Norwegian Safety Investigation Authority

ANNUAL REPORT 2021

Norwegian Safety Investigation Authority

Rail Department

Lillestrøm, 30 September 2022

Index

1. Norwegian Safety Investigation Authority

1.1 NSIA activities and key figures

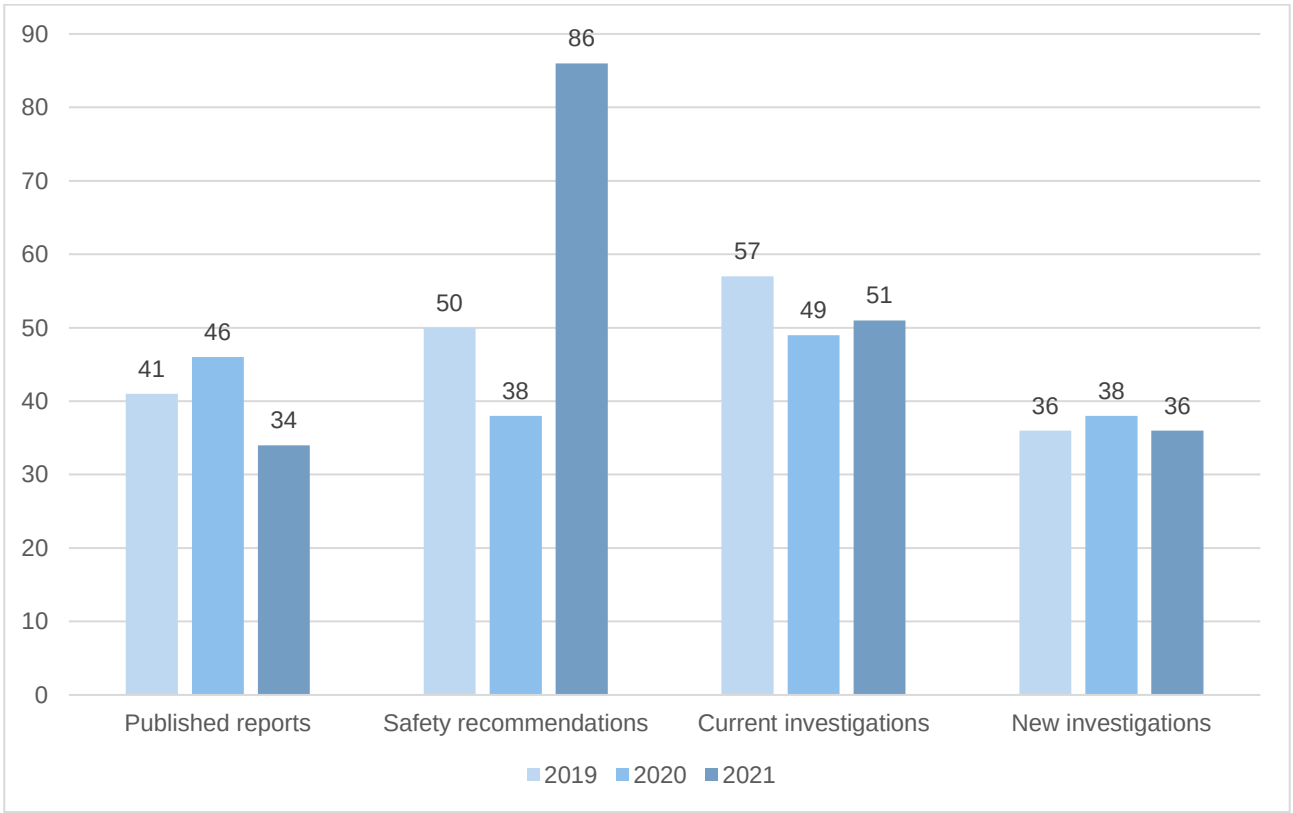
The Norwegian Safety Investigation Authority (NSIA) is an administrative agency under the Ministry of Transport. The NSIA is an independent expert body.

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.

