



STATE COMMISSION ON RAILWAY ACCIDENTS INVESTIGATION
Ministry of the Interior and Administration

REPORT No. PKBWK 02/2025

on the investigation of a railway accident that occurred on 5 October 2023 at 7:00 a.m.
at Gdynia Główna station, track No. 5, turnout No. 45, km 21.522 of railway line
No. 202 Gdańsk Główny – Stargard
area of the infrastructure operator PKP Polskie Linie Kolejowe S.A. Maintenance-of-Way Department
in Gdynia

WARSAW, 25 February 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. SUMMARY

Type of Event: Accident.

Description: Passenger train ROJ 50673 of the railway carrier POLREGIO S.A. travelling from Malbork to Gdynia Chylonia departed from track four of the Gdynia Główna station towards mainline track No. 1 to Gdynia Chylonia station. This train was travelling on a locked route, at signal S10a displayed by the K4^{2/4m} exit signal. At the same time, railbus SA138-004 of the railway carrier POLREGIO S.A. was leaving a fuel depot on a shunting run as a shunting train. The railbus was travelling from track 404 to track 15a on a locked route, the end of which was a shunt signal Tm30 displaying the aspect Ms1 "Shunting prohibited". Despite this, the railbus ran past the signal in front of which it was supposed to stop and continued towards track one at platform 2. It ran over turnout No. 64, trailing the switch, drove approximately 128 m over turnouts No. 63 and No. 61 aligned in the straight direction and entered the path of an oncoming ROJ 50673 train, leading to a head-on collision at turnout No. 45 located on track 5. The travel time of the railbus from the moment of activation of the ALARM on the computer panel in the LCS Gdynia Główna signal box – "Switch 64 trailing" to the moment of the collision was 6 s.

Date of the occurrence: 5 October 2023, 7:00 a.m.

Location of the occurrence: Gdynia Główna station, track No. 5, turnout No. 45, km 21.522 of railway line No. 202 Gdańsk Główny – Stargard. Geographical location: 54°31'25.0"N 18°31'21.2"E.

Consequences of the occurrence: Four people were injured, including: a seriously injured driver of the ROJ 50673 train, as well as two crew members of that train and one injured passenger, all of whom required medical attention.

Car (ra) of the EN57-1248 rail vehicle was completely destroyed and derailed, and car (s) was damaged. The cab of car A of rail vehicle SA138-004 was crushed.

Elements of railway infrastructure at the Gdynia Główna station were damaged.

Causal factor:

(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)

Running past the Tm30 shunt signal displaying the Ms1 aspect, "Shunting prohibited" by the driver performing a shunting run with the SA138-004 railbus of the railway carrier POLREGIO S.A., causing the bus to cross the route of the ROJ 50673 passenger train of the railway carrier POLREGIO S.A. and resulting in the head-on collision with that train.

Contributing factors:

(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)

- 1) Exceeding the permitted shunting speed by the driver of rail vehicle SA138-004.
- 2) Insufficient observation of the shunting run route by the driver of rail vehicle SA138-004, resulting in the vehicle running past the Tm30 shunt signal displaying the Ms1 aspect, "Shunting prohibited", and running over the switch of turnout No. 64 and trailing it (the switch was set for the ROJ 50673 train to go straight).
- 3) Failure of the driver of rail vehicle SA138-004 to react to the trailing of turnout 64 and continuing the run of the vehicle.
- 4) Time pressure on the driver of rail vehicle SA138-004 related to

the unscheduled refuelling of the railbus and the need to keep up with the timetable for the ROS 90303 train, which was to be operated by this railbus.

- 5) Restricted visibility of the front of each rail vehicle by their drivers.

Systemic factor: The time-consuming procedure for activating the RADIO-STOP signal from the level of the remote control panel of the *Remote Radio Control System of the Gdynia Główna*

(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, the design and application of the safety management system, skills of the staff, procedures and maintenance)

station by the traffic operator, making it impossible to quickly stop rail vehicles in case of danger to train traffic.

Recommendations and their addressees:

- 1) Authorised infrastructure operators, users of sidings and other entities exempted from the obligation to have a safety authorisation, with computerised signalling equipment and Remote Radio Control Systems, shall take measures to ensure that the RADIO-STOP function can be immediately initiated by the traffic operators in case of a risk to train traffic safety by means of a dedicated and readily accessible button for each base transceiver station.
- 2) The infrastructure operator PKP Polskie Linie Kolejowe S.A. will change the organisation of railway traffic within the Gdynia Główna station by:
 1. preventing transmitting the signal from displaying the Ms2 aspect “*Shunting permitted*” for shunting runs from shunt signal Tm37 to Tm30 during train runs from station tracks 1, 2, 3, 4 and 5 towards mainline tracks No.: 1Ch, 2Ch, 301 and 302. During the above-mentioned train runs, track and switch sections Jt15a, iz80, iz73, iz70 should be free of rolling stock;
 - or
 2. introducing stipulations in the Technical Regulations of Gdynia Główna Station stating that before carrying out a train, run the traffic controller is obliged to: interrupt any shunting operations that create the risk of a vehicle entering the path of a passing train, ensure that the operations have been successfully interrupted and have this fact acknowledged by the driver performing the shunting run (Instruction Ir-1 §12(2)).
- 3) The carrier POLREGIO S.A. will ensure that the running data of powered rail vehicles are correctly recorded in accordance with the real state.
- 4) Railway carriers shall include in their internal rules the need to carry out periodic inspections of the on-board recorders of rail vehicles to the extent and within the periods of time recommended by the manufacturers of the recorders and covering, in particular, the correct recording of the actual operating state of the vehicle. Inspections should be carried out by the recorder manufacturers or entities authorised by the manufacturers.
- 5) The carrier POLREGIO S.A. and the railway infrastructure operator PKP PLK S.A. Maintenance-of-Way Department in Gdynia shall ensure the implementation of provisions included in in the notes (column 20) in the timetable of PR Gdynia trainsets connected with refuelling run. Unscheduled refuelling of powered rail vehicles may only take place in justified emergencies.
- 6) Infrastructure operator PKP Polskie Linie Kolejowe S.A. will undertake actions aimed at the elimination of irregularities found by the Investigation Team in the course of the investigation, and included in section V.3(6–10).



Photo 1 – The site of the occurrence (source: PKBWK documentation)

II. THE PROCEDURE 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”), Mr Tadeusz Ryś, issued decision no. PKBWK.590.10.2023 of 6 October 2023 to establish an investigation of the occurrence of 5 October 2023 at 7:00 a.m. at the Gdynia Główna station. Pursuant to the provisions of Article 28e(4) of the Act of 28 March 2003 on rail transport (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-10456.

2. Motivation for the decision to establish an investigation

Based on an analysis of the circumstances, considering the nature of the occurrence, which under slightly different conditions would have been a serious accident, interrupting the operation of structural subsystems or interoperability constituents, and further considering that it forms a series of accidents concerning the system as a whole, the Chairman of PKBWK decided to establish an investigation to be conducted by the Commission's Investigation Team pursuant to Article 28e(3)(2) of the Rail Transport Act.

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

The investigation into the causal factors and systemic factors contributing to the occurrence 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.

There were no restrictions during the investigation that would have a negative impact on its course.

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

The Chairman of the Commission nominated a three-person Investigation Team from among the standing members of the Commission, equipping it 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

Pursuant to Article 28h(2)(5) of the Railway Transport Act, the Chairman of PKBWK obliged specific members of the railway commission representing the infrastructure operator and the railway carrier concerned to cooperate with the Investigation Team (letter no. PKBWK. 590.10.1.2023 of 6 October 2023). In accordance with the above-mentioned letter, the chairman of the railway commission transferred formally the accumulated documentation to the head of the PKBWK Investigation Team at the registered office of PKP Polskie Linie Kolejowe Maintenance-of-Way Department in Gdynia on 13 October 2023.

The Chairman of PKBWK requested the infrastructure operator and the railway carrier in writing to submit the documents necessary for the investigation carried out by the Commission's Investigation Team. The aforementioned entities provided all the materials necessary for the investigation.

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

Cooperation with representatives of the entities linked with the factors contributing to the occurrence, i.e., the infrastructure operator and the railway carrier, which took place during the investigation into the causes and circumstances of the occurrence did not give rise to any objections on the part of 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

Throughout the process aimed at clarifying the causes of the occurrence, the investigation team has considered the provisions of national rules, internal rules of the infrastructure operator and railway carrier, and technical documentation. Furthermore, the Investigation Team relied on their own knowledge and experience, as well as on the documentation gathered by the Investigation Team, the railway commission and the Public Prosecutor's Office.

Within the investigation, the Investigation Team prepared/carried out inter alia the following activities:

- visual inspection of the site of the occurrence and the railway vehicles following the occurrence,
- preparation of photo and video documentation,
- analysis of the documentation provided by the railway carrier and the railway infrastructure operator,
- analysis of the data of the recorder of running data in the rail vehicles,
- analysing the image from the front-facing video recorder (railbus SA138-004),
- hearing the employees involved in the occurrence,
- site visit consisting of a ride in the cab of an EN57-series electric multiple unit and an SA138 railbus,
- inspection of the site of the occurrence (Gdynia Główna station, command signal box).

Below is a list of selected legal acts, rules and internal instructions used in the course of the investigation:

European Union rules:

- 1) 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).
- 2) 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)
- 3) 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).

National rules:

- 1) Rail Transport Act of 28 March 2003 (consolidated text: Journal of Laws of 2023, item 1786, as amended).
- 2) Personal Data Protection Act of 10 May 2018 (consolidated text: Journal of Laws of 2019, item 1781).
- 3) 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).

- 4) 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).

Internal instructions of the infrastructure operator PKP PLK S.A. (selected)

- 1) Ir-1 Instruction on operating rail traffic.
- 2) Ir-5 (R-12) Instruction for using railway radio communication devices.
- 3) Ir-8 Instructions for the handling of serious accidents, accidents and incidents in rail transport.
- 4) Ir-9 Instruction on the shunting technique.
- 5) Ie-1 Instruction on signalling operations.
- 6) Ie-4 (WTB-E10) Technical guidelines on the construction of rail traffic control devices.
- 7) Ie-14 Instruction on the organisation and use of radiotelephone networks.
- 8) Ie-105 Technical and operational requirements for fixed/transportable radiotelephones for radio networks with selective group calling.
- 9) Ie-107 Technical and operational requirements for the remote radio control system.
- 10) Id-1 Technical conditions on the maintenance of the surface of railway lines.
- 11) Ik-2 Instruction on inspections concerning the safety of railway traffic.
- 12) User manual for the Remote Radio Control System F-804/2/M.

