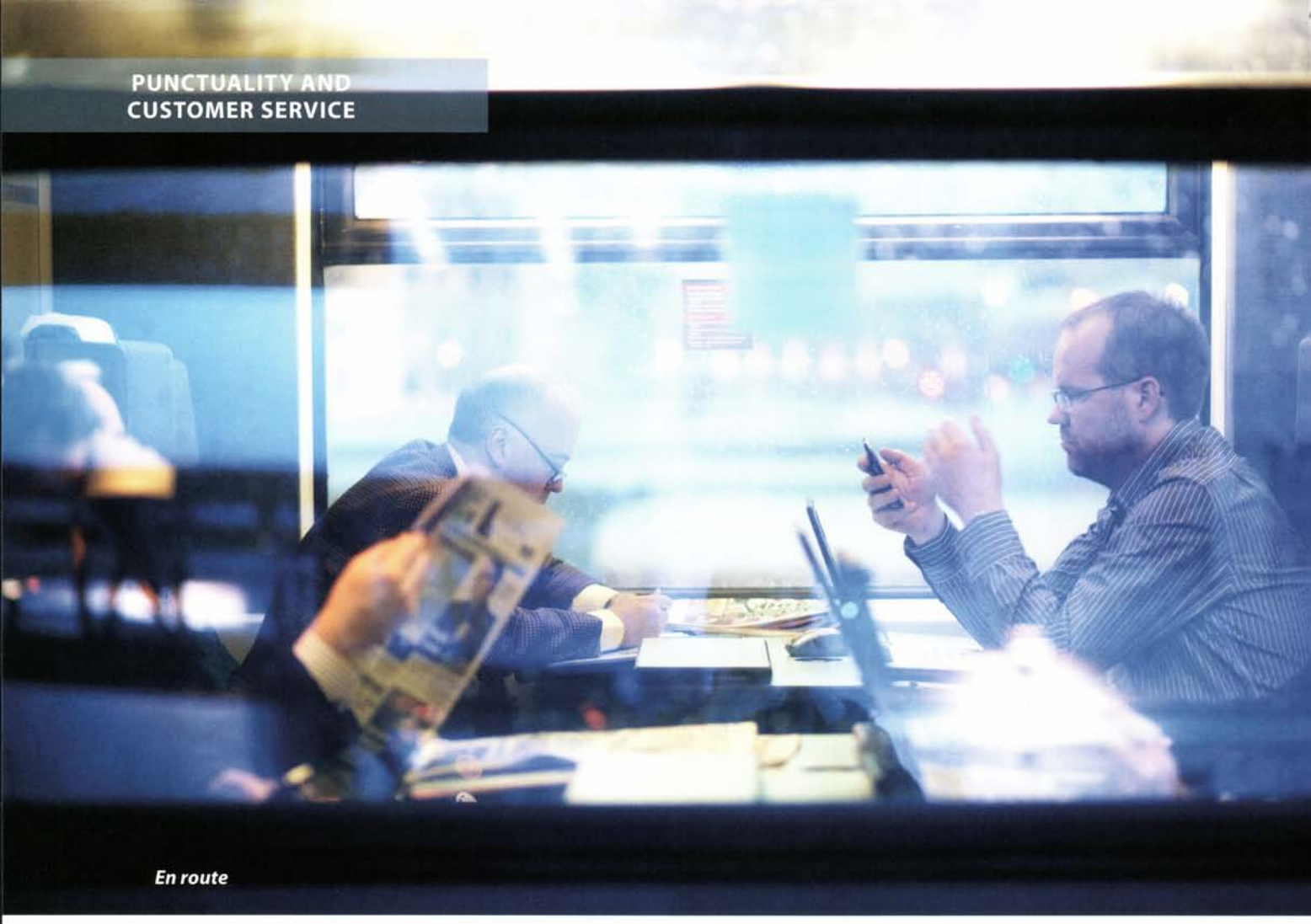
One main challenge in 2008 in the work to realise universal design has been to provide step-free boarding from the platform to the new trains which NSB will take into use from 2012. Together with other measures at the stations, this will provide passengers with significantly improved access to public transport and help to remove barriers currently perceived as discriminatory.

Station parking

It is Jernbaneverket's responsibility to provide satisfactory parking at railway stations.

This should be based on social profitability, and provision is made for other stakeholders to help finance new parking facilities. Jernbaneverket also has a responsibility to set parking charges for commuters.

Access to a number of stations will be improved thanks to the package of measures to increase employment



En route

Efficient train passengers

DID YOU KNOW...

