STATE COMMISSION ON RAILWAY ACCIDENTS INVESTIGATION
Ministry of Interior and Administration

REPORT No PKBWK 08/ 2022

on the investigation of a railway accident
that occurred on January 14, 2022 at 10:48 am at Kolbuszowa station,
track No 1Wb, category C level crossing at km 46.925
railway line No 71 Ocice - Rzeszów Główny
area of the infrastructure manager PKP PLK S.A. Railway Line Department in Rzeszów

WARSAW, 27/12/2022.

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

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 used for railway accidents and occurrences investigation report (Official Journal of the European Union No. 132 of 27 April 2020)*

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I. SUMMARY

Type of Event: Accident

Description: An occurrence at a rail-road crossing (hereafter referred to as a "level crossing" or "crossing," according to the Act on Road Traffic), involving a RAJ 33506 train invading a Citroen Jumper delivery road vehicle, which entered a Cat C crossing during signals emitted by traffic signals prohibiting entry on the crossing and audible signals emitted by acoustic devices.

Date of Event: 14.01.2022 10:48 am.

Place of Event: Railway line No 71 Ocice - Rzeszów Główny, Kolbuszowa station, track No. 1Wb, cat. C level crossing km 46,925, crossing identification number 071 046 925, geographical location 50°11'29 "N 21°53'12 "E.

Implications of the occurrence: As a result of the occurrence, the driver of the road vehicle died on the spot. The van and the first section of rail vehicle No. EN63B-108 were destroyed, and five train passengers were injured. Four people received medical assistance on the spot, one person was taken to the hospital in serious condition, who died because of the injuries suffered.

Causal factors:
(means any act, omission, event or condition, or combination thereof, which, if corrected, eliminated or avoided would most likely have prevented the event)

1) Failure by the driver of a road vehicle to obey the light signals given on traffic signals (alternating flashing red lights) and the audible signals emitted by acoustic devices involving passing the traffic signal despite the prohibition.
2) Continuing to pass the level crossing and entering the level crossing by the road vehicle, directly in front of the oncoming RAJ 33506 train.

Contributing factors:
(means any act, omission, event, or condition that influences the occurrence of an event by increasing its probability, accelerating the consequences over time, or increasing the severity of the consequences, but the elimination of which would not have prevented the event)

1) Driver's failure to behave with special caution when approaching a level crossing, as provided for in *Article 28(1) of the Act of June 20, 1997, Act on Road Traffic (i.e., Journal of Laws of 2021, item 450, as amended).*
2) Restriction of the field of view of the level crossing for the driver of passenger train RAJ 33506, due to a train set running from the siding of PKN ORLEN S.A. standing on track No. 101 in front of the crossing. - Widełka Fuel Terminal. This train also restricted the field of vision for the driver of the road vehicle.
3) Explosion in the driver's cab of vapors emanating from damaged packages of flammable goods carried by the delivery truck, causing the door leading to the driver's cab to be torn off and severely injuring a train passenger.

Systemic factors: Not stated.

Recommendations and their addressees:

1) Related to the change in infrastructure: level crossing (from category C to category B), track layout and designation of tracks on the siding adjacent to the railway line track, and the change in traffic organization within the crossing, PKN Orlen S.A. will establish a risk assessment and evaluation team to identify risks affecting the traffic safety of railway vehicles and road vehicles at the level crossing and on

track No. 101. It is recommended that the team identifying risks include representatives of the Railway Infrastructure Manager, Road Manager, Siding User and the organizer of traffic in the area of the siding.

2) PKN Orlen S.A., in consultation with PKP PLK S.A., will update the start of the Widełka Fuel Terminal siding in relevant documentation.
3) PKP PLK S.A. will liquidate redundant built-up vertical rails along line No. 71, which are fixed points of the long-welded rail. Use the existing catenary pylons as fixed points.
4) Railway operators licensed to transport passengers shall equip railway vehicles in places accessible to the train operator with rescue stretchers or other equipment for carrying injured persons.

Fig. 1 - Field of view from the driver's cab when passing the entry semaphore U

Fig. 2 - View from the driver's cab as the car entered the crossing (2 seconds before the occurrence)

Fig. 3 - View from the driver's cab just before hitting the car

Fig. 4 - The scene of the accident (railway commission material)

Fig. 5 - The aftermath of the occurrence (railway commission material)

Fig. 6 - The aftermath of the occurrence (railway commission material)

Fig. 7 - The aftermath of the occurrence (railway commission material)

II. INVESTIGATION AND ITS CONTEXT

1. Decision to initiate the investigation

Chairman of the State Commission for Investigation of Railway Accidents (hereinafter referred to as "PKBWK" or "Commission") Mr. Tadeusz Ryś has issued decision No. PKBWK.4631.1.2022 dated January 27, 2022, to undertake investigation to clarify the causes and circumstances of the accident at the Category C level crossing at km 46.925. Considering this fact and the provisions of Article 28e, paragraph 4 of the Act of 28 March 2003 on railway transport (that is: Journal of Laws of 2021, item 1984, as amended), hereinafter referred to as "Railway Transport Act", the occurrence was reported to the European Union Agency for Railways within the prescribed period and registered in the database under number PL-10186.

2. Grounds for the decision to initiate the investigation

Based on an analysis of circumstances and taking into account the nature of the occurrence, the Chairman of PKBWK decided to initiate investigation by the Commission Investigation Team under Article 28e (2) of the Railway Transport Act.

3. The scope and limitations of the investigation, including its justification, as well as an explanation of any delays that are considered to be a risk or other impact on the investigation or the conclusions of the investigation

Investigation to determine the causes of the occurrence were conducted under Article 28h (1) of the Railway Transport Act, which according to the provision of Article 28f (3), does not decide about fault or responsibility.
Among other things, the research team analyzed:

- Material collected by the Investigation Team,
- Material made available by the Kolbuszowa District Prosecutor's Office,
- Crossing documentation, internal regulations of the infrastructure manager and the Railway Undertaking related to the investigated occurrence,
- Safety management systems (SMS) of the infrastructure manager and the Railway Undertaking,
- Regulations for the operation of the PKN ORLEN S.A. railway siding. - Widełka Fuel Terminal,
- Authorizations of the road vehicle driver,
- Documentation of the cargo being transported and the approval of the road vehicle,
- Maintenance system documentation (DSU) of the railway vehicle.

During the investigation, there were no restrictions that would adversely affect its conducting.

4. Aggregated description of the technical capabilities of the functions in the team of persons conducting the investigation

The Chairman of the Commission appointed from among the permanent members of the Commission an Investigation Team with qualifications and competence in the field of the investigation.

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5. Description of the communication and consultation process conducted with persons or entities involved in the occurrence, during the investigation and in relation to the information presented

Pursuant to Article 28h (2) (5) of the Railway Transport Law, the Chairman of PKBWK obligated designated persons from among members of the railway commission to cooperate with the Investigation Team (letter PKBWK no. 4631.1.1.2022 dated 27.01.2022).
On 31.01.2022 the documentation gathered by the railway commission had been formally handed over at PKP PLK S.A. Railway Line Department in Rzeszów.
By letter No. PKBWK.4631.1.5.2022 dated February 16, 2022, the Chairman of PKBWK requested that the District Prosecutor's Office in Kolbuszowa provide access to the materials of the investigation.
On March 22, 2022, the PKBWK received materials from the Kolbuszowa District Prosecutor's Office.
The Chairman of PKBWK requested by letter No. PKBWK.4631.1.6.2022 dated February 18, 2022, to the President of the Management Board of POLREGIO S.A. in Warsaw for access to documentation on the Safety Management System (SMS) related to the occurrence. In response to the aforementioned letter, POLREGIO S.A. by letter No. POB2c. 731.8.1.2022 dated March 09, 2022, sent the relevant documents.

6. Description of the level of cooperation proposed by the actors involved

During the ongoing investigation of the circumstances and causes of the occurrence, the cooperation of with representatives of entities related to the circumstances of the occurrence did not raise any objections from the Investigation Team.