Internal instructions of the railway carrier POLREGIO S.A. (selected)

- 1) Pt-2 Instructions for the traction vehicle crew.
- 2) Pr-2 Instruction on shunting technique, signalling and organisation of passenger trains on railway sidings used by POLREGIO S.A.

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

The Investigation Team did not encounter any other difficulties or problems that could affect the course or conclusions of the investigation.

9. Any interaction with the judicial authorities

The Investigation Team cooperated with the District Public Prosecutor's Office in Gdynia, gaining access to the materials collected during the investigation by the Police and the Public Prosecutor's Office.

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

No other relevant information.

III. DESCRIPTION OF THE OCCURRENCE

1. The occurrence and background information

1.1. The description of the type of occurrence

Accident – train collision.

Passenger train ROJ 50673 of the railway carrier POLREGIO S.A. travelling from Malbork to Gdynia Chylonia departed from track four of the Gdynia Główna station towards mainline track No. 1 to Gdynia Chylonia station. This train was travelling on a locked route, at signal S10a displayed by the K4^{2/4/m} exit signal. At the same time, railbus SA138-004 of the railway carrier POLREGIO S.A. was leaving a fuel depot on a shunting run as a shunting train. The railbus was travelling from track 404 to track 15a on a locked route, the end of which was a shunt signal Tm30 displaying the aspect Ms1 "*Shunting prohibited*". Despite this, the railbus ran past the signal in front of which it was supposed to stop and continued towards track one at platform 2. It ran over turnout No. 64, trailing the switch, drove approximately 128 m over turnouts No. 63 and No. 61 aligned in the straight direction and entered the path of an oncoming ROJ 50673 train, leading to a head-on collision at turnout No. 45 located on track 5. The travel time of the railbus from the moment of activation of the ALARM on the computer panel in the LCS Gdynia Główna signal box – “Switch 64 trailing” to the moment of the collision was 6 s.

1.2 The date, exact time and location of the occurrence

The occurrence took place on 5 October 2023 at 7:00 a.m. at Gdynia Główna station, turnout No. 45, track No. 5, km 21.522 of railway line No. 202 Gdańsk Główny – Stargard. Area of the infrastructure operator PKP Polskie Linie Kolejowe S.A. Maintenance-of-Way Department in Gdynia.

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

Located on the station's plains, Gdynia Główna station is a junction station where five railway lines converge. It is designed to handle passenger and freight traffic. Five double-face platforms with an underground tunnel and a footbridge over the tracks are located for passenger services. The axis of the station is located at km 20.992 of line No. 202.

The main and secondary tracks have a type C95-C overhead contact line.

The station houses the sectional signal box of the Local Control Centre (LCS) Gdynia Główna “GO”, with the following workstations:

- dispatch traffic operator,
- auxiliary traffic operator,
- route traffic operator,
- section traffic operator.

Geographic coordinates of the occurrence site: 54°31'25.0"N 18°31'21.2"E. The occurrence took place in the daytime (morning), without cloud cover or precipitation, temperature: +13°C, good visibility and audibility, no other atmospheric phenomena.

There were no works in the area of the station that could have affected the occurrence.

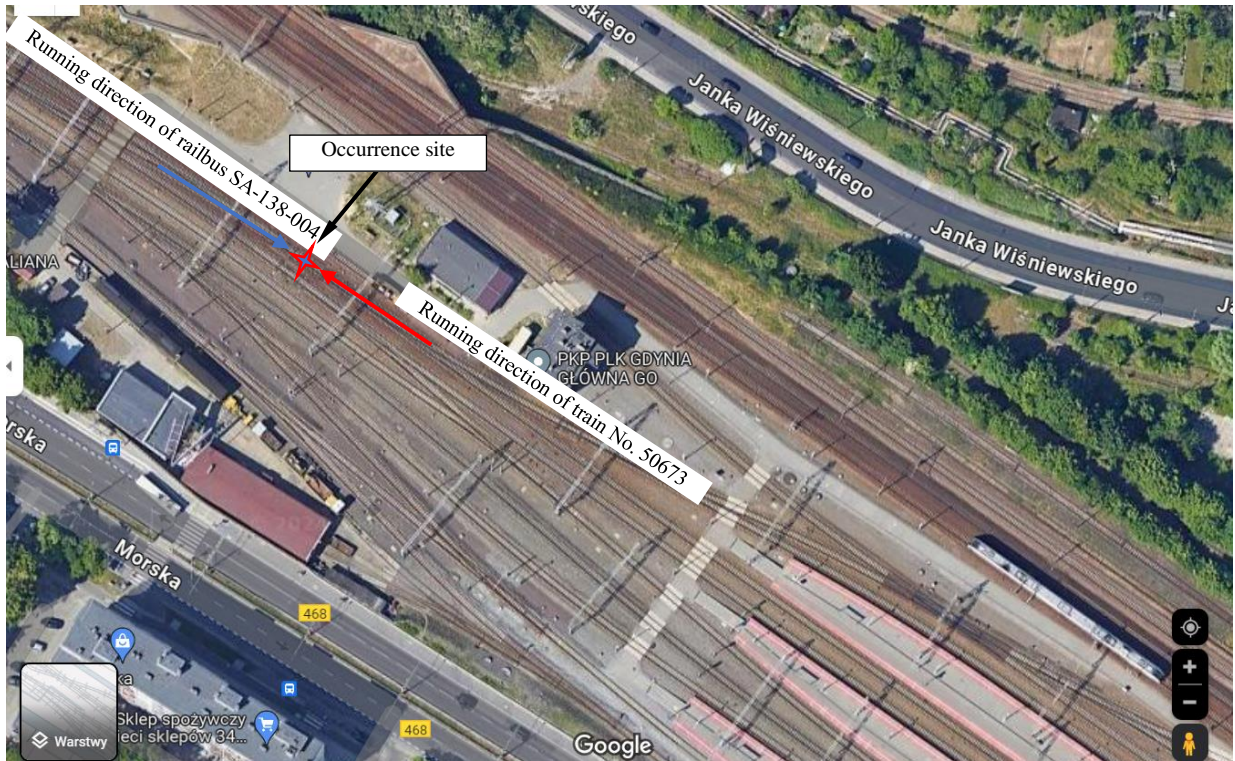


Photo 2– A general view of the occurrence site (source: Google Earth)



Photo 3 – View of the location of vehicles after the accident (source: trójmiasto.pl)

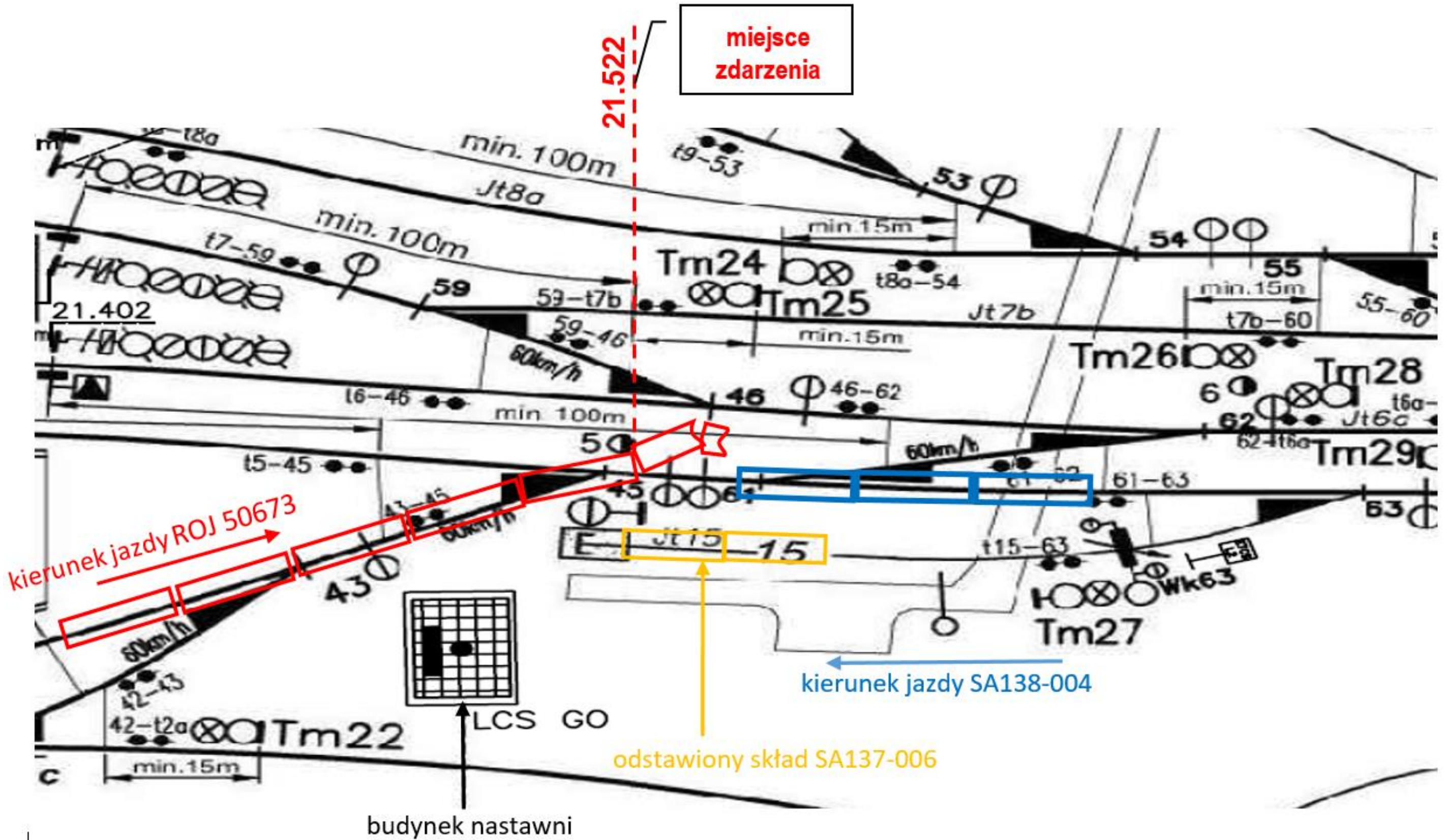


Figure 1 – A sketch of the accident scene (prepared by PKBWK)

