Annual Report 2014

Accident Investigation Board, Norway
Railway Department

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Introduction

The Accident Investigation Board Norway (AIBN) is a multimodal organisation covering four transport modes. It was established in 1989 to investigate air accidents and incidents. The first railway accident investigation started 1 July 2002. Today, the AIBN is a multi-modal body investigating accidents and incidents in aviation, railways (including trams and metros), road transport and the marine sector. The different transport modes are organised in different departments within the AIBN reporting to the Director General. The multi-modal concept has been very successful in relation to stimulating cooperation, how to approach an investigation, methodology, sharing relevant safety issues and learning from the other transport sectors. In 2002 the AIBN's mandate was expanded to cover railway accidents, in 2005 road accidents and in 2008 marine accident investigations were included in our mandate.

Rail accident investigation in Norway is subject to the Directive for the Accident Investigation Board Norway, laid down by the Ministry of Transport and Communications on 12 June 2002. The AIBN itself decides the scale of the investigations to be conducted, including an assessment of the investigation's expected safety benefits with regard to resources required.

The AIBN is independent and focus entirely on safety and not apportion blame or liability, nor do we enforce law or carry out prosecutions. The most important elements in the railway safety investigations are to improve the safety of railways, learning from experience and preventing accidents from recurring. Over the years, the investigations have increasingly addressed the human element, focusing on the system of interaction between human factors, technology and organisational factors. In addition, the AIBN addresses Safety Management System (SMS), safety culture etc.

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Regulation

Railway accident investigation in Norway is regulated in detail by the Norwegian Act of June 3rd 2005, No.34, relating to notification, reporting and investigation of railway accidents and railway incidents, and regulations stipulated pursuant to the Act.

EUs safety directive for railway was adopted and made official March 1st 2006 as Regulation 2006-03-31 nr 378. *Regulation for official investigation of railway accidents and serious incidents etc.* ("The Railway Investigation regulation").

Mandate

AIBN shall investigate accidents and incidents in the aviation, railway, road and marine sectors.

The objective of the investigations is to elucidate matters deemed to be significant for the prevention of transport accidents. The AIBN shall not apportion any blame or liability under civil or criminal law.

The AIBN itself decides the scale of the investigations to be conducted, including an assessment of the investigation's expected safety benefits with regard to necessary resources.

Budget

The 2014 total budget is NOK 67.550.000,-

Organisational flow charts

Relationship between the AIBN and other national bodies:

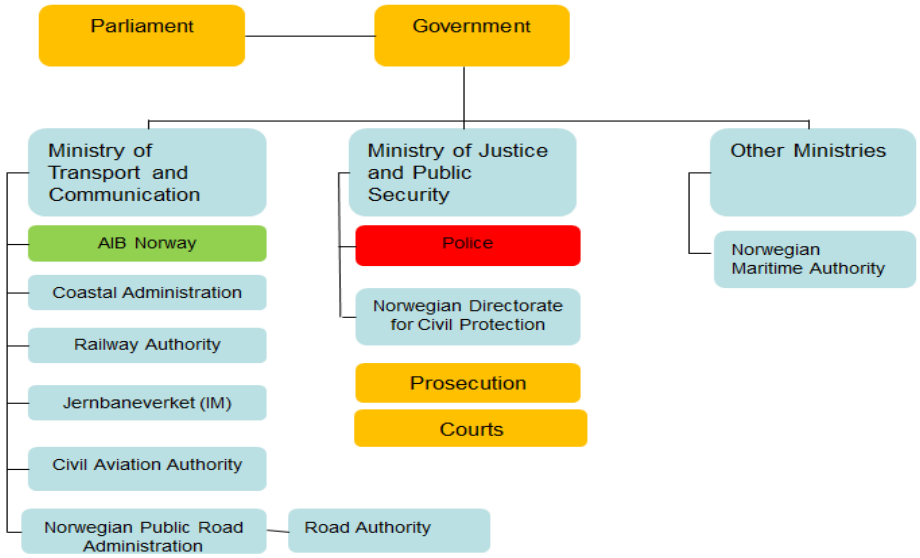

Figure 1: AIBN and other national bodies.

