

ANNUAL REPORT 2022

Norwegian Safety Investigation Authority

Rail Department

Lillestrøm, 30 September 2023



Table of contents

1. NORWEGIAN SAFETY INVESTIGATION AUTHORITY	4
1.1 NSIA activities and key figures	4
1.2 Organisation as of 31 December 2022	5
1.3 Selected key figures from the annual accounts	5
1.4 Goal	6
1.5 About this report.....	6
2. RAIL DEPARTEMENT'S ACTIVITIES AND GOAL ACHIEVEMENT	7
2.1 Notification of accidents and incidents	7
2.2 Investigations	7
2.3 Published reports	10
2.4 Safety recommendations	13
2.5 Developments over the past three years	13
2.6 Other activities	13
2.7 Goal achievement	14
ANNEXES	15

1. Norwegian Safety Investigation Authority

1.1 NSIA activities and key figures

The Norwegian Safety Investigation Authority (NSIA) is an administrative agency under the Ministry of Transport. The NSIA is an independent expert body.

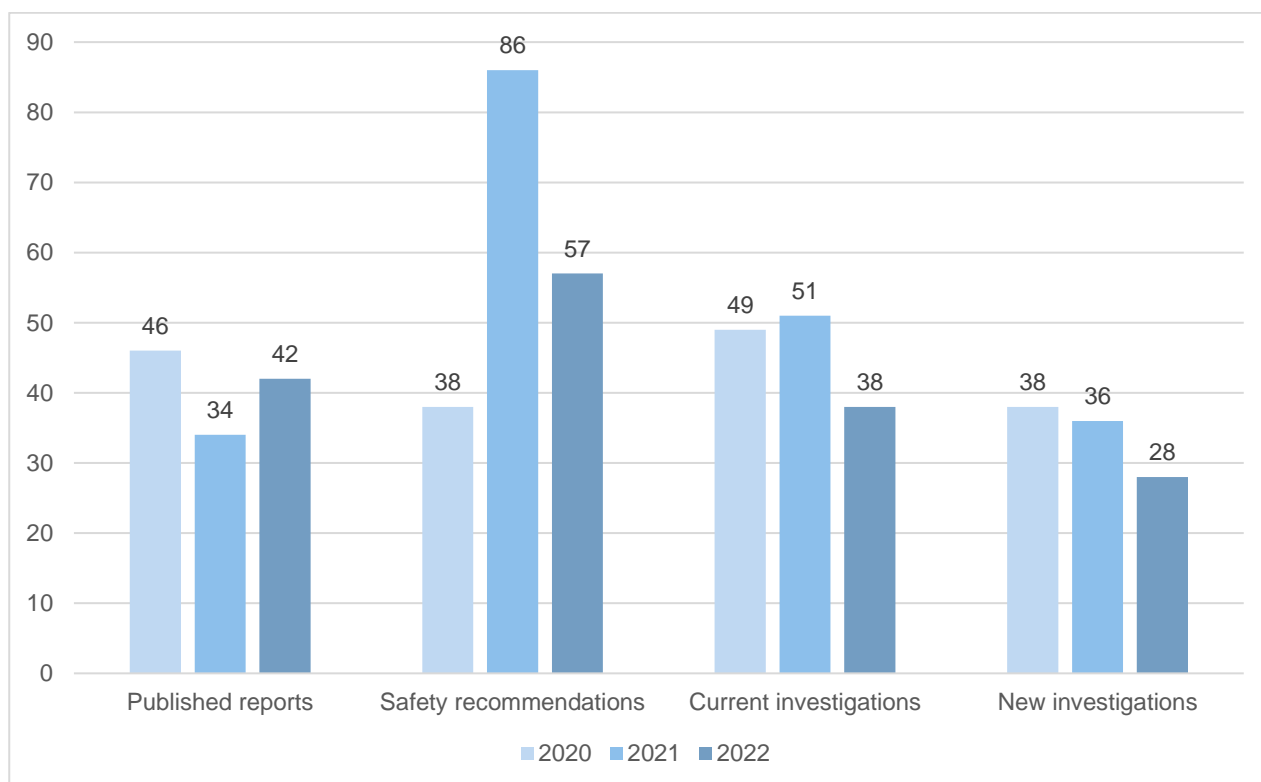
The NSIA investigates accidents and serious incidents in the aviation, rail, road, marine and defence sectors. The purpose of the investigations is to elucidate matters deemed to be important for the prevention of accidents in the transport and defence sectors, but it is not the NSIA's task to apportion blame or liability under criminal or civil law. The NSIA decides the scale of the investigations to be conducted and this includes making an assessment of the investigation's expected safety benefits in relation to necessary resources.