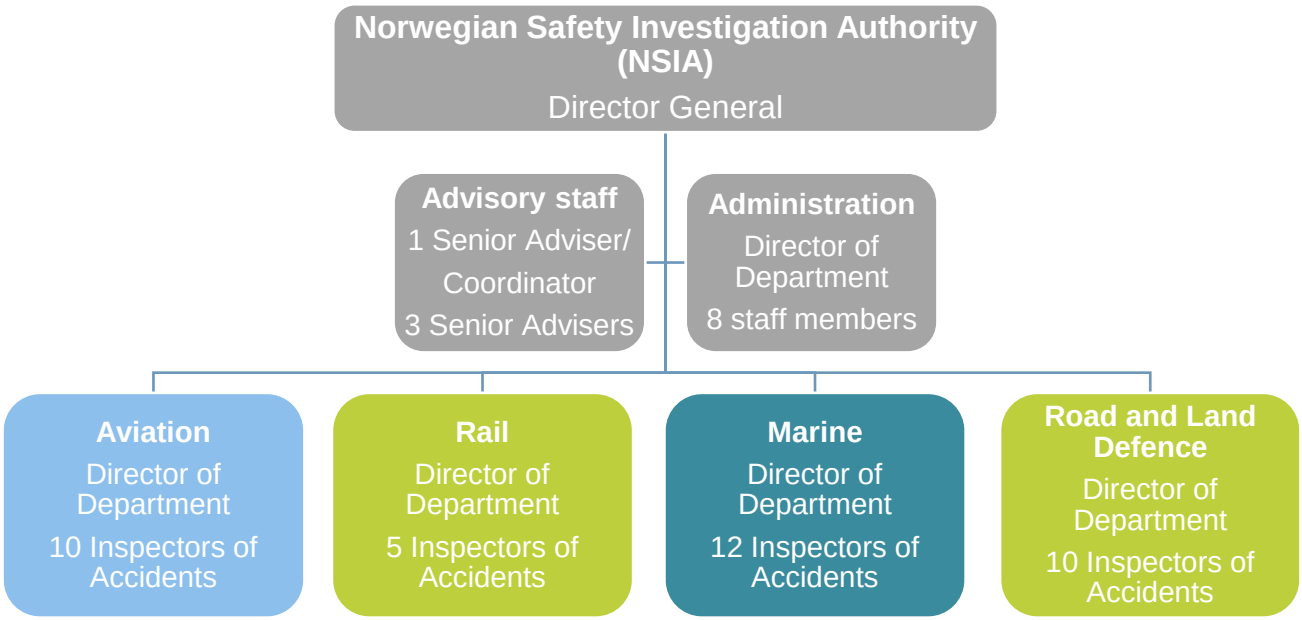
The NSIA is located in Lillestrøm. Photo: NSIA

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 2021



As of 31 December 2021, the NSIA had 55 employees and 59 positions. The last change in postitions came as a result of the transfer of the investigation authority for the defense sector on 1 July 2020.

1.3 Selected key figures from the annual accounts

Key figures from the annual accounts	2021	2020	2019
Number of employees	55	54	46
Number of full-time equivalents*	50.5	44.0	44.9
Total appropriations (NOK)	93,673,000	83,804,000	81,032,000
Utilisation of appropriations	91.2 %	94.2 %	99.7 %
Operating expenses	82,534,144	77,047,785	78,822,761
Payroll expenses as a percentage of operating expenses	73.8 %	68.9 %	69.5 %
Payroll expenses per full-time equivalent	1,206,671	1,206,188	1,219,709
Payroll expenses as a percentage of operating expenses**	65.1 %	63.3 %	67.6 %
Consultant percentage of total turnover	2.4 %	5 %	3.3 %

* 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.

** Since the NSIA has no total turnover, the total allocation is used to calculate key figures.

1.4 Goal

The main goal for the Norwegian Safety Investigation Authority in 2021 was:

"The Norwegian Safety Investigation Authority shall contribute to increasing safety through independent investigations of accidents and serious incidents in the aviation, rail, road and defense sectors, and of maritime accidents and occupational accidents on board ships."

Sub-goals related to the main goal were:

"A report on the investigations, with any safety recommendations, must be submitted no later than 12 months after the accident or serious incident took place. If the deadline cannot be met, a preliminary report must be submitted 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 in the preceding year, the safety recommendations that were issued and actions taken in accordance with recommendations issued previously. This report is an extraction from the official annual report for NSIA, which can be found on https://havarikommisjonen.no/Om-oss/Arsrapport. 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 281 railway accidents and serious railway incidents in 2021, compared with 224 in 2020. This is the highest number reported since 2014. About 50% 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 on-duty officer is higher than the number of incidents recorded.

