



STATE COMMISSION ON RAILWAY ACCIDENT INVESTIGATION
Ministry of Interior and Administration

REPORT No. PKBWK 01/2025

**on the investigation of a serious railway accident occurring on
10 January 2024 at 7:58 AM
on the Rogoźno Wielkopolskie-Budzyń section, track No. 1, km
56.055, of railway line No. 354, Poznań Główny POD-Piła Główna,
level crossing of category D
area of infrastructure operator PKP PLK S.A. Maintenance-of-Way Department in
Poznań**

WARSAW, 3 January 2025

<https://www.gov.pl/web/mswia/panstwowa-komisja-badania-wypadkow-kolejowych>

Pursuant to Article 28f (3) of the Rail Transport Act of 28 March 2003, the Commission's investigation determines neither guilt nor liability.

This Report has been prepared under the provisions of *Commission Implementing Regulation (EU) 2020/572 of 24 April 2020 on the reporting structure to be followed for railway accident and incident investigation reports (OJ L 132 of 27 April 2020)*

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I. ABSTRACT

Type of occurrence: Serious accident.

Description: An occurrence at a level crossing of category D (hereinafter referred to as the “level crossing”), where an IVECO truck (a tractor with a semi-trailer) drove onto the crossing directly in front of an oncoming MOJ 87940 passenger train running on the Kołobrzeg-Poznań Główny section, as a result of which the train hit the semi-trailer of the truck.

Date of the occurrence: 10/1/2024, 7:58 AM.

Location of the occurrence: Level crossing of cat. D on the Rogoźno Wielkopolskie-Budzyń section, track No. 1, km 56.055, railway line No. 354, Poznań Główny POD-Piła Główna, level crossing identification number: 354 056 055, geographical location: 52°52'32,18"N 16°58'18,01"E.

Consequences of the occurrence: The train inspector died at the scene. The driver and train manager were seriously injured. The driver died in the hospital as a result of the injuries suffered, and the manager was discharged home after a hospital stay. The inspector, driver and train manager were employees of the railway undertaking POLREGIO S.A. One passenger on the MOJ 87940 train was injured. The driver of the road vehicle was not injured. A truck semi-trailer and an EN57AL-1527 electric multiple unit were destroyed. The train derailed to the right with the first bogie.

Causal factor: Truck entering a level crossing directly in front of an oncoming train.

(means any action, omission, event or condition, or a combination thereof that, if corrected, eliminated, or avoided, would have prevented the occurrence, in all likelihood)

Contributing factors:

- 1) A road vehicle entering a level crossing without stopping as required by the B-20 “STOP” sign.
- 2) Sharp angle of the level crossing, making it difficult for the driver of the road vehicle to observe the front of the oncoming train.
- 3) Inattention of the driver of the road vehicle when he approached, drove onto and passed the level crossing while talking on the phone.

(means any action, omission, event or condition that affects an occurrence by increasing its likelihood, accelerating the effect in time or increasing the severity of the consequences, but the elimination of which would not have prevented the occurrence)

Systemic factors: Insufficient description of the method for measuring the visibility of the front of oncoming trains included in section 4, part B of Annex No. 3 to the Regulation of the Minister of Infrastructure and Development of 20 October 2015 *on the technical conditions to be met by crossings of railway lines and sidings with roads, and on their positioning* (Journal of Laws of 2015, item 1744, as amended). The Regulation only specifies the height of the vantage point, which does not fully describe the conditions experienced by road users; in particular, it does not account for the limited visibility for drivers of road vehicles through windscreens and side windows.

(means any causal or contributing factor of an organisational, managerial, societal or regulatory nature that is likely to affect similar and related occurrences in the future, including, in particular, the regulatory framework conditions and the design and

application of the safety management system)

Recommendations and their addressees:

1. In view of the accidents that have occurred and the significant risk of further occurrences at the crossing, the infrastructure operator PKP PLK S.A., together with the road operator, the Head of Budzyń Municipality, will agree to implement one of the following measures to improve safety at the crossing:
 - 1) reconfiguring a section of the road leading to the railway line so that the angle of intersection with the railway line is close to 90° without changing the current category of the crossing, or
 - 2) increasing the category of the crossing, or
 - 3) removing the crossing.
2. Until one of the measures specified in recommendation 1 is implemented, due to the safety risk at the crossing, the railway infrastructure operator PKP PLK S.A. will introduce permanent speed limits of 20 km/h for the train front at the level crossing of category D at kilometre 56.055 of railway line 354, Poznań Główny POD-Piła Główna, in both directions.
3. The Minister of Infrastructure will analyse the Regulation of the Minister of Infrastructure and Development of 20 October 2015 *on the technical conditions to be met by crossings of railway lines and sidings with roads, and on their positioning (Journal of Laws of 2015, item 1744, as amended)* to determine if it is necessary to add specific requirements to check the visibility of the train front from the road and account for conditions similar to those experienced by road users (e.g., drivers of various road vehicles. See the reasons described in Chapter IV, section 3.4, of this Report).
4. Railway undertakings operating powered railway vehicles will check the installed forward-facing video recording systems to determine if the recorded footage is correct and uninterrupted. For systems with delayed video recording, the undertakings will modify the power supply systems to ensure the recording process continues even if external power is lost.
5. PKP PLK S.A. will verify the results of the risk assessments of occurrences at level crossings of cat. D for which the intersection angle is smaller than 60° (conducted in accordance with Section 4.2, Recommendation No. 7, in the PKBWK 2020 Annual Report), and will take appropriate action.



Photo 1 – Consequences of the occurrence for the railway vehicle (source: PKBWK)



Photo 2 – Consequences of the occurrence for the railway vehicle (source: PKBWK)

II. THE INVESTIGATION AND ITS CONTEXT

1. Decision to establish an investigation

The Chairman of the State Commission on Railway Accident Investigation (hereinafter referred to as “PKBWK” or the “Commission”), Tadeusz Ryś, issued decision No. PKBWK.590.1.2024 of 23 January 2024 to investigate the railway occurrence at the level crossing of cat. D at km 56.055 of railway line No. 354.

Considering this fact and the provisions of Article 28e(4) of the Rail Transport Act of 28 March 2003 (consolidated text: Journal of Laws of 2023, item 1786, as amended), hereinafter referred to as the “Rail Transport Act”, the occurrence was reported to the European Union Railway Agency and registered in its database under the number PL-10513.

2. Motivation to the decision to establish an investigation

According to Article 28e(3)(2) of the Railway Transport Act, “*an accident or incident constitutes a series of accidents or incidents relating to the system as a whole*”.

3. Scope and limits of the investigation including a justification thereof, as well as an explanation of any delay that is considered a risk or other impact to the conduct of the investigation or its conclusions

There were no restrictions during the investigation that would have a negative impact on its course. The investigation was conducted under Article 28h(1) of the Rail Transport Act and, in accordance with the provisions of Article 28f(3), does not determine guilt or liability.

4. An aggregated description of the technical capabilities of the functions of the persons represented in the team of investigators

The Chairman of the Commission appointed the Investigation Team from among the standing members of the Commission with qualifications and competencies regarding the investigation concerned.

5. A description of the communication and consultation process established with persons or entities involved in the occurrence during the investigation and in relation to the information provided

Under Article 28h(2)(5) of the Rail Transport Act, the PKBWK Chairman obliged specific persons from the railway commission to cooperate with the Investigation Team (letter No. PKBWK.590.1.1.2024 of 23 January 2024).

In accordance with Letter No. PKBWK.590.1.2.2024 of 24 January 2024, the chairman of the railway commission transferred formally the collected documentation to the Investigation Team on 30 January 2024.

6. A description of the level of cooperation offered by the entities involved

During the course of the investigation, the cooperation with representatives of entities linked to the circumstances of the occurrence did not raise any concerns with the Investigation Team.

7. A description of the investigation methods and techniques as well as analysis methods applied to establish the facts and findings referred to in the report

In the course of the investigation, the investigators took into account the provisions of national regulations, the infrastructure operator's internal regulations and the technical documentation. Furthermore, the Investigation Team relied on their own knowledge and experience, as well as on the documentation prepared by the Investigation Team and the railway commission.

In connection with the investigation, the Investigation Team performed the following activities (among others):

- inspection of the site and consequences of the occurrence on the day of the accident, including, but not limited to, an inspection of the level crossing, approach roads and the railway line,
- interviews with the people involved in the occurrence,
- preparation of photo and video documentation on the day of the occurrence and at later dates,
- analysis of the documentation provided by the railway undertaking, the railway infrastructure operator and the public prosecutor's office,
- analysis of data from the running data recorder of the rail vehicle (EN57AL-1527),
- analysis of the internal provisions of the infrastructure operator and railway undertaking applicable to the occurrence concerned,
- analysis of the Safety Management System (SMS) operated by the infrastructure operator and railway undertaking,
- analysis of the rail vehicle's maintenance system documentation (Polish: Dokumentacja Systemu Utrzymania, DSU).