- Freight transport by rail is increasing both nationally and internationally
- The public transport share to and from Oslo Airport Gardermoen is the highest in the world (over 60%)
- One in ten train journeys in Norway is on the Airport Express (5.6 million passengers in 2008)
- Only one in ten train passengers perceive travelling time as a waste.

(Source: Institute of Transport Economics)

A survey of 1,200 train passengers conducted by the Norwegian Institute of Transport Economics (TØI) shows that people make good use of their time on the train.

The opportunity to use modern technology such as PCs, mobile phones, etc. gives the travelling time added value for passengers, whether they are business or leisure travellers. Train journeys also provide an opportunity for social interaction, reading or simply a valuable breathing space in a busy day. Many appreciate the chance to enjoy the view while letting their mind wander.

The results of the survey can be summarised as follows:

- only ten per cent of those questioned felt that their travelling time was wasted
- over half of those who travelled for work reasons used the time to work
- one in four business travellers are paid for travelling time

This means that short travelling times are not as important a competitive advantage in the transport sector as previously. In future it will be possible to make even better use of unbroken travelling times of a certain duration, for example through better facilities for using information and communications technology.

Comfort Class customers happy with onboard Internet

The pilot project offering free Internet access to Comfort Class customers on the Gjøvik line started in 2008.

"The customers are extremely satisfied with the service," says Margareth Nordby-Kringli, manager of the train company NSB Gjøvikbanen AS, "and so we have decided to continue the service in 2009, with the aim of making it even more stable."

New onboard modems are therefore being tested on the Gjøvik line, and work to improve coverage is under way in several places. Internet access is currently free to Comfort Class ticket holders, and this will remain the case for the time being. "Stability has improved," says Nordby-Kringli, "but we won't consider charging until it is good enough."

Connection via the WLAN is easily accessible using a wireless network card. The Internet solution is compatible with all types of operating system, and is ideal for PCs, handheld PDAs or mobile phones with built-in WLAN. The mobile broadband service is provided by Ice.

Margareth Nordby-Kringli

Capacity

The capacity of the railway network determines whether we can handle current traffic, and to what extent we are able to accommodate increased traffic in the future.

Infrastructure capacity means space on the track that can be used to operate trains. The train companies apply for capacity, which is allocated by Jernbaneverket once a year. Jernbaneverket is required to accommodate all capacity requests wherever possible[1]. In several places the capacity of the national railway network is being used above the recommended level.

In 2008 Jernbaneverket received capacity requests we were unable to satisfy.

> **"The railway plays a strategically important role in meeting a strong increase in transport requirements"**
>
> ***Elisabeth Enger***
> ***Director General***

1 The guidelines for Jernbaneverket's allocation of capacity to the train companies are set out in Chapter 4 of the Network Statement. The document can be found at www.jernbaneverket.no/Market

Safety

Railway safety in Norway is extremely good even though traffic is increasing. Jernbaneverket works continuously to prevent accidents and reduce the possibility of collisions at level crossings and on the track.

Transport contributes to economic growth in society, but also increases the risk of injury to people and damage to the environment and property. It is important to keep the risks in check in order to maintain a railway network with an acceptable safety level. As it is responsible for allocating capacity on the railway network, it is Jernbaneverket which monitors the total risk contributions from infrastructure, traffic management and train companies, and from the interaction between them.

Jernbaneverket undertakes line by line risk analyses on the national railway network. Risk analyses are also carried out in connection with any change to technical systems, the man-machine interface, organisational changes or anything else which may impact on railway safety.

Over the last 20 years an average of 6.7 persons per year have lost their lives in connection with the railway.

Level crossings

Level crossings have historically been seen as one of the biggest risks on the railway in Norway. The goal is therefore to reduce the number of level crossings.

At the end of 2008, there were a total of 3,687 level crossings on lines with scheduled services. In 2007 a total of 74 level crossings were dismantled altogether and replaced by other solutions, while five level crossings were equipped with barrier systems. Since 1998 Jernbaneverket has removed around 1,300 level crossings.

ROGER measures safety

ROGER is a familiar name in Jernbaneverket, and most people know that behind the name is a state-of-the-art rail line measurement and inspection vehicle. On board ROGER we find a locomotive driver and an experienced engineer. The vehicle contains advanced technical equipment used to measure the condition of the track and record any changes. This is important information when it comes to initiating maintenance measures.

Geir Harald Ingvaldsen is section leader for the measuring vehicle unit. He explains that, among other things, ROGER measures the surface and geometry of the track. "Grooving and waving on the surface of the rail are measured. This is vital knowledge because it is highly relevant in terms of noise and breakdown of ballast. The measurements can be carried out at speeds between 40 and 160 km/h, and two lasers and a camera capture the movement of the axle.