The NSIA is located in Lillestrøm. Photo: NSIA

The disciplines road, aviation and rail transport fall under the Ministry of Transport's area of responsibility. Marine transport falls under the Ministry of Trade, Industry and Fisheries, while the Ministry of Defence is responsible for the defence sector.

The diagram below shows the NSIA's total production of reports and safety recommendations, the number of ongoing investigations at the turn of the year and investigations initiated per year for the past three years. In chapter 2 the figures are shown for the rail department.



1.2 Organisation as of 31 December 2022



The NSIA consists of four technical departments, one administrative department and an advisory staff unit. The head of the Aviation Department coordinates the follow-up of the Defence Accident Investigation Act and the pertaining Regulations.

The NSIA had 53 permanent employees at 31 December 2022.

1.3 Selected key figures from the annual accounts

Key figures from the annual accounts	2022	2021	2020
Number of employees*	53	55	54
Number of contracted FTEs*	51	54	48
Number of FTEs worked**	48.4	50.5	44.0
Total appropriations (NOK)	94,919,000	93,673,000	83,804,000
Utilisation of appropriations	95.7%	91.2%	94.2%
Operating expenses	90,817,869	82,534,144	77,047,785
Payroll expenses as a percentage of operating expenses	68.3%	73.8%	68.9%
Payroll expenses per full-time equivalent	1,282,025	1,206,671	1,206,188
Consultancy fees as a percentage of total payroll expenses	10.0%	3.7%	7.9%

* Source: Statistics Norway table '12623 Government employees, by unit'. Data collected through the A-ordningen service.

** One full-time equivalent is defined as one person working full time for one year. Other periodic work measurements (monthly, quarterly, four-monthly) are defined as full-time work throughout the period in question. The Ministry of Local Government and Modernisation has defined the concept of 'full-time equivalents worked', cf. personnel notification of change to the Personnel Handbook for State Employees: PM-2019-13: Definisjon av utførte årsverk.

1.4 Goal

The NSIA's main objective for 2022 was as follows:

'The Norwegian Safety Investigation Authority shall contribute to improving safety through independent investigations of accidents and serious incidents in the aviation, rail, road and defence sectors, and of marine accidents and work accidents on board ships.'

A subsidiary objective was that:

'Investigation reports, including any safety recommendations, shall be submitted within 12 months of the accident or serious incident occurring. If the time limit cannot be met, an interim report shall be made at least every 12 months.'

1.5 About this report

By 30 September every year the investigating body shall publish an annual report accounting for the investigations carried out by the rail department in the preceding year, the safety recommendations that were issued and actions taken in accordance with recommendations issued previously. This report is sent to European Railway Agency and is an extraction from the official annual report for NSIA, which can be found on <https://www.nsia.no/About-us/Annual-report>. In addition, an annex providing status for the safety recommendations has been added.

2. Rail department's activities and goal achievement

2.1 Notification of accidents and incidents

The Rail Department was notified of 329 railway accidents and serious railway incidents in 2022, compared with 281 in 2021. This is the highest number reported in the past ten years. About 66% of the notifications were received outside normal working hours, and just over 20% were received at weekends or on movable public holidays. The Rail Department is often notified of the same incident by both the railway undertaking and the infrastructure manager, and in some cases also the police, which means that the number of calls received by the duty officer is higher than the number of incidents recorded.

The number of notifications received per month varied from 13 in March to 42 in October, an average of 28 per month. Most accidents and incidents were reported Monday–Friday, which reflects the weekly pattern of train traffic.

In 2022, the Rail Department was notified of 31 railway accidents and 283 serious railway incidents. Fifteen notifications were registered as non-reportable incidents.

Notifications are received via the 24/7 duty phone. Dealing with such notifications requires considerable effort by the department, as notifications received at an early stage are often based on limited knowledge about the severity of the accident or incident. A decision on whether to initiate an investigation must be made quickly, so that rolling stock/vehicles and infrastructure can be released and traffic resumed.

The most common accident and incident types this year, as before, were signal passed at danger, persons on the track and level-crossings incidents. There were 16 fatal accidents assumed to be self-inflicted. The NSIA does not investigate these incidents any further, but relies on the police's work.