Below is a list of selected legal acts, regulations and internal instructions used during the investigation:

European Union regulations:

- 1) Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety (OJ L 138, 26/5/2016, p. 102, as amended).
- 2) Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) (OJ L 119, 4/5/2016, p. 1, as amended).
- 3) Commission Implementing Regulation (EU) 2020/572 of 24 April 2020 on the reporting structure to be followed for railway accident and incident investigation reports (Official Journal of the European Union No. 132 of 27 April 2020)

National rules:

- 1) Rail Transport Act of 28 March 2003 (consolidated text: Journal of Laws of 2023, item 1786, as amended).
- 2) Construction Law Act of 7 July 1994 (consolidated text: Journal of Laws of 2023, item 682, as amended).
- 3) Road Traffic Law Act of 20 June 1997 (consolidated text: Journal of Laws of 2023, item 1047 as amended).
- 4) Public Roads Act of 21 March 1985 (consolidated text: Journal of Laws of 2023, item 645, as amended).
- 5) Personal Data Protection Act of 10 May 2018 (consolidated text: Journal of Laws of 2019, item 1781).

- 6) Regulation of the Minister of Infrastructure and Development of 20 October 2015 on the technical conditions to be met by crossings of railway lines and sidings with roads, and on their positioning (Journal of Laws of 2015, item 1744, as amended).
- 7) Regulation of the Minister of Infrastructure of 11 January 2021 on personnel employed in positions related directly to the operation and safety of rail traffic and to the driving of specific types of rail vehicles (Journal of Laws of 2021, item 101, as amended).
- 8) Regulation of the Minister of Infrastructure and Construction of 16 March 2016 on serious accidents, accidents and incidents in rail transport (Journal of Laws of 2016, item 369).
- 9) Regulation of the Minister of Infrastructure of 18 July 2005 on general conditions for rail traffic operation and signalling (consolidated text: Journal of Laws of 2015, item 360, as amended).
- 10) Regulation of the Ministers of Infrastructure and of the Interior and Administration of 31 July 2002 on road signs and signals (consolidated text: Journal of Laws of 2019, item 2310, as amended).
- 11) Regulation of the Minister of Transport and Maritime Economy of 2 March 1999 on the technical conditions to be met by public roads and on their positioning (consolidated text: Journal of Laws of 2016, item 124, as amended).

Internal instructions of the railway undertaking POLREGIO S.A.

- 1) Pt-2 Instructions for the traction vehicle crew.
- 2) Pt-5 Instructions for the maintenance of powered railway vehicles.

Internal instructions of the infrastructure operator PKP PLK S.A.

- 1) Ir-8 Instructions for the handling of serious accidents, accidents and incidents in rail transport.
- 2) Ir-1 Instructions for the working of trains.
- 3) Id-1 Technical requirements for the maintenance of railway tracks.
- 4) Ik-2 Instructions for inspections concerning railway traffic safety.
- 5) Id-7 Instructions for surveillance of railway lines.
- 6) Ir-7 Instructions for the maintenance of rail/road crossings and pedestrian crossings.
- 7) Ir-17 Instructions for ensuring railway operability in winter.

8. A description of the difficulties and specific challenges encountered during the investigation

Members of the Investigation Team had difficulties when investigating the occurrence with reading data from the forward-facing video recorder of the EN57AL-1527 rail vehicle. Despite recommendation No. 4 in report GDPWK/01/2019, the front-facing video recorder of the vehicle was operating in the mode of intermittent recording on the recorder media, and the last recorded front-facing footage ended 3 minutes before the occurrence. Due to the destruction of the front camera of the railway vehicle and the loss of power, the recorded footage was kept in temporary memory from the time of the last recording in the recorder until the destruction of the camera and has not been saved.

9. Any interaction with the judicial authorities

In connection with an independent investigation by the District Public Prosecutor's Office in Wągrowiec, the Investigation Team cooperated with the public prosecutor in charge of the case. The cooperation was based on the Agreement of 27 June 2014 between the Prosecutor General and the Chairman of the State Commission on Railway Accident Investigation. The Investigation Team was allowed to examine the documents gathered

by the Public Prosecutor's Office. In addition, the District Public Prosecutor's Office in Wągrowiec provided the Investigation Team with an Expert Opinion prepared by a forensic road traffic expert.

10. Any other information relevant in the context of the investigation

The Investigation Team has not identified any other information relevant to the occurrence.

III. DESCRIPTION OF THE OCCURRENCE

1. The occurrence and background information

1.1. The description of the type of occurrence

The occurrence was classified as a serious accident.

A truck (an IVECO tractor with a semi-trailer) drove onto the crossing directly in front of an oncoming MOJ 87940 passenger train running on the Kołobrzeg-Poznań Główny section, as a result of which the train hit the semi-trailer of the truck.

1.2 The date, exact time and location of the occurrence

The occurrence took place on 10/1/2024 at 7:58 AM, at the level crossing of cat. D, located on the Rogoźno Wielkopolskie-Budzyń section, track No. 1, km 56.055 of railway line No. 354, Poznań Główny POD-Piła Główna. The geographical location was: 52°52'32.18 "N 16°58'18.01 "E.

1.3. The description of the occurrence site, including weather and geographical conditions at the moment of the occurrence and if any works were carried out at or in the vicinity of the site

The level crossing of cat. D where the occurrence took place is located at Nowe Budy Street, and it runs across municipal road No. 201517P. The road has a bitumen surface and a ground shoulder. The width of the carriageway in the approach sections leading to the level crossing is 5.00 m. Traffic lanes are separated by the P-4 marking, "Double solid line". The speed limit for road vehicles on the road in the area of the crossing was 90 km/h. The road intersects with the railway track at a 53° angle. The area where the road intersects with the railway line is located in a non-built-up area. Nowe Budy Street in Budzyń in the area of the crossing is marked on both sides with A-10 warning signs, G-1a, G-1b and G-1c trackside signposts on the right side and T-7 sign ("Sign indicating the track and road layout at the crossing"). In front of the crossing, there is a G-3 sign, "St. Andrew's Cross", and a B-20 road sign, "STOP". The carriageway is marked with the pavement marking P-12 "Stop line". The geographical coordinates of the level crossing are as follows: 52°52'32.18 "N 16°58'18.01 "E. The occurrence took place in daylight, without precipitation or fog, with an ambient temperature of -9°C. There had been snowfall in the days prior to the occurrence and there had been some compacted snow and ice on the approach road leading to the crossing and on the crossing slabs. There were no repair works in the area of the crossing that could have affected the occurrence.