The geometry of the track is primarily measured using six lasers with associated camera. The measurements can be made at any speed up to 160 km/h. Track width and curvature are recorded, and inclinometers are used to detect super elevation, longitudinal elevation faults and warping in the track. "Correct super elevation is important on bends," says Ingvaldsen, "and warping can present a safety risk if not dealt with."

The geometry of overhead lines is measured using a pantograph equipped with load cells and conventional electronics. Both elevation and lateral location (zigzag) are measured from the centre of the track. "Correct positioning is crucial to prevent overhead lines from being torn down and to avoid power outages,

The measurement and inspection vehicle ROGER at work on the Nordland line

which in turn cause major delays," the section leader points out. The dynamic forces to which the pantograph and overhead line system are subject to while moving are measured too.

Advanced measurement technology enables detailed control

The vehicle is also fitted with equipment to measure the field intensity, bit error rate and quality of Jernbaneverket's GSM-R network. Photographic equipment to document the locomotive driver's view and visibility was installed in 2006. Images are taken every 20 metres. This amounts to a total of approx. 130 gigabytes of images per year, and these are used for everything from desk-based surveys, planning work and illustrations in reports to monitoring of forest clearance, as well as in training simulators for locomotive drivers. "Employees in Jernbaneverket can either use the images individually or 'run' through a section using the Vitafoto software to obtain further details of bridges, level crossings, stations, etc. along the track. Jernbaneverket's accident commission, the National Rail Inspectorate and the Norwegian Accident Investigation Board also use the images in their work," Ingvaldsen explains.

The surroundings are surveyed at low speed (approx. 1.5 km/h) using rotating lasers. This gives an image of the track's location in the terrain. "This enables us to discover potential conflicts between trains and fixed objects such as platform edges, roofs and other items. The follow-up work is then carried out using dedicated computer tools, and forms the basis for decisions on special transportations and maintenance," Ingvaldsen says.

Rotating lasers can also be used for 3D scanning of tunnels. This provides a unique opportunity for subsequent follow-up using advanced computer tools.

Jernbaneverket does not have this type of equipment itself but hires surveying services on the open market.

Georadar is used to 'see' what is present in the ground beneath the track. This is also hired when necessary.

Ultrasound is used to detect cracks in the rails. This is done using hired trains, but verified manually by in-house staff. In-house staff also carry out ultrasound control of rail welds and rail stubs which are to be inserted in the track, and where it is not practical to use hired trains.

International reference

ROGER makes an invaluable contribution to railway safety, and the section leader proudly adds that the vehicle has been used as a reference for equivalent equipment in Korea, China and Switzerland.

"One image of the infrastructure is taken for every 20 metres ROGER covers"

Geir Ingvaldsen
Jernbaneverket

DID YOU KNOW...

- Jernbaneverket has seven weather stations in operation along the railway network and plans to build 20 more nationwide
- 74 level crossings were removed in 2008

New investments in landslide and flood warnings

More precipitation and significant fluctuations in the weather make the railway vulnerable, and in 2008 Jernbaneverket therefore directed its focus to landslides and landslide prevention. In recent years more landslide and flood incidents have led to more frequent closures of railway lines and landslide warnings based on historical data are no longer sufficient.

Jernbaneverket is dependent on reliable meteorological data and a good overview of areas susceptible to landslides. Collaborations have been established with the Norwegian Meteorological Institute, the Norwegian Crop Research Institute, the Norwegian Public Roads Administration and other bodies with climate stations in order to exchange data and build new weather stations. We also work with the Storm Weather Center on simulations to study the consequences of intense volumes of precipitation in small field areas.

The fourth of seven new weather stations along the Nordland line was completed on the south side of Saltfjellet just before New Year 2009. Jernbaneverket and the Norwegian Meteorological Institute have entered into an agreement to standardise weather stations and monitor local weather conditions. This has resulted in seven new weather stations being taken into use along the railway network. A further 20 are planned nationwide. The Nordland line, The Ofoten line and the Bergen line are particularly susceptible to landslides and require particularly careful monitoring.

National landslide survey

Nine new systems for landslide warning and prevention went into use in 2008. Most of the new systems have been built on the Bergen line and the Flåm line, but extensive landslide prevention work has also been carried out on the Grong – Gartland section of the Nordland line. Jernbaneverket has also initiated a national survey of areas vulnerable to landslide in collaboration with geologists. Areas are surveyed to reveal the risk of rocks sliding and falling onto the track. The risk of avalanches, landslides, floods and quicksand slips is also logged in a joint national database. In 2008 this work was led by the Norwegian Geological Survey (NGU) in collaboration with the Norwegian Geotechnical Institute (NGI), the Norwegian Water Resources and Energy Directorate (NVE) and other bodies. The NVE has been appointed as the national landslide authority to coordinate this work with effect from 2009.