Relationship between the AIBN and the railway sector:

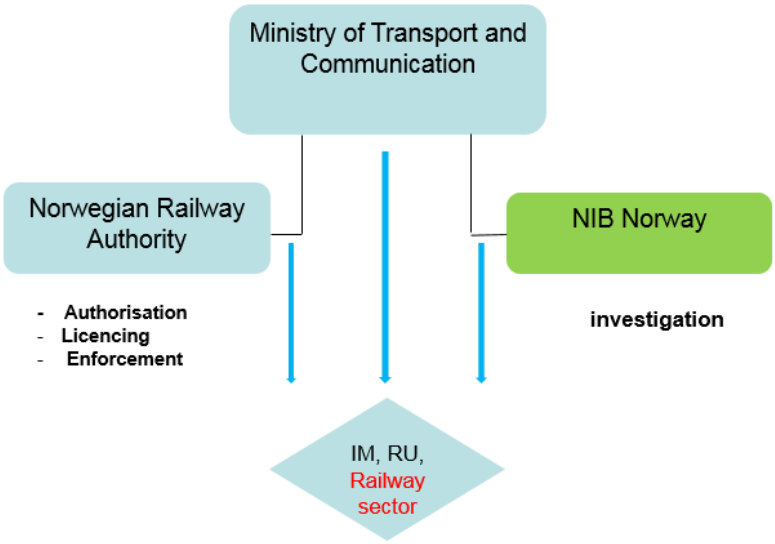

Figure 2: AIBN and the railway sector.

Accident Investigation Board Norway (AIBN) - Organisation

The AIBN organisation as of 31st December 2014:

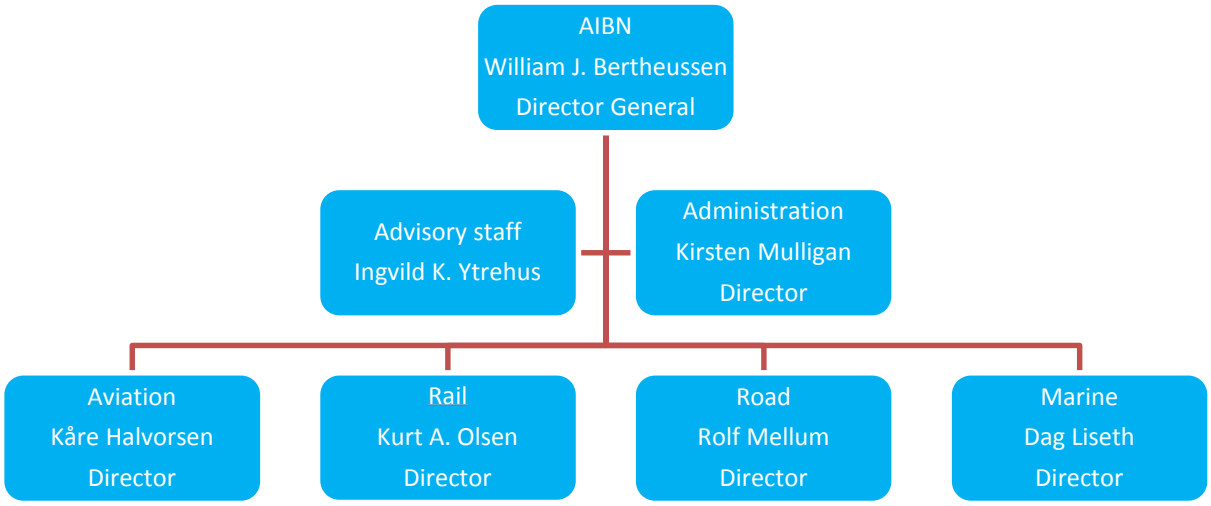

Figure 3: The AIBN organigram.

The AIBN employs 5 railways inspectors with either a professional railway or investigation background, and who have been given extensive and bespoke training concerning railway operations, railway engineering and investigation skills.

All inspectors carry an AIBN identification card, which identifies their powers at the scene of an investigation.

The AIBN Inspectors have the power to:

- Enter railway property, land or vehicles.
- Seize anything relating to the accident and make records.
- Require access to and disclosure of records and information.
- Require people to answer questions and provide information about anything relevant to the investigation.