PL	EN
miejsce zdarzenia	occurrence site
kierunek jazdy ROJ 50673	running direction of ROJ 50673
kierunek jazdy SA138-004	running direction of SA138-004
odstawiony skład SA137-006	the stabled passenger trainset SA137-006

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

Four people were injured as a result of the occurrence, including: a seriously injured driver of the ROJ 50673 train, as well as two crew members of that train and one injured passenger, all of whom required medical attention.

b) cargo, luggage and other property

The luggage of the passengers on the train was not damaged.

c) rolling stock, infrastructure and the environment

Rolling stock

ROJ 50673 passenger train composed of:

- EN57-1248ra: damaged frame, damaged wheelsets, damaged bogie frames, damaged lead coupler, damaged inter-car coupler, completely destroyed driver's cab and car structure, numerous dents in side wall plating,
- EN57-1248s: damaged frame, damaged wheelsets, damaged bogie frames, dented frame (from the direction of the ra car), bumper plate pressed into the frame, damaged bumper and bumper plate, damaged inter-car coupler (connecting cars s and rb), dented car body plating (right side from the direction of the ra car), dented wall from the direction of the inter-car door, dented wall from the direction of the windows inside the car,
- EN57-1248rb: damaged frame, damaged wheelsets, damaged bogie frames, damaged inter-car coupler (connecting cars s and rb).

SA138-004 railbus, segment A: damaged driver's cab structure, damaged draw and buffer gear, damaged pneumatic half couplings, damaged driver's console, damaged cab heaters, damaged windscreen, damaged side windows, damaged headlights, damaged electrical cabinet, damaged air-conditioning unit and air-conditioning ducts, damaged floor, damaged segment structure, damaged external plating, damaged two pairs of automatic doors, damaged window panes.

POLREGIO S.A. has decided to remove the EN57-1248 vehicle from its inventory, with its final destination being physical liquidation. The SA138-004 railbus, in order to restore the technical performance of the rolling stock unit, was qualified for emergency repair in its entirety.



Photo 4 – Damage to rail vehicles after the occurrence (source: PKBWK)

Infrastructure

Parts of the signalling equipment (three long control rods of EFA-100 point detectors) and the overhead line (two suspension hangers) were damaged.

Damage to road infrastructure elements: damaged left half switch in turnout 64 due to trailing. In turnout 46, damaged right half switch, damaged turnout sleepers, sliding plates and a chipped point in the left half switch.

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 consequences of the occurrence necessitated the suspension of train traffic at Gdynia Główna station.

a) train traffic restrictions:

- tracks No. 1 and No. 2 of the route Gdynia Główna – Gdynia Chylonia closed from 7:01 a.m. on 5 October 2023 until 2:43 a.m. on 6 October 2023
- track No. 1 of the route Gdynia Orłowo – Gdynia Główna closed from 7:13 a.m. on 5 October 2023 to 2:43 a.m. on 6 October 2023
- track No. 2 of the route Gdynia Orłowo – Gdynia Główna closed from 7:13 a.m. on 5 October 2023 to 8:18 a.m. on 6 October 2023
- track No. 202 of the route Gdynia Główna – Gdynia Port impassable for electric rolling stock from 7:15

a.m. to 8:20 a.m.

- train travel on the section Gdańsk Główny – Gdynia Chylonia took place on line 250 via the Rapid Urban Railway tracks.

b) train delays

Opóźnienia		Pierw.	Wtórne	RAZEM			Pierw.	Wtórne	RAZEM			Pierw.	Wtórne	RAZEM			
Poc. pas.	ilość	185	419	604	Poc. tow.	ilość	22	8	30	Poc. poz.	ilość	13	7	20	Op. wt.	ilość	0
	min.	9 593	5 279	14872		min.	10 250	469	10 719		min.	1 121	467	1 588		min.	0

c) substitute transport means: not necessary

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:

- driver driving passenger train ROJ 50673 of the railway carrier POLREGIO S.A.
- driver driving the SA 138-004 railbus of the railway carrier POLREGIO S.A.
- LCS Gdynia Główna “GO” traffic operator.

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

Passenger train ROJ 50673 of the railway carrier POLREGIO S.A., between Malbork and Gdynia Chylonia, consisting of two electric multiple units (EMUs):

- 1) EN57-1248 (three-car) with EVN numbers:
 - PL PREG 94 51 2 121 923-8 (ra);
 - PL PREG 94 51 2 121 924-6 (s);
 - PL PREG 94 51 2 121 925-3 (rb);
- 2) EN57-1250 (three-car) with EVN numbers:
 - PL PREG 94 51 2 121 926-1 (ra);
 - PL PREG 94 51 2 121 927-9 (s);
 - PL PREG 94 51 2 121 928-7 (rb)

Train length: 129.94 m; total train weight: 276 t; required brake mass: 241 t; actual brake mass: 260 t; percentage of actual brake mass: 94%, percentage of required brake mass: 87%.

Shunting train consisting of the SA138-004 diesel multiple unit of the railway carrier POLREGIO S. A. (three-car) with EVN numbers: PL-PREG 95 51 2 720 069-4 (A); 95 51 2 720 070-2 (B); 95 51 2 720 071-0 (C).

Length of shunting train: 58.63 m. Permitted shunting speed: 25 km/h.

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

Light signals (entry, exit and routing signals) are installed at Gdynia Główna station, and signal repeaters are used for them where required. Shunting signals are given by shunt light signals (dwarf signals and lamps placed on masts) and signals marked with the letter “m” on a descriptive plate.

For the safe operation of train traffic and shunting, the computer-based railway traffic control system EbiLock 950 with the Ebiscreen 300 remote traffic control and management system is used with the SOL-21 counter system for track and turnout occupancy detection and electric point machines of the EEA-5 type with EFA-1 point detectors.

Station track 5

Rail type.....	– 60E1
Sleepers.....	– pre-stressed concrete PS94 type
Attachment type.....	– flexible, type Sb3,
Ballast type.....	– gravel

Straight turnout No. 64 – right, 60E1 – 1:9 – 300, SKL-type fastening, manufactured by Vossloh Cogifer, pre-tensioned turnout sleepers, ballast bed, built in 2009.

Straight turnout No. 61 – left, 60E1 – 1:12 – 500, SKL-type fastening, manufactured by Vossloh Cogifer, pre-tensioned turnout sleepers, ballast bed, built in 2009.

Straight turnout No. 45 – left, 60E1 – 1:12 – 500, SKL-type fastening, manufactured by Vossloh Cogifer, pre-tensioned turnout sleepers, ballast bed, built in 2009.

After the occurrence, members of the railway commission and representatives of PKBWK established the following condition of the signalling equipment of LCS Gdynia Główna:

Fixed route for ROJ 50673 train from station track 4 to mainline track 1 towards Gdynia Chylonia station. The route is equipped with SHL-12 four-aspect computerised automatic multi-block signalling.

Condition of the signalling equipment after the occurrence:

- a) positions of points: No. 43 (+) plus, No. 45 shows trailing, No. 61 shows trailing, No. 64 shows trailing, No. 66ab (+) plus, No. 66cd (+) plus, No. 68ab (+) plus, No. 68cd (+) plus, locked route, No. 46 – no position detection,
- b) occupancy detection sections: It5 – vacant, It4 – vacant, It6 – occupied, Iz43 – occupied, Iz45/61 – occupied, Iz63/64 – occupied, Iz68 – vacant,
- c) signals: signal K4 – aspect S1, red light, signal K5 – aspect S1, red light, shunt signal Tm27 – aspect Ms1, blue light, shunt signal Tm30 – aspect Ms1, blue light, shunt signal Tm37 – aspect Ms1, blue light, shunt signal Tm36 – aspect Ms1, blue light.

Direction of interlocking, to Gdynia Chylonia station on mainline track 1:

status of block repeaters – mainline tracks (track relays), exit sections it221D vacant, it227D vacant, it239D vacant.

Indication of first and last block signal: first block signal 227D – aspect S3, one green flashing light, last block signal 239D – aspect S5, one orange continuous light.

Status of P1 entry signal at Gdynia Główna station: one continuous red light S1 – “Stop”.

Status of exit signal K4: one continuous red light S1 – “Stop”.

Premises closed and sealed with seals in accordance with the latest copies in the E1758 Signalling Equipment Inspection Record.

The state of the signalling equipment in the field is consistent with the status of the signalling equipment on the EbiScreen 300 computer desktop of the Gdynia Główna signal box.

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

The Investigation Team did not identify any other information relevant for the purpose of the description of the occurrence.

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 4 October 2023, at 7:15 p.m., the driver of the railway carrier POLREGIO S.A. started his working shift at Gdynia Główna station, where he took the SA133-series rail vehicle and performed a run on the section Gdynia Główna – Hel, Hel – Kuźnica. Subsequently, at Kuźnica station, he took the diesel vehicle (railbus) SA138-004, which he ran to Hel station and which he surveilled from 11:00 p.m. to 4:30 a.m., guarding the train set due to instances of vandalism by persons who painted graffiti on rail vehicles.

With this train, as the passenger train ROM 90402, he departed on 5 October 2023 according to the timetable at 4:41 a.m. on the route Hel – Gdynia Główna.

Train ROM 90402 entered Gdynia Główna station on schedule at 6:14 a.m., where it terminated its run on track one. Upon the instruction of the dispatcher of the carrier POLREGIO S.A., in consultation with the

dispatch traffic operator (despite the fact that refuelling was not scheduled in the train traffic plan), he ran the train, as a shunting train, at 6:41 a.m., to the filling station located on track 404 to refuel the railbus. The vehicle remained at the filling station from 6:46 a.m. to 6:56 a.m. After refuelling, the train was due to depart at 7:03 a.m. from Gdynia Główna station as train ROS 90303 on a return run between Gdynia Główna and Hel after the change of the train crew on the platform.