All these measures contribute to a safer railway. The surveys mean that Jernbaneverket can to a greater extent implement effective safety measures and simultaneously develop increasingly better emergency response plans for extreme weather situations.

Preparedness for increasing precipitation

Jernbaneverket started introduction of a stepwise emergency preparedness system for large volumes of precipitation in 2002. The procedures have been introduced across the entire railway network and involve more frequent inspection of sections with high levels of precipitation. In the event of extreme volumes of precipitation, railway lines can be closed. The weather stations along the railway record the weather situation in areas which often receive high volumes of precipitation. In conjunction with systematic surveys of landslide risk, the weather stations will help to make the railway safer for locomotive drivers, passengers and railway workers.

In order to reduce the risk of major accidents and serious landslides as a result of climatic changes, Jernbaneverket wishes to increase annual allocations to landslide prevention and warning systems to about NOK 50 million.

Landslide prevention is a natural part of Jernbaneverkets's maintenance work

DID YOU KNOW...

- 1,519 trains operate daily on Norwegian tracks
- a total of 7,000 hectares of forest are to be cleared over the next five to six years to prevent trees falling onto tracks and overhead lines

Forest clearance

Clearance work is primarily carried out to prevent trees falling onto tracks and overhead lines. It also provides better visibility at level crossings, a better view of signs and signals along the line, fewer animal fatalities, and an enhanced travel experience for train passengers thanks to a more open landscape.

Jernbaneverket has drawn up an overall plan for forest clearance along railway lines throughout the country. All main lines – a total length of approx. 3,000 km – will be cleared over the next five to six years at a cost of approx. NOK 150 million.

NOK 15 million was allocated to forest clearance in 2008, starting with the Gjøvik line (Grefsen - Gjøvik 116 km), the Bergen line (Hønefoss - Geilo 160 km), the Sørland line (Lunde - Neslandsvatn 42 km) and a number of shorter track sections on the Spikkestad line, the Østfold line, the Røros line and the Ofoten line.

The allocation for 2009 is NOK 45 million, including an additional allocation of NOK 25 million as part of the package of measures for increased employment. This will enable work on the sections already started to be completed, and measures to be started on the Kongsvinger line, the Oslo-Eidsvoll line and the Dovre line.

The work is carried out by external forestry contractors using a combination of large forestry machines and manual work. Normally a width of 15 metres is cleared either side of the track.

New railway traffic rules

New regulations from the National Rail Inspectorate (SJT), which will replace the current signalling and train operating regulations, come into force when the new timetable period starts in December 2009. The new regulations are more generic than the current regulations and therefore require Jernbaneverket – as the infrastructure manager – to draw up its own detailed rules. Jernbaneverket continued the work on these rules throughout 2008 in the form of a project in which the train companies were involved and consulted on a frequent basis. The draft detailed rules were sent out for consultation in spring 2008 with a three-month deadline for comments. The response was extremely positive on the whole.

Together with the Inspectorate's new train operating regulations, Jernbaneverket's detailed rules will form the basis on which the train companies will draw up their own rule books for locomotive drivers, referred to in the regulations as "the driver's rulebook".

In its work on these regulations, Jernbaneverket has made provision to incorporate the Inspectorate's regulations in the text as well as its own detailed rules, in such a way that the end product "Traffic rules for Jernbaneverket's network" will be a collation of the traffic rules applicable to train driving and track work on the public railway network in Norway.

For internal use in Jernbaneverket, the internal operating instructions and procedures for traffic management and work on and alongside the track will be included in the edition of "Traffic rules for Jernbaneverket's network" applicable to Jernbaneverket's staff and contractors.

'Skier danger' increasing in the mountains

Skiers are a major problem on the high-mountain sections of the Bergen line. Both fatalities and a large number of close calls have occurred as a result of skiers taking chances crossing railway tracks. In recent years Jernbaneverket has run campaigns at relevant times such as Easter and the winter holidays. Announcements have been made in trains, leaflets have been handed out, and notices displayed to warn of the dangers and provide information on crossing safely. Jernbaneverket has also used local and regional media and the national broadcaster NRK Riks to communicate its message.