The number of reported railway accidents and serious railway incidents received (72-hour reports) was 1,056 in 2022, compared with 929 in 2021 and 930 in 2020. The figures have not been adjusted for double reporting, nor for any subsequent reclassification. Every report is reviewed and assessed in terms of what lessons one can expect to draw from an investigation with a view to improving safety.

The figures presented herein do not represent Norway's official accident and incident statistics, as the preparation of such statistics does not fall under the NSIA's remit.

2.2 Investigations

The department published eight investigation reports in 2022. No preliminary reports or notifications of safety-critical factors were issued in 2022.

A number of preliminary investigations are also carried out to obtain further information in order to decide whether or not to investigate a reported incident. Relevant information is filed to allow for subsequent use of data in similar cases. The amount of time spent on investigations of this type varies from a few hours to several days.

The Rail Department visited accident sites on six occasions in the course of 2022, compared with seven in 2021.

2.2.1 Current investigations

At the beginning of 2023, the department had six ongoing investigations.

An overview of the Rail Department's ongoing investigations can be found on the NSIA's website. The information is updated regularly.

The Rail Department's investigation portfolio as of 31 December 2022:

Date	Title	Type of transportation	Category of occurrence
4 Nov. 2022	Investigation of a landslide incident with subsequent derailment of a freight train at Heskestad, Sørlandsbanen	Freight train	Derailment/collision
23 Oct. 2022	Investigation of a serious railway incident at the Alnabru shunting yard	Shunting	Runaway train
31 May 2022	Investigation on collision between tractor and passenger train at Hagamælen level crossing, north of Støren station	Passenger train	Collision
11 May 2022	Investigation of near-collision between freight train and passenger train at Bolna Station on Nordlandsbanen	Freight train / Passenger train	Collision
26 Sept. 2021	Investigation of fire in a snow shed between Vegårshei and Selåsvatn on Sørlandsbanen		Fire and smoke development
27 July 2021	Investigation of short circuit and subsequent fire in catenary and signalling system at Sandefjord Station		Fire and smoke development / Infrastructure events

Two of the investigations are given special mention below.

On **Tuesday 31 May 2022** at about 06:45, SJ Norge AS's passenger train 411 from Røros to Trondheim collided with a tractor at Hagamælen level crossing just north of Støren station.

The driver of the tractor died in the crash. Hagamælen level crossing is protected by a signalling system with both lights and sound. The road runs parallel with the railway line and crosses the tracks in a kind of s-curve.

Level crossings represent one of the greatest risks in rail operations. The NSIA recognises the need to address the issue regularly in different ways in order to raise awareness.



Photo: NSIA

On **Friday 4 November 2022** at around 02:00, a freight train ran into a landslide at Heskestad on the Sørlandsbanen Line. The landslide was 10 to 15 metres wide. The collision caused the locomotive and 6 of 12 wagons to derail.

At the scene of the accident, the railway line runs along a steep slope in the terrain. Below the railway, there is a municipal road that runs along Heskestad lake. Soil detached from a slope above the railway and down onto the railway track.

The driver sustained minor injuries in the collision. The locomotive and wagons sustained major material damage, and there was also damage to sleepers and tracks.

In Norway, stretches of railway often run through terrain where there is a risk of landslides and avalanches. Climate change is expected to result in more frequent heavy precipitation, and in this investigation, the NSIA will elucidate issues such as landslide protection and weather response procedures.



Photo: NSIA

2.3 Published reports

Eight investigations were completed in 2022. They resulted in the following reports:

- 2022/08 Report on faulty interlocking system at Jar metro station on the Kolsås line on 27 November 2021
- 2022/07 Report on fire in locomotive at Sarpsborg station on the Østfold Line on 2 October 2021
- 2022/06 Report on serious railway incident at Rosenholm stop on the Østfold line 14 April 2021
- 2022/05 Report on collision between two trams at Storo in Oslo on 3 July 2021
- 2022/04 Report on derailment at Straumsnes station on Ofotbanen on 9 December 2021
- 2022/03 Report on collision between a passenger train and a truck at Loenga on 3 March 2021
- 2022/02 Report on collision between a road-rail machine and a Robel 25 Track Vehicle close to Øvre Vang level crossing on 9 February 2021
- 2022/01 Report on derailment on the corner of Parkveien and Welhavens gate in Oslo on 22 January 2021

One of these reports was translated into English in its entirety. The rest of the reports have summaries and safety recommendations in English.

A more detailed discussion of two of these reports is given below.