Notifications of accidents and incidents – key numbers

The AIBN, Railway department received totally 287 notifications by telephone in 2014. The number of notification includes rail-, metro- and tram traffic (LTR). According to the Norwegian Railway Authority (responsible for official statistics), the total number of reported accidents and incidents is on the average level compared to the previous years.

Thirty-seven accidents were registered with a total of 18 fatalities.

Eight accident or incident investigations were started this year.

The AIBN, Railway department was involved in seven investigations as of 31st December 2014.

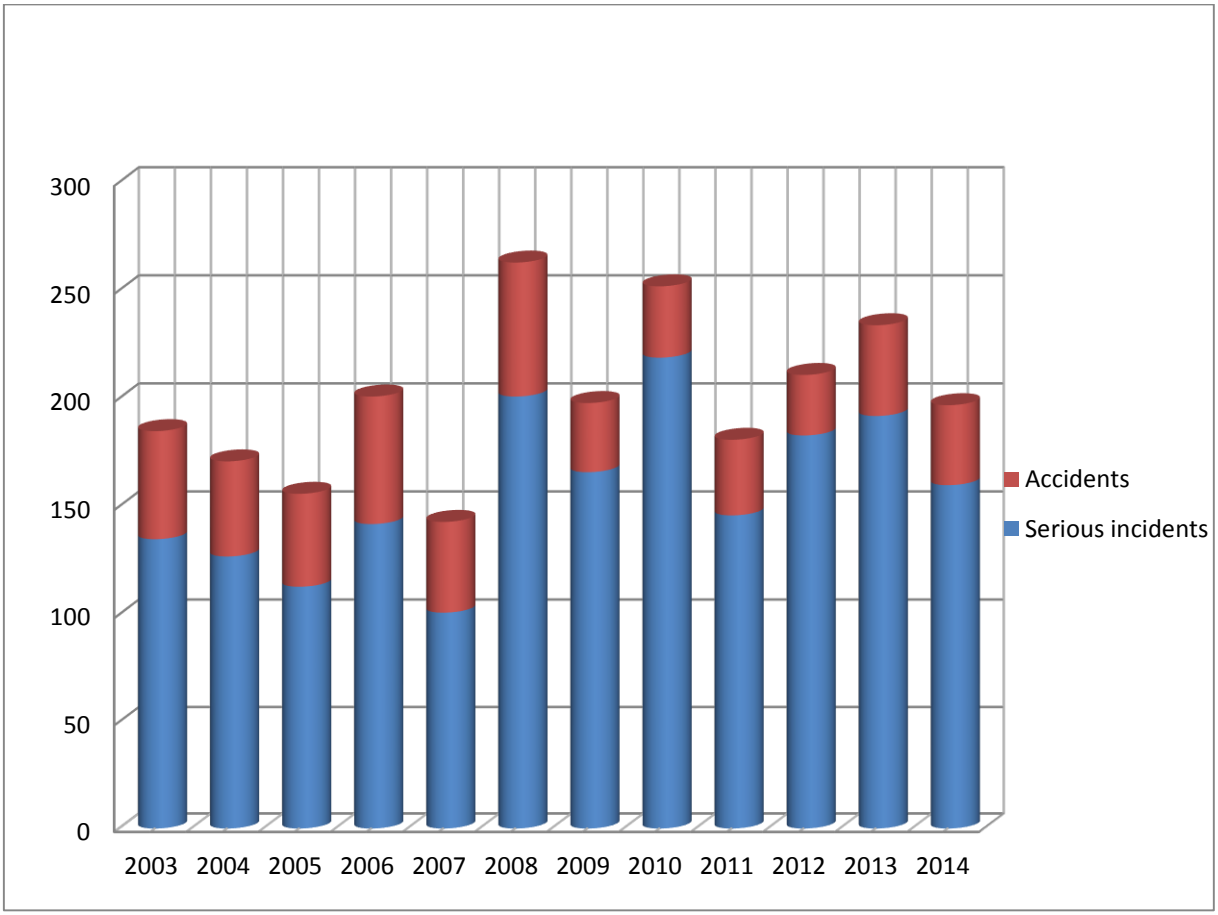

Figure 4: Key numbers, reported (72 hours) railway accidents and serious incidents.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Serious railway incidents	127	113	142	101	201	166	219	146	183	192	160
Railway accidents	44	43	59	42	62	32	33	35	28	42	37
Total	181	156	201	143	272	198	252	181	211	234	197
Published reports	**15**	**7**	**11**	**13**	**9**	**11**	**9**	**10**	**9**	**9**	**7**

Table 1: Key numbers, reported railway accidents and serious incidents (not official statistics).