7. Description of methods and techniques employed in the investigation and the methods of analysis used to establish the facts and make the determinations referred to in the report

Throughout the whole process, aimed at clarifying the causes and circumstances of the occurrence, the investigation team considered the provisions of national regulations, internal regulations of the infrastructure manager and the technical documentation of PKP PLK S.A., the user of the siding, the Railway Undertaking and the manufacturer of the railway vehicle. In addition, it benefited from its own knowledge and experience.
Documentation compiled by the Research Team and documentation gathered by the prosecutor's office and the railway commission was used.
As part of the investigation of the occurrence, the Investigation Team performed the following activities, among others:

- inspection of the scene and its aftermath after the occurrence, including inspection of the level crossing, the railway line, and the railway vehicle,
- detailed visual inspection of railway vehicle components and structures at the carrier's technical facilities,
- Preparation of photographic and video documentation,
- analysis of the documentation provided by the Railway Undertaking, the railway manager, the road manager, the owner of the road vehicle, and the prosecutor's office,
- Conducting inspections at the PKN ORLEN S.A. railway siding. - Widełka Fuel Terminal,
- Analysis of the railway vehicle manufacturer's construction documentation and participation in the examination of the damaged vehicle in the process of disassembly of individual components at the vehicle manufacturer's premises with the participation of the owner,
- Listening to the driver and the manager of the RAJ 33506 train,
- Analysis of the monitoring recordings of the vehicle interior and forecourt and vehicle surroundings recorded on the rail vehicle,
- Analysis of listening to recorded calls and billing of business phone calls,

- Analysis of data of the railway vehicle driving parameters register (EMU EN63B-108),
- Analysis of data sheets of the goods transported on the road vehicle,
- Analysis of medical records of the injured,
- Verification of the progress of implementation of interim recommendations made by PKBWK.

The following is a selection of laws, regulations and internal instructions used during the investigation:

European Union regulations:

1) Regulation (EU) 2016/679 of the European Parliament and of the Council of April 27, 2016, on the protection of natural persons with regard to the processing of personal data and on the free flow of such data and repealing Directive 95/46/EC (General Data Protection Regulation (Official Journal of the EU L 119 of 04.05.2016. p. 1. as amended)) and the related Act of May 10, 2018 on the Protection of Personal Data (Journal of Laws No. 1000).
2) Commission Regulation (EU) No. 1158/2010 of December 9, 2010, on a common safety assessment method for compliance with the requirements for obtaining railway safety certificates.
3) Commission Regulation (EU) No. 1169/2010 of December 10, 2010, on a common safety assessment method for compliance with the requirements for obtaining railway safety authorization.
4) Commission Implementing Regulation (EU) 2020/572 of April 24, 2020, concerning the reporting structure to be used for the reporting of investigations of accidents and railway occurrences (Official Journal of the European Union No. 132 of April 27, 2020.
5) Directive 2016/798/EC of the European Parliament and of the Council of May 11, 2016, on railway safety (Official Journal of the EU L 138 of May 26, 2016, p. 102, as amended).

National regulations:

1) Railway Transport Act of March 28, 2003 (i.e. Journal of Laws 2021, item 1984, as amended).
2) Act of July 7, 1994, Construction Law (i.e. Journal of Laws of 2020, item 1333, as amended).
3) Law of June 20, 1997, Law on Road Traffic (i.e. Journal of Laws 2021, item 450, as amended).
4) Act of March 21, 1985, on public roads (i.e., Journal of Laws of 2021, item 1376, as amended).
5) Regulation of the Minister of Infrastructure dated July 18, 2005, on general conditions for railway traffic and signaling (i.e., Journal of Laws 2015, item 360, as amended).
6) Regulation of the Minister of Infrastructure of January 11, 2021, on employees working in positions directly related to the operation and safety of railway traffic and the operation of certain types of railway vehicles (Journal of Laws of 2021, item 101).
7) Regulation of the Minister of Infrastructure and Development of October 20, 2015, on technical conditions to be met by intersections of railway lines and railway sidings with roads and their location (Journal of Laws 2015 item 1744, as amended).
8) Regulation of the Ministers of Infrastructure and Internal Affairs and Administration of March 8, 2021, on traffic signs and signals (i.e., Journal of Laws 2019, item 2310, as amended).
9) Regulation of the Minister of Transport and Maritime Affairs of March 2, 1999 on the technical conditions to be met by public roads and their location (i.e. Journal of Laws of 2016, item 124, as amended).

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

1) Ir - 1 Instruction on train operation.
2) Ir - 8 Instruction on the handling of serious accidents, and occurrences in rail transport.

3) Ie - 4 (WTB-E10) Technical guidelines for the construction of railway traffic control devices.
4) Id - 1 Technical conditions for maintenance of track superstructure.
5) Ik - 2 Railway safety inspection instructions.
6) Id - 7 Instruction on supervision of railway lines**.**

Railway Undertaking POLREGIO S.A. internal instructions.

1) Pt-2 Instruction for the EMU team.
2) Pt-5 Instruction on maintenance of powered railway vehicles.

8. Description of difficulties and specific challenges encountered during investigation

The members of the Investigation Team did not encounter difficulties or problems that could affect the investigation, timeliness or conclusions.

9. Any interaction with the judicial authorities

The Chairman of PKBWK applied by letter No. PKBWK.4631.1.05.2021, dated February 16, 2022, to the District Prosecutor's Office in Kolbuszowa to gain access to the collected documents relevant to establishing the circumstances and causes of the occurrence. These documents were made available to the extent specified in the letter in question.

10. Other information relevant to the ongoing investigation

Regulations for the operation of the siding of Polski Koncern Naftowy ORLEN S.A in Plock 7 Chemików St., 09-411 Plock Fuel Terminal in Widełka 36-145 Widełka 869 allows the formation of trainsets on track No. 101. This track does not provide safe technical and traffic conditions. The inter-track gauge of tracks No. 1 and 101 is 4.8 m, and the speed allowed on track No. 1, line No. 71, is 120 km/h. In addition, between siding tracks 101 and 102 is built metal fencing. Such a condition does not provide safe working conditions for people performing activities in putting together a train set and its technical preparation for travel.
The above the Investigation Team recognized as a safety risk for train operations and shunting, which should be assessed and risk valued by a team appointed by PKN Orlen.

III. DESCRIPTION OF THE OCCURRENCE

1. Occurrence and background information

1.1. Description of the type of event

Occurrence at a level crossing. The occurrence involved a passenger train RAJ 33506 of the Railway Undertaking POLREGIO S.A., consisting of an electric multiple unit EN63B-108 and a Citroen Jumper van. The occurrence consisted of the train hitting the side of the car, the driver of which entered the crossing despite emitted traffic signals forbidding passing these signals and sound signals emitted by acoustic devices.

1.2. Date, exact time, and place of the occurrence

The occurrence occurred on 14.01.2022 at 10:48 a.m., at the Cat C crossing, Kolbuszowa station, track No. 1Wb, km 46.925 of the single-track railway line No. 71 Ocice - Rzeszów Główny.

1.3. Description of the site of the occurrence, including meteorological and geographic conditions at the time of the occurrence, as well as any work being carried out at or near the scene of the occurrence

Fig. 8 - General view of the scene (railway commission material)

The category C crossing where the accident occurred is located on district road No. 1214R Widełka - Głogów Małopolski, made of asphalt superstructure with a dirt shoulder. The width of the roadway at the traffic signals S1 and S3 is 5.20 m, and S2 and S4 is 5.30 m. The permissible speed for road vehicles on the road in the crossing area on the day of the accident was 90 km/h, the angle of intersection of the road with the railway tracks is 65º. The area of intersection of the railway and the siding access track with the road is in an undeveloped area. Signs A-10, G-1a, G-1b, G-1c, G-2 and G-4 are set up on both

sides of the crossing along county road No. 1214R. In front of the crossing, on both sides of the access road, there are traffic signals of the automatic crossing system. The distance of all traffic signals from the edge rails of tracks No. 1Wb and No. 100 is 6m.
The visibility of the level crossing as well as the signals given by the traffic signals did not comply with the requirements to the speed of road vehicles specified in Appendix No. 3 of *the Regulation of the Minister of Infrastructure and Development of October 20, 2015 on the technical conditions to be met by the intersections of railway lines and railway sidings with roads and their location (Journal of Laws 2015, item 1744, as amended).*
The occurrence occurred during daylight hours, air clarity good, no fog, drizzle precipitation, ambient temperature +2ºC.
At the time of the occurrence, no work was being carried out around the crossing on the railway and road infrastructure.
On the right side of the running RAJ 33506 train, there is a railway siding of the Fuel Terminal in Widełka PKN ORLEN S.A. On track No. 101 of the siding at the time of the occurrence parked a train set of locomotive M62M-014 and 33 tank cars. The front of this train was located at kilometer 46,971 (the locomotive was standing on the siding's turnout No. 102), i.e. 46 meters from the axis of the level crossing. The standing depot on the siding limited the field of vision, making it difficult for the driver to observe the crossing and the access road to the crossing from the right in accordance with the train's direction of travel. The driver of train RAJ 33506, traveling on track 1Wb at a speed of 118 km/h (32m/s), noticed a delivery truck entering the crossing about 2 seconds before the occurrence.