The number of notifications received varied from 18 in July to 30 in August. Most accidents and incidents were reported Monday–Friday, which reflects the weekly pattern of train traffic.

In 2021, the Rail Department was notified of 30 railway accidents and 242 serious railway incidents. Nine notifications were registered as non-reportable incidents. Six of the railway accidents caused the train traffic on the section of line to stop for more than six hours.

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 13 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 929 in 2021, compared with 930 in 2020 and 1,035 in 2019. 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

All the safety investigations that were concluded in 2021 were completed within the space of 12 months, except two thematic reports that were published after approximately 13 months.

No preliminary reports or notifications of safety-critical factors were issued in 2021.

The department also conducts a number of extensive preliminary investigations that form part of the basis for deciding whether or not to investigate a reported incident. The information that emerges in connection with such preliminary investigations is stored for possible subsequent use in cases where the data may be relevant. The time spent on this type of investigation varies from a few hours to several working days.

The Rail Department visited accident sites on seven occasions in the course of 2021. This number is higher than for the year before, but still slightly lower than before the pandemic. There have been fewer serious accidents overall, and some travel restrictions still in place.

At the beginning of 2022, the department had ten 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 2021:

Date	Title	Type of transportation	Category of occurence
09.12.2021	Investigation of derailment at Straumsnes station, Ofotbanen	Freight train	Derailment
27.11.2021	Investigation of wrong side signalling failure at Jar Metro station, Kolsåsbanen	Metro	Wrong side signaling
02.10.2021	Investigation of fire in locomotive at Sarpsborg station on Østfoldbanen	Freight train	Fire and smoke development
26.09.2021	Investigation of fire in a snow shed between Vegårshei and Selåsvatn at Sørlandsbanen		Fire and smoke development
27.07.2021	Investigation of short circuit and subseqent fire in catenary and signaling system at Sandefjord Station		Fire and smoke development / Infrastructure events
03.07.2021	Investigation of a serious tram incident at Storo in Oslo	Tram	Collision
14.04.2021	Investigation of railway accident at Rosenholm station	Passenger train	Other
03.03.2021	Investigation of collision between a passenger train and a truck at Loenga	Passenger train	Collision
09.02.2021	Investigation of collision between a road-rail machine and a Robel 25 Track Vehicle close to Øvre Vang level crossing on 9 February 2021	Working engine	Collision
22.01.2021	Investigation of derailment on the corner of Parkveien and Welhavens gate in Oslo	Tram	Derailment

2.3 Published reports

Seven investigations were completed in 2021. They resulted in the following reports:

Report no	Title
2021/07	Report on derailment with train 4842 at Flå on the Bergensbanen line on 25 June 2020
2021/06	Report on derailment between Løten and Hamar on 23 June 2020
2021/05	Class investigation of axle bearing failures on 7 November 2019 and 27 March 2020
2021/04	Report on collision between train 811 and a tractor-trailer on the Borgestad fabrikker level crossing on the Bratsberg line on 29 April 2020
2021/03	Thematic report on accidents related to the contact line in the period 2017-2019
2021/02	Report on signal failure at Grønland Metro Station on 2 March 2020
2021/01	Report on a collision between train 64 and a car on a level crossing at Vikersund station the 28 January 2020

The summaries and safety recommendations have been translated into English. The reports are available on https://www.nsia.no/Rail/Published-reports .