The Norwegian Railway Authority (Statens jernbanetilsyn) is the responsible body for the official national statistics regarding railway accidents, serious incidents and incidents.

Other activities

During 2014, several meetings have been arranged with the Norwegian Railway Authority, Infrastructure Manager (Jernbaneverket) and the operators, including metro and tram operators. The meetings have focused on closing safety recommendations, accident reporting and classification, organisational changes, point of contact etc.

Norway, Sweden, Denmark, Finland, Estonia and UK are members of the Nordic Network of Accident Investigation Boards (NRAI). The network organises one meeting per year, where the focus is to inform each other about on-going investigations, safety learning, ERA network and task force meetings and any other business common to the Nordic Region. ERA participates in the NRAI meetings.

ERA carried a voluntary assessment of the NIB Norway as part of a series of voluntary assessments of NIBs of the EU Member states (Norway is included as a member of the EEA agreement). The assessment took place in the period from March 2014 to September 2014, with the onsite work carried out in the week from June 30 until July 4 2014. NIB Romania and NIB Sweden acted as observer.
In the Exit-meeting, NIB Norway presented an action plan with timeline and milestones for implementation of the findings and items for improvement.

The NIB Railway department was subject to internal revision in 2014. This year revision included receipt of notifications and transfer to the site of the accident.

Investigation reports

The Accident Investigation Board, Norway, Railway Department, published 7 final investigation reports, within 12 months after the date of the occurrence. This gives approximately 2 reports pr. year for each Inspector of Accident. See appendix A for details.

Key elements of the report (roadmap):
The AIBN reports follow the Directive 2004/49/EC of the European Parliament annex IV (Principal content of accident and incident investigation report) and include the following key elements:

- Notification of the accident
- Summary (in Norwegian and English language)
- Facts
- Investigations carried out
- Analysis
- Conclusion
- Planned and implemented measures
- Safety recommendations (in Norwegian and English language)
- References
- Appendices

Safety recommendations

The Accident Investigation Board Norway, the Railway department, published 9 safety recommendations in 2014. An overview of the recommendations is given in appendix B.

Status of the safety recommendations, (see actions taken for the 2014 safety recommendations below):

Year:	**2010**	**2011**	**2012**	**2013**	**2014**
Open:	1	0	2	0	1
Closed:	15	16	7	6	8
Total:	**16**	**16**	**9**	**6**	**9**

Table 2: Number of Safety recommendations.

Appendix A - Published reports 2014

See link: http://www.aibn.no/Jernbane/Avgitte-rapporter

No:	Identification:	Date of occurrence:	Report published:
1	On Wednesday 9 January 2013, a shunting unit collided with the locomotive of train 5509 on track C31 at Alnabru station. No one was injured, but the locomotive of train 5509 and two of the freight cars in the shunting unit suffered material damage. The crew of the shunting engine consisted of a driver, a senior shunter and a shunter in training. The crew on train 5509's locomotive consisted of one driver.	09.01.2013	08.01.2014
2	At 13:25 on Friday 17 May 2013, tram no 104 ran into tram no 114 at Sørli tram stop in Oslo. Both trams were en route from Oslo to Ljabru. Tram 114 was standing still while passengers were alighting and boarding when it was hit by tram 104. Three people were taken to the accident and emergency service, and a total of 18 people suffered injuries and/or experienced pain after the incident. Both trams sustained material damage from the collision.	17.01.2013	18.03.2014
3	At 15:25 on Monday 22 July 2013, Hector Rail AB's northbound freight train 41631 derailed at kilometre point 281.5 between Kvam and Sjoa on the Dovrebanen line. The train consisted of one locomotive and 14 empty timber wagons. Wagons 4 to 13 ran completely or partially off the rails, and the train came apart between wagons 6 and 7.	22.07.2013	17.06.2014
4	On Friday 5 July 2013, a 17-year-old youth fell onto the track between the platform and the metro train at Høyenhall metro station and died. The person in question walked approximately 30 metres along the side of the train before tripping and falling onto the track while the train was leaving the station. The person fell onto the track in the gap between the wagons, where the wagons were connected. The gap is wider at the rectangular opening between the wagons than between the side of the wagons and the platform.	05.07.2013	18.06.2014
5	On Thursday 1 August 2013, train 123 hit a vehicle that had queued up on the Enebekk level crossing at the Østfold line, between Råde and Fredrikstad. The driver managed to leave the vehicle immediately before the train crashed into the car, but suffered minor injuries as the car was pushed towards the driver. Investigations by the Accident Investigation Board Norway (AIBN) indicate	01.08.2013	01.07.2014