Fig. 9 - View of the crossing from the direction of the van (railway commission material)

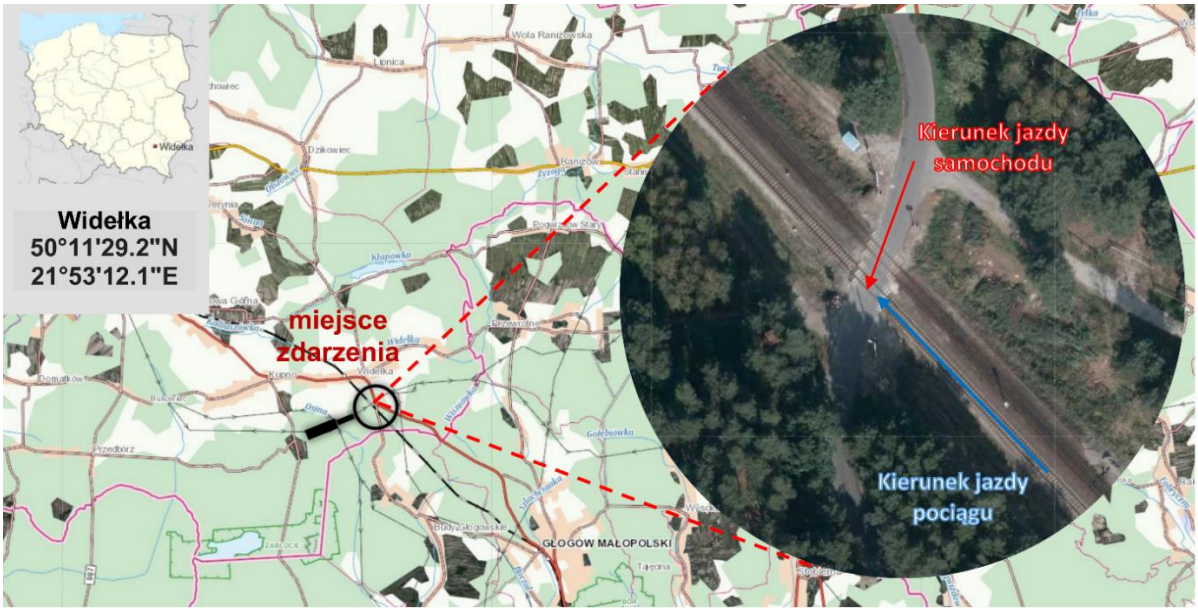
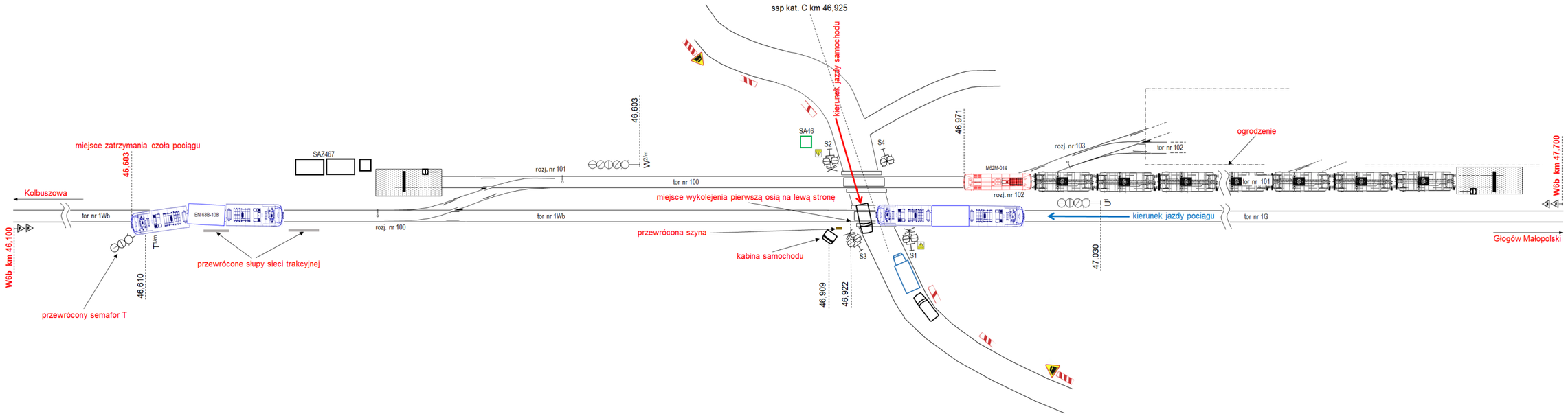


Figure 1 - General view of the site (source: Geoportal)

Figure 2 - Sketch of the accident



1.4. Deaths, injuries, and damage to property

a) Passengers, employees or contractors, level crossing users, trespassers, other persons on the platform, other persons not on the platform

As a result of the accident, the driver of the van died on the spot while one passenger on the train suffered serious injuries and died in the hospital. Four travelers were slightly injured, who went home after receiving medical attention. No one of the train crew was injured.

b) cargo, luggage, and other property

As a result of the accident, the road vehicle (van) was destroyed along with the with the cargo being transported. There was no damage to the luggage of the train passengers.

c) rolling stock, infrastructure, and environment

The first section of the EN63B-108 electric multiple unit was completely destroyed.
The train was derailed by the first and second bogies, causing damage to the wheelsets.

Fig. 10 - View of the railway vehicle after the accident

Scope of infrastructure damage.
As a result of the occurrence, the derailed train destroyed the entrance semaphore $T^{1/m}$, the track superstructure, i.e. prestressed concrete sleepers - 193 pieces, turnout No. 100 showed following damages: fixing bolts in the amount of 60 pieces, setting closure at the adjacent point blade and point blade stabilizer. The precipitation sensor and heaters for heating the setting closure were destroyed. The overhead catenary was ripped off at the section of the locos of catenary poles No. 46-13, 46-14, 46-15, and unsettled over a length of 1,000 meters. Three catenary poles were destroyed, as well as the overhead catenary in the derailment section.

1.5. Description of other effects, including the impact of the occurrence on regular activities of entities involved

As a result of the occurrence, the single-track route Kolbuszowa - Głogów Małopolski was closed from 10:50 a.m. on 14.01.2022 to 03:20 a.m. on 18.01.2022. As a result of the occurrence, 7 passenger trains were delayed by about 333 minutes and 3 freight trains by about 298 minutes. From January 14 to 18, 2022, substitute communication was introduced between Kolbuszowa station and Głogów Małopolski.

1.6. Identification of the individuals, their functions, and the entities involved, including any ties to contractors or other relevant parties

The following people were directly involved in the occurrence:

- Driver running the RAJ 33506 train,
- RAJ Train Manager 33506,
- Driver of the road vehicle,
- train passengers.

The driver of the road vehicle had a medical certificate of no contraindications to work in his position. According to documents provided by his employer, driving the road vehicle on the day of the occurrence was planned and prepared on the designated route with the cargo being transported. The protocol of postmortem examination of the driver of the road vehicle shows no alcohol in his blood, as well as no other psychoactive compounds.

The train crew's working hours were in accordance with the applicable standards. The driver of train RAJ 33506 had 30 hours of rest before starting work. The driver had the required training on the operation of EN63B series traction vehicles and other training related to the work position. The train driver had authorization and a current medical examination for his position.