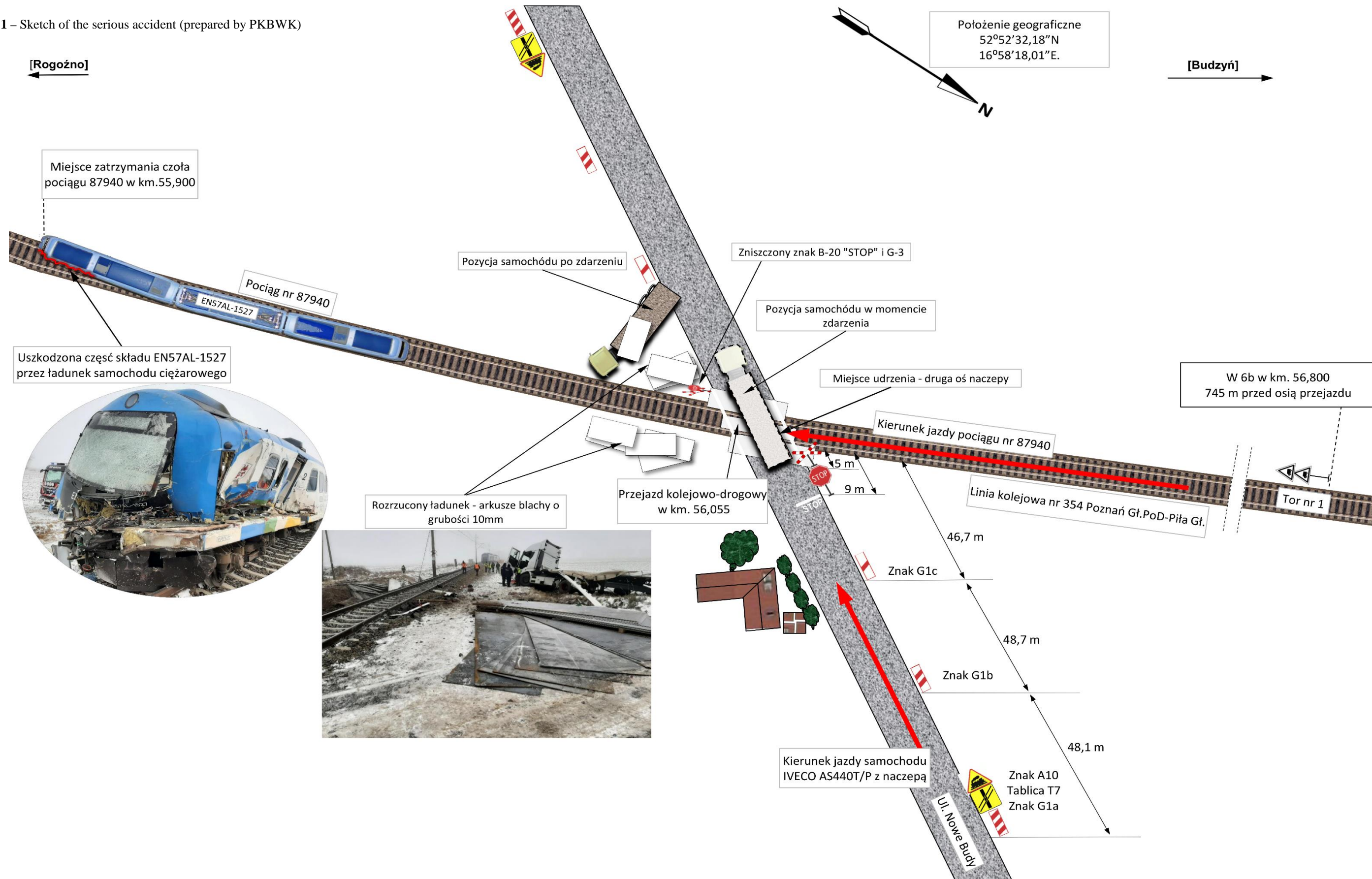


Photo 3 – Marking of the road leading to the crossing (source: PKBWK)



Photo 4 – View of the crossing from the direction of travel of the road vehicle (source: PKBWK)

Figure 1 – Sketch of the serious accident (prepared by PKBWK)



1.4. Deaths, injuries and material damage

a) passengers, employees or contractors, level crossing users, trespassers, other persons at a platform, other persons not at a platform

The train inspector died at the scene. The driver and train manager were seriously injured. The driver died after 26 days in the hospital as a result of his injuries. The train manager was discharged home after 13 days in the hospital. The inspector, driver and train manager were employees of the railway undertaking POLREGIO S.A. One passenger on the MOJ 87940 train was injured. The driver of the road vehicle was not injured.

b) cargo, luggage and other property

As a result of the train hitting the semi-trailer of the road vehicle, the semi-trailer was destroyed, and the cargo in the form of sheets of metal was scattered on both sides of the railway line.

c) rolling stock, infrastructure and the environment

Rolling stock

The train consisted of the EN57AL-1527 electric multiple unit whose carriage B was damaged and derailed (photos 1 and 2).

The driver's cab was detached from the frame, and the console and cab equipment were displaced into the passenger compartment behind the cab. The first passenger compartment was destroyed as a result of the displaced components.

Infrastructure

The following damage was identified:

- damaged lighting pole,
- damaged road signs G-2, G-3 and B-20,
- damaged concrete sleepers – approx. 300 sleepers, rail fastening components along a distance of 150 m.

Environment

There was no environmental contamination as a result of the occurrence.

1.5. The description of other consequences, including the impact of the occurrence in the regular operations of the actors involved

The occurrence necessitated the suspension of train traffic on track 1 of line 354, on the Rogoźno Wielkopolskie-Budzyń section, from 7:58 AM on 10/1/2024 until 4:30 PM on 11/1/2024.

During the closure, 35 passenger trains were delayed by 2253 minutes, and four freight trains were delayed by 107 minutes.

1.6. The identification of the persons, their functions, and entities involved, including possible interfaces to contractors and/or other relevant parties

The following persons were directly involved in the occurrence:

- the driver of the MOJ 87940 train – an employee of the POLREGIO S.A. railway undertaking,
- the manager of the MOJ 87940 train – an employee of the POLREGIO S.A. railway undertaking,
- the conductor of the MOJ 87940 train – an employee of the POLREGIO S.A. railway undertaking,
- the inspector of the MOJ 87940 train – an employee of the POLREGIO S.A. railway undertaking,
- the driver of the road vehicle (truck tractor).

1.7. The description and identifiers of train(s) and their composition including the rolling stock involved and their registration numbers

The MOJ 87940 train consisted of the EN57AL-1527 electric multiple unit (EMU).

The EMU had “*Railway Vehicle Type Approval Certificate No. T/2014/0254*” and valid “*Periodic Repair Certificate No. POT3/2-46/2023*” dated 19/7/2023. The certificate was valid until 15/8/2027 or until the mileage of 996,584 km. At the time of the occurrence, the mileage of the EMU recorded by the DEUTA WERKE recorder was 639,665 km.

Notwithstanding the aforementioned certificates, the vehicle had “*Certificate of Restoration to Service No. PRS2KG/33/01/2024*” dated 9/1/2024 after P1 maintenance activities.

The individual carriages of the EMU were given separate identifiers – EVN numbers:

- carriage A – No. PL-PREG 94 51 2 122 343-8
- carriage S – No. PL-PREG 94 51 2 122 344-6
- carriage B – No. PL-PREG 94 51 2 122 345-3.

Details of the MOJ 87940 train – from the brake test report form:

- train length..... 65 m;
- total weight of the train..... 145 tonnes,
- required braked mass percentage..... 104%,
- required braked mass..... 151 tonnes,
- actual braked mass..... 161 tonnes.

1.8. Description of the relevant parts of the infrastructure and signalling system – track type, switch, interlocking, signal, train protection systems

Railway line No. 354, Poznań Główny POD-Piła Główna, was being upgraded between 2015 and 2018.

Track:

- Rail type..... – 60E1 (UIC60) - year of construction 2010,
- Sleepers..... – prestressed concrete, type PS94,
- Fastening type..... – resilient, type SB3,
- Ballast type..... – crushed stone, thickness of 30 cm,
- Maximum permitted train speed on the section... – 120 km/h.

Level crossing:

- category D,
- intersection of railway line No. 354 , Rogoźno Wielkopolskie-Budzyń section, with municipal road No. 201517P, Nowe Budy Street, village of Budzyń,
- individual journey identification number (yellow sticker): 354056055,
- crossing axis – km 56.055,
- angle of railway line-road crossing – 53°,
- the surface of the crossing is made of CBP crossing slabs,
- road surface on the approach roads – bitumen,
- gradient of the approach road (according to the chainage of the railway line):
 - left side: +2.00% over a distance of 25 m,
 - right side: (the direction of entry of the road vehicle to the level crossing) +2.30% over a distance of 25 m,
- train vehicle unit – 6682; last measured on 19/20 September 2023,
- total length of the level crossing – 9.5 m,
- width of the road prism on the level crossing – 9.0 m,
- width of the carriageway on the level crossing 4.5 m,
- width of the carriageway on the approach roads, left side – 5.0 m,

- width of the carriageway on the approach roads, right side – 5.0 m,
- maximum speed of road vehicles on the level crossing – 90 km/h,
- illuminated crossing – two lighting poles, one on each side of the crossing.

Crossing signage.

Signage on the approach road leading to the crossing on the day of the occurrence

At the approach roads leading to the level crossing on both sides, there was an A-10 warning sign together with G-1a, G-1b and G-1c trackside signposts and, due to the crossing being dangerous and intersecting with the road at an angle smaller than 60° , a T-7 sign was put up there as well. In front of the crossing, a B-20 "STOP" sign was put up 9 m away from the railhead, and a G-3 "St. Andrew's Cross" sign and G-2 "Live Network" sign were put up on a common post 5 m away from the rail head.

The visibility of the train front from the approach road from a distance of 5, 10 and 20 metres is shown in Table 1 (data from the level crossing certificate). The red colour in Table 1 indicates distances relating to visibility from the direction of travel of the road vehicle towards the oncoming train.