	that the automatic road barrier system was working as intended, but it is not designed to detect any object stranded between the barriers. AIBN suggests one should consider implementing systems for object detection at level crossings with a high risk of vehicles queuing back to the level crossing. The barriers at Enebekk are equipped with a sign at the inside, instructing the driver to drive through the barrier in the case of an emergency. However, the driver failed to follow the instruction, and AIBN question the efficiency of these kinds of signs.		
6	On Wednesday 17 October 2013, a person was hit by a light rail vehicle at the Mårdalen stop on Bergen Light Rail. The person died at the scene of the accident. The accident occurred as the person was in the process of crossing the tracks some way away from the pedestrian crossing in order to get to the platform on the other side. It is assumed that the deceased was focusing on the vehicle standing at the platform on the opposite side in order to take it to work, and therefore failed to notice the light rail vehicle coming from the left on the nearest track.	17.10.2013	09.10.2014
7	At 10:55 on Monday 4 November 2013, Cargolink AS` southbound freight train no 5910 derailed at kilometre point 333.796 between Dombås and Dovre station on the Dovrebanen line. Uneven settlement of the tracks had taken place after some excavation work two weeks previously. The tracks had settled in a way that produced pendulum movements in the train. This took the load off the rear axle of the train's first wagon in a way that caused one of the wheel flanges to climb onto and run off the rail. The coupler between the first and second wagons also bounced off at the same time. The derailment broke one of the panels on a level crossing. Boards from the panel hit the air hose coupling between the first and second wagon, and closed the first wagon's air valve. As a consequence, the brakes for the rear part of the train were automatically engaged, but not those for the forward part of the train. The train was operated without any nonconformities in relation to applicable guidelines. The train composition was unfavourable, but not incorrect. It is acceptable to operate empty, two-axled freight wagons with axle loads as low as five tonnes at the forward end of freight trains, and to use the locomotive's dynamic electrical brakes at the same time. It is assumed that the derailment was due to a	04.11.2013	03.11.2014

	combination of factors. The settlement of the track, the composition of the train and the operation of the train were all within acceptable limits; the AIBN believes that the derailment was a result of how these factors acted together. The fact that some parts of the train's brake system were uncontrolledly shut off in connection with the derailment is a serious matter in the AIBN's opinion, and deserving of attention.		

Appendix B - Safety recommendations 2014

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.

See link: http://www.aibn.no/Jernbane/Avgitte-rapporter

Report No.	Rec. No.	Safety recommendation.	Status.
2014/01	01	The accident at Alnabru container terminal on 9 January 2013 occurred as a consequence of the shunting unit travelling towards track C31 at too high a speed to be able to stop within the available braking distance. When track C31 turned out to be occupied, the shunting unit was unable to stop before crashing into the rolling stock of train 5509. The brakes of the freight car set were not connected, and the shunting engine's brakes alone did not provide sufficient braking capacity. The AIBN takes a critical view of the fact that regulations and instructions are not complied with during shunting operations at Alnabru terminal. The AIBN recommends that the Norwegian Railway Authority follow up the railway enterprises at Alnabru with a view to reviewing the shunting procedures and ensuring that all operations are carried out in accordance with the regulations, shunting instructions and special local rules.	Status: The processing of the safety recommendation has been concluded. All freight companies with safety certificates have provided feedback confirming that they have reviewed their shunting procedures (the quality of the review and any results and measures have not been assessed by the NRA).
2014/01	02	The accidents at Alnabru station in recent years have shown that the local traffic controllers do not have optimal working conditions for traffic control. The traffic controllers have to move between control panels to set shunting routes and control signals, and they have a minimal overview. In connection with previous accidents as well as this one, the AIBN has pointed out that the traffic control centre at Alnabru is outdated and poorly adapted to the current organisation and activities at the terminal.	Status: The case processing has been concluded on the basis of the Norwegian National Rail Administration's letter dated 12 February 2014, in which it states that it has appointed a project group that will submit a master plan for upgrading the traffic control centre in April 2014.