2.4 Safety recommendations

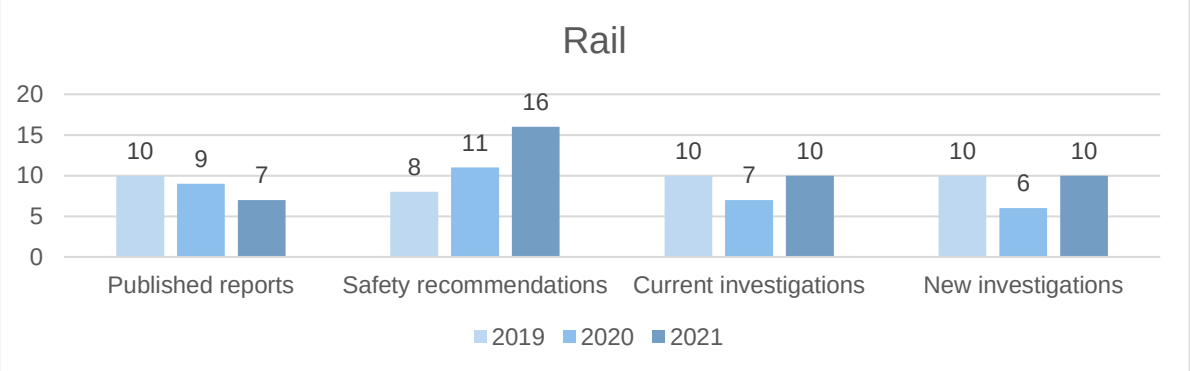
The Rail Department issued 16 safety recommendations in 2021.

Reference is made to Annex A, 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 13 October 2021, covered the second half of 2020 and the first half of 2021. None of the safety recommendations issued in 2021 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 2021, the Rail Department attended three network meetings for European rail accident investigation bodies held by the European Union Agency for Railways (ERA). The last of these meetings was a hybrid meeting that the NSIA choose to attend in person, while the other two were digital meetings.

The NSIA has chaired an ERA working group tasked with developing guidelines for various aspects of investigation bodies' work. The guidelines are meant to reflect best practices and support the work of European rail accident investigation bodies. Because of the work method and the COVID-19 pandemic, all the group's meetings have so far been digital.

The NSIA has led the work on a 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 was cancelled in 2020, but the planned peer reviews were completed in autumn 2021. Towards the end of 2021, after many years of determined effort, the programme was finally granted funding. It will give accident investigation bodies with limited financial resources a better chance to participate. Responsibility for the programme has now been transferred to the Swedish Accident Investigation Authority.

The Nordic meeting was cancelled in 2021, as the year before, but is expected to take place in 2022. Representatives of the accident investigation bodies in the four Nordic countries will participate, as well as representatives from ERA, the UK, Ireland and Estonia.

Regular contact meetings are held with the Norwegian Railway Authority and relevant sector stakeholders. In connection with investigations, meetings are also held with relevant parties at all levels of the organisation. In 2021, most of the meetings were held digitally, but necessary on-site inspections and technical examinations have been carried out with due regard to infection control measures.

Since 2013, the department has given 3–6 annual 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. Due to a backlog from 2020, nine lectures were given in 2021.

2.7 Goal achievement

The Rail Department completed 7 investigations and issued 16 safety recommendations in 2021. All the investigations were completed within 12 months of the date of the accident or incident, except two thematic reports that were published after about 13 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 the 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 and safety

recommendations from all its published reports, which helps to make the results of our investigations available to an international audience.

Annex

Annex A Safety recommendations

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 2021.

Title	Safety rec. No	Safety recommendation	Ministry of Transport Status report.	Status
Report on a collision between train 64 and a car on a level crossing at Vikersund station the 28 January 2020	**2021/01T**	On Tuesday 28 January 2020, the driver of the car died when a passenger train collided with the car at a level crossing at Vikersund station. The level crossing was secured with full barriers. The car's position between the barriers meant that the signal "The level crossing can be passed" was shown to the train. Bane NOR SF does not have systems that warn the train driver of obstacles at level crossings with road safety systems. The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority ask Bane NOR SF to further develop systems for detecting obstacles at level crossings.		**Open**
Report on signal failure at Grønland Metro Station on 2 March 2020	**2021/02T**	On Monday 2 March 2020 at 1338, a signal error occurred at Grønland Metro station in Oslo. A safety relay failed when it over time was exposed to a higher load than it was designed for. The investigation has revealed deficiencies in Oslo Metros process for replacement and maintenance of components in the signalling system. The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority follow up that Oslo Metro has a process that ensures that all components in the signalling system can withstand the load to which they are exposed.		**Open**
Report on signal failure at Grønland Metro Station on	**2021/03T**	On Monday 2 March 2020 at 1338, a safety relay failed and caused a signal error at the Grønland Metro station in Oslo. The error led to different information being given in the		**Open**