Table 1 – Visibility of the train front from the road according to the crossing certificate

Distance measured from the outermost rail												Speed V in the area of the crossing	Required visibility conditions		
5 m track side				10 m track side				20 m track side							
right		left		right		left		right		left					
to the right	to the left	to the right	to the left	to the right	to the left	to the right	to the left	to the right	to the left	to the right	to the left	from 5 and 10 m	from 20 m	from 4 m	
Measurements according to the level crossing certificate															
1000	850	660	1000	1000	600	660	700	500	600	550	600	120	660	432	-

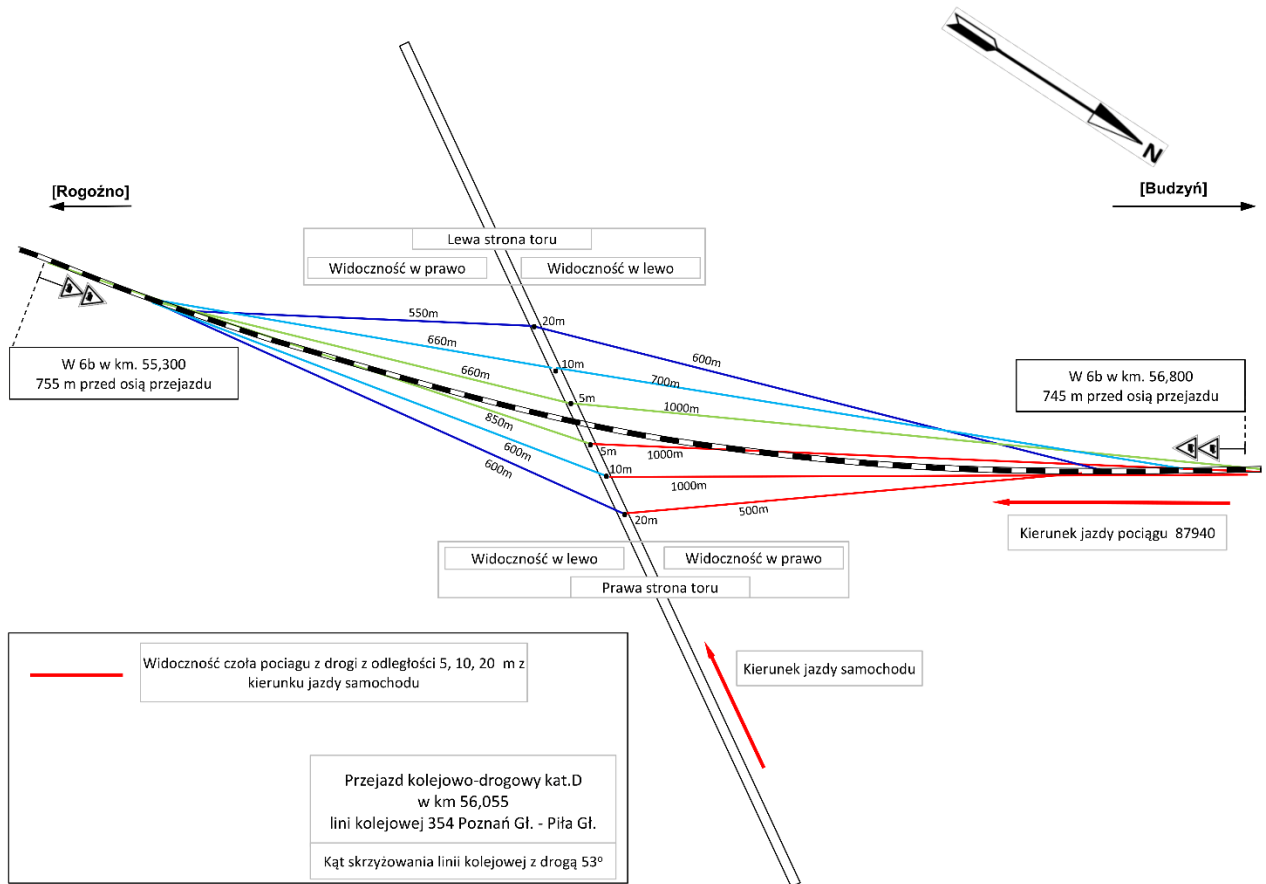


Figure 2 – Sketch of visibility based on the crossing certificate (prepared by PKBWK)

Signage from the direction of the track

W6b trackside signs:

- at km 55.300, i.e., 755 metres from the centreline of the crossing,
- at km 56.800, i.e., 745 metres from the centreline of the crossing (direction of train travel).

1.9. Any other information relevant for the purpose of the description of the occurrence and background information

No other relevant information was identified in the context of the occurrence description.

2. The factual description of the events

2.1. The proximate chain of events leading up to the occurrence, including actions taken by persons involved, the functioning of rolling stock and technical installations, the functioning of the operating system

On 10 January 2024, at 7:55 AM, a traffic operator of the LCS Poznań IV station prepared the line section for the departure of the MOJ 87940 train of the POLREGIO S.A. railway undertaking from station track No. 1 from the Budzyń station onto the mainline track towards the Rogoźno Wielkopolskie station.

On the same day, at around 7:00 AM, the driver of an IVECO road tractor with a semi-trailer was on his way to deliver cargo after an overnight break. When he was driving onto municipal road No. 201517P leading to the railway crossing to continue towards the unloading site, he received a phone call at 7:57 AM via the hands-free kit from a representative of the client. At the time, train No. 87940 was approaching the crossing, having left the Budzyń station. After passing the W6b trackside sign, the driver started to sound the horn. When he spotted the truck approaching the crossing, he sounded the horn continuously for 12 seconds. At the time, the train inspector and the train manager were sitting in the first compartment behind the driver's cab (staff compartment). The driver, seeing that the truck was continuing through the crossing, implemented emergency braking on the train 7 seconds before the occurrence, after which he ran out of the cab and shouted "*get down on the floor*". After hearing this command, the train manager ran out of the staff compartment to warn the passengers, while the inspector remained in the staff compartment. Despite the emergency braking, the train hit the semi-trailer of the tractor-trailer at 100.5 km/h. The driver of the truck was uninjured and, after the occurrence, terminated the phone call with his client's representative.

When the train hit the semi-trailer, the straps securing the sheets broke, and the sheets were ejected in the direction of the train, rupturing the side skin of the EN57AL-1527 electric multiple unit along a section of 9 metres. Then, the metal sheets were scattered on both sides of the track within the crossing. At the time of the occurrence, the axles of the semi-trailer were on the level crossing, while the drive axle of the road tractor was past the crossing. The train hit the semi-trailer near the second and third axles. The train struck the truck with the front left corner. The centrifugal force turned the road vehicle around, and the vehicle was thrown to the right side of the track (looking along the direction of travel of the train). The first bogie of EN57AL-1527 electric multiple unit derailed to the right side of the track, and the train stopped at kilometre 55.900 (155 metres away from the crossing). The relative positions of the vehicles at the time of the occurrence are shown in Figure 3.

Following the occurrence, the train inspector died on the scene due to the sustained, and the driver died after 26 days in the hospital as a result of his injuries. The train driver was seriously injured and transported to the hospital. One passenger was discharged home the same day after being taken to the hospital and receiving medical care.

Based on data contained in the recorders of the operating parameters of the train and the truck, the Investigation Team has compiled a table of identified occurrences immediately preceding the accident (Table 2). Data from the recorders have been rounded to whole seconds, whole km/h and whole metres.

Table 2 – Identified occurrences

Time before the occurrence	Occurrences identified in the railway vehicle	Occurrences identified in the road vehicle
16 seconds	<ul style="list-style-type: none"> - speed: 117 km/h - distance from the crossing: 512 m - the train driver starts to sound the horn 	<ul style="list-style-type: none"> - speed: 16 km/h - distance to the P-12 “STOP” line – 17 m - a telephone call is in progress via the handsfree system
12 seconds	<ul style="list-style-type: none"> - speed: 118 km/h - distance from the crossing: 400 m - the train driver still sounds the horn 	<ul style="list-style-type: none"> - speed: 3 km/h - distance to the P-12 “STOP” line – 5 m - a telephone call is in progress via the handsfree system
9 seconds	<ul style="list-style-type: none"> - speed: 117 km/h - distance from the crossing: 300 m - the train driver still sounds the horn 	<ul style="list-style-type: none"> - speed: 8 km/h - driving over the P-12 “STOP” line - a telephone call is in progress via the handsfree system
7 seconds	<ul style="list-style-type: none"> - speed: 117 km/h - distance from the crossing: 232 m - the train driver still sounds the horn - emergency braking 	<ul style="list-style-type: none"> - speed: 7 km/h - the vehicle continues to approach the crossing - a telephone call is in progress via the handsfree system
5 seconds	<ul style="list-style-type: none"> - speed: 117 km/h - distance from the crossing: 174 m - emergency train braking continues 	<ul style="list-style-type: none"> - speed: 9 km/h - distance between the front of the truck and the tracks: approx. 2 m - a telephone call is in progress via the handsfree system
4 seconds	<ul style="list-style-type: none"> - speed: 114 km/h - distance from the crossing: 120 m - emergency train braking continues - the train driver stops sounding the horn 	<ul style="list-style-type: none"> - speed: 9 km/h - the front part of the vehicle passes the tracks at the crossing - a telephone call is in progress via the handsfree system
2 seconds	<ul style="list-style-type: none"> - speed: 109 km/h - distance from the crossing: 76 m - emergency train braking continues 	<ul style="list-style-type: none"> - speed: 10 km/h - the semi-trailer of the vehicle is on the tracks at the crossing - a telephone call is in progress via the handsfree system
occurrence	<ul style="list-style-type: none"> - speed: 100.5 km/h - the safety loop is broken 	<ul style="list-style-type: none"> - a telephone call is in progress via the handsfree system

The recording of the running data of the railway vehicle ended due to the damage 1 second after the occurrence at 90 km/h.