		The AIBN recommends that the Norwegian Railway Authority recommend that the Norwegian National Rail Administration consider upgrading the traffic control centre at Alnabru to achieve efficient and good work operations, a good exchange of information, overview and planning.	
2014/02	03	On Friday 17 May 2013, there was a collision between two trams at Sørli tram stop in Oslo. Tram 114 was standing still while passengers were alighting and boarding when it was hit by tram 104. Accidents and collisions in recent years underline the need for the public transport company Sporveien Trikken AS to carry out a new review of measures that can prevent collisions. The Norwegian Accident Investigation Board recommends that the Norwegian Railway Inspectorate follow up that Sporveien Trikken AS assess barriers that can prevent collisions between trams.	Status: The processing of the safety recommendation has been concluded. Sporveien Trikken AS is addressing safety culture and behaviour, especially with a view to following up tram drivers. Sporveien Trikken is also working on measures relating to training, recruitment and attitudes. The refresher course for tram drivers will be renewed during the year.
2014/03	04	On 22 July 2013, track buckling occurred at kilometre point 281.5 between Kvam and Sjoa on the Dovrebanen line. Hector Rail AB's northbound freight train 41631 derailed as a consequence of this. Three days prior to the incident, packing had been carried out due to uneven settlement of the track. It is assumed that the work that was done, together with high rail temperatures, temporarily weakened the track's lateral stability to a sufficient extent to cause buckling. The packing had not been followed up by daily inspection visits. The Accident Investigation Board Norway recommends that the Norwegian Railway Authority recommend that the Norwegian National Rail Administration review the inspection procedures for this type of track work, assess whether they are adequate and, if applicable, update the procedures.	Status: The processing of the safety recommendation has been concluded. Grounds for closing the case The Norwegian National Rail Administration has reviewed the inspection procedures for this type of track work and initiated a process to implement identified measures.
2014/03	05	The purpose of establishing permanent geodetic control marks along the track is to define the track's position in an external local reference system. The method is based on comparing the theoretical position of the track with the position of the track relative	Status: The processing of the safety recommendation has been concluded. Grounds for closing the case Based on the fact that the Norwegian National Rail

		to a set of geodetic control marks along the track. Excessive deviation between these positions indicates that the track has been displaced, and that stresses may have developed in the track. A lateral displacement towards the inside of a curve will reduce the fastening-down (neutral) temperature of the rails, and thus increase the stresses at high temperatures. Geodetic control marks had been surveyed at Heggerusta on the Dovrebanen line, but the marks had not been maintained. The Accident Investigation Board Norway recommends that the Norwegian Railway Authority recommend that the Norwegian National Rail Administration establish a binding progress schedule for updating existing track sections and for establishing geodetic/permanent geodetic control marks on any sections lacking such marks.	Administration has undertaken to establish geodetic/ permanent geodetic control marks on all sections of line in accordance with the previously submitted progress plan, the NRA finds that JB No 2014/05T can be closed.
2014/04	06	On Friday 5 July 2013, a 17-year-old youth fell onto the track between the platform and the metro train at Høyenhall metro station and died. The person in question alighted at Høyenhall station tripped and fell onto the track while the train was leaving the station. The opening between the wagons is 60 cm x 40 cm, and wide enough for an adult person to fall onto the track. The Accident Investigation Board Norway recommends that the Norwegian Railway Authority follow up that Sporveien T-banen AS considers measures to reduce the probability of people falling between the platform and the train.	Status: The processing of the safety recommendation has been concluded. Grounds for closing the case The NRA finds that the safety recommendation can be closed based on the fact that Sporveien T-banen has carried out a risk assessment and is working on measures to improve the situation. For more information, see memo 13/1390-11.
2014/05	07	On Thursday 1 August 2013, train 123 hit a vehicle that had queued up on the Enebekk level crossing at the Østfold line. The Accident Investigation Board Norway (AIBN) points to a weakness of full barriers as a safety measure. If a vehicle is caught between the barriers, the train will still receive a clear signal in the level crossing signal. One relies on the visual observation of the vehicle by the train driver to prevent, or reduce the consequence of an impact.	Status: The processing of the safety recommendation has been concluded. Grounds for closing the case The NRA finds that the safety recommendation can be closed because the Norwegian National Rail Administration has carried out assessments of obstacle detection (systems for object detection at level crossings) in connection with the proposal to allow longer