2 March 2020		main signal, the automatic train protection (ATP) and the information to the traffic manager. Even though the main signal was dark, the ATP and information to the traffic manager displayed “green”. The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority ask Oslo Metro to ensure that ATP and information to the traffic manager reflects the signal image of the main signals.		
Thematic report on accidents related to the contact line in the period 2017-2019	**2021/04T**	Every year, a number of accidents and undesirable incidents occur in connection with work in the vicinity of overhead contact systems on the national railway network. The investigation has shown that faults and defects in the drawings that form the basis for high-voltage systems can contribute to accidents. The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority request Bane NOR SF to review the process for preparing and updating documentation of high-voltage systems in order to ensure that the drawings are correct.		**Open**
Thematic report on accidents related to the contact line in the period 2017-2019	**2021/05T**	Every year, a number of accidents and undesirable incidents occur in connection with work in the vicinity of overhead contact systems on the national railway network. Several incidents and incorrect actions can be ascribed to inadequate competence and understanding of the systems on the part of the different functions involved in planning and execution. The process for work on Bane NOR’s high-voltage systems involves several disciplines and requires coordination between planning, traffic control and operational work in the field. The Norwegian Safety Investigation Authority recommends that Bane NOR SF identify all functions that affect the safety of work on high-		**Open**

		voltage systems and assess the need for competence, instruction, training and follow-up of these functions.		
Thematic report on accidents related to the contact line in the period 2017-2019	**2021/06T**	Every year, a number of accidents and undesirable incidents occur in connection with work in the vicinity of overhead contact systems on the national railway network. The investigation has shown that Bane NOR SF does not adequately analyse reported incidents with a view to 3rganizational learning and improvement. Given the number of registered accidents, the number of reports on near-misses and condition reports should be higher. The Norwegian safety Investigation Authority recommends that the Norwegian Railway Authority request Bane NOR SF to assess its process for handling reported near-misses, conditions and accidents relating to high-voltage systems, so that these are considered both individually and together for the purpose of implementing targeted measures to remove the causes of such incidents.		**Open**
Thematic report on accidents related to the contact line in the period 2017-2019	**2021/07T**	Every year, a number of accidents and undesirable incidents occur in connection with work in the vicinity of overhead contact systems on the national railway network. The investigation has shown that inadequate planning has been a contributory cause of accidents. It is challenging to establish safety at work if the job is not ordered and planned in a structured way that enables coordination. The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority request Bane NOR SF to assess its process for planning works on power supply systems, so that all factors are taken into consideration prior to execution of the work.		**Open**

Report on collision between train 811 and a tractor-trailer on the Borgestad fabrikker level crossing on the Bratsberg line on 29 April 2020	**2021/08T**	On Wednesday 29 April 2020, Vygruppen AS's Train 811 collided with a tractor-trailer that was stuck on a secured level crossing in Borgestadbakken in Skien Municipality. Bane NOR SF's measurements showed that the elevation of the level crossing exceeded their recommendations, but there are no procedures in place to ensure that this is followed up as a risk. The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority request Bane NOR SF to conduct a survey to determine what level crossings entail a risk of vehicles with low ground clearance and widely spaced axles getting stuck, and to inform the respective road owners of the results.		**Open**
Report on collision between train 811 and a tractor-trailer on the Borgestad fabrikker level crossing on the Bratsberg line on 29 April 2020	**2021/09T**	On Wednesday 29 April 2020, Vygruppen AS's Train 811 collided with a tractor-trailer that was stuck on a secured level crossing in Borgestadbakken in Skien Municipality. The alignment of the municipal road at the level crossing made passing by vehicles with low ground clearance difficult. The municipality did not consider the road at the level crossing to fall within its area of responsibility. The Norwegian Safety Investigation Authority recommends that the Ministry of Transport inform public road owners of their overriding responsibility for road traffic safety and accessibility on their roads, including at level crossings.		**Open**
Report on collision between train 811 and a tractor-trailer on the Borgestad fabrikker level crossing on the Bratsberg	**2021/10T**	On Wednesday 29 April 2020, Vygruppen AS's Train 811 collided with a tractor-trailer that was stuck on a secured level crossing in Borgestadbakken in Skien Municipality. The alignment of the municipal road at the level crossing made passing by vehicles with low ground clearance difficult. The Norwegian Public Roads Administration's requirements and guidelines contain no information about level crossings		**Open**