Figure 3 – Relative positions of vehicles at the time of their collision (source: Opinion of a forensic expert)

2.2. The chain of events from the occurrence until the end of the actions of the rescue services, including measures taken to protect and safeguard the site of the occurrence, the efforts of the rescue and emergency services.

After the accident at 7:59 AM, the driver of the road tractor called the emergency number 112 and reported the occurrence. A passenger (employee of PKP PLK S.A.) who was travelling on the MOJ 87940 train reported the occurrence at 8:08 AM to the traffic officer of the LCS Poznań IV station, position B. At 8:10 AM, the traffic officer closed track No. 1 of the Rogoźno Wielkopolskie-Budzyń section. At 8:30 AM the overhead line was de-energised.

According to the dispatcher's note, the ambulance service, police and firefighters arrived at the accident scene at 8:18 AM, and a representative of the infrastructure operator arrived at 9:47 AM. The public prosecutor arrived on the scene at 9:40 AM. The fire brigade and the arriving ambulance service proceeded immediately to assist the injured persons, i.e. the train inspector, the driver and the train manager. The injured driver of the MOJ 87940 train, after being freed from the jammed parts of the train by the fire brigade, was transported to a hospital in Piła, where he died 26 days later as a result of the extensive injuries he had sustained. The train inspector died at the scene of the accident as a result of his injuries. The train driver was transported to a hospital in Chodzież and then to a hospital in Piła, where he was discharged home after 13 days of treatment.

Rescue operations related to the occurrence lasted until 3:15 PM, 10/1/2024.

The train involved in the occurrence was pulled to the Budzyń station at 3:15 PM by the SM42-1123 locomotive of PKP CARGO S.A. after the operations of the emergency services had been completed.

IV. ANALYSIS OF THE OCCURRENCE

1. Roles and duties

1.1. Railway undertaking(s) and/or infrastructure operator(s)

Infrastructure operator PKP PLK S.A. Maintenance-of-Way Department in Poznań

The infrastructure operator is responsible for, in particular, the appropriate maintenance of the railway line, including level crossings. The responsibilities of the railway infrastructure operator are laid down in, inter alia,

Article 62 of the Construction Law Act of 7 July 1994. The said provision requires infrastructure operators to conduct annual and five-year reviews of civil structures (including level crossings and their traffic protection systems). § 31 of Internal Instructions Id-1 of the infrastructure operator imposes an obligation to conduct diagnostic examinations of level crossings (including the road pavement and track superstructure, visibility conditions and lighting). The intervals of reviews of civil structures set forth in the applicable instructions are consistent with Article 62 of the Construction Law Act of 7 July 1994. PKP PLK S.A. The Maintenance-of-Way Department in Poznań presented reports on annual and five-year reviews (inspections)

of level crossings. The Investigation Team analysed the reports on five-year, annual and ad hoc inspections carried out in 2022–2023 concerning the maintenance of the civil structure that consisted of an inspection of its condition. Upon examining the devices, the diagnosing technician did not find any irregularities and described their condition as good. Therefore, it was not necessary to issue any recommendations, and the civil structure was cleared for further operation without any recommendations regarding required corrective actions.

In addition, the Maintenance-of-Way Department of PKP PLK S.A. in Poznań presented the “*Technical and Operational Risk Assessment Report*“ dated 30/11/2022, accepted by the Director of the Safety Office of PKP PLK S.A.

Railway undertaking POLREGIO S.A.

The railway undertaking operates based on single safety certificate No. PL1020210197 issued by the President of the Office of Rail Transport for the period from 1/12/2021 to 1/12/2026. For carrying out the transport duty, the Railway Undertaking assigned a railway vehicle with a railway vehicle type approval certificate and vehicle fitness certificate. The designated train crew that operated the train had all the licences and qualifications required by law. The train was run based on a timetable.

The responsibilities of railway undertakings concerning the safe operation of a rail vehicle are laid down in the infrastructure operator’s *Instructions Ir-1 for the working of trains*, *Instructions Ie-1(E-1) – Instructions on signalling – and internal instructions of the railway undertaking Pt-2 – Instructions for a traction vehicle crew*. Based on an analysis of the collected evidence, the Investigation Team did not identify any irregularities in the conduct of the train crew while they were driving the train.

1.2. The entity/entities in charge of maintenance, the maintenance workshops, and/or any other maintenance suppliers

The POLREGIO S.A. railway undertaking, which provides the rolling stock, is responsible for its serviceability, technical condition and compliance with the vehicle maintenance process. The EN57AL-1527 electric multiple unit leading the train had a railway vehicle type approval certificate and valid periodic repair certificate No. POT3/2-46/2023 dated 19/7/2023. The railway undertaking submitted documentation concerning the latest technical inspections of its rail vehicles. The investigation team found irregularities in the maintenance and operation of the front-facing recording systems of the train. The irregularity was the lack of power backup and continuity of video recording until the occurrence.

The technical condition of the rail vehicle had no impact on the occurrence concerned.

1.3. Manufacturers of rolling stock or other supplier of rail products

Based on the material gathered in the investigation, the Investigation Team did not identify any factors that would be affected by manufacturers of rolling stock and suppliers of rail products.

1.4. National safety authorities and/or the European Union Agency for Railways

The President of the Office of Rail Transport (UTK) supervises railway traffic safety. Based on the material gathered in the investigation, the Investigation Team did not identify any factors indicating a connection between the national safety authorities and the occurrence. According to the data received from the Maintenance-of-Way Department in Poznań, from 2021 until the date of the accident at the Maintenance-of-Way Department in Poznań, the President of the Office of Rail Transport carried out 9 inspections regarding the condition and maintenance of railway infrastructure. 33 level crossings were inspected. The level crossing concerned was not inspected by the President of the Rail Transport Office.

1.5. Notified bodies, designated bodies and/or risk assessment bodies

Based on the material gathered in the investigation, the Investigation Team did not identify any factors related to notified bodies and risk assessment bodies that could have an impact on the occurrence.

1.6. Certification bodies of entities in charge of maintenance mentioned under section 1.2

The certification body certifying the POLREGIO S.A. railway undertaking as the entity responsible for maintenance within the Safety Management System (SMS) is the President of the Office of Rail Transport. Based on the material gathered in the investigation, the Investigation Team did not identify any factors attributable to the certification body of the railway carrier that would have an impact on the occurrence.

1.7. Any other person or entity relevant to the occurrence, documented or not in one of the relevant safety management systems or referred to in a register or relevant legal framework

Under § 81 of the Regulation of the Minister of Infrastructure and Development of 20 October 2015 *on the technical conditions to be met by crossings of railway lines and sidings with roads, and on their positioning* (consolidated text: Journal of Laws. 2015, item 1744, as amended), the duties of the proper marking and maintenance of the approach roads leading to the crossing rest with the road operator.

The driver of the road vehicle managed a heavy transport company under a sole proprietorship. He held a category C+E road driving licence and, at the time of the occurrence, was the owner of an IVECO road tractor with a semi-trailer.

2. Rolling stock and technical installations

Powered railway vehicle

The EN57AL-1527 electric multiple unit (EMU) was equipped by the manufacturer with the DEUTA-WERKE system to record running data.

The Investigation Team analysed the recorded running data.

The EMU was driven from cab B. The chart below shows the following running data of the MOJ 87940 train:

- 1) time,
- 2) speed in km/h,
- 3) train braking – activation of emergency braking,
- 4) driving with electricity,
- 5) activation of the horn.

Report on the investigation of a serious railway accident occurring on 10/1/2024 at 7:58 AM, level crossing of cat. D on the Rogoźno Wielkopolskie-Budzyń section, track No. 1, km 56.055, railway line No. 354, Poznań Główny POD-Piła Główna