2022/04 Report on derailment at Straumsnes station Ofotbanen on 9 December 2021

On Thursday 9 December 2021 at around 04:00, an ore wagon travelling in the direction of Sweden derailed at Straumsnes station. The derailment was detected by one of Bane NOR's detectors and the train was stopped and checked. The driver carried out a visual inspection of the train, but did not find any derailed wagons. The train then continued for six kilometres to Rombak station, where it received another derailment detector alert. The new inspection revealed that wagon number 12 had derailed. The derailed wagon had caused major damage to the infrastructure.

The NSIA's investigation has shown that the cause of the derailment was that the derailed wagon was unevenly loaded. This caused one of the wheels to be lifted off the track in a curve, and the wagon derailed.

In the time before the derailment, the temperatures had been low, and this may have caused the iron ore to freeze. The method used for unloading caused the iron ore to freeze high up on one of the sides of the car body. No need had been identified or procedures established for visual inspection of the car bodies prior to departure from Narvik.

Bane NOR's detection system at Straumsnes station had detected and registered increasingly uneven side-to-side loads in the train. The detector in question was not programmed to warn about dangerous faults of this type, however. Similarly, one of the Swedish Transport Administration's detectors in Sweden was set up to issue warnings concerning the weight of the train, but not uneven side-to-side loading. The dangerous situation was therefore allowed to develop without anyone being aware of it, and thus no measures were taken.

The NSIA issues one safety recommendation following this accident concerning the use of detector data.



Photo: NSIA



Photo: NSIA

2022/05 Report on collision between two trams at Storo in Oslo on 3 July 2021

On Saturday 3 July 2021, trams number 132 and 135 collided at Storokrysset junction in Oslo. Tram 132 was heading to Oslo city centre from Kjelsås, while tram 135 was heading from the city centre towards Kjelsås. The tram usually drives straight ahead towards Storokrysset, but there are tracks at the junction that are used by trams heading towards Grefsen station or the depot and workshop at Grefsen. The last tram to pass the points had been on its way to the workshop, and the points were therefore set to the left. As the tram passed the points, the driver did not notice which direction the points were set to.

The NSIA has not identified any definite reason for this, but the driver had been involved in a collision with a car at Dronning Eufemias gate some days earlier, which might have had a bearing

on the driver's performance. The car traffic in the Storokrysset junction, which the driver perceived as demanding, also took a lot of his attention.

The NSIA finds it unfortunate that a driver may have operated a tram without feeling fit to do so. This was not detected – not by the staffing manager, the head of section or by the driver himself. The NSIA understands the challenges involved in identifying issues and providing assistance following an incident if the driver does not ask for support. Based on the above, Sporveien Trikken should consider whether the undertaking has sufficient principles and processes in place to compensate for the human factor and identify such issues.

Following the collision on Saturday 3 July, it was proposed that the driver should be accompanied by an instructor on his first shifts after returning from holiday. Due to a failure of communication between heads of sections, the measure was not implemented.

Based on Sporveien Trikken having addressed the problem and implemented measures, the NSIA does not issue any safety recommendations following this investigation.