line on 29 April 2020		to support road owners in connection with road safety risk assessments. The Norwegian Safety Investigation Authority recommends that the Norwegian Public Roads Administration offer all road owners guidance on risk assessment of level crossings.		
Report on collision between train 811 and a tractor-trailer on the Borgestad fabrikker level crossing on the Bratsberg line on 29 April 2020	**2021/11T**	On Wednesday 29 April 2020, Vygruppen AS's Train 811 collided with a tractor-trailer that was stuck on a secured level crossing in Borgestadbakken in Skien Municipality. The alignment of the municipal road at the level crossing made passing by vehicles with low ground clearance difficult. Drivers lack sources of information that would enable them to identify the challenges that such level crossings entail. The Norwegian safety Investigation Authority recommends that the Norwegian Public Roads Administration further develop its information services so that they include information about level crossings that pose particular challenges.		**Open**
Class investigation of axle bearing failures on 7 November 2019 and 27 March 2020	**2021/12T**	In 2019 and 2020, two derailments were caused by bearing failure in the same type of freight wagon from CargoNet AS, within the space of only five months. The investigation has shown that Mantena AS, the maintenance contractor, does not keep an overview of the type of damage found in bearings that are discarded during inspections. In accordance with the ECM Regulation (Commission Regulation (EU) No 445/2011), a railway undertaking may request such information when developing maintenance specifications, with a view to determining causes of damage. The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority request CargoNet AS to cooperate with		**Open**

		Mantena AS to document the types of damage found in discarded axle bearings.		
Class investigation of axle bearing failures on 7 November 2019 and 27 March 2020	**2021/13T**	In 2019 and 2020, two derailments were caused by bearing failure in the same type of freight wagon from CargoNet AS, within the space of only five months. The investigation has shown that current leakage erosion is found in a large proportion of the axle bearings used in CargoNet AS's ordinary operations. Such damage generally arises as a result of interaction with the infrastructure. How this occurs, whether the cause lies in the infrastructure and whether the same problem is experienced by railway undertakings other than Cargo Net AS are matters that should be further investigated. The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority request Bane NOR SF to coordinate collaboration between relevant players in order to register the causes, scope and severity of current leakage erosion in axle bearings.		**Open**
Class investigation of axle bearing failures on 7 November 2019 and 27 March 2020	**2021/14T**	In 2019 and 2020, two derailments were caused by bearing failure in the same type of freight wagon from CargoNet AS, within the space of only five months. The faults in the axle bearings were not detected before the incidents occurred. By means of condition monitoring along the track, it is possible to detect different fault conditions in rolling stock before they become critical, but such systems are hardly used in Norway. The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority request Bane NOR SF to collaborate with relevant parties to examine the effectiveness of today's system and future needs for monitoring faults in rolling stock.		**Open**

Report on derailment between Løten and Hamar on 23 June 2020	**2021/15T**	On Tuesday 23 June 2020, an uncoupled locomotive of the V4 type derailed between Hamar and Løten. The accident occurred when the locomotive passed a track fault consisting of both height misalignment and warping. This was the second derailment in two years involving this type of locomotive and similar track faults. The design of the locomotive results in running characteristics that make it vulnerable to this type of fault. The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority request Grenland Rail AS to conduct a risk assessment of the use of the V4 locomotive as regards its tolerance for height misalignments and warping.		**Open**
Report on derailment with train 4842 at Flå on the Bergensbanen line on 25 June 2020	**2021/16T**	On Thursday 25 June 2020, GreenCargo AB's train derailed when it caused buckling of the track at Flå on the Bergen Line. There had been several days of high temperatures, at the same time as ballast cleaning was taking place during the night, on assignment for Bane NOR SF. According to Bane NOR SF's regulations, this type of activity must not be performed if the rail temperature exceeds 30 °C. The parties involved were under the impression that the temperature requirement only applied when work was actually being performed, without considering the expected daytime temperature. The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority ask Bane NOR SF to clarify and ensure a correct understanding of the temperature requirement in the technical regulations.		**Open**