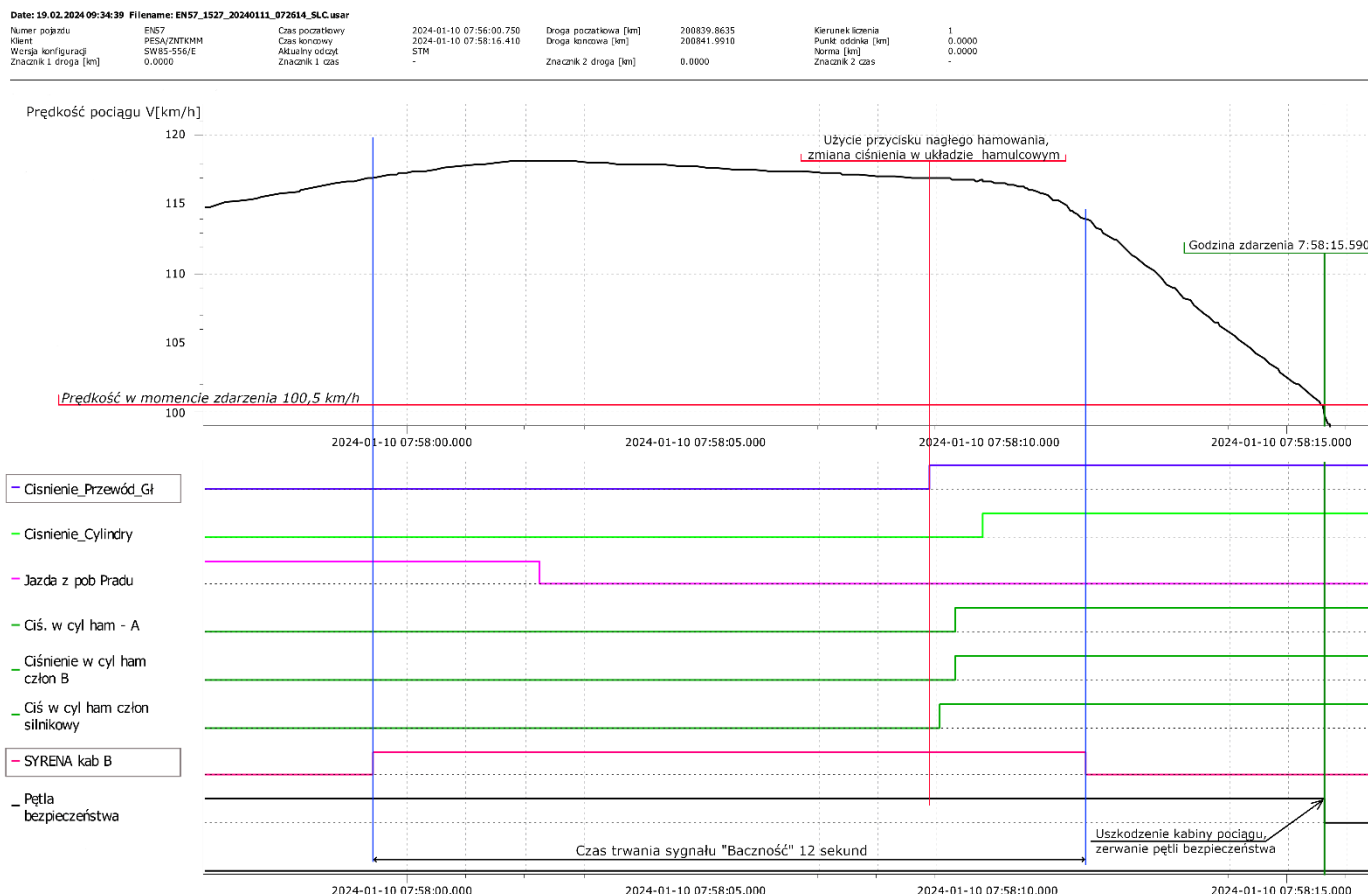


Figure 4 – Chart of the running data of the MOJ 87940 train (prepared by PKBWK)

Description of the recorded running data of train No. 87940 from 7:57 AM to 7:58 AM – until the time of the occurrence and the end of the data recording:

- at 07:57:59 AM at 117 km/h, 512 metres ahead of the crossing, the train horn was sounded for 12 seconds over a distance of 392 metres,
- at 07:58:09 AM at 116 km/h, after travelling 338 metres and sounding the horn, a sudden increase in air pressure in brake cylinders was recorded, the driver implemented the emergency braking procedure; due to the braking, the running speed decreased quickly,
- at 07:58:11 AM, at a speed of 114 km/h, the horn was stopped (7 seconds before the occurrence and 120 metres before the crossing),
- at 07:58:15 AM – the time of the occurrence at 100.5 km/h (breaking the safety loop of the railway vehicle),
- at 07:58:16 AM at 90.6 km/h, the recording of data by the recorder ended as a result of the accident; after cab B was damaged, there was an outage of data transmission to the recorder in cab A.

The vehicle was equipped with a POLGARD-type front-facing video recording system with periodic recording in permanent memory. The last recording was made at the Budzyń station. As a result of the occurrence, there was a power failure and no video was recorded from the Budzyń station until the time of the occurrence. The front-facing video footage from the Budzyń station to the scene of the occurrence contained in the temporary memory was lost upon the loss of power and connection of the recorder with the cameras on the vehicle connected to the LAN. The train was run using cab B. The train safety apparatus (A.B.P.) on the EMU was operational.

3. Human factors

3.1. Human and individual characteristics

According to the findings of the Investigation Team, the driver of the road vehicle was talking on the phone via a hands-free kit. Although a hands-free phone call is allowed while driving on the road by current law, the driver's distraction was such that it could have led to a misjudgement of the situation in the area of the level crossing. The inattention of the driver of the road vehicle when he approached and passed the level crossing – caused by the ongoing phone call – was considered by the Investigation Team to be a contributing factor in the occurrence.

The Investigation Team did not identify an impact of individual driver characteristics on the occurrence. The driver sounded the train horn before the truck entered the crossing. From a distance of 512 m and at a speed of 117 km/h, the train driver was unable to determine whether the truck had stopped in front of the crossing or, as was the case, was moving at a slow speed (3 km/h). After the truck entered the level crossing, the driver initiated emergency braking and evacuated from the cab.

3.2. Job factors

The train driver's workstation was typical, consistent with the operating approval. The train driver's workstation had no impact on the occurrence.

The truck driver's workstation was typical. The road vehicle had a valid roadworthiness test certificate. The design of the road vehicle cab limits visibility to the right. This restriction has a significant impact especially when approaching and passing level crossings with an intersection angle of less than 60°. The visibility from the driver's position in the cab of the road vehicle is shown in Photo 8.

3.3. Organisational factors and assignments

As it transpires from the material gathered by the Investigation Team, the employer provided the train driver involved in the occurrence with the rest time required by law. The driver of train No. MOJ 87940 had had 12 hours of rest prior to starting work. He had received the training required for operating EMU traction vehicles and had completed other training courses related to his job. The train driver had all the licences and authorisations required by the applicable law and instructions for duties connected with the relevant job. The Investigation Team does not have any objections concerning the railway undertaking's organisational duties. According to the recorded operation of the road vehicle, the driver had taken the required rest.

3.4. Environmental factors

The occurrence took place in the morning, in cloudless conditions, without precipitation, at a temperature of around -9° C. The approach road to the crossing was snowy and icy due to the snowfall that had occurred a few days earlier. According to the Investigation Team, the approach road and the level crossing had not been gritted with any substances to improve the traction of road vehicles.

The approach road to the crossing from the direction of the moving road vehicle rises along a distance of 25 m

and has a slope of 2.3%. The angle of intersection between the railway line and the road is 53°.



Photo 5 – View of the crossing from the direction of travel of the road vehicle (source: PKBWK)

The Regulation of the Minister of Infrastructure and Development of 20 October 2015 *on the technical conditions to be met by crossings of railway lines and sidings with roads, and on their positioning* (Journal of Laws of 2015, item 1744, as amended) defines the requirements for the design, construction and use of level crossings.

In the aforementioned Regulation, Annex 3, Part B, section 4 specifies how to determine the visibility of the front of the train from the road ahead of a level crossing for individual observation points (from 5, 10 and 20 m), stating that: “*Train visibility should be checked in conditions similar to those experienced by road users. The observation of the front of an oncoming train shall be made from a height of 1 to 1.2 m above the centreline of the lane of the public road. This visibility is determined by the railway operator, and it is recorded in the level crossing certificate*”.

The infrastructure operator provided the Investigation Team with the level crossing certificate, a report on the verification of train front visibility made on 10/1/2024 and a level crossing report of 22/8/2023. In the provided documents, the visibility of the train front from the road from a distance of 5 m and 10 m to the extreme rail was 1000 m (Table No. 1 – right side to the right). The measurements were taken from a height of 1–1.2 metres above the centreline of the lane of the public road.

In order to verify the visibility of the front of the train from the road in conditions similar to those experienced by road users, the Investigation Team carried out a check from a Citroen Jumper road vehicle. When the car was stopped in front of the P-12 line, the visibility of the front of the train, with the driver leaning forward as much as possible, is shown in Photo 6. After taking measurements, the visibility of the front of the train from the van, taking into account the design of the cab, was found to be between 45–50 metres. A visibility measurement taken at the same location (ahead of the P-12 line) but from the height of a pedestrian confirmed the values in the level crossing certificate (photo 9). The difference in visibility of the train front from the car and from the observation point according to the rules of the Regulation is between 950–955 m. As can be seen from the measurements, checking visibility only from a height of 1–1.2 m above the

centreline of the lane, as envisaged by the legislator, cannot – in the opinion of the Investigation Team – be considered representative of the conditions similar to those experienced by road users. Differences in measurements amounting to up to 2000% are too large to be considered representative. The visibility of the train front from the road was also checked using a KIA Sportage car available to the Commission (photo 7), while visibility measurements from the truck were made by a forensic expert (photo 8). The results of measurements carried out using different types of vehicles (KIA Sportage car, Citroen Jumper van and Mercedes truck) are comparable in terms of their results.