1.7. Description and identifiers of trains and their composition, including associated rolling stock and registration numbers

Train RAJ 33506 was compiled from an EN63B -108 electric multiple unit.
The vehicle had a Certificate of Technical Efficiency of the Railway Vehicle No. PBUO4/6-16/2020 issued on 07.12.2020, for which a Permission to Operate the type of Railway Vehicle No. PL 51 2020 0176 has been issued. The certificate is valid until 06.12.2026 or for a mileage of 1,000,000 km calculated from 0 km. Mileage on the day of the occurrence 73,865 km.
The three-member electric multiple unit had the EVN identifier PL- PREG 94 51 2 141 608-1, PL- PREG 94 51 2 141 609-9, PL- PREG 94 51 2 141 610-7.

Data on the RAJ 33506 train - from the brake test card:

- train length..... ..... 59.3 m
- total train weight..... 133 t
- required percentage of braking mass.... ... 107 %
- actual percentage of braking weight.... ... 165 %
- braking weight required..... 143 t
- actual braking weight..... 220 t

1.8. Description of relevant parts of infrastructure and signaling - track type, switch, dependency device, signal, train protection systems

Track

Type of rails..... - 60E1- year 2007, jointless rail track
Sleepers..... - prestressed concrete of PS94 type

Attachment type..... - SB-3 type
Type of ballast..... - gravel
Highest permissible speed of trains on the route.... - 120 km/h

Level crossing - metric data:

- Category C crossing,
- Individual ride identification number (yellow sticker): 071 046 925,
- Axis of passage - km 46,925,
- Angle of intersection of the road with the railway track - 65°,
- Crossing surface constructed of prefabricated reinforced concrete crossing slabs of Miroslaw Ujski type,
- Road surface on access roads - asphalt,
- Gradeline of the access road:
  - Right side (direction of entry of the road vehicle onto the crossing) - 1.9% over a length of 20 m,
  - Left side 1.2% over a length of 2 m,
- Crossing traffic product - 11730.5; last, measurements were made on 05-06 October 2021.
- Overall length of the passage - 15.3 m,
- Width of the road crown at the crossing - 7.2 m,
- Roadway width of the road at the crossing - 7.2 m,
- Width of the roadway on the access road left side - 5.25 m,
- Width of the roadway on the access road right side - 5.30 m,
- Maximum speed of road vehicles when passing the crossing - 90 km/h,
- Illuminated crossing - two light poles,
- Visibility of the crossing from the road - 50 m with the required 120 m.

Signage of the crossing on the day of the occurrence:

Marking of the district road from the Widełka village to the crossing
Access crossing marked: warning sign A-10, indicator posts G-1a, G-1b, G-1c, and signs G-2 and G-4. In front of the crossing, traffic signal S2 is set up on the right side of the road, S4 on the left, facing the county road. The signals given by these traffic signals are visible from the county road from 50 meters.

From the side of the track set indicators W6b:

- at km 46,100, i.e. 825 meters from the axis of the crossing,
- at km 47,700, i.e. 775 meters from the axis of the crossing (from the direction of the train).

1.9. Any other information relevant to the description of the event and background information

The research team identified other relevant information in the context of the event description.

1. Lack of visibility of traffic signals transmitted by traffic signals from 100 meters from both directions of access to the crossing.
2. No P-14 horizontal signs.
3. On the access road to crossing No. 1214R from State Road No. 9 (left side of the crossing) improperly built sign A-10, G-1a and G-1b (improper foundation height).
4. On district road No. 1214R, class Z, the speed limit was 90 km/h with the speed limit for this class of road below 60 km/h.
5. In the area of the level crossing, a fixed point of the jointless rail track in the form of S60 rail dug vertically is located.

6. According to the records in the Metrics of the crossing, the last measurements of the conditions of visibility of the head of the train from the road were made on 21/03/2017.

Fig. 11 - Visibility of traffic signals from the direction of the vehicle (PKBWK material)

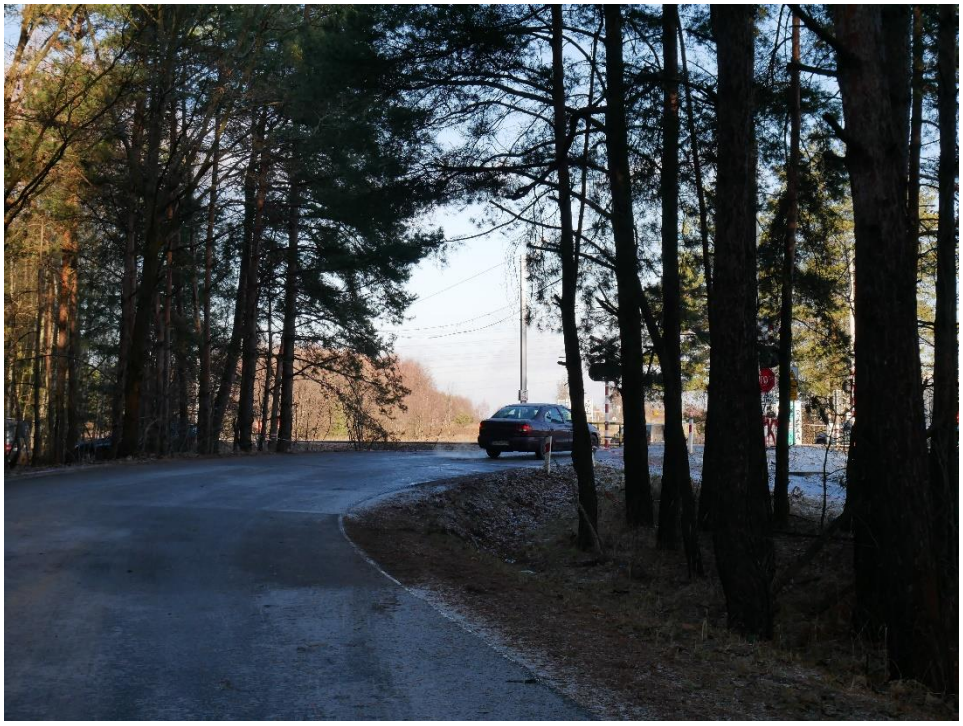


Fig. 12 - Visibility of traffic signals from the opposite side of the crossing (PKBWK material)

2. Fact-based account of events

2.1 Chain of contiguous events that led to the occurrence, including: actions taken by the persons involved; operation of rolling stock and technical installations; operation of the operating system.

At 10:30 a.m. on January 14, 2022, according to the timetable, the passenger train RAJ 33506 Rzeszów Główny - Kolbuszowa by RU POLREGIO S.A. left Rzeszów Główny station. The last scheduled stop of the train before the scene of the occurrence was at Budy Głogowskie passenger stop. After the train departed from this stop approaching the siding of PKN ORLEN S.A. - Fuel Terminal in Widełka at the W6b indicator, the driver gave the Rp1 "Attention" signal. On the siding track No. 101 parked a set comprised of locomotive M62M and 33 GATX tank cars, limiting the field of view of the level crossing, so the driver of train RAJ 33506 repeated the "Attention" signal. For this train, the signal S2 "driving at the highest permitted speed" was transmitted on the U entry semaphore[1] at km 47,030, located 105 m in front of the axis of the crossing. The driver of this train approximately 2 seconds before the occurrence (about 70 meters before the crossing) noticed a white van, which then entered the track from his right directly in front of the oncoming train, again send the Rp1 "Attention" signal. The driver immediately implemented emergency braking of the train with the driving setter in the direction of braking, nevertheless, the train was hit at 118.5 km/h by the passing car.
The driver of the Citroen Jumper delivery vehicle on the day of the occurrence drove from his residence to a wholesaler in Kraśnik to pick up materials and deliver them to customers. At the wholesaler, the vehicle was loaded with flammable materials, including paints, aerosol varnishes and solvents. From the wholesaler, the driver of the vehicle drove in direction of Rzeszow on national road No. 9 and turned onto county road No. 1214R, leading toward the level crossing where the occurrence occurred. After reaching the level crossing, the driver of the van stopped in front of traffic signals displaying alternating red-light signals and emitting audible signals. After a while, he moved off, despite the signals broadcast by the traffic signals, forbidding passing the signals, and entered the crossing directly in front of an oncoming train.

2.2. The sequence of events from the occurrence of the occurrence to the completion of the emergency services, including measures taken to protect and secure the scene, efforts of rescue and emergency services.