Report on damaged windows in passenger trains on the Bergen Line 17 and 26 March 2019	**2020/04T**	On Sunday 17 and Tuesday 26 March 2019, several windows in B7 carriages were smashed by ice and gravel. Three persons sustained cuts in connection with the latter incident. The windows are made up of an outer layer of toughened glass and an inner layer of laminated glass. In instances where both the outer and inner panes smash, the laminated glass should remain in the window frame and prevent the toughened glass from entering the passenger compartment. The Accident Investigation Board Norway recommends that the Norwegian Railway Directorate advise Norske Tog AS to assess whether the windows in Norwegian passenger carriages are sufficiently strong.		**Open**
Report on derailment at Bjørnstad, between Majavatn and Namsskogan at Nordlandsbanen line, train 5790, on 25 July 2019	**2020/05T**	On Thursday 25 July 2019, CargoNet AS's goods train 5790 derailed at milepost 303.3 between Majavatn and Namsskogan on the Nordlandsbanen line. The derailment was due to buckling that is related to earlier work on the track. The AIBN has conducted several investigations into derailments of this type. Several of the actions taken by Bane NOR SF after these investigations are deemed to also be relevant to this accident. It is therefore necessary to again address the problem of buckling and prior work on tracks. The Accident Investigation Board Norway recommends that, in order to identify areas for improvement, the Norwegian Railway Authority order Bane NOR SF to review and evaluate previously implemented measures.	Bane NOR set up a working group which was given the mandate to review and evaluate previously introduced measures in order to identify areas for improvement. The working group has submitted a report with a number of proposals. Bane NOR's management has decided that graphic presentation of welding reports shall be introduced. It will give a better overview of work and will make it easier to check whether the necessary neutralization has been carried out. Furthermore, in connection with the joint inspection regime, opportunities will be looked at to establish best practice for the content and process of inspection plans for track workers. This should also give an increased focus on follow-up work during supplier audits. From autumn 2021, the necessary expertise on requirements for ballast quality must be ensured in all projects.	**Closed**
Report on derailment at Oslo S on 8 May 2019	**2020/06T**	On Wednesday 8 May 2019, the locomotive of shunting unit 39052 derailed at Oslo Central Station. The derailment was due to a track fault in an S-curve related to earlier work on the track. Bane NOR SF lacks relevant control procedures that	Bane NOR set up a group which made an overview of all geographical track plans with locations with similar track geometry as on Oslo S. Post-track work activities were established in special regimes. A "how we do it" lesson and a	**Closed**

		over time are capable of identifying this type of track fault. Nor did Bane NOR SF's follow-up inspection identify the track fault before the track was reopened after the derailment. The Accident Investigation Board Norway recommends that the Norwegian Railway Authority request Bane NOR SF to ensure that it has adapted procedures in place for inspections following track work and accidents.	learning sheet have also been prepared. Bane NOR also points towards work with a joint control regime for track work carried out by suppliers. The East area has drawn up the checklists and put them into use. The rest of the country must implement this during the third quarter of 2021. There must be checklists and routines for checks after completed track work and accidents for all track disciplines. The checklists will be risk-based and must be able to be focused on the various suppliers.	
Report on collision between train 1859 and 1860 at Berekvam station, Flåm Line on 31 July 2019	**2020/07T**	On Wednesday 31 July 2019, at approximately 14.00, train 1859 collided with train 1860, which was stationary in track 2 at Berekvam station. The station traffic control routines consist of a series of tasks that need to be done in the correct order, where human errors may lead to accidents. The Accident Investigation Board Norway recommends that the Norwegian Railway Authority request Bane NOR SF to risk assess local practices at stations with single-entry signals with the goal of reducing the possibility of human error.	Bane NOR has carried out a risk analysis for local practice at stations with a single entrance signal. Single entry signals are outdated technology, and will be replaced with ERTMS according to the national signaling plan. Until all facilities have been replaced, Bane NOR must ensure that train movement at a single entrance signal is carried out as safely as possible. The risk assessment is limited to looking at local practice at commissioned stations with a single entrance signal. This includes a total of 21 stations in Norway. The risk assessment of local practice at stations with a single entry signal reveals a total of nine dangers linked to the execution of train advance and local practice at the stations. A total of seven inputs to the action plan have been identified, where all seven measures are recommended to be implemented, based on Bane NOR's acceptance criteria.	**Closed**
Report on collision between train 1859 and 1860 at Berekvam station, Flåm Line on 31 July 2019	**2020/08T**	On Wednesday 31 July 2019, at approximately 14.00 , train 1859 collided with train 1860, which was stationary in track 2 at Berekvam station. The station has a single-entry signal, and in this accident, a point was by mistake set to the wrong track. The speed limit at the station was 30 km/h, but it was not sufficiently low to avoid collision. The Accident Investigation Board Norway recommends that the Norwegian Railway Authority request Bane NOR SF to	In the Traffic Rules for the Railway Network (TJN) 2021, a rule is introduced about half the sight speed over the first point when crossing at stations with a single entrance signal.	**Closed**