In the vehicle types used for the check, visibility through the windscreen and side windows was limited due to their design. Therefore, there is a need to amend the provisions defining the rules for measuring the visibility of the front of the train from the road. The amendments should take into account the constraints of road vehicle design.



Photo 6 – View from the driver's position in the Citroen Jumper car (source GDPWK).



Photo 7 – View from the KIA Sportage car (source GDPWK)

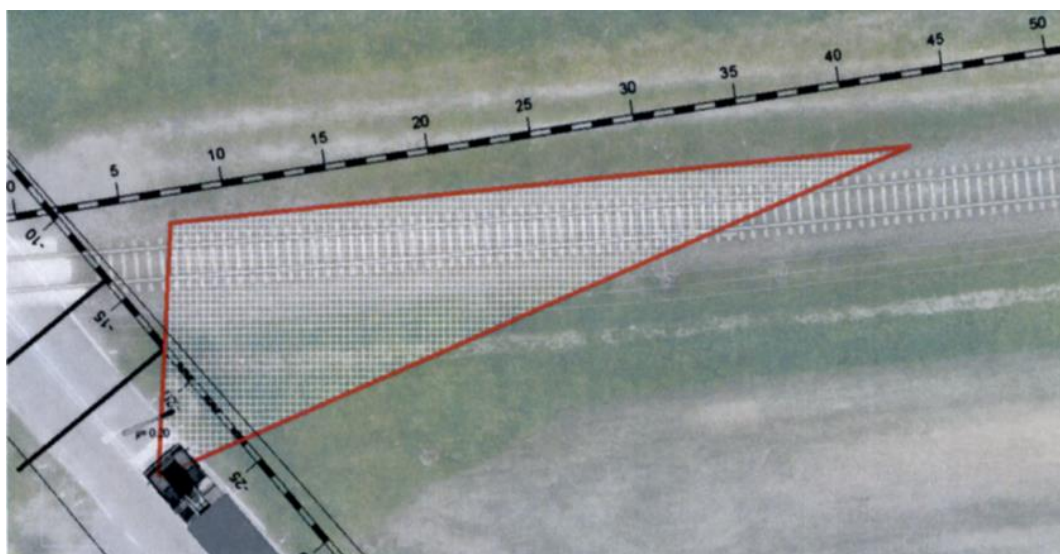


Photo 8 – Determined field of view from the position of the truck driver (source: Opinion of a forensic expert)



Photo 9 – Visibility of the train front from the pedestrian’s position (source: GDPWK)

Section 4, part B of Annex No. 3 to Regulation of the Minister of Infrastructure and Development of 20 October 2015 *on the technical conditions to be met by crossings of railway lines and sidings with roads, and on their positioning* (Journal of Laws of 2015, item 1744, as amended) stipulates that: “Train visibility should be checked in conditions similar to those experienced by road users. Observation of the front of an oncoming train shall be made from a height of between 1 m and 1.2 m above the centreline of the lane of the public road.(...)”. The Regulation does not define “conditions similar to those experienced by road users”, but the following provision: “Observation of the front of an oncoming train shall be made from a height of between 1 m and 1.2 m above the centreline of the lane of the public road” only permits the determination of visibility connected with terrain obstacles (e.g., trees, shrubs, tall vegetation, buildings and structures), without considering other conditions similar to the those actually experienced by the road users (e.g., visibility from the cab of road vehicles). Such a provision leads to very large differences in the determined visibility of the train front from the road. Precise determination of the way in which measurements are taken to determine the visibility of the train front at level crossings from the road is particularly important because it has a direct bearing on traffic management in the crossing area (e.g. train speed).

In light of the foregoing, the Investigation Team recommends that the Minister of Infrastructure analyse the *Regulation of the Minister of Infrastructure and Development of 20 October 2015 on the technical conditions to be met by crossings of railway lines and sidings with roads, and on their positioning* (Journal of Laws of 2015, item 1744, as amended) to determine if it is necessary to add specific requirements to check the visibility of the train front from the road and account for conditions similar to those experienced by road users (e.g., drivers of various road vehicles).

3.5. Any other factor relevant for the purpose of the investigation

During the course of the investigation, another occurrence was recorded at that crossing on 10/8/2024. The investigation into the causes of the occurrence was conducted by the railway commission.

Description of the occurrence and its impact included in the Final Findings of the railway commission: 10/8/2024 at 10:50 AM, level crossing at kilometre 56.055 of line No. 354, Poznań Główny POD-Piła Główna. The driver of the van was travelling along Nowe Budy Street towards national road No. 11. Although a train was approaching the crossing, the van drove onto the crossing and was struck in the rear by passenger train No. 78093 running on the Poznań Główny-Kołoźbrzeg section as it exited the crossing. No one was injured as a result of the occurrence. The rear part of the van was destroyed, and the right corner of the rail vehicle was damaged.

According to an analysis of occurrences at this crossing, conditions in the area of the level crossing are dangerous (two accidents within 8 months), in particular, because of the sharp angle of the intersection of the road and the railway line (53°) and the limited visibility of the front of the train for the road users due to the “blind spot” of the road vehicle, among other factors. There were three accidents involving road users at this crossing between 2011 and 2024, two of which occurred in 2024. In the opinion of the Investigation Team, until a change is made as outlined in Recommendation 1, a 20 km/h train speed limit should be introduced in the area of the level crossing. The limit should apply to the front of the train along the entire length of the crossing. This limit is due to the lack of required visibility of the train front from the road when determined from road vehicles in conditions similar to those experienced by road users.

In the Annual Report on the activity of PKBWK in 2020, the following recommendation was made:

*“Railway infrastructure operators shall identify level crossings where the angle of the railway-road intersection does not meet the condition specified in § 26(2) of the Regulation of the Minister of Infrastructure and Development of 20 October 2015 on the technical conditions to be met by crossings of railway lines and sidings with roads, and on their positioning (Journal of Laws, item 1744, as amended), assess the risk of occurrences taking place at these crossings and take appropriate preventive action in accordance with their safety management systems. The above recommendation is caused by the recurring occurrences at some level crossings where the angle of the **railway/road** intersection does not meet the above condition”.*

The Safety Office of PKP PLK S.A. has provided the following documents concerning this recommendation (Measure M.1.5.1):

1. Safety Improvement Program 2022 One of the tasks was defined by the priority: “Assessing the risk concerning key hazards to the infrastructure”, and the related measure: “Assessing the risk for level crossings where the angle of the railway-road intersection does not meet the condition specified in § 26(2) of the Regulation of the Minister of Infrastructure and Development of 20 October 2015 on the technical conditions to be met by crossings of railway lines and sidings with roads, and on their positioning”, with a time limit for implementation set for 28/2/2022.
2. Extract from the implementation of measure M.1.5.1.
3. Technical and Operational Risk Assessment Report No. IZ16EI.2803.02.1.2022.AH (Maintenance-of-Way Department in Poznań).

After analysing the “Extract from the implementation of measure M.1.5.1”, the Investigation Team found incomplete entries in the “Implementation” column. In the table next to the entries for many Maintenance-of-Way Departments, there was no indication of how the task was carried out and no reference to a document describing the implementation of the task. In “Technical and Operational Risk Assessment Report” No. IZ16EI.2803.02.1.2022.AH, in the analysis for the individual risk assessment sheets, there was no indication of the location of the level crossing the sheet concerned.

Nineteen risk assessment sheets were produced, and for all sheets, the result of the analysis is the same:

Quote:

“1) 27 risks in the acceptable category;

2) 0 risks in the tolerable category; additional risk control measures have been identified for risks No.: ,

3) 0 hazards in the unacceptable category; additional risk control measures have been identified for risks No.:

In the opinion of the Investigation Team of the Commission, in section 1) of the “*Technical and Operational Risk Assessment Report*”, 27 risks from the “*Risk register of PKP PLK S.A.*” were indicated without naming the risk, and the sentences in section 2) and 3) are unfinished, and their content should be verified.

4. Feedback and control mechanisms, including risk and safety management as well as monitoring processes

The Investigation Team identified a systemic factor that contributed to the occurrence. No feedback or control mechanisms, including risk and safety management or the monitoring process, had an impact on the occurrence.

5. Previous occurrences of a similar character

As part of the investigation, the Investigation Team analysed a selection of accidents occurring under similar circumstances at level crossings. A brief description of the occurrences and their consequences.

1. On 23/9/2011 at 7:08 AM, at the level crossing of cat. D at kilometre 56.055 of railway line No. 354, train No. 87324 struck the semi-trailer of a truck passing through the crossing. The semi-trailer of the truck was damaged as a result. The train did not derail. No one was injured as a result of the accident.

“Direct cause:

Disregarding the B-20 “STOP” sign and driving onto the crossing.

Root cause:

Inattention of the driver of the road vehicle approaching and passing through the level crossing.