After the train collided with the car, the driver additionally used the "emergency braking mushroom" implementing emergency braking, which simultaneously lowered the pantographs and immediately left the cab. The road vehicle was completely smashed. Parts of the car (including the rear bridge and fuel tank) got under the chassis of the rail vehicle, causing the first bogie's wheelsets to lose contact with the rails and derail to the left side in the direction of travel. Driving in a derailed state, the first bogie, because of the impact of the front of the rail vehicle with the overhead line pole, was violently blocked and derailed with the second bogie to the right side in the direction of travel. As a result of the impact, the cargo carried in the road vehicle was damaged, containers of aerosols, paints and solvents were unsealed, and their vapors penetrated through a broken window into the driver's cab. The friction of the damaged vehicles' metal components caused sparks and ignition of the scattered, unsealed containers along the track along the entire path of the derailment. Accumulated fumes in the driver's cab from the transported containers and diesel fumes from the jammed fuel tank, underwent a violent ignition-explosion, caused by the sparking of friction metal parts and the broken catenary falling on the roof of the driver's cab.
As a result of the explosion, the door leading from the cabin to the vestibule was destroyed, and the door between the vestibule and the passenger compartment was torn out. The door leading to the passenger compartment, hit and seriously injured a passenger on the train. The explosion in the driver's compartment was the cause of the train fire. In a derailed state, the train traveled 322 meters, destroying the railway infrastructure, then the train set came to a stop. The front of the train stopped at km 46,603.
After the train collided and stopped, passengers who were not injured left the vehicle on their own by stepping outside. A passenger on the train who was injured in the accident and was unconscious was helped by the train driver and one of the travelers. Due to the burning train vehicle and the toxic smoke coming out, there

was a need to urgently move the injured person to a safe place. The injured person was dragged to the center section of the vehicle and then carried outside. Carrying the injured person outside the train was difficult due to the lack of rescue equipment on the train (rescue stretcher, plank). The injured person was carried out on the door. Immediately after the accident, the Emergency Notification Center was notified.
The train manager, after exiting the train, radioed the Kolbuszowa station duty officer about the accident. The Police and Fire Department arrived on the scene and proceeded to provide premedical first aid to the accident victims, and then to extinguish the burning railway vehicle (12 firefighting units). The arriving ambulance service took over the rescue efforts of the injured person, who was taken to the hospital.

IV. OCCURRENCE ANALYSIS

1. Roles and responsibilities

1.1.Railway companies or infrastructure managers

Infrastructure manager PKP PLK S.A. Railway Line Department in Rzeszów

Among other things, the infrastructure manager is responsible for the proper maintenance of the railway line, including crossings. The infrastructure manager's duties are defined, among other things, by the provision of Article 62 of the Law of July 07, 1994 - Construction Law. This provision obliges managers to conduct annual inspections and five-year inspections of construction facilities (including crossings, along with devices for securing traffic on the crossing). The infrastructure manager's internal instruction Id-1 in § 31 imposes an obligation to carry out a diagnostic survey of crossings (including railway and road surfaces, visibility conditions, lighting, among others). In addition, Instruction Ie-7 (E-14) includes the scope, time periods, methods of testing regarding traffic control devices (including crossing safety devices). Timelines for inspections of construction facilities included in the instructions in accordance with Article 62 of the Law of July 07, 1994 - Construction Law.

PKP PLK S.A. Department of Railway Lines in Rzeszow presented protocols of inspections of the railway-road crossing in terms of the surface and in terms of traffic protection devices at the crossing.

Protocol No. IZATAI/1/17A-071/2021, dated 13/08/2021, of the inspection for checking the technical condition based on the applicable construction code. The diagnostician, after inspecting the equipment, found no irregularities and determined its technical condition as very good. Therefore, there was no need to issue recommendations and the facility was allowed to continue operation without issuing recommendations requiring corrective action.
Protocol No. IZATA-17/071/2020 from the diagnostic test (inspection) of traffic control devices conducted on 23.04.2021 at the railway-road crossing in question. As a result of the diagnostic test, no faults were found in the traffic control equipment and telecommunications equipment. The diagnosis of the test showed that the crossing equipment ensures the safety of train traffic, is suitable for further operation.

Railway Undertaking POLREGIO S.A. Podkarpacki Zakład w Rzeszowie

The Railway Undertaking designated a railway vehicle with a certificate of authorization for operation of a type of railway vehicle and a certificate of technical efficiency of the vehicle to carry out the transport task. The designated train crew operating the train had all the authorizations and qualifications required by law. The train was operated based on a timetable.
Obligations of Railway Undertakings in the area of safe driving are specified in the infrastructure manager's instruction Ir-1 - on train operation, Ie-1(E-1) - instruction on signaling and the railway operator's internal instruction, Pt-2 - instruction for the EMU team. Based on the analysis of the collected material, the Investigation Team did not find any irregularities in the conduct of the train crew while driving the train.

1.2.Maintenance entities, maintenance workshops or any other maintenance providers

Railway Undertaking POLREGIO S.A., which supplies rolling stock, is responsible for its efficiency, technical condition and compliance with the vehicle maintenance process. The EN63B-108 electric multiple unit had a railway vehicle type certificate and a current certificate of technical efficiency. The RU provided documentation of the last technical inspections of railway vehicles performed. The examination team found no irregularities in the maintenance and operation of the rolling stock. The technical condition of the railway vehicle did not affect the occurrence.

1.3.Rolling stock manufacturers or other suppliers of railway products

Based on detailed visual inspections of the vehicle and tests carried out at the premises of the vehicle's user and the manufacturer (NEWAG S.A.), the testing team compared the construction documentation of the driver's cab body, with particular reference to the doors leading to the passenger compartment, with its execution, and no inconsistencies were found.

Based on the collected research material, the Investigation Team did not identify factors influencing rolling stock manufacturers and suppliers of railway products to the occurrence.

1.4.National safety authorities or the European Union Railway Agency

The President of the Office of Rail Transport (UTK) supervises rail traffic safety. The Investigation Team, based on the collected research material, did not identify factors influencing the national safety authority on the occurrence.
From 2015 until the date of the accident, no inspection by the President of the Office of Rail Transport was carried out at the railway-road crossing in question.

1.5.Notified bodies, designated bodies, or risk assessment authorities

The Investigation Team, based on the collected research material, did not identify factors influencing notified bodies and risk assessment authorities on the occurrence of the occurrence.

1.6. Certification bodies of entities responsible for maintenance listed in section 1.2

The certification body of RU POLREGIO S.A. as the entity responsible for maintenance under the safety management system (SMS) is the President of the Office of Rail Transport. The Investigation Team, based on the collected research material, did not identify factors influencing the railway operator's certification body on the occurrence of the occurrence.

1.7. Any other person or entity that has a connection to the occurrence, as possibly documented in one of the relevant security management systems, or referred to in the register or the relevant legal framework

Pursuant to §81 of the Regulation of the Minister of Infrastructure and Development dated October 20, 2015 *on technical conditions to be met by intersections of railway lines and railway sidings with roads and their location* (i.e., Journal of Laws 2015, item 1744, as amended), the duties of proper marking and maintenance of the access road to the crossing belong to the administrator of district road No. 1214R.

2. Rolling stock and technical installations

Powered railway vehicle
The EN63B-108 electric EMU is equipped by the manufacturer with the DEUTA WERKE electronic system for recording driving parameters.
The Investigation Team analyzed selected driving parameters recorded in the system immediately before the occurrence. The driving parameters of the train on the 1-kilometer route and during the 1 minute before the occurrence to the moment of stopping after the occurrence are shown in the following graph with description.
The following chart shows the following parameters of the RAJ 33506 train ride:

1) pressure in main line,
2) pressure in supply line,
3) brake cylinder pressure,
4) speed,
5) forced braking,
6) activation of emergency braking,

7) Initiation - SHP light on,
8) CA and SHP lamp erasure,
9) giving the attention signal.

Description of the driving characteristics of train No. 33506 relation Rzeszów - Kolbuszowa on section Budy Głogowskie - to the place of accident.