		The Accident Investigation Board Norway recommends the Norwegian Railway Authority to ask the Norwegian National Rail Administration to evaluate object detection solutions for level crossings with a high risk of vehicles being trapped between the barriers.	timber wagons. The Norwegian National Rail Administration's input for the UIC report concerning obstacle detection even shows that it has been considered to start testing a solution. The Norwegian National Rail Administration gives no indication of the current status of the obstacle detection work, but it states that the ALARP principle forms the basis for their risk assessments. At the same time, the UIC report shows that the relationship between cost and benefit is the reason why such systems have not been introduced. Thus, if we allow ourselves to read between the lines of the documentation submitted, it does not seem like this is a measure that will be introduced (at least not in the foreseeable future). This decision rests with the Norwegian National Rail Administration. For more information, see memo 13/1524-12.
2014/06	08	The deceased did not notice that a light rail vehicle heading in the direction of the city centre was approaching the stop and therefore started to cross the track. Bergen Light Rail has emphasised openness and accessibility at its stops, and physical barriers such as guide fences and railings are little used, including at stops. The problem of separation has been solved visually by distinguishing between areas and marking places where pedestrians can cross. The Accident Investigation Board Norway proposes that the Norwegian Railway Inspectorate recommend Bybanen AS to identify measures that can substantiate that Bergen Light Rail's stops are designed in a manner that ensures that all users can cross	Status: The processing of the safety recommendation has been concluded. Grounds: Bybanen AS has planned the following risk-reduction measure: to install bollards spaced at a distance of 60–70 cm, which is intended to have a fence effect and act as a barrier to any third parties wanting to cross the tracks. The reason for not choosing a fence is that the amount of space is limited and that a fence may cause people to be trapped on the track when a light rail vehicle is approaching.

		safely. This includes users with an impaired ability to perceive and avoid dangerous situations, for example children, the elderly and people with other forms of functional impairment.	Bybanen AS has positive experience of installing bollards on the ramp facing Møllendalsveien. In addition, it wants to remove the grass to make it less attractive to cross the tracks outside the designated crossing point.
2014/07	09	At the time of the derailment, Cargolink AS lacked a description of where wagons should be placed in a train and had not defined any requirements for functional interfaces for longitudinal transfer of traction and compression loads in the train. As part of the general and overriding requirements for the operation of trains on the national rail network, the Norwegian Train Operation Regulations state that it is the responsibility of each individual railway undertaking to analyse its own activities in order to ensure that it has adequate instructions and procedures in place that are harmonised with overriding requirements and the activities of other railway undertakings. The Accident Investigation Board Norway recommends that the Norwegian Railway Authority (Statens jernbanetilsyn) request that Cargolink AS review the risk analyses on which its internal procedures and instructions are based in order to ensure that they are comprehensive enough and ensure functional operation across interfaces with the national railway network and with the activities of other railway undertakings.	Status: The safety recommendation is being processed.

Appendix C – Directive for the Accident Investigation Board Norway

Laid down by the
Ministry of Transport and Communications on 12 June 2009.

1 Organisation
The Accident Investigation Board Norway (AIBN) is an administrative agency that reports to the Ministry of Transport and Communications. The AIBN is an independent body as regards professional issues.
The areas of road, air and railway transport are the responsibility of the Ministry of Transport and Communications. Marine transport is the responsibility of the Ministry of Trade and Industry.
The Ministry of Transport and Communications cannot instruct the agency in professional matters in those areas for which the AIBN is responsible. With the exception of such matters as stated in Section 476, seventh subsection of the Norwegian Maritime Code, the same applies to the Ministry of Trade and Industry within the marine sector.