The dispatch traffic operator, using a computerised interlocking system, proceeded to arrange the routes for railbus SA138-004 and train ROJ 50673.

06:57:02 a.m. – Tm62-P21 shunting run (for the railbus) was locked;

06:57:07 a.m. – P21-Tm37 shunting run (for the railbus) was locked;

06:57:14 a.m. – shunt signal Tm37 locked, as the start of the run (for the railbus);

06:57:14 a.m. – Tm30 locked, as the end of the run (for the railbus);

06:57:17 a.m. – the interlocking computer confirms the correctness of the selected command of the traffic operator for setting the path for the manoeuvre from Tm37 to Tm30 (for the railbus);

06:57:17 a.m. – Tm37 displays the Ms2 aspect (shunting run from shunt signal Tm37 to shunt signal Tm30 for the railbus);



Photo 5 – View from the railbus of the shunt signal Tm37 displaying the Ms2 aspect (source: POLREGIO S.A.)

06:57:30 a.m. – train ROJ 50673 enters track 4 and stops in front of signal K4^{2/4/m} displaying aspect S1 “Stop”;

06:58:45 a.m. – occupation of insulated turnout section Jz87/91 (behind shunt signal Tm62 by the railbus);

06:59:10 a.m. to 07:00:14 a.m. – the railbus runs with speed between 35 km/h and 39.5 km/h;

06:59:23 a.m. – the traffic operator gives the order to arrange a train run from signal K4^{2/4/m} to mainline track 1 towards Gdynia Chylonia station for train ROJ 50673;

06:59:23 a.m. – the interlocking computer confirms the correctness of the selected command for setting the path for train ROJ 50673 from signal K4^{2/4/m} to mainline track 1 towards Gdynia Chylonia station;

06:59:23 a.m. – the S10a aspect is displayed on the K4^{2/4/m} exit signal for train ROJ 50673;

06:59:30 a.m. – train ROJ 50673 starts its run from track four;

- 06:59:39 a.m. – the railbus enters track 21a;
- 06:59:49 a.m. – the railbus enters turnout No. 73;
- 06:59:55 a.m. – the railbus enters turnout No. 70;
- 06:59:57 a.m. – the railbus leaves track 21a;
- 07:00:03 a.m. – the railbus leaves turnout 73;
- 07:00:04 a.m. – the railbus enters track 15a;

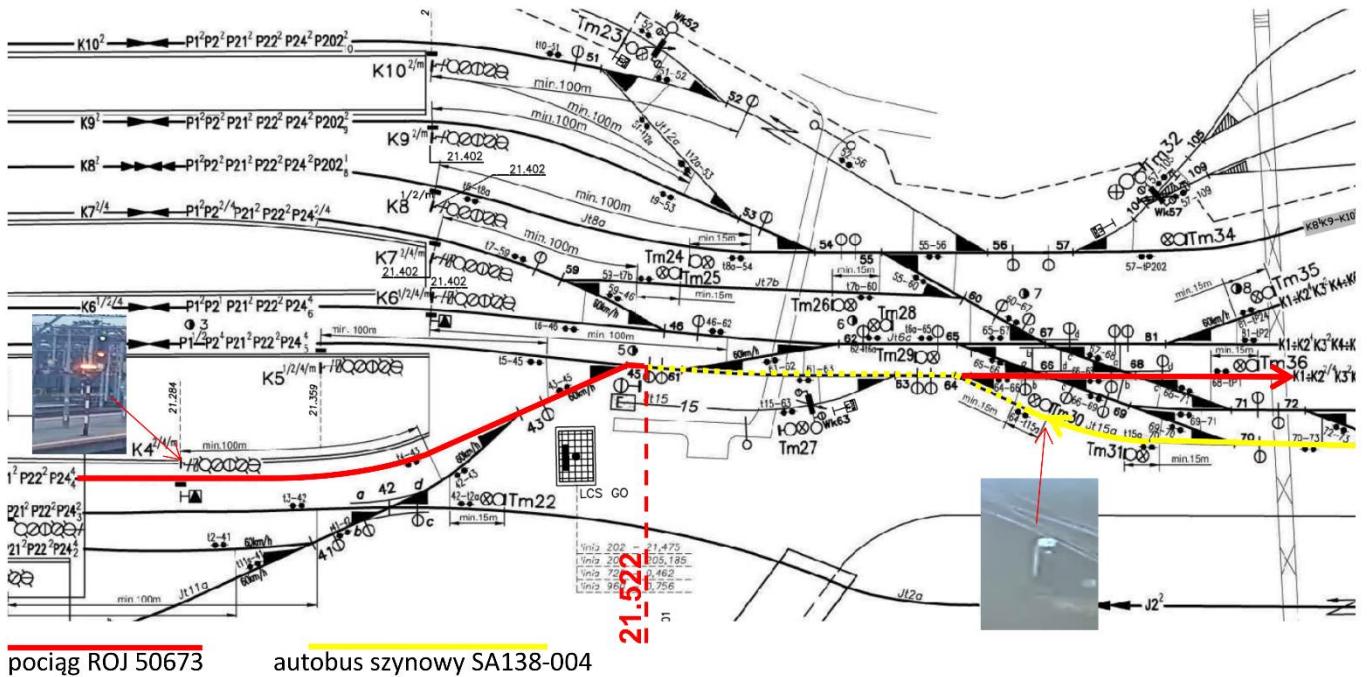


Figure 2– Train paths (prepared by PKBWK)

- 07:00:04 a.m. – the railbus runs past shunt signal Tm30 displaying aspect Ms1;



Photo 6 – View from the railbus of the shunt signal Tm30 displaying the Ms1 aspect (source: POLREGIO S.A.)

07:00:08 a.m. – the railbus occupies turnout No. 64 and the next turnout No. 63;

07:00:12 a.m. – turnout No. 70 is left vacant;

07:00:13 a.m. – Ebi Lock interlocking system confirms that Tm30 displays the Ms1 base aspect;

07:00:13 a.m. – Ebi Lock interlocking system confirms that Tm30 is the end of the shunting run;

07:00:13 a.m. – ALARM is activated – “Switch 64 trailed”;

07:00:13 a.m. – another alarm is activated – “Point 64 position detection failure”

07:00:13.5 a.m. – the railbus driver applies braking at the speed of 37.5 km/h;

07:00:16 a.m. – the railbus leaves track 15a;

07:00:16 a.m. – the dispatch traffic operator uses a radiotelephone on channel R6 to broadcast a verbal message “Bus, stop”;

07:00:18 a.m. – train ROJ 50673 enters turnout 43 at approximately 53 km/h, and the driver applies emergency braking;



Photo 7 – View from the railbus of train ROJ 50673 leaving track 4 7 seconds before the occurrence (source: POLREGIO S.A.)



Photo 8 – View from the railbus of train ROJ 50673 leaving track 4 (source: POLREGIO S.A.)



Photo 9 – View from the railbus of train ROJ 50673 leaving track 4 (source: POLREGIO S.A.)

07:00:19 a.m. – train ROJ 50673 enters turnout 45 at 42 km/h;



Photo 10 – View from CCTV cameras just before the collision (source: PKBWK)

07:00:19 a.m. – the railbus enters turnout No. 45 at 6.75 km/h;
07:00:19 a.m. – collision of the rail vehicles.

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 and the efforts of the rescue and emergency services.

Following the train collision, the LCS Gdynia Główna traffic operator called the 112 emergency number and notified the Emergency Communications Centre of the occurrence at 7:01 a.m. He then closed tracks 1 and 2 of the Gdynia Główna – Gdynia Chylonia route and informed the route dispatcher and network dispatcher about the occurrence and the need to de-energise the overhead line.

Rescue operations were launched on 5 October 2023 at 7:01 a.m. with the ambulance, fire brigade, police, railway protection guard, technical rescue service and emergency power service.

The passengers of train ROJ 50673 evacuated from the damaged train on their own and went towards Platform 1 of Gdynia Główna station. Four of the injured persons were hospitalised after receiving medical attention on site earlier.

IV. ANALYSIS OF THE OCCURRENCE

1. Roles and duties

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

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

The tasks of the infrastructure operator, hereinafter referred to as "the operator", include the operation of rail infrastructure involving inter alia:

- operation of rail traffic;
- provision of railway infrastructure, provision of related services and levying of the related charges;
- maintenance of the rail infrastructure through carrying out works aimed at maintaining the condition and ability of the existing rail infrastructure to operate rail traffic safely, including supervision of the functioning of rail traffic control devices and track-side train safety control devices.

As part of the supervision of the operation of the rail traffic control equipment, in order to ensure the safety of train traffic in the years 2021–2023, in accordance with the Construction Law and internal regulations at LCS Gdynia Główna, the diagnostic team of the operator carried out inspections of the maintenance of the structure in terms of checking its technical condition and suitability for use and conducted diagnostic tests of the rail traffic control equipment and railway telecommunications. Inspections and diagnostic tests did not reveal any irregularities contributing to the occurrence.

LCS Gdynia Główna is equipped with a Remote Radio Control System and is operated by a traffic operator from the radio system control station. The automatic transmission of the "ALARM" signal takes place after the operator performs the actions laid down in the operating instructions for the relevant type of radio. This results in the immediate automatic braking of all powered rail vehicles equipped with "Radio-stop" equipment whose radios have received the "ALARM" signal. The procedure used in the system for transmitting the "ALARM" signal does not allow the traffic operator to transmit it immediately in the event of an emergency, requiring a delay of several seconds.

Railway carrier POLREGIO S.A. Pomeranian Department in Gdynia

For carrying out a transport task, the railway carrier is obliged to allocate rail vehicles with a type authorisation certificate and a railworthiness certificate. The railway operator has a single safety certificate which, together with the licence to carry out rail transport, entitles the operator to carry out its operations.

The Investigation Team established that the rail vehicles involved in the occurrence met the requirements concerning authorisation to operation and had the required documents.

The responsibilities of a railway carrier concerning the safe driving of a rail vehicle are specified in the internal rules of the infrastructure operator and railway carrier. On the basis of the analysis of the collected material, the Investigation Team found irregularities in the behaviour of the driver of the railbus SA138-004 during the shunting run from the filling station, which are described in detail in section IV(3).