Photo: Sporveien Trikken AS

2.4 Safety recommendations

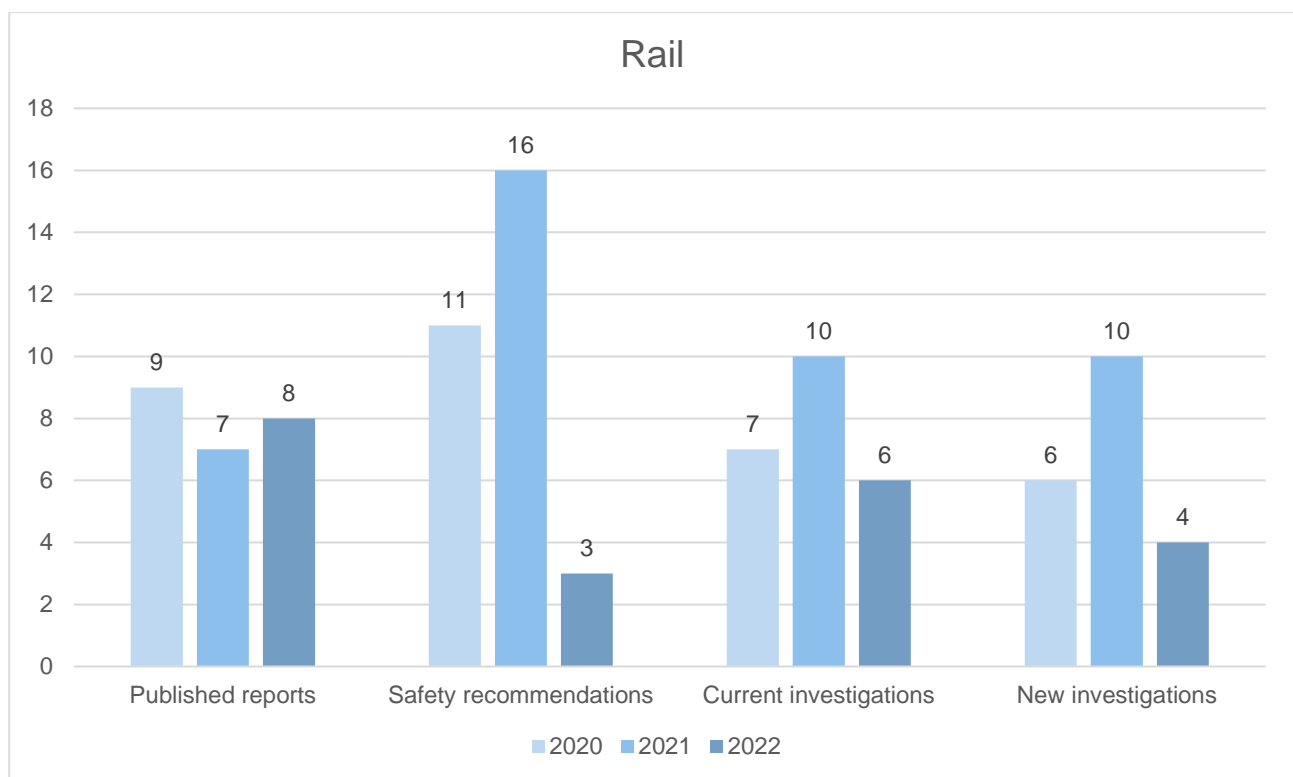
The Rail Department issued three safety recommendations in 2022.

Reference is made to Annex B, which contains an overview of all safety recommendations in the rail area.

Twice a year, the NSIA is informed of the status of the safety recommendations in a letter from the Ministry of Transport. The most recent report, dated 27 June 2022, covered the second half of 2021 and the first half of 2022. None of the safety recommendations issued in 2022 have been closed.

2.5 Developments over the past three years

The diagram shows the trends in submitted reports, safety recommendations, ongoing investigations at the turn of the year and initiated investigations per year for the past three years.



As the figure shows, the number of safety recommendations issued varies from one year to the next. The reasons for this are complex, and the number varies with the number of completed reports and the complexity of and number of parties involved in a case, among other things. If the NSIA has recently submitted a safety recommendation on the same topic, it will be natural to wait until the measures have had time to take effect before considering repeating the message in another safety recommendation. The NSIA also expects the content of its reports to be used in the work to improve safety, not just the individual safety recommendations.

2.6 Other activities

In 2022, the Rail Department attended three network meetings for European rail accident investigation bodies held by the European Union Agency for Railways (ERA). Two were held as virtual/hybrid meetings, while the last meeting took place near ERA's headquarters in Valenciennes.

In 2022, the NSIA has participated in a working group that is currently working on a future ERA reporting system. Because of the work method and the COVID-19 pandemic, all the group's meetings have so far been digital.

Pursuant to Regulations No 378 of 31 March 2006 on Public Investigations of Railway Accidents and Serious Railway Incidents etc. (the Railway Investigation Regulations), the NSIA shall, by 30 September each year, prepare and publish a report describing the investigations carried out in the course of the preceding year, the safety recommendations issued and their status. The report for 2021 was prepared and published within the deadline. It is available on the NSIA's website under Rail.

The NSIA registered its interest in participating in an observer capacity in the peer review programme for accident investigation bodies in Europe. The objective of the programme is to facilitate the identification of best practice and point out any areas where improvements are needed in the way work is organised or carried out. The programme is led by the Swedish Accident Investigation Authority.

The Nordic rail accident investigation meeting was held in York in May 2022. Representatives of the accident investigation bodies of Denmark, Finland, Sweden and Norway took part in the meeting, as well as representatives from ERA, the UK, Ireland and Estonia.

Two contact meetings with the Norwegian Railway Authority are held each year. In 2022, contact meetings were also held with Bane NOR SF, Sporveien T-banen AS and Sporveien Trikken AS, in addition to a larger meeting to which representatives of all the passenger and freight transport companies were invited. In connection with investigations, meetings are also held with relevant parties at different levels of the organisation.