- 10:45:39 - departure of the train from the stop Budy Głogowskie, increase in speed to 119 km/h on a section of 1052 m,
- 10:46:39 - driving at speed of 119.2 km / h and CA light, using the SIFA (delete) button,
- 10:47:04 - driving at 118.6 km / h and SHP light, use of the SIFA (delete) button,
- 10:47:20 - driving at speed of 116.3 km/h, giving the signal "Attention" for 3 seconds,
- 10:47:35 - driving at 118.6 km/h, giving the "Attention" signal for 3 seconds, SHP light and using the SIFA button,
- 10:47:43 - driving at 118.7 km/h, giving the "Attention" signal for 3 seconds,
- 10:47:44 - speed 118.5 km/h, implementation of emergency air braking, sudden drop in pressure from the main line to 0 bar and a drop in speed to 33.7 km/h over a distance of 279 meters,
- 10:47:45 - speed 117.7 km / h, pressure drop from the supply line to 0 bar 9 (the moment of impact with the road vehicle),
- 10:47:47 - speed 101.4 km/h, use of the emergency brake "Mushroom",
- 10:47:57 a.m. - speed 33.7 km / h, a sudden increase in speed to 43.2 km / h and a decrease in speed to 0 km / h at a distance of 32 m,
- 10:48:06 a.m. - Train stop and standstill.

During the operation of the train, the driver's responses to the operation of ABP (Automated Train Safety) equipment - correct. Train operated in accordance with the timetable and Appendix 2 to the timetable and written order "O" issued for this train. Scheduled speed of the train on this section is up to 120 km/h.

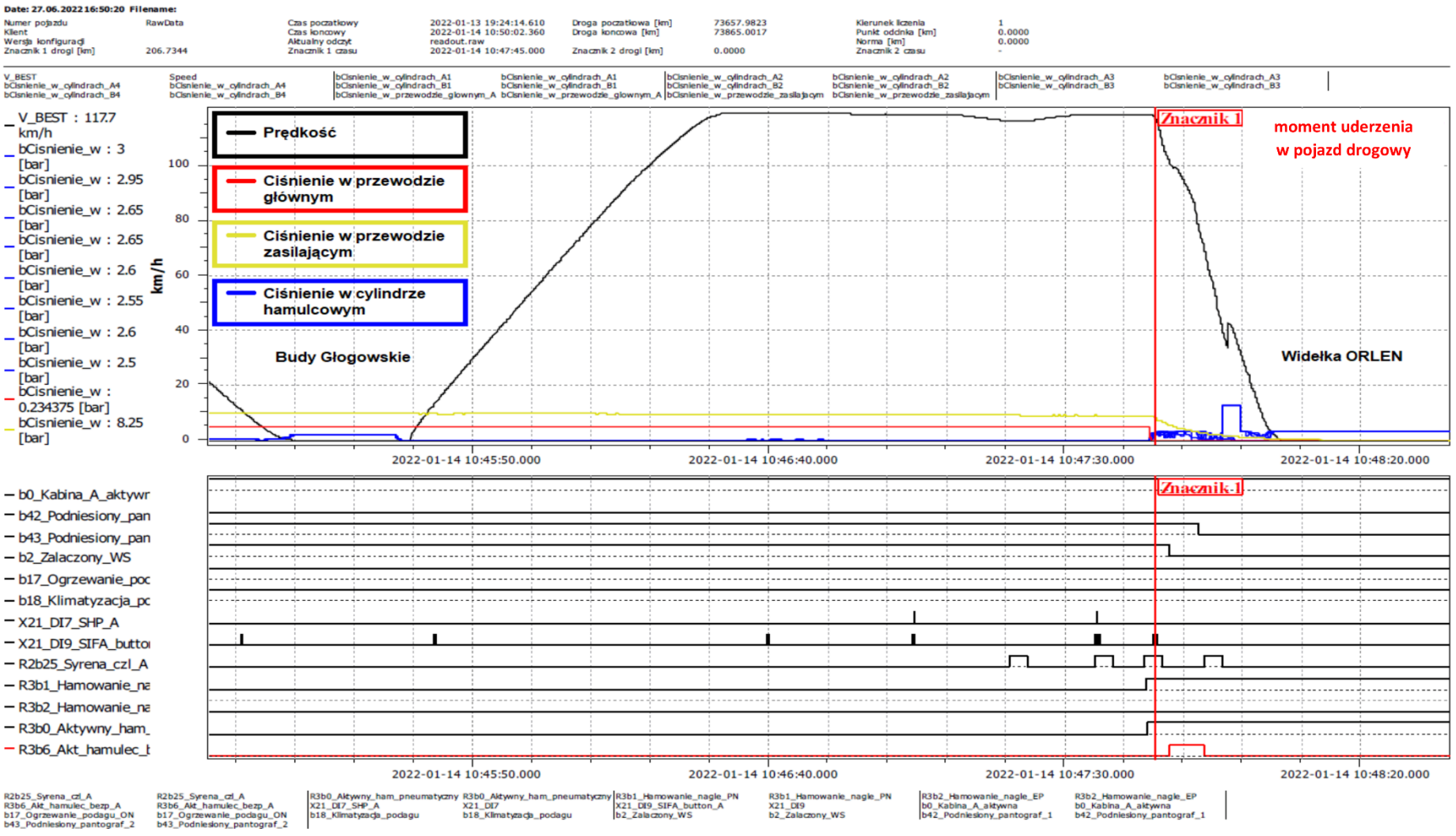


Figure 3 - Graph of EN63B-108 locomotive driving parameters as a function of time (PKBWK material)

STATE COMMISSION ON RAILWAY ACCIDENTS INVESTIGATION
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The EN63B-108 EMU has appropriate authorization for operation on the rail network and was technically sound. The road vehicle was in good working order and had a current technical inspection allowing it to operate safely. The driver of the road vehicle was trained in terms of the workstation being operated. The Investigation Team's analysis of the collected material shows that the scope of the job training included general health and safety rules.

Self-operated crossing system (ssp)

- Type of automatic crossing system equipment - SPA-4.
- Type of signaling devices -EHZ-7 - 4 pieces.
- Acoustic devices - buzzers - 2 pcs.
- Remote control equipment (UZK) - ERP-6, installed at Kolbuszowa station.
- Wheel sensors - ELS952 - 4 kpl.
- Equipment built for a speed of 120 km/h.
- Traffic protection devices at the crossing linked to the Kolbuszowa station's traffic control devices.
- The display of the Ms2 signal on the T semaphore$^{1/m}$ (entering the siding) triggers the self-activation of the warning to pass at km 46.925.
- For driving at 40 km/h, the required warning time is provided.
- Disabling the warning in this case is done manually from the local control panel.
- In any other case of driving on track 100, switching on and off the crossing warning is done manually from the local control panel.
- Cat C level crossing Max speed on the route 120 km/h.
- Warning time min 30 s + 2 s = 32 s.
- Crossing signaling type SPA-4 with wheel sensor, switching ssp devices by station srk devices of Kolbuszowa and Głogów Małopolski stations.
- Ssp devices adapted to the development of the overhead line.

On the day of the occurrence, the railway commission read data from the UZK remote control device of the automatic crossing system (ssp) at the Cat C crossing km 46.925 in the Kolbuszowa LCS.
The work regularity reading covered the period from 09:00 to 15:00 on 14/01/2022.
According to data read from the UZK ssp at km 46,925.

- Hour 09:38:23 – activation of ssp in alert state (switching on was done by siding workers).
- Hour 09:39:59 - disabling of warning on ssp, transition to standby.
- Hour 09:52:13 - activation of the ssp in state of warning train travel on track No. 1Wb.
- Hour 09:54:23 - disabling of warning on ssp, transition to standby.
- Hour 10:47:01 - activation of the ssp in the warning state driving train RAJ 33506 on track No. 1Wb. (Hitting a commercial vehicle at a level crossing with the srk equipment in working order, ssp engaged in warning condition).
  After the occurrence, the ssp remained in an attached state.
- Hour 15:00:43 RESET A, RESET B ssp. The reset was performed by automation personnel from the apparatus container in the presence of the Chairman of the railway commission after receiving permission from the Prosecutor's Office and the police.