The designated train crew that operated the ROJ 50673 train and the driver operating the SA138-004 railbus had all the licences and qualifications required by law. Train ROJ 50673 was operated on the basis of the annual timetable according to which it was to depart from the Gdynia Główna station at 6:58 a.m., but it left 90 s later. The SA138-004 railcar at Gdynia Główna station was performing a shunting run to a designated refuelling point for refuelling, and then, as passenger train ROS 90303 according to the timetable, was due to depart at 7:03 a.m. for the Gdynia Główna – Hel route. Upon the instruction of the railway carrier's dispatcher with the consent of the traffic operator of the LCS GO station, vehicle refuelling took place contrary to the schedule of vehicle refuelling planned for POLREGIO S.A. train traffic.

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

The POLREGIO S.A. railway carrier, which provides the rolling stock, is responsible for its serviceability, technical condition and compliance with the vehicle maintenance process. The two electric multiple units EN57-1248 and 1250 and the diesel multiple unit SA138-004 had all the required documents. The carrier submitted

documentation concerning the latest technical inspections of its rail vehicles. The Investigation Team did not find any irregularities as regards rolling stock maintenance. The technical condition of the rail vehicles had no impact on the occurrence concerned.

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

Not applicable.

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 investigation material gathered in the case, the Investigation team did not identify any factors on the side of the national safety authority that would have an impact on the occurrence.

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

Based on the investigation material gathered, the Investigation Team did not identify any factors that could be affected by notified bodies.

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

Based on the investigation material gathered, the Investigation Team did not identify any factors that could be affected by the certification bodies of the rail carrier.

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

Not applicable.

2. Rolling stock and technical installations

Description of selected running data of the railbus SA138-004 from the moment of departure from the refuelling point at Gdynia Główna station to the moment of stopping after the occurrence.

SA138-004 railbus owned by POLREGIO S.A. The Pomeranian Department in Gdynia is equipped by the manufacturer with an electronic system for recording running data:

- recorder manufacturer: ATM PP Sp. z o.o.,
- recorder type: ATM-RP4
- parameters recorded by the recorder: distance, speed, time, driving from cab A or cab B, activation of the SHP automatic braking device (SHP), activation of the dead man's switch (CA), braking and other.

The Investigation Team used FDS10 10.1.10 software to analyse selected running data recorded by the recorder immediately prior to the occurrence.

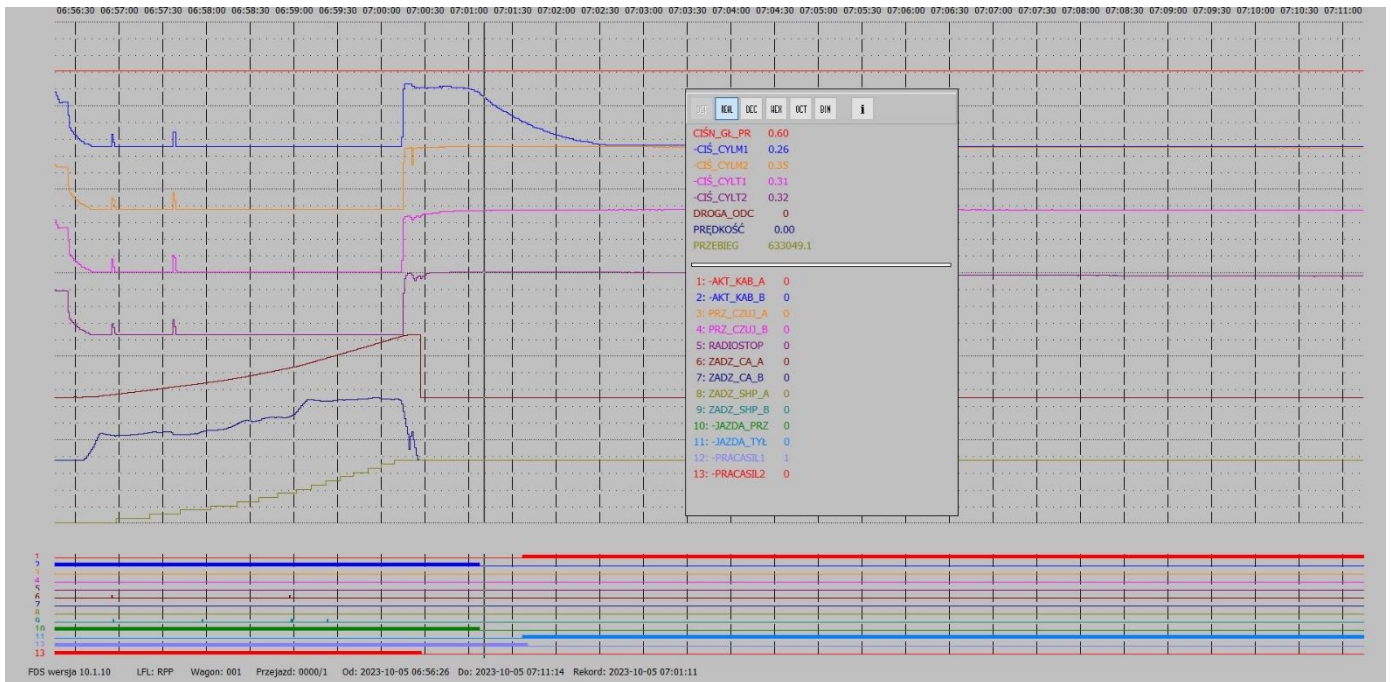


Figure 3 – Diagram of the running data of the SA138-004 rail vehicle (prepared by PKBWK)

Description of data:

06:56:36 a.m. – the drive is switched on, and the train departs from the filling station;

06:56:36 a.m. to 06:58:00 a.m. – increase in speed from 0 km/h to 18.5 km/h over a distance of 362 m; activation of the dead man's switch (CA) and double activation of the automatic braking device (SHP);

06:58:00 a.m. to 06:59:10 a.m. – increase in speed from 18.5 km/h to 38 km/h over a distance of 492 m; activation of the dead man's switch (CA) and the automatic braking device (SHP);

06:59:10 a.m. to 07:00:14 a.m. – running with speed between 35 km/h and 39.5 km/h over a distance of 665; activation of the automatic braking device (SHP);

07:00:14 a.m. – implementation of braking at 36.1 km/h (safety loop triggered);

07:00:14 a.m. to 07:00:19 a.m. – decrease in speed from 36.1 km/h to 6.75 km/h over a distance of 38 m; a gradual increase in pressure in the brake cylinders of both bogies (M1 and M2) of the railbus;

07:00:19 a.m. – head-on collision with the EN57-1248 rail vehicle with the railbus moving at a speed of 6.75 km/h;

07:00:19 a.m. to 07:00:22 a.m. – rapid increase in speed from 6.75 km/h to 17.5 km/h as a consequence of the collision (rolling of the wheelset with the sensor due to a temporary lifting of the wheelset);

07:00:22 a.m. – 07:00:26 a.m. – decrease in speed from 17.5 km/h to 0 km/h over a distance of 7 m;

from 07:00:26 a.m. – vehicle standstill after the accident;

07:01:37 a.m. – change of power supply from cab B to cab A.

In the described section, the vigilance button was recorded to have been triggered and used 6 times as a result of the activation of the automatic braking device (SHP) or the dead man's switch (CA).

The total distance travelled from the starting point to the stopping point after the occurrence was 1573 m.

Identified irregularities:

- Rail vehicle SA138-004 was operated from cab A during the accident, whereas the recorder records control from cab B.
- The driver operated the vehicle from cab A, while the recorder records the activation of the automatic braking device (SHP) and the dead man's switch (CA) from cab B.
- No recording of the use of the automatic braking device (SHP)/dead man's switch (CA) button in both cabs.
- Incorrect recording of pressure in the main reservoir pipe.

The above irregularities, in the opinion of the Investigation Team, may be due to missing or incorrectly connected cables feeding signals from individual devices to the recorder.

Description of the records of selected running data of the ROJ 50673 train driving the electric multiple unit EN57-1248 from station Gdynia Główna until the moment of stopping after the occurrence.

EN57-1248 EMU owned by POLREGIO S.A. The Pomeranian Department in Gdynia is equipped by the manufacturer with an electromechanical system for recording running data:

- recorder manufacturer: HASLER Bern,
- recorder type: RT9
- parameters recorded by the speedometer: distance, time, speed, active cab A or B, recording of the use of vigilance systems: automatic braking device (SHP), dead man's switch (CA), pressure in the brake cylinders, running with/without power supply.

The Investigation Team analysed the running data recorded on the tape of the speedometer to investigate the train's driving characteristics immediately prior to and after the occurrence.

The chart below shows the running data of train ROJ 50673:

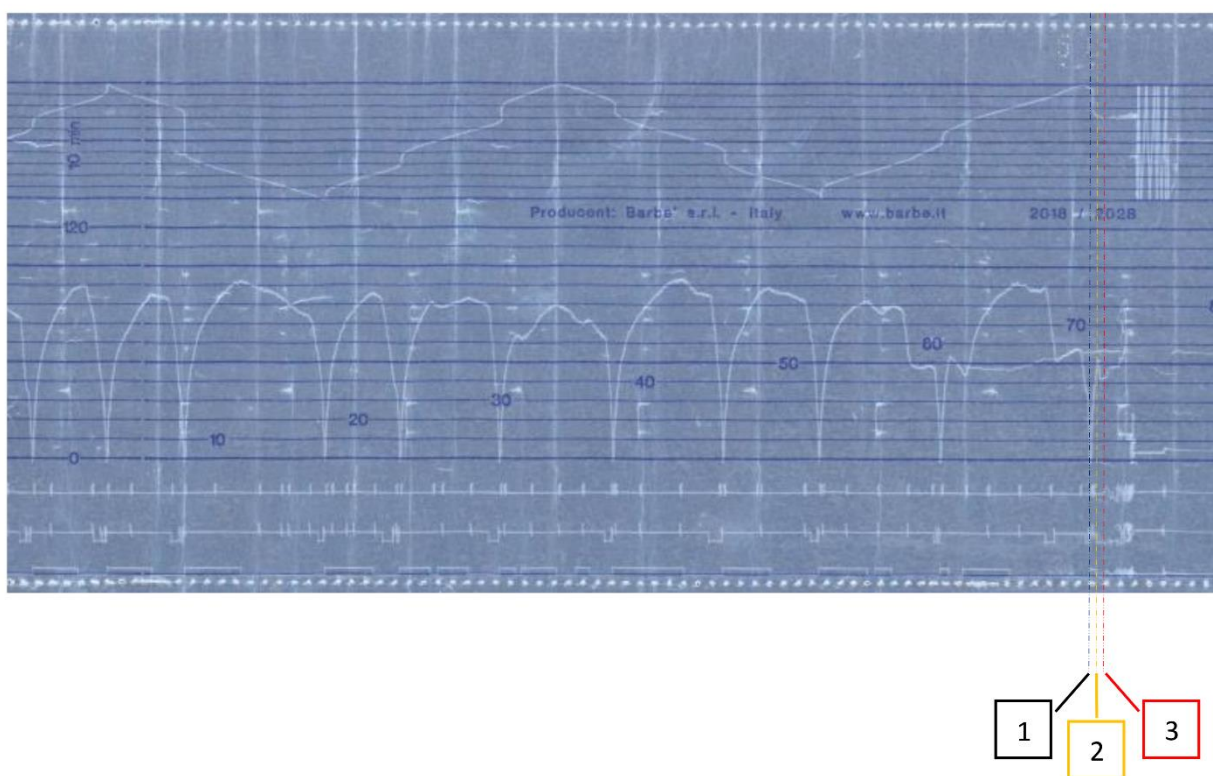


Figure 4 – Diagram of the running data of the EN57-1248 rail vehicle (prepared by PKBWK)

Description of data:

06:00:30 a.m. – beginning of train stop at Gdynia Główna station [1]

06:02:30 a.m. – departure from the platform, use of the vigilance button, switching on the automatic braking device (SHP) and speed increase to 40 km/h over a distance of 200 m;

06:02:40 a.m. – speed increase to 53 km/h over a distance of 200 m; [2]

06:03:00 a.m. – unpowered running, recording of cylinder pressure (braking), speed drop to 42 km/h over a distance of 100 m; further recorded data are not linear – they are wavy, which is due to the occurrence of a frontal collision between the rail vehicles, the vehicle stops after the accident. [3]

Identified irregularities:

The calibration of the recorder was carried out on 5 August 2023; however, the hourly time is recorded incorrectly on the tape, i.e., continuous operation of the recorder, recording the time at hourly intervals from 5:00 p.m. to 11:00 p.m. on the tape. However, the hours from 11:00 p.m. to 4:00 a.m. are not recorded on the tape. This is

followed by a recording of hour “5” and, with a minute offset, a partial recording of the digit “6”. Other data are correctly recorded on the tape.

The times recorded by the Hasler recorder are offset relative to the actual time by approximately 57 minutes – the times recorded on the tape are earlier than the actual time, e.g., the accident time according to the Hasler recorder is 6:03 a.m., and the actual accident time is 7:00 a.m.

The railway commission established the following sequence of events on the basis of an analysis of entries in the signalling system equipment of LCS Gdynia Główna:

06:57:02 a.m. – *The Tm62-P21 shunting run is locked;*

06:57:07 a.m. – *The P21-Tm37 shunting run is locked;*

06:57:14 a.m. – *Tm37 locked as the start of the run;*

06:57:14 a.m. – *Tm30 locked as the end of the run;*

06:57:17 a.m. – *The interlocking computer confirms the correctness of the selected command of the traffic operator for setting the path for the manoeuvre from Tm37 to Tm30;*

06:57:17 a.m. – *Tm37 displays the “clear” aspect for the manoeuvre: shunting run from shunt signal Tm37 to shunt signal Tm30 (for the SA138-004 railbus);*

06:58:45 a.m. – *Railbus SA138-004 occupies insulated turnout section Jz87/91 behind shunt signal Tm62;*

06:59:23 a.m. – *The traffic operator gives the order to arrange a train run from signal K4 to mainline track 1 towards Gdynia Chylonia station for train 50673;*

06:59:23 a.m. – *The interlocking computer confirms the correctness of the selected command of the traffic operator for setting the path for train 50673 from signal K4 to mainline track 1 towards Gdynia Chylonia station;*

06:59:23 a.m. – *Signal K4 displays the “clear” aspect for train 50673;*

06:59:39 a.m. – *Railbus SA138-004 occupies track 21a, under shunt signal Tm37;*

06:59:49 a.m. – *Railbus SA138-004 occupies turnout 73;*

06:59:55 a.m. – *Railbus SA138-004 occupies turnout 70;*

06:59:57 a.m. – *Railbus SA138-004 exits track 21a;*

07:00:03 a.m. – *Railbus SA138-004 exits turnout 73;*

07:00:04 a.m. – *Railbus SA138-004 occupies track 15a;*

07:00:08 a.m. – *Railbus SA138-004 occupies turnout 63/64;*

07:00:12 a.m. – *Railbus SA138-004 exits turnout 70;*

07:00:13 a.m. – *Ebi Lock interlocking system confirms that Tm30 displays the “Stop” base aspect;*

07:00:13 a.m. – *Ebi Lock interlocking system confirms that Tm30 is the end of the shunting run;*

07:00:13 a.m. – *ALARM is activated – Switch 64 trailed;*

07:00:13 a.m. – *Another alarm is activated – Point 64 position detection failure;*

07:00:16 a.m. – *Railbus SA138-004 exits track 15a;*

07:00:18 a.m. – *Train 50673 occupies turnout 43;*

07:00:19 a.m. – *Train 50673 occupies turnout 45/61;*

07:00:19 a.m. – *Railbus SA138-004 occupies turnout 45/61;*

3. Human factors

3.1. Human and individual characteristics

Employer POLREGIO S.A. The Pomeranian Department in Gdynia had provided the drivers involved in the occurrence with the required rest time before they started work. The employees had the required qualifications and licences and up-to-date medical examinations.

The driver of the railbus, being 25 years old, had a short work experience. He had held his train driver's licence since 21 March 2022; he acquired the complementary certificate and the licence to drive the SA138 vehicle on 11 May 2023. The occurrence took place during the ending night shift, i.e., in its 12th hour, which may have contributed to the lack of focus and distraction of the driver during the shunting operations and may have contributed to the fact that he ran past the Tm30 shunt signal displaying the Ms1 aspect, “*Shunting prohibited*”. The driver's failure to observe the indications of this shunt signal may also have been influenced by routine and driving by rote. The driver, in his explanations to the PKBWK Investigation Team, stated that: “... *The Tm62 signal often displays the “shunting prohibited” aspect if there is a train departing from Gdynia Główna station. If Tm62 is displayed, we almost always run to the platforms...*”.

The driver was also under time pressure due to the dispatcher's instruction to carry out an unscheduled refuelling, which shortened the train's scheduled stop at the platforms and the handover to the new train crew. This train was due to depart as train ROS 90303 from Gdynia Główna station at 7:03 a.m.

23		57108	05:45	05:50	7	4	IC-JC STOCZNIOWIEC Gdynia Gl. - Zielona Góra kurs. w (1)-(7) . podjazd GP przez Laskowice Bydgoszcz
24		55368	05:55	05:57	9	5	PR-R Gdynia Chylonia - Pruszcz Gdański kurs. w (1)-(5) opr.1.XI
25	96985		05:57	obrót	2	2	PR-R Kościerzyna - Gdynia Gl. kurs. w (1)-(7) na poc. 96210 godz. 7:11 PALIWO PRZESTAWIĆ TOR 10 - za 96208; z Gda. Osowa
26	35173		06:01	06:47	5	3	IC-TLK ROZEWIE Szklarska PoJelenia Góra/Kraków Gl. - Gdynia Gl kurs. w (1)-(7) 17.IX-11XI zjazd GP
27		96206	podjazd	06:07	10	5	PR-R Gdynia Gl. - Gda. Wrzeszcz kurs. w (1)-(7) podjazd GP 556284 g. 6:05 ,przez Gda. Osowa
28	50625		06:11	06:15	2	2	PR-R Elbląg - Gdynia Chylonia kurs. w (1)-(7) oprócz 10.IX
29	50625		06:11	06:17	2	2	PR-R Elbląg - Gdynia Chylonia kurs. w 10.IX
30		90402	06:14	obrót	1	2	PR-R Hel- Gdynia Gl kurs. w (1)-(7) 4.IX-11.XI na poc. 90303 g. 7:03
31	38171		06:19	06:39	4	3	IC-TLK USTRONIE Kraków Gl. - Kolobrzeg kurs. w (1)-(7) przez Słupsk
32		55430	z obrotu	06:20	6	4	PR-R Gdynia Gl. - Smetowo kurs. w (1)-(6) z poc. 55401
33		5302	06:22	06:37	7	4	IC-EIP Gdynia Gl. - Kraków Gl. kurs. w (1)-(7) podjazd GO-1 przez Malbork Iławe
34		85200	06:24	06:27	6	4	PR-R Słupsk - Elbląg .kurs. (1)-(6) oprócz 11.XI przez Tczew Malbork
35		85200	06:24	zjazd	9	5	PR-R Słupsk - Gdynia Gl. .kurs. (7) oraz 11.XI oprócz 10.IX - zjazd GP 556093 g. 6:50 , GCA 556183 g. 6:43
36	55403		06:25	06:30	2	2	PR-R Smetowo - Gdynia Chylonia kurs. w (1)-(7) oprócz 10.IX
37	55403		06:25	06:31	2	2	PR-R Smetowo - Gdynia Chylonia kurs. w 10.IX
38		85200	06:30	zjazd	9	5	PR-R Słupsk - Gdynia Gl. .kurs. 10.IX - zjazd GP 556093 g. 6:40 , GCA 556183 g. 6:43
39		96208	podjazd	06:33	10	5	PR-R Gdynia Gl.-Gda. Wrzeszcz kurs. w (1)-(5) opr.1.XI podjazd GP 556200 g. 6:29 ,przez Gda. Osowa
40	35173		06:34	06:39	5	3	IC-TLK ROZEWIE Szklarska PoJelenia Góra/Kraków Gl. - Gdynia Gl kurs. w (1)-(7) 4-16.IX zjazd GP
41		54100	06:37	06:43	6	4	IC-TLK DOKER Gdynia Gl -Katowice kurs. w (1)-(7) podjazd GP przez Laskowice Bydgoszcz
42	96715		06:45	obrotu	2	2	PR-R Gdańsk Rębiechowo -Gdynia Gl. - kurs. w (1)-(5) opr.1.XI na poc. 96212 g.7:34 PRZESTAWIĆ NA TOR 10 ZA 96210 - ZWOLNIC TOR NA POC. 96987 z Gdańsk Osowa
43	50673		06:57	06:58	4	3	PR-R Malbork - Gdynia Chylonia kurs. w (1)-(7)
44	96987		06:58	obrót	2	2	PR-R Chojnice - Kościerzyna - Gdynia Gl. kurs. w (1)-(5) opr.1.XI na poc. 96214 g. 8:07 PALIWO PRZESTAWIĆ NA TOR 10 ZA 96212 z Gdańsk Osowa
45		58110	06:56	07:01	7	4	IC-TLK BORY Tucholskie Gdynia Gl. - Kostrzyn kurs. w (1)-(7) 8-13.IX podjazd GP przez Tczew, Chojnice
46	96953		07:03	obrót	9	5	PR-R Kościerzyna - Gdynia Gl. kurs. w (1)-(7) na poc. 96902 g 7:15 z Sopotu
47	90303		z obrotu	07:03	1	2	PR-R Gdynia Gl. - Hel kurs. w (1)-(7) 4.IX-11.XI z poc. 90402