Forest clearance along the Gjøvik line

Last winter Jernbaneverket had a stand at Finse to provide information on the dangers of crossing the track

Common standard for European railways

Standardisation is important in implementing the EU's goal of free movement of goods and services, and free competition within the supplier market and in the market for transport services. Jernbaneverket is Norway's representative on a number of committees and working groups in European standardisation organisations.

> **"Investing in the railway can give Norway sustainable mobility in the future"**
>
> *Magne Bergerud*
> *Jernbaneverket*

Europe investing in trains

Standardisation work for rail has fallen behind other sectors. This has led to the railway becoming less competitive relative to other transport modes and having difficulties in fulfilling its role in an efficient and sustainable transport system in Europe. This is why the EU took up the issue of standardisation within the railway system in the 1990s. The Directive on the interoperability of the trans-European high-speed rail system came into force in 1996, and an equivalent directive for the trans-European conventional railway system in 2001. These directives have been implemented in Norwegian law in the form of regulations issued pursuant to the Railways Act. The directives require technical specifications for interoperability (TSIs) to be drawn up specifying what is required to achieve safe and efficient international railway traffic. The TSIs are also incorporated in Norwegian law as regulations. TSIs have been drawn up for most so-called subsystems (signals, noise, freight trains, telesystems, etc.). The last TSIs will be issued in 2010.

Since 1997 chief engineer Magne Bergerud has been Jernbaneverket's representative in a number of working groups and EU committees with the goal of implementing railway directives to ensure safe and efficient international railway traffic in Europe (interoperability). Today, a large part of this work is conducted via the group of European Rail Infrastructure Managers (EIM), which in recent years has been Jernbaneverket's most important channel to the EU.

Collaboration lends perspective

Standardisation makes it possible to use expertise across national borders and enables the railway to fulfil its role in the European transport system of the future. In Bergerud's opinion, participating in this work therefore helps Jernbaneverket to help itself. "I think working on things like this is very interesting, and I recognise that it provides a wide perspective in terms of future development of the railway," he adds.

"The last two years have seen an increased will to invest in the railways in Norway. However, totally different dimensions are needed in order to develop a railway which will be able to fulfil its role in the transport system of the future," Bergerud insists.

The trend in Europe is to build new lines for high speed services and free capacity for more freight traffic on the existing, conventional railway system alongside 'local' passenger traffic.

Sustainable mobility by train

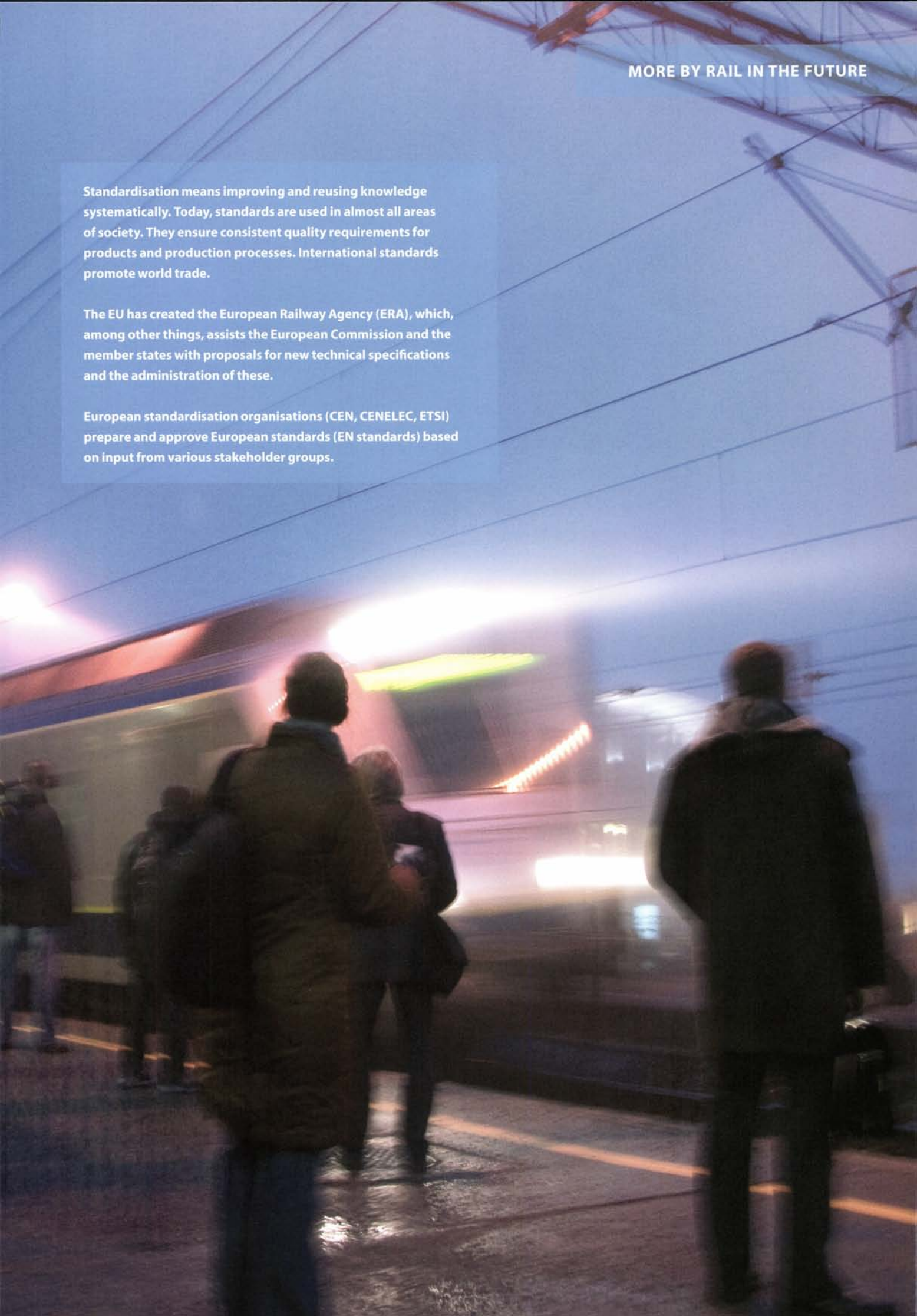
Bergerud believes that as awareness of the environment and sustainable development grows, the railway will play an ever more prominent role in a total transport system.