ALSTOM Bombardier Transportation staff ripped event and error buffer logs from UZK ssp km 46,925 on 14/01/2022. - report no. 01/1901/ASZ/2022. The following is a record of the data provided by the company.
Fault buffer records:

2a 22/01/14 10:47:56 avr sensor III
2a 22/01/14 10:47:56 avr sensor II
2a 22/01/14 10:47:56 avr sensor I
2b 22/01/14 10:47:57 avr sensor III
2b 22/01/14 10:47:57 avr sensor II
2b 22/01/14 10:47:57 avr sensor I
2a 22/01/14 10:52:47 avr tort zone occupied

2b 22/01/14 10:52:48 avr cake zone occupied
2a 22/01/14 14:55:21 avr open ssp cabinet
2b 22/01/14 14:55:27 avr open cabinet ssp
2b 22/01/14 15:00:35 avr communication with ssp
2a 22/01/14 15:00:37 avr communication with ssp
2a 22/01/14 15:00:43 ok communication with ssp

These data show that as of 14/01/2022, the equipment of the automatic crossing system (ssp) km 46.925 were operating without failure. The apparatus container at the crossing was closed.
The first fault recorded by the recorder was shown at 10:47:56 - sensor failure and then irregularities in the occupied zones of the ssp.
The emergency states resulted from the derailment of ETZ EN63B-108 after the accident.
The train did not leave the ssp interaction zone, which was recorded, as an "occupied zone" error. Traces of the impact on the ssp interaction sensors were included in the accident scene inspection report.
The opening of the ssp apparatus container at the km 46.925 crossing occurred at 14:55:21.
The ssp malfunctions occurring after the container was opened were caused by an attempt to reset the ssp equipment while work to eliminate the effects of the derailment began.

3. Human factors

3.1 Human and individual characteristics

The driver of the road vehicle had no contraindications to driving for this type of vehicle in a current medical certificate. The driver of the road vehicle was not found to have alcohol in his blood, as well as no psychoactive compounds, which is evident from the protocol of postmortem examination.
The driver of the car failed to comply with *the* provisions of the *Road Traffic Act of June 20, 1997* and implementing regulations.

3.2 Job-related factors

The Investigation Team raises no objections to workplace factors.

3.3 Organizational factors and tasks

The Investigation Team does not object to factors related to organizational tasks.

3.4 Environmental factors

The Category C level crossing is located in an undeveloped area in the vicinity of the Widełka Fuel Terminal. The crossing encompasses track No. 1Wb and the access track to siding No. 100. The level crossing is located between the exit semaphore $W^{2/m}$, and turnout No. 102 directing to the siding tracks.

(a) On both sides of the crossing, visibility conditions from the road are not provided. Lack of visibility of traffic signals from a distance of at least 100 meters due to the crowns of trees on the approaches to it, which does not meet the requirements of the provision of § 49 (1) (6) of the provisions of the *Regulation of the MINISTER OF INFRASTRUCTURE AND DEVELOPMENT of October 20, 2015 on the technical conditions to be met by intersections of railway lines and railway sidings with roads and their location,* as an implementing regulation under Article 7 (2) (2) and (3) (2) of the Act of July 7, 1994. - Construction Law.
(b) On both sides of the crossing, the conditions of visibility of the crossing from observation points for the permissible speed of road vehicles of 90 kilometers per hour (required 120 meters, actual 50 meters) were not observed, as stipulated in Appendix No. 3, Chapter A, paragraph 1 of the aforementioned regulation.
c) The height of the placement of the A-10 sign on the left side of the crossing (the lower edge or the lowest point of it) is less than the minimum of 2 meters and is not in accordance with paragraph 1.5.3. (Fig. 1.7.) of Appendix No. 1 of *the Regulation of the Minister of Infrastructure dated July 3, 2003 on detailed technical conditions for road signs and signals and road traffic safety devices and conditions for their placement on*

roads (Journal of Laws No. 220, item 2181, i.e. as of September 9, 2019. Journal of Laws of 2019, item 2311).
(d) Horizontal signs P-14 "conditional stop line" were not placed at the crossing. According to paragraph 4.2.5. of the aforementioned regulation, sign P-14 "conditional stop line composed of rectangles" is used to designate the stopping of vehicles before, among others: traffic signals, tramway crossings and level crossings.

The environmental conditions described in (a), (b), (c) and (d) were considered by the study team as other abnormalities, not directly related to factors contributing to the occurrence.

The investigation team considered as a contributing factor to the occurrence, the restriction of the field of view of the level crossing for the driver of passenger train RAJ 33506, due to a train set running from the PKN ORLEN S.A. siding standing on track No. 101 in front of the crossing. - Widełka Fuel Depot. The location of track No. 101 in the vicinity of the crossing and the train set standing on track No. 101 limited the visibility of both the driver in the direction of the approaching train and the driver in the direction of the car entrance.

3.5 Any other factors relevant to investigation

As a result of the collision between the train and the road vehicle, there was an explosion in the driver's cab of vapors emanating from damaged packages of flammable goods carried by the delivery truck, causing the door leading to the driver's cab to be torn off and causing serious injury to the train passenger.
The team considers the above as a contributing factor to the consequences of the accident.

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

The Investigation Team did not identify systemic factors influencing the occurrence.
Feedback mechanisms, control mechanisms throughout the railway system actively influencing the emergence of similar events, have not been identified.

5. Previous events of a similar nature

The Investigation Team, as part of its investigation, analyzed accidents that occurred under similar circumstances on line No. 71.
A brief description of the events and their consequences.

1) Accident at a category C level crossing, track No. 1 km 46.925 of line 71 Ocice - Rzeszów Główny, Subcarpathian, in the area of responsibility of the infrastructure manager PKP PLK S.A. Department of Railway Lines in Rzeszow.
   On 15.03.2017 at 17:50, during the entry into Kolbuszowa station of train No. 32604 between Rzeszów Główny and Lublin compiled with SA134-029, at a category C level crossing with the self-activated crossing signal "on alert" at km 46.925, the driver of a Ford Focus passenger car drove into the rear door of rail bus SA134-029. In front of the crossing, a shunting set from Widełka Fuel Terminal siding was parked on track No. 102, limiting the visibility of vehicles approaching the crossing. The driver of train No. 32604 did not notice the impact on the rear of the rail vehicle. The train reached Widełka passenger stop at km 45,430, where a passenger notified the train driver that the rear door had been hit. The speed of the train at the crossing was 109 km/h. The driver of the road vehicle pushed the car off the crossing and fled the scene of the accident,

abandoning the car. Casualty-free occurrence. A witness to the occurrence, the engineer of the shunting locomotive, confirms that the crossing signal was switched "on alert" by the railbus.
Causes of the accident:
Direct: the invasion of a road vehicle into a rail vehicle at a level crossing equipped with a crossing system with traffic lights (Cat. C).
Original: failure of the driver of a road vehicle to exercise caution when approaching a level crossing.
Indirect: failure of the driver of a road vehicle to stop in front of a G4 sign and a traffic signal switched to "warning" status.
Systemic: none.
The railway commission did not uncover other irregularities and did not issue preventive motions.

2) A serious accident of category A20 occurred on 19/12/2018 at 14:33 on a category C crossing, located on the Głogów Małopolski - Rzeszów Główny route, at km 63.130 of the railway line No. 71 Ocice - Rzeszów Główny.
On December 19, 2018, at 2:33 pm, at the category C level crossing, which is the intersection of Borowa Street under the management of the Municipal Road Administration (MZD) Rzeszów with the railway line No. 71 Ocice - Rzeszów Główny (route Głogów Małopolski - Rzeszów Główny) at km 63.130, a passenger car of the Volkswagen Passat was driven directly in front of the oncoming APM train No. 32432 between Rzeszów Główny and Stalowa Wola with the light and sound signal of the automatic crossing system activated.
The car was hit by the front wall of the locomotive on its left side (i.e., on the driver's side), causing it to be jammed under the rail vehicle and pushed 382 meters from the axis of the crossing. As a result of the accident, two people (the driver of the vehicle and one passenger) died on the spot, the third person (the other passenger of the car) died in the hospital because of the injuries sustained.
Causes of the accident:
Direct:
The driver of a Volkswagen Passat vehicle entered a Category C level crossing directly in front of an oncoming APM train No. 32432 with the train's traffic light and sound signals (ssp) properly activated.
Primary:
Failure to exercise special caution by the driver of a road vehicle (Article 28(1) and (2) of the Act of June 20, 1997 Traffic Law - Journal of Laws of 2018, item 1990, as amended) including failure to stop the car in front of a traffic signal transmitting a signal prohibiting driving (two red lights alternately flashing § 98(5) of the Decree of the Ministers of Infrastructure and Internal Affairs and Administration of July 31, 2002 on traffic signs and signals - item 1393, as amended.).
Intermediate:
Lack of visibility of the train approaching the crossing due to the visibility triangle being obscured by a delivery truck waiting to exit onto Warszawska Street.
Systems:
1. Allowing the level crossing to operate despite the abandonment of Phase II of the reconstruction project, without imposing restrictions on the movement of rail and road vehicles.
2. Failure of the infrastructure manager to take corrective and preventive measures resulting from the from the safety management system following the B20 category accident that occurred on 04/05/2018. Internal inspections of the crossing carried out by the infrastructure and road managers, did not reveal safety risks.