2 Objective
The AIBN shall investigate accidents and serious incidents in the aviation, railway, road and marine sectors.
The objective of the investigations is to elucidate matters deemed to be significant for the prevention of transport accidents. The AIBN shall not apportion any blame or liability under civil or criminal law.
The AIBN itself decides the scale of the investigations to be conducted, including an assessment of the investigation's expected safety benefits with regard to necessary resources.
Details of the objectives within the various transport sectors:

Aviation
The AIBN shall investigate aviation accidents and serious aviation incidents within the framework stated in Act No. 101 of 11 June 1993 relating to Aviation (the Aviation Act), Chapter XII Notification, reporting and investigation of civil aviation accidents and civil aviation incidents etc., and regulations stipulated pursuant to the Act. Reference is also made to Council Directive 94/56/EC of 21 November 1994 establishing the fundamental principles governing the investigation of civil aviation accidents and incidents.

Railways
The AIBN shall investigate railway accidents and serious railway incidents within the framework stated in the Act of 3 June 2005, No. 34, relating to notification, reporting, and investigation of railway accidents and railway incidents etc. (the Railway Investigation Act), and regulations stipulated pursuant to the Act.

Road traffic
The AIBN shall investigate serious road accidents and road incidents within the framework stated in the Act of 18 June 1965, No. 4, relating to road traffic (the Road Traffic Act),

Chapter VII Investigation of traffic accidents etc., and regulations stipulated pursuant to the Act.

Marine
The AIBN shall investigate marine accidents within the framework stated in the Norwegian Maritime Code of 24 June 1994, No. 39, Chapter 18 (II) Maritime inquiries, and regulations stipulated pursuant to the Code and obligations Norway has assumed under international law.

3 Delineation
The activities of the AIBN do not comprise areas of responsibility that come under the Police and Prosecution Authority, the Armed Forces, the Norwegian Railway Inspectorate, the Norwegian Public Roads Administration, the Norwegian Civil Aviation Authority or the Norwegian Maritime Directorate.
The AIBN shall also cooperate with other parties to the extent necessary, where this may be beneficial in terms of resource use and user-friendliness.

4 Duties
Within the framework of current legislation the responsibilities of the AIBN shall include:

• investigating transport accidents/incidents as mentioned in Item 2,

• preparing reports containing a statement from the AIBN on the causes of the accident/incident and any recommendations on matters the responsible party should consider rectifying to prevent re-occurrences of the same or similar nature, but without outlining specific solutions.

• performing special duties of significance for safety as may be imposed on the agency by the Ministry of Transport and Communications, and for maritime matters in consultation with the Ministry of Trade and Industry, pursuant to statutes and regulations,

• representing the Ministry of Transport and Communications and/or the Ministry of Trade and Industry as required, or participating in meetings with the said ministries in various international organisations and forums within the relevant transport sectors.

• issuing comments/statements on matters submitted by the Ministry of Transport and Communications, and for maritime matters in consultation with the Ministry of Trade and Industry, to the extent requested by the ministries, assisting in processing cases, etc.

The AIBN shall report to the Ministry of Transport and Communications in the course of the year and in a separate annual report on the agency's activities and results.
The activities shall be conducted within the framework of current statutes, rules and regulations. Cases shall be considered in accordance with generally accepted administrative principles and applicable rules for case processing in the public sector.

5 Day-to-day management
Day-to-day management of the AIBN is exercised by the Director General. The Director General is appointed by the King upon recommendation from the Ministry of Transport and Communications.
The Director General shall:

• inform the Ministry of Transport and Communications of important matters that come under the AIBN's area of responsibility,

• ensure good quality in cases submitted to the Ministry of Transport and Communications,

• decide all cases that do not require submission to a higher authority,

• ensure that the AIBN is run efficiently in accordance with current statutes, rules and regulations and the requirements stipulated in the management dialogue,

• ensure that there are documentable systems for internal control and risk management, and that evaluations are conducted of the agency's efficiency, goal achievements and results.

Within limited areas the Director General may delegate authority to other employees of the AIBN and issue further instructions for the performance of the delegated authority in general or for individual cases.

6 Authority to issue a directive

The Ministry of Transport and Communications has the authority to stipulate a new directive or make changes in the directive.

7 Entry into force

This directive enters into force on 12 June 2009.
From the same date the directive for the AIBN of 21 June 1999 with subsequent changes is repealed.