"In tandem with this development, there are ever more stringent demands for mobility to be sustainable. The only way to achieve this is by significant investment in the railway. The railway is energy efficient and can use renewable energy in areas where this is feasible, like in Norway," Magne Bergerud concludes.

Standardisation means improving and reusing knowledge systematically. Today, standards are used in almost all areas of society. They ensure consistent quality requirements for products and production processes. International standards promote world trade.

The EU has created the European Railway Agency (ERA), which, among other things, assists the European Commission and the member states with proposals for new technical specifications and the administration of these.

European standardisation organisations (CEN, CENELEC, ETSI) prepare and approve European standards (EN standards) based on input from various stakeholder groups.



International railway collaboration

Jernbaneverket is represented in a large number of committees and working groups in international organisations working with railways. There are organisations/groups at Nordic, European and global level.

European Infrastructure Managers (EIM) and the European Railway Agency (ERA)

EIM is first and foremost a special interest and lobbying organisation for infrastructure managers. The ERA functions as a specialist unit on interoperability and safety for the European Commission and the EU member states. The organisation draws up proposals for measures in connection with implementation of the interoperability and safety directive. This work covers the following main areas:

- Interoperability
- ERTMS
- Safety
- Cross-acceptance
- Economic evaluation

More than ten employees represent Jernbaneverket in most of the EIM working groups. Jernbaneverket represents EIM in three ERA working groups.

Nordic Infrastructure Managers (NIM)

Jernbaneverket is represented by 12 to 15 employees in working groups within the following areas:

- Technology
- Environment
- Safety

RailNet Europe (RNE)

RNE is an organisation comprising the majority of European infrastructure managers, which works in the interest of fast and simple access to the European railway system at the same time as improving the quality and efficiency of international railway traffic. The RNE has working groups with six to seven representatives from Jernbaneverket within:

- Traffic
- Operations and quality
- Scheduling
- Law
- Network Statement

Union Internationale des Chemins de fer (UIC)

The UIC operates through projects and activities. Three different fora have been established:

- Infrastructure forum
- Passenger transport forum
- Freight transport forum

A multidisciplinary approach is taken to the following subjects:

- Technology and research
- ERTMS
- Environment
- Safety
- Security

Jernbaneverket is represented in projects, activities and working groups by 25-30 employees.

The European Committee for Standardization (CEN) and the European Committee for Electrotechnical Standardization (CENELEC)

CENELEC's sphere of activity is drawing up voluntary electrotechnical standards (EN) for electrical and electronic goods and services. These standards will contribute to the development of the internal market in the EU/EEA area,

remove barriers to trade, develop new markets and reduce adaptation costs.

CEN's sphere of activity covers most areas other than those covered by CENELC and the telecoms area.

CEN TC256 (Technical Committee) and CENELEC TC9X work on standardisation within the railways. Jernbaneverket is represented in these technical committees, subcommittees and working groups by 10-12 employees.