Other irregularities found during the investigation, which did not directly affect the occurrence, included:
1. Incorrect distance values entered in the Metric of the crossing specified in item. 6.2. "conditions of visibility of the level crossing from the road" (the measurement values were changed in the Metrics of the crossing three times in 2018 despite the absence of changes in local conditions).
2. No speed limit signage before the exit from Warszawska Street into Borowa Street.
3. Marking the crossing with P-12 lines instead of P-14.
4. No visibility of the S1 traffic signal from 100 m.

5. Lack of lanes on the roadway - exiting and joining traffic.
6. No F6a sign on the left side of the dual carriageway from Rzeszow.
7. No tonnage restriction in front of the entrances to the crossing (irregularity corrected during the investigation).
8. Incorrect creation of an intersection on the right side of the crossing (the axis of the side road at 8.5 m from the extreme rail, and its edge 5 m).
9. Lack of signage on the side road to Borowa Street (irregularity corrected during the investigation).
10. The sidewalk on the side of Warszawska Street leads to the crossing bypassing the traffic signal, the crossing lacks a dedicated pedestrian lane.
11. Failure of the recording device to record the image from the front camera of the rail vehicle of the recording from Rzeszow Main station to the time of the occurrence.
12. At a distance of 12 meters behind the crossing there is a rail more than 2 meters high (the rail was removed after the occurrence).

V. CONCLUSIONS

1. Summary of analysis and conclusions about the causes of the occurrence

The analysis showed that the rolling stock involved in the accident as well as elements of the railway infrastructure, including the automatic crossing system built at the crossing, were technically sound and did not contribute to the occurrence. Workstation factors as well as organizational tasks performed by the entities involved in the occurrence did not contribute to the occurrence of the occurrence in question.
The study team identified as causal factors for the occurrence of the occurrence:
- Failure by the driver of a road vehicle to obey the light signals given on traffic signals (alternating flashing red lights) and the audible signals emitted by acoustic devices involving driving behind the traffic signal despite the prohibition.
- Continuing through the level crossing and entering the road vehicle at the level crossing, directly in front of the oncoming RAJ 33506 train.

The Investigation Team identified as contributing factors to the occurrence:
- Failure of the driver of a road vehicle to exercise special caution when crossing a level crossing, as stipulated in Article 28 (1) of the Law of June 20, 1997, the Law on Road Traffic (unified text of Journal of Laws 2021, item 450, as amended).
- Restriction of the field of view of the level crossing to the driver of passenger train RAJ 33506, due to a train set running from the siding of PKN ORLEN S.A. parked on track No. 101 in front of the crossing. - Widełka Fuel Terminal. This train also restricted the field of vision for the driver of the road vehicle.
- Explosion in the driver's cab of vapors emanating from damaged packages of flammable goods carried by a delivery truck, causing the door leading to the driver's cab to be torn off and severely injuring a train passenger.

A forensic fire expert appointed by the District Public Prosecutor in Kolbuszowa in his opinion dated 14.02.2022, established, among other things, that because of the train hitting the luggage area of the delivery vehicle, which contained pressurized containers of flammable and explosive substances were under the front right side of the train's chassis. A large part of the containers was unsealed, and the vapors of these substances penetrated through the broken window into the driver's cabin space. Sparks created from the friction of metal elements ignited the vapors of these substances and an explosion occurred in the front space of the driver's cab, causing the windshield to be torn off and the driver's cab door to be torn off.

2. Measures taken since the occurrence

The Chairman of the PKBWK, taking into account the existing state of reduced safety, based on the provisions of Article.28l paragraph 1a of the Railway Transport Act of March 28, 2003 (i.e. Journal of Laws 2021. item 1984), on 24.02.2022 in a letter addressed to the Director of PKP PLK S.A. Department of Railway Lines in Rzeszow, issued recommendations to increase safety in rail transport with regard to the level crossing in question:

- Introduction of a permanent speed limit in front of the category C railway-road crossing in Kolbuszowa station, at km 46.925, of the railway line No. 71 Ocice - Rzeszów Główny for trains moving towards Kolbuszowa station to 60 km/h and setting W6b indicators according to this speed.
- Ensure visibility of traffic signals given by traffic signals from a distance of 100 meters.

According to information provided by the Department of Railways in Rzeszow, as of 03.03.2022, a train speed limit of 60 km/h has been introduced and the locations of indicator W6b have been changed.

In addition, by letter No. PKBWK. 1.2.2022, dated February 03, 2022, addressed to the Director of the Kolbuszowa County Road Administration, issued recommendations to increase railway safety with respect to the subject railway-road crossing with the following content:

1) Introducing a speed limit of up to 50 km/h on road No. 1214R on the accesses to the crossing in connection with the failure to meet the requirements of the provisions of the Regulation of the MINISTER OF INFRASTRUCTURE AND DEVELOPMENT of October 20, 2015 *on the technical conditions to be met by the intersections of railway lines and railway sidings with roads and their location*, Annex No. 3, paragraph A, 1 as an implementing regulation to Article 7 of the Construction Law.
2) Mark the crossing (on the side of Road 9 - the left side of the crossing) with an A-10 sign in accordance with regulations.
3) Mark the crossing with P-14 horizontal signs.

By the closing date, the aforementioned recommendations had been implemented.

3. Additional notes

Regulations for the operation of the PKN ORLEN S.A. railway siding. - The Fuel Terminal in Widełka in force on the day of the occurrence indicated the beginning of the siding at the place of the siding branch, i.e. a PKP PLK S.A. infrastructure element, which requires updating the relevant documentation.

VI. SAFETY RECOMMENDATIONS

1) In connection with the change in infrastructure: level crossing (from category C to category B), the track layout and track use on the siding adjacent to the railway line track, and the change in traffic organization within the crossing, PKN Orlen S.A. will appoint a team for the following purposes Risk assessment and valuation to identify risks affecting the safety of traffic of railway and road vehicles at the level crossing and on track No. 101. It is recommended that the team identifying risks include representatives of the Railway Infrastructure Manager, Road Manager, Siding User and the organizer of transport in the area of the siding.
2) PKN Orlen S.A., in consultation with PKP PLK S.A., will update the start of the Fuel Terminal siding in Widełka in the relevant documentation.
3) PKP PLK S.A. will liquidate redundant built-up vertical rails along line No. 71, which are fixed points of the jointless rail track. Using the existing traction poles as fixed points.
4) Railway operators licensed to transport passengers shall equip railway vehicles in areas accessible to train operators with rescue stretchers or other equipment for carrying injured persons.

STATE COMMISSION ON RAILWAY ACCIDENTS INVESTIGATION
CHAIRMAN

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Tadeusz Ryś

List of entities appearing in the contents of Report No. PKBWK 08/2022

No.	Symbol (abbreviation)	Explanation
1	*2*	*3*
1.	EUAR	European Union Railway Agency
2.	PKBWK	State Commission on Railway Accidents Investigation
3.	UTK	Office of Rail Transport
4.	PKP PLK S.A.	Infrastructure manager
5.	IZ	PKP PLK S.A. Department of Railway Lines
6.	POLREGIO S.A.	Railway Undertaking
7.	PKN ORLEN S.A. - Forkłka Fuel Depot	Owner of the siding
8.	County Road Manager in Kolbuszowa	Manager of road No. 1214R