Photo 11 – Photo of the plan of train runs of the Gdynia Główna station on the date of the accident (source: PKBWK)

3.2. Job factors

The rail vehicles involved in the occurrence had the relevant approvals for operation on the railway network in Poland and were in good working order. The drivers' workstations were typical and did not contribute to the occurrence.

The traffic operator of LCS Gdynia Główny, by means of the Remote Radio Control System, can automatically send the “ALARM” signal, resulting in the immediate automatic braking of all powered rail vehicles equipped with “Radio-stop” equipment whose radios have received the “ALARM” signal in the LCS region targeted by the operator. However, the process used in the system for transmitting the “ALARM” signal does not allow the traffic operator to transmit it intuitively and immediately in the event of an emergency, requiring a delay of several seconds. The traffic operator, responding to the alarm condition from signalling equipment indicating that turnout No. 64 was trailed (6 s before the collision), shouted into the microphone of the radiotelephone: “Bus, stop” (3 s before the collision). The driver of railbus SA138-004, in response to hearing the announcement, applied emergency braking. The driver of train ROJ 50673, in turn, did not react as he was unaware of the imminent danger. He applied emergency braking as he was exiting the curve when he saw the front of the railbus approx. 100 m ahead of him.

Additionally, the traffic operator at the operator station operates the equipment using several mice with the same appearance and profile, but only one mouse, not marked in any special way, is intended for the operation of the radio communication system and can be used to transmit, in particular, the “ALARM” signal.



Photo 12 – LCS GO operator's station (materials of PKBWK)

In addition, the Investigation Team, during the course of the investigation, found overlapping radiotelephone calls on train channel No. 4 from Gdynia Osobowa and Gdynia Port stations, which interfered with the transmitted and received messages at the LCS GO station.

3.3. Organisational factors and assignments

According to Ir-9 Instruction on the shunting technique, the driver of the railbus was performing an organised shunting run from the filling station located on track 404, along a route prepared by the LCS GO technical station traffic operator, only up to shunt signal Tm30, which displayed aspect Ms1, “*Shunting prohibited*”.

In accordance with the provisions of the aforementioned instruction, railway safety depends on the visual observation of routes, signals and obstacles and the use of safe running speed depending on the conditions. In this case, the shunting speed should have been 25 km/h but was exceeded and was 39.5 km/h. According to the Investigation Team, adhering to the permitted shunting speed of the railbus, a maximum of 25 km/h, would increase its travel time by about 60 s. Extending the running time could make it possible to avoid the collision or reduce its consequences, even if the SA138-004 rail vehicle had run past the Tm30 shunt signal and onto the switch of turnout No. 64, not aligned with the vehicle’s direction of travel.

3.4. Environmental factors

The driver of train ROJ 50673 departing from track 4 at Platform 3 had a restricted view of the area in the front of the train due to driving on a curved track and due to the LCS GO signal box building in front of him, as well as the parked passenger trainset on stabling track 15 of Gdynia Główna station. This limited visibility had delayed the reaction and application of emergency braking by the driver of the passenger train. The driver of the railbus also had a restricted view of the area in front of the vehicle due to the signal box building and the stabled passenger trainset on track 15.

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

In the course of the investigation, the Investigation Team did not identify any other factors relevant to the accident.

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

The relevant regulatory framework conditions::

4.1. The processes, the methods, the content and the results of risk assessment and monitoring activities, performed by any of the involved actors: railway carriers, infrastructure operators, entities in charge of maintenance, maintenance workshops, other maintenance providers, manufacturers and any other actors, and the independent assessment reports referred in Article 6 of Implementing Regulation (EU) No 402/2013

The infrastructure operator PKP PLK S.A. keeps the so-called *Hazard Record* as part of its Safety Management System (SMS). The record contains the following elements: hazard name, hazard number, hazard source, outcomes, risk control measures, hazard source manager, and risk acceptance rules.

The railway carrier POLREGIO S.A. keeps the *Record of Significant Risks* – a document used to record identified significant risks, the source of the risks and risk acceptance criteria and indicated related safety measures and the organisational body responsible for managing the risks.

The Investigation Team does not raise any comments concerning the Records.

4.2. The safety management system of the involved railway carrier(s) and infrastructure operator(s) including the basic elements stated in Article 9(3) of Directive (EU) 2016/798 and any EU legal implementing acts

The entities involved in the railway occurrence that took place on 5 October 2023 at 7:00 a.m. at Gdynia Główna on track 5 at turnout No. 45 at km 21.522 of railway line no. 202 Gdańsk Główny – Stargard have Safety Management Systems (SMS) approved by the President of the Office of Rail Transport.

4.3. The management system of the entity/entities in charge of maintenance and maintenance workshops including the functions stated in Article 14(3) and Annex III of Directive (EU) 2016/798 and any subsequent implementing acts

Not applicable.

4.4. The results of supervision performed by the national safety authorities in accordance with Article 17 of Directive (EU) 2016/798

No factors influencing the occurrence were identified on the side of the national safety authority.

4.5. The authorisations, certificates and assessment reports granted by the Agency, the National Safety Authorities or other conformity assessment bodies

The condition for the release to service of structures and types of equipment affecting the level of railway safety is to obtain a type approval certificate.

Alstom Polska S.A. has fulfilled these conditions and holds, among others, Certificates of approval for the type of device intended for railway traffic control No. U/2011/0076 for the EBI Screen 300 train control and management system and No. U/2012/0065 for the EbiLock 950 computerised railway traffic control system, which are installed at Gdynia Główna station.

LCS Gdynia Główna is equipped with a Remote Radio Control System and is operated by a traffic operator from the radio system control station. The system manufacturer, PYRYLANDIA Sp. z o.o., holds the Certificate of approval for the operation of type F-804/2/M of the remote radio control system No. U/2002/0037.

5. Previous occurrences of a similar character

As part of the investigation, the Investigation Team analysed accidents occurring in similar circumstances. Particularly noteworthy was the accident that occurred on 18 September 2017 at 3:16 p.m. at Kobylnica station, on track No. 2, km 8.415 of line No. 353 Poznań Wschód – Skandawa.

Train No. TNS 773020 between Września and Kobylnica of the carrier Torpol S.A. driven by the UCS-40.00 puller No. 05 entered Kobylnica station at 3:02 p.m. After stopping on track 4 and discussing the manoeuvres to be carried out in a manner inconsistent with the guidelines in §7 of instruction Ir-5, with the traffic operator and the driver of the rail vehicle using professional slang, the rail puller (railway trolley) was moving the trainset (2 cars left on track No. 4) on track No. 6. During the ongoing shunting run of the puller on track No. 6, the traffic operator of the Ko station proceeded to prepare the route for the entry of train No. 18102 of the carrier PKP Intercity S.A. running between Suwałki and Szczecin Główny and driven by locomotive EP08-006 onto track No. 2 of the Kobylnica station. When train No. 18102 was approaching the entry signal of the Kobylnica station, the driver driving the rail puller on track No. 6 passed a signal box with a grey mast and three aspects (no plate with a description and no board with a line marking the order in front of the signal), which displayed the aspect “one continuous white light”. The driver of the rail puller interpreted the above-mentioned image on the signal as the permission to continue shunting – the Ms2 aspect, “shunting permitted” – and continued his run, passing the M2m signal displaying aspect S1, “Stop”, and then passing across turnout No. 23 to enter turnout No. 24 without trailing it (up to the frog). The entry of the puller onto turnout 24 changed the image on the “U” entry signal from the clear aspect to the S1 aspect, “Stop”. The driver of train 18102 noticed a change of aspect on the signal and the rail puller that had entered the turnout located ahead of the train, and, therefore, applied emergency braking. The rail trolley travelled beyond the end of turnout 24, stopping at its frog (the turnout was not trailed). The front of train No. 18102 struck the front of the rail trolley at approximately 45 km/h, causing it to move approximately 50 metres towards track 6. The occurrence resulted in the derailment of one bogie of the rail puller, all axles of the locomotive and one bogie of the first car behind the locomotive. All the employees inside the rail puller managed to leave it before it was hit by the locomotive. The driver and driver's assistant took refuge in the engine compartment of the locomotive just before the collision.

The railway commission determined the following causes of the occurrence:

direct: UCS-40.00 rail puller running past exit signal M2m displaying the S 1 aspect, “Stop”, and entering the end of turnout No. 24;

root cause: an imprecise and excessively general plan of shunting work plan established (discussed) by the Kobylnica station traffic operator with the driver of the UCS- 40.00 rail puller and the implementation of the plan;

incorrect interpretation of the aspect of the M2m exit signal (five-aspect signal, correctly described) by the driver of the UCS-40.00 rail puller.

Between 2021 and 2023 (up to the date of the occurrence in question), a total of 103 accidents of a similar nature occurred on the network of the infrastructure operator PKP PLK S.A.