Other Nordic, European and global organisations

Jernbaneverket is also represented in a number of other Nordic, European and global organisations by 10 or more employees.

One Stop Shop (OSS)

Among other things, Rail Net Europe (RNE) offers the train companies a network of customer contact points called 'One Stop Shops' (OSS), which are intended to make it easy to be allocated routes through Europe. Thanks to this network, customers only need to contact one of these contacts to obtain the necessary track access for international railway traffic. Consultant Britt Jorun Øverstad is Jernbaneverket's representative in RailNet Europe's OSS Network.

"I receive and co-ordinate enquiries from both new and existing train companies," Øverstad explains. "This concerns both national and international issues. As well as questions on and orders for international routes, there can also be questions on everything from track and terminal capacity and the need to upgrade infrastructure to how to obtain CTC keys and GSM-R telephones," she adds.

"I think it's important for Jernbaneverket to get involved in international work. We should be able to offer the train companies co-ordinated procedures independent of the countries in question. This is why things such as deadlines for ordering routes and the transition to new timetable periods have now been harmonised," she explains.

"As a result of participating in meetings (OSS working group), I now have a network of colleagues almost everywhere in Europe, and this naturally makes it easier to make contact when the train companies need help and information," she concludes with a smile.

"Helping to develop international railway collaboration is exciting!"

Britt Jorun Øverstad
Jernbaneverket

National Transport Plan 2010-2019: An essential maintenance boost for the railway

On 13 March 2009 the Government submitted the National Transport Plan (NTP), setting out its commitment to passenger and freight transport over the next 10 years. The proposal represents a significant boost to the railway, and is an extremely positive contribution to the work to create a robust and reliable railway.

"It's pleasing that, in the NTP, the Government is showing a strong will to invest in the railway," commented a satisfied Director General Elisabeth Enger after the proposal was submitted. She was particularly pleased with the significant increase in maintenance.

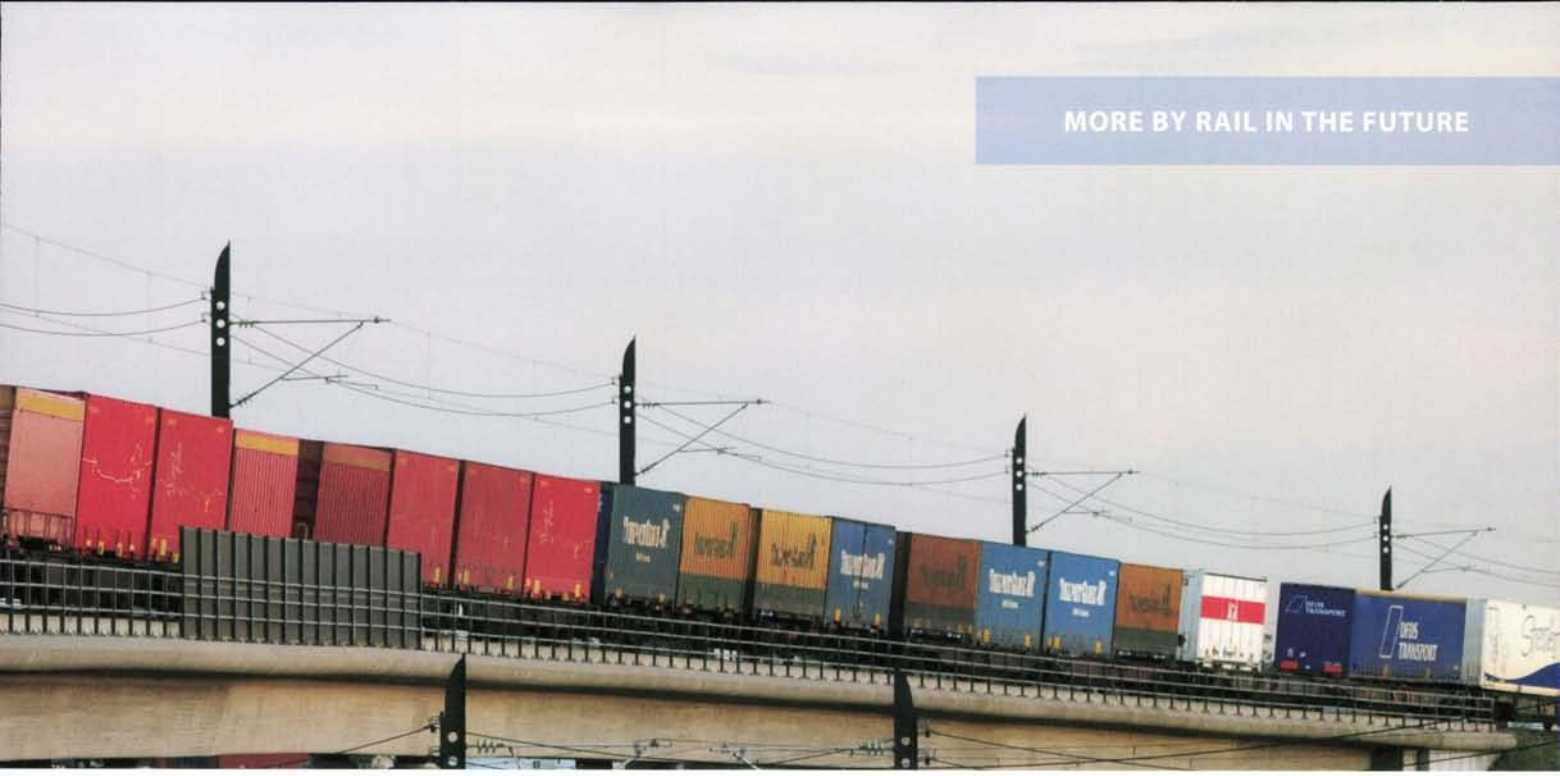
With this plan the Government contribute to an essential upgrading of existing infrastructure. In addition, the construction of new double track around the major towns in Eastern Norway is the priority. Both elements are a precondition for improving punctuality and regularity for passengers and freight transporters. Over the period in question, Jernbaneverket will be able to facilitate the transfer of almost twice as much freight transport from the roads to the railway.