		consider speed reductions at stations with single-entry signal where similar accidents may happen.		
Report on derailment at Bryn station on the Hovedbanen line on 25 September 2019	**2020/09T**	On Wednesday 25 September 2019, a locomotive travelling as part of a train derailed at Bryn station on the Hovedbanen line. The train derailed in a curve due to a track fault that had developed over time. The track fault consisted of both height misalignment and warping, neither of which Bane NOR SF considered to be critical when looked upon separately. The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority request Bane NOR SF to ensure that the maintenance system addresses concurrent track faults.	For track geometric height error limit values in Bane NOR's technical regulations in the upper part of the measure limit (21 mm). This will be changed to 19 mm. This will give a greater margin against derailment. The change is planned to be implemented in February 2021. Technical regulations also contain requirements for follow-up. The term "as soon as possible" must be specified in more detail in technical regulations to mean that rectification must be carried out at the first opportunity based on practical and economic assessments. The following conditions can accelerate error development and/or reduce margins against derailment and must lead to an increased priority for rapid rectification of errors. The error must then be monitored with manual measurements until it is rectified. • Poor ground conditions / drainage conditions • Poor ballast quality • Other track geometry errors, gauge errors, side errors and other height errors in the immediate vicinity • Large wounds or rolling in the head of the rail	**Closed**
Report on fatal railway accident at Storforshei on the Nordlandsbanen 7 December 2019	**2020/10T**	On Saturday 7 December 2019, a person was killed when a freight train collided with the excavator he was sitting in. The person was employed by a contractor carrying out maintenance work for Bane NOR SF at Storforshei on the Nordlandsbanen line. The work was carried out through track possession between ordinary train operations. The work team used the timetable graph to plan their work as a supplement to the announcement. The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority request Bane NOR SF to map whether an unfortunate practice of using	Bane NOR has set up a working group that has looked at the causes of unwanted incidents for work in and near tracks. The working group concludes, based on its investigations, that there is no basis for claiming that an unfortunate practice has developed. The problem is a topic in operational checks in 2021. DROPS (operational center) carries out checks if it is suspected that the current rules are not being followed, in particular the use of route graphs is addressed. So far, the checks have not revealed the use of route graphs. There will also be a survey among principal site safety supervisors (PSSS) whether the training is perceived	**Closed**

		alternative sources of information to plan work on tracks has developed.	as sufficient, this is expected to be completed by 31.12.21.	
Bane 2020/09 Rapport om dødsulykke ved Storforshei, Nordlandsbanen 7. desember 2019	**2020/11T**	On Saturday 7 December 2019, a person was killed when a freight train collided with the excavator he was sitting in. The person was employed by a contractor carrying out maintenance work for Bane NOR SF at Storforshei on the Nordlandsbanen line. The work was carried out through track possession between ordinary train operations. A permission to work on tracks is communicated verbally. The Norwegian Safety Investigation Authority recommends that the Norwegian Railway Authority request Bane NOR SF to look into possible measures to make work teams aware of track possession.	Bane NOR has carried out a survey of possible measures that can make it visible to a work team that the track is managed. External principal site safety supervisors from selected contractors have been involved to ensure the quality of the list of measures under assessment. Bane NOR has concluded that a new standardized communication with a requirement for read-back between principal site safety supervisors and operators of work machines should be introduced.	**Closed**