- in 2021 - 33,
- in 2022 - 34,
- in 2023 - 36.

V. CONCLUSIONS

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

Diagnostic tests of signalling equipment and railway telecommunication systems at LCS Gdynia Główna carried out by the operator did not reveal any irregularities contributing to the occurrence. However, according to the Investigation Team, the Remote Radio Control System, which is operated by the traffic operator, does not enable the intuitive and immediate transmission of the automatic “ALARM” signal in the event of an emergency.

On the basis of the analysis of the collected material, the Investigation Team found irregularities in the behaviour of the driver of the railbus SA138-004 during the shunting run from the filling station, i.e., incorrect observation of the route, lack of focus and distraction of the driver caused by fatigue during the 12th hour of work on the night shift. In addition, the time pressure caused the driver to hurry and exceed the permitted shunting speed.

The drivers of the rail vehicles involved in the occurrence had a limited view of the area in front of their vehicles due to the track layout (running on a curve) and the signal box building and stabled passenger train on track 15 of Gdynia Główna station, which further obscured the view.

The Investigation Team of PKBWK established that the causal factor of the occurrence was running past the Tm30 shunt signal displaying the Ms1 aspect, “*Shunting prohibited*” by the driver performing a shunting run with the SA138-004 railbus of the railway carrier POLREGIO S.A., causing the bus to enter the path of the ROJ 50673 passenger train of the railway carrier POLREGIO S.A. and resulting in the head-on collision with that train.

Factors contributing to the occurrence were:

- 1) Exceeding the permitted shunting speed by the driver of rail vehicle SA138-004.
- 2) Insufficient observation of the shunting run route by the driver of rail vehicle SA138-004, resulting in the vehicle running past the Tm30 shunt signal displaying the Ms1 aspect, “Shunting prohibited”, and running over the switch of turnout No. 64 and trailing it (the switch was set for the ROJ 50673 train to go straight).
- 3) Failure of the driver of rail vehicle SA138-004 to react to the trailing of turnout 64 and continuing the run of the vehicle.
- 4) Time pressure on the driver of rail vehicle SA138-004 related to the unscheduled refuelling of the railbus and the need to keep up with the timetable for the ROS 90303 train, which was to be operated by this railbus.
- 5) Restricted visibility of the front of each rail vehicle by their drivers.

As a systemic factor, the Investigation Team identified the time-consuming procedure for activating the RADIO-STOP signal from the level of the remote control panel of the *Remote Radio Control System of the Gdynia Główna station* by the traffic operator, making it impossible to quickly stop rail vehicles in case of danger to train traffic.

2. Measures taken since the occurrence

There was no need for additional measures during the course of the investigation by the PKBWK Investigation Team.

3. Additional comments

The Investigation Team, during its investigation, found the following irregularities, which were not the causal or contributing factors of the occurrence:

- 1) On the tape of the HASLER Bern RT9 recorder on the EN57-1248 EMU, the hourly time was incorrectly recorded, i.e., continuous operation of the recorder from 5:00 p.m. to 11:00 p.m. and no record of hours

- from 11:00 p.m. to 4:00 a.m. on the tape. This is followed by a recording of hour “5” and, with a minute offset, a partial recording of the digit “6”.
- 2) The times recorded by the Hasler recorder are offset relative to the actual time by approximately 57 minutes – the times recorded on the tape are earlier than the actual time.
 - 3) Rail vehicle SA138-004 was operated from cab A during the accident, whereas the ATM-RP4 recorder records control from cab B. The driver operated the automatic braking device (SHP) / dead man’s switch button in cab A, while the recorder records running above the SHP electromagnet and triggering of the CA device from cab B.
 - 4) No recording of the use of the automatic braking device (SHP)/dead man's switch (CA) button by the ATM-RP4 installed in the SA138-004 rail vehicle.
 - 5) Run of the SA138-004 vehicle for the purpose of refuelling, inconsistent with the plans of train runs implemented by the railway carrier POLREGIO S.A.
 - 6) Section 28 of the Technical Regulations of Gdynia Główna Station does not include train runs to the K4 exit signal for runs P21 and P22.
 - 7) Overlapping radiotelephone calls on train channel No. 4 from Gdynia Główna and Gdynia Port stations interfering with the transmitted and received messages at the LCS GO station.
 - 8) Limited ability to recognise the signals displayed in the daytime by the dwarf shunt signal Tm30 in sunny weather.

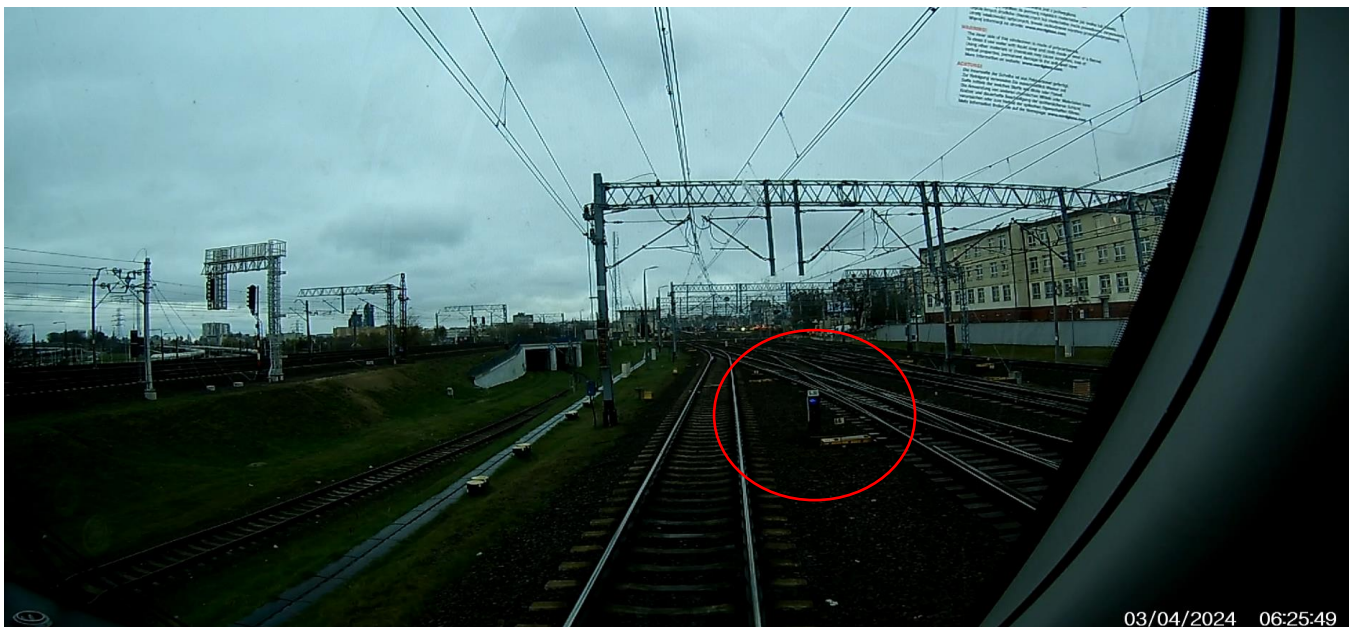


Photo 13 – Visibility of the shunt signal Tm30 displaying signal Ms1. (PKBWK materials)

- 9) Failure to label computer mice used to operate the radio communication system.
- 10) Improper transmission of train radio messages by the LCS GO traffic operator, not in accordance with the radiogram patterns.

VI. SAFETY RECOMMENDATIONS

- 1) Authorised infrastructure operators, users of sidings and other entities exempted from the obligation to have a safety authorisation, with computerised signalling equipment and Remote Radio Control Systems, shall take measures to ensure that the RADIO-STOP function can be immediately initiated by the traffic operators in case of a risk to train traffic safety by means of a dedicated and readily accessible button for each base transceiver station.
- 2) The infrastructure operator PKP Polskie Linie Kolejowe S.A. will change the organisation of railway traffic within the Gdynia Główna station by:
 1. preventing transmitting the signal from displaying the Ms2 aspect “*Shunting permitted*” for shunting runs from shunt signal Tm37 to Tm30 during train runs from station tracks 1, 2, 3, 4 and 5 towards mainline tracks No.: 1Ch, 2Ch, 301 and 302. During the above-mentioned train runs, track and switch sections Jt15a, iz80, iz73, iz70 should be free of rolling stock;
 - or
 2. introducing stipulations in the Technical Regulations of Gdynia Główna Station stating that before carrying out a train, run the traffic controller is obliged to: interrupt any shunting operations that create the risk of a vehicle entering the path of a passing train, ensure that the operations have been successfully interrupted and have this fact acknowledged by the driver performing the shunting run (Instruction Ir-1 §12(2)).
- 3) The carrier POLREGIO S.A. will ensure that the running data of powered rail vehicles are correctly recorded in accordance with the real state.
- 4) Railway carriers shall include in their internal rules the need to carry out periodic inspections of the on-board recorders of rail vehicles to the extent and within the periods of time recommended by the manufacturers of the recorders and covering, in particular, the correct recording of the actual operating state of the vehicle. Inspections should be carried out by the recorder manufacturers or entities authorised by the manufacturers.
- 5) The carrier POLREGIO S.A. and the railway infrastructure operator PKP PLK S.A. Maintenance-of-Way Department in Gdynia shall ensure the implementation of provisions included in the notes (column 20) in the timetable of PR Gdynia trainsets connected with refuelling run. Unscheduled refuelling of powered rail vehicles may only take place in justified emergencies.
- 6) Infrastructure operator PKP Polskie Linie Kolejowe S.A. will undertake actions aimed at the elimination of irregularities found by the Investigation Team in the course of the investigation, and included in section V.3(6–10).

STATE COMMISSION ON RAILWAY ACCIDENT INVESTIGATION
CHAIRMAN

.....
Tadeusz Ryś

List of entities appearing in Report No. **PKBWK 02/2025**

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.	PKP PLK S.A. Maintenance-of-Way Department in Gdynia	Infrastructure operator
5.	POLREGIO S.A. Pomeranian Department in Gdynia	Railway carrier
6.	Alstom Polska S.A.	Manufacturer of signalling equipment
7.	PYRYLANDIA Sp. z o.o.	Manufacturer of communication equipment