Higher speed and shorter journey time

The Government's proposals entail a 55% increase in maintenance compared with the period covered by the previous plan. Together with the construction of passing loops and double track, this will contribute to increased capacity and regularity in train traffic. Jernbaneverket's target of doubling freight capacity by 2020 has also been incorporated. Provision has been made for Jernbaneverket to build 116 km of double track, 28 km of single track and around 45 new passing loops over the plan period.

Big investments

As well as being able to complete projects already in progress, the NTP proposes prioritising a number of major new investment projects. This includes construction of new double track between Oslo and Ski, which will be completed over the course of the plan period.



Completion of ongoing projects

- double track Lysaker – Sandvika and Lysaker station
- double track Barkåker – Tønsberg
- Alnabru freight terminal
- double track Sandnes – Stavanger
- capacity expansion between Bergen station and Fløen
- remote control Mosjøen – Bodø
- the Gjevingåsen Tunnel

New projects

- new double track Oslo – Ski
- subsections of double track at Holmestrand
- new, shorter section between Farriseidet and Porsgrunn (the Eidanger Link)
- double track Sandbukta – Moss – Kleberget and Kleberget – Såstad (the Østfold line)
- double track Langset – Kleverud – Steinsrud (the Dovre line)
- Bergen – Arna: two tracks through Ulriken
- upgrading of Trondheim – Steinkjer section

When you take the train instead of a car, bus or plane,
you are doing your part to reduce the burden on the environment.
Someone will be grateful for that in the future!

See www.jernbaneverket.no

Jernbaneverket

Jernbaneverket – a good place to work

- A forward-looking organisation in rapid development
- HIghly skilled co-workers and a community characterised by professionalism, commitment, openness and team spirit.
- Good opportunities for specialist development and further training
- Access to company cabins all over Norway
- Beneficial banking and insurance services via Jernbanepersonalets Bank og Forsikring, specialist banking and insurance services for railway employees
- Beneficial pension conditions via the Norwegian Public Service Pension Fund, with a paid contribution equivalent to 2% of salary
- Flexible working time and leave arrangements
- Payment for overtime
- Annual season ticket for NSB trains

Current vacancies will be found at www.jernbaneverket.no/jobb

Contact details

Jernbaneverket's units are located at several sites throughout the country. For more detailed information, visit our website at www.jernbaneverket.no or ring our national switchboard:

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Published by: Jernbaneverket, Oslo, June 2009
Print run: 500
Layout and design: Geelmuyden.Kiese
Front page photo: Lillian Jonassen
Other photos: Arvid Bårdstu, Bjørn Skauge, C&Z, Dag Svinsås, Geir Aasheim, Hilde Lillejord, Inge Hjertaas, Jan B. Henriksen, Kyrre Lien, Lillian Jonassen, Rune Fossum/Jernbanefoto.no, Sindre Ånonsen, Steinar Austli, Tore Holtet, Øystein Grue

Printing/production: Merkur Trykk
English translation: Amesto Translations AS

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