Since 2013, the department has given more than 50 lectures as part of the Norwegian Railway Academy's training of new train drivers. This helps to raise knowledge about the NSIA among all new train drivers. Seven lectures were held in 2022.

2.7 Goal achievement

The Rail Department completed eight investigations and issued three safety recommendations in 2022. The main reason why reports are published without safety recommendations is that the enterprise concerned has already addressed the issue and implemented measures. The NSIA assumes that the entire report will be used for safety learning purposes, not just the safety recommendations. Three investigations were completed within 12 months of the date of the accident or incident, and the remaining were published after 12–17 months.

Through its investigations, the NSIA makes important contributions to safety in the sector. The undertakings concerned make direct use of the safety recommendations and reports in their safety work. In addition, the Norwegian Railway Authority uses the reports as a basis for its audit programme.

Feedback received by the NSIA indicates that the reports and safety recommendations maintain good quality and are included in the curriculum used for training new train drivers and for in-house training by the railway undertakings. The NSIA translates the summaries, conclusions and safety recommendations from all its published reports into English, which helps to make the results of our investigations available to an international audience.

Annexes

Annex A

Safety recommendations 2022 – Rail

The safety recommendations are translated from Norwegian language. The Norwegian text remains the official version of the safety recommendations. Should ambiguity arise between the two, the Norwegian text takes precedence. Status is given per 31 December 2022.

Report title	Safety rec. No	Safety recommendation	Ministry of Transport Status report.	Status
Report on derailment at Straumsnes station Ofofbanen on 9 December 2021	2022/03T	<p>On 9 December 2021 at 03:15, Railcare T's train 42601 derailed at Straumsnes station on the Ofoten line. The cause of the derailment was an unevenly loaded ore wagon. The uneven load was registered by Bane NOR SF's detector system, but the system was not configured to issue a warning.</p> <p>The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority request Bane NOR SF to establish systems to ensure that the relevant railway undertaking and the traffic controllers are informed of dangerous situations identified by the detector systems on the Ofoten line.</p>	Bane NOR informs that they have introduced a routine to share data from the monitoring system FleetONE from Ofofbanen. Bane NOR works to evaluate what can be taken out of data operationally with current sensors and technology. Bane NOR states that they will also evaluate how data from the monitoring system can be used operationally through alerts and alarms on dangerous conditions detected by the sensors, including what kind of conditions and threshold are needed to trigger an alarm and further actions based on these.	Closed
Report on collision between a road-rail machine and a Robel 25 Track Vehicle close to Øvre Vang level crossing on 9 February 2021	2022/02T	<p>On Tuesday 9 February 2021, a collision took place between a road-rail machine and a Robel 25 near Jevnaker. The immediate cause of the collision was that the road-rail machine was operated in a way that put its safety systems out of action. Bane NOR SF's supplier Spordrift AS had not identified the necessary skills required to operate the machine, nor carried out any systematic training in the machine's functions. Shortly before the accident, Spordrift AS had been issued an ISO 9001 certificate as a full service supplier of construction, operation and</p>		Open

		<p>maintenance services for railway-related infrastructure. However, the management system was not an effective means of identifying competence needs and thereby training needs in the company.</p> <p>The Norwegian Safety Investigation Authority recommends that Norwegian Accreditation evaluate whether its procedures for granting accreditation to certification bodies in this industry are sufficient to achieving the purpose of an ISO certification.</p>		
Report on collision between a road-rail machine and a Robel 25 Track Vehicle close to Øvre Vang level crossing on 9 February 2021	2022/01T	<p>On Tuesday 9 February 2021, a collision took place between a road-rail machine and a Robel 25 near Jevnaker. The immediate cause of the collision was that the road-rail machine was operated in a way that put its safety systems out of action. Bane NOR SF's supplier Spordrift AS had not identified the necessary skills required to operate the machine, nor carried out any systematic training in the machine's functions.</p> <p>The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority request Bane NOR SF to follow up that suppliers have adequate systems in place to identify competence needs and provide appropriate training to ensure compliance with Bane NOR SF's safety policy.</p>	<p>Bane NOR informs that they have carried out measures related to the recommendation. These measures includes risk assessment for increased use of rail/road machinery and how this affects the risk picture. In order to clarify the competence requirements for type training, the relevant instructions have been updated. It has been decided that a register of approved operators and those who work in and near Bane NOR's infrastructure will be established. Bane NOR wants a system where the employer can upload documentation into the register and confirm that the requirements have been met at all times.</p>	Closed