2. On 13/6/2018 at 12:54 PM, at the level crossing of cat. D at kilometre 342.231 of railway line No. 273, Wrocław Główny-Szczecin Główny, a Volvo truck (road tractor) with a semi-trailer loaded with wooden bales drove directly in front of the oncoming passenger train No. MOJ 87502 running on the Szczecin Główny-Zielona Góra section. The cab of a three-carriage electric multiple unit struck the road vehicle between the driver’s cab and the fifth wheel of the tractor.

As a result of the collision with the road vehicle, the Volvo truck was wrecked, and the driver died on the scene. Twenty-three persons travelling on the passenger train and three train staff members were injured – the driver was seriously injured and was transported by air ambulance. As a result of the occurrence, the EN57AL-2108 “Rb” electric multiple unit was derailed (first, second and fourth bogie looking along the direction of travel with 2 axles, third bogie with the second axle looking along the direction of travel). The carriage of the EN57AL-2108 “Rb” EMU No. EVN 94 51 2 121 862-8 was completely destroyed.

Torn overhead contact system over a distance of approximately 300 metres, two catenary poles broken at track 2, damaged track superstructure along a distance of approximately 140 metres and damaged device and power supply panel.

“Direct cause:

The truck driving onto the level crossing directly in front of the oncoming MOJ 87502 train on the Szczecin Główny-Zielona Góra section.

Root causes:

The driver of the truck approaching the crossing disregarded both the B-20 “STOP” sign and the P-12 stop line, i.e. he did not stop his road vehicle in the designated place and drove onto the level crossing directly in front of the oncoming MOJ 87502 train on the Szczecin Gł.–Zielona Góra section.

Indirect causes:

1. *Failure of the driver of the road vehicle approaching the level crossing to check if no train was approaching and continuing onto the level crossing without stopping.*
2. *Limited visibility of the train front due to the lack of continuous visibility from 5 m caused by concrete catenary masts obstructing the driver's field of view".*
3. On 7/6/2023, at 10:53 AM, at the level crossing of cat. D at kilometre 25.700 of railway line No. 377, Gniezno Winiary-Sława Wielkopolska, a truck (a special vehicle filled with concrete – a concrete mixer truck) drove directly in front of an oncoming freight train No. 774040.
The occurrence resulted in the derailment of the locomotive and three cars (empty tank cars). The truck was completely wrecked. Through the broken windscreen of the locomotive, the cargo was ejected into the driver's cab. The driver of the road vehicle was taken by ambulance to the hospital for examination.
*“Direct cause:
A rail vehicle striking a road vehicle at a level crossing of cat. D.
Root cause:
Failure by the driver of the truck to comply with the B-20 “STOP” and G-3 signs and the P-12 stop line when approaching the level crossing.
Indirect cause:
Failure to exercise due care by the driver of the truck when passing across the level crossing and failing to yield to the rail vehicle”.*
4. On 15/2/2023, at 11:32 AM, at a level crossing of cat. D at kilometre 41.713 of railway line No. 404, Szczecinek-Kołobrzeg, a Mercedes truck loaded with soil drove directly in front of the oncoming passenger train No. 84102. The first axle of the first bogie of the locomotive derailed to the right side of the track (looking along the direction of travel). The truck was completely wrecked as a result of the occurrence. Through the broken windscreen of the EP07-1012 locomotive, the cargo was ejected into the driver's cab. As a result of the occurrence, railway infrastructure was destroyed at a section of 150 m.
*“Direct cause:
A railway vehicle striking a truck at a level crossing of cat. D.
Root cause:
Inattention of the driver of the truck when approaching the level crossing.
Indirect cause:
The user of the level crossing drove their truck onto the level crossing without stopping in front of the B-20 “STOP” road sign and was talking on the phone when driving”.*
5. On 11/8/2023, at 8:50 AM, at the level crossing at kilometre 23.159 of line No. 027, Nasielsk-Toruń Wschodni, a truck with a semi-trailer loaded with debris drove directly in front of the oncoming passenger train No. 15161. The train hit the semi-trailer of the truck. As a result of the occurrence, the cab of the Vt627-101 rail vehicle was crushed. The casualties included 5 train passengers and 2 train crew members. The railway vehicle was derailed with two bogies and was unfit for further travel.
*“Direct cause:
Train No. 15161 hitting the road vehicle (road tractor with a semi-trailer) passing through the level crossing.
Root cause:
Inattention of the driver of the road vehicle approaching the level crossing and failing to check if no rail vehicle was approaching the crossing before passing.
Indirect cause:
Failure of the driver of the road vehicle to comply with the traffic signs”.*

As can be seen from the analyses of the above-mentioned occurrences, the main cause was the failure of the road vehicle drivers to exercise caution despite the correct marking of the approach roads leading to the level crossings and the level crossings themselves.

V. CONCLUSIONS

1. A summary of the analysis and conclusions with regard to the causes of the occurrence

The causal factor in the occurrence was the fact that the road tractor with a semi-trailer loaded with sheets of metal drove onto a level crossing directly in front of a train approaching the crossing.

The failure of the driver of the road vehicle to exercise extreme caution before and while crossing the level crossing, the failure to stop in front of the B-20 “STOP” sign and the “P-12 stop line” when a train was approaching, and talking on the phone using a hands-free kit were considered by the Investigation Team as contributing factors to the occurrence. A large influence on the deterioration of the visibility of the front of the train from the road was the angle of intersection of the railway line with the road, which was also identified by the Investigation Team as a contributing factor. The current legal regulations on the determination of the visibility triangle do not specify in detail how to carry out measurements taking into account the constraints imposed by the design of different types of road vehicles. This is particularly important at level crossings with angles of less than 60° . The visibility triangle from a position 1–1.2 m above the lane centreline (usually performed from a tripod with a specific height) is determined only with consideration of terrain obstacles (slopes, buildings, structures, trees, shrubs, tall vegetation). A measurement taken in this way does not reflect conditions similar to those experienced by road users.

2. Measures taken since the occurrence

On the day of the occurrence, the road operator, immediately after the rescue operation, dispatched a gritting truck to the approach road leading to the level crossing, and both the road and the level crossing were gritted with sand and salt.

The Budzyń Municipality introduced a new traffic organisation at the level crossing within the intersection of municipal road 201517P with railway line 354 in August 2024. At Nowe Budy Street, the following signs have been put up
D-42 – “Built-up area”, limiting the speed to 50 km/h. Rumble strips have been installed on both sides of the road.

VI. SAFETY RECOMMENDATIONS

1. In view of the accidents that have occurred and the significant risk of further occurrences at the crossing, the infrastructure operator PKP PLK S.A., together with the road operator, the Head of Budzyń Municipality, will agree to implement one of the following measures to improve safety at the crossing:
 - 1) reconfiguring a section of the road leading to the railway line so that the angle of intersection with the railway line is close to 90° without changing the current category of the crossing, or
 - 2) increasing the category of the crossing, or
 - 3) removing the crossing.
2. Until one of the measures specified in recommendation 1 is implemented, due to the safety risk at the crossing, the railway infrastructure operator PKP PLK S.A. will introduce permanent speed limits of 20 km/h for the train front at the level crossing of category D at kilometre 56.055 of railway line 354, Poznań Główny POD-Piła Główna, in both directions.
3. The Minister of Infrastructure will analyse the Regulation of the Minister of Infrastructure and Development of 20 October 2015 *on the technical conditions to be met by crossings of railway lines and sidings with roads, and on their positioning (Journal of Laws of 2015, item 1744, as amended)* to determine if it is necessary to add specific requirements to check the visibility of the train front from the road and account for conditions similar to those experienced by road users (e.g., drivers of various road vehicles. See the reasons described in Chapter IV, section 3.4, of this Report).
4. Railway undertakings operating powered railway vehicles will check the installed forward-facing video recording systems to determine if the recorded footage is correct and uninterrupted. For systems with delayed video recording, the undertakings will modify the power supply systems to ensure the recording process continues even if external power is lost.
5. PKP PLK S.A. will verify the results of the risk assessments of occurrences at level crossings of cat. D for which the intersection angle is smaller than 60° (conducted in accordance with Section 4.2, Recommendation No. 7, in the PKBWK 2020 Annual Report), and will take appropriate action.

STATE COMMISSION ON RAILWAY ACCIDENT INVESTIGATION
CHAIRMAN

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Tadeusz Ryś

List of acronyms used in Report No. **PKBWK 01/2025**

No	Symbol (acronym)	Explanation
<i>1</i>	<i>2</i>	<i>3</i>
1.	EUAR	European Union Agency for Railways
2.	PKBWK	State Commission on Railway Accident Investigation
3.	UTK	Office of Rail Transport (Polish: Urząd Transportu Kolejowego)
4.	IZ	PKP PLK S.A. Maintenance-of-Way Department
5.	ISE	Operation Section of the Maintenance-of-Way Department
6.	POLREGIO S.A.	Railway undertaking