

No. PRMK1-732/16/2010

REPORT
of the final conclusions of a class B 04 accident investigation
which took place on 16 May 2010 at 20:25 hrs on Gliwice GLC – Zabrze Zz
section, track 2 at km 22.857 of line 137 Katowice – Legnica

Committee:

1.	Stanisław Parciak	PRMK 1	PR Katowice
2.	Henryk Sadowski	IZKR 3	IZ Tarnowskie Góry
3.	Janusz Krymer	IZKA	IZ Tarnowskie Góry
4.	Piotr Rajwa	IZDKN 3a	IZ Tarnowskie Góry
5.	Marcin Nowrot	IZKA 2	IZ Tarnowskie Góry
6.	Grzegorz Knapik	PRRK 1	PR Katowice
7.	Andrzej Wójcik	PRMI 1	PR Katowice
8.	Gerard Hanszla	PRSM4	PR Katowice

With the participation of Mr Tadeusz Ryś, Chairman of the State Railway
Accident Examination Committee

**1. Description of the factual circumstances on site as found by the railway
committee, including**

**a) the description of the incident, with indication of date, exact time and
place:**

On 16 May 2010 at 19:40 hrs the dispatcher of Zakład Linii Kolejowych in Tarnowskie Góry gave a telephone instruction to a track supervisor to go to Ruda Chebzie station in order to pump water out of a tunnel. After preparing the train for the journey between 20:00 hrs and 20:10 hrs, the railcar driver reported the departure to Ruda Chebzie via radio to the traffic inspector of the GIC signalbox. After the traffic inspector had arranged the movement on the telephone with the line dispatcher of the Katowice branch, the dispatcher ordered a work train to run in the ZRM22 plan, which was not noted down by the master traffic inspector of the GIC signalbox in the R-138 register with a note on the extent of the planned works. The purpose of the departure was marked with an entry in the IZ Tarnowskie Góry operational dispatcher's register at 17:55 hrs 'Ruda Chebzie, flooded tunnel'. Based on that entry, the GIC signalbox master inspector should specify the purpose and scope of the p-way team's departure, which would form the basis for issuing the ZXM22 plan by the line inspector, i.e. for a maintenance train. The train departed Gliwice station towards Zabrze station at 20:13 hrs on running line 2 which is equipped with the Eac-type automatic block system. There was no need for the inspector to inform the departing ZRM22 train of the fact that it would be followed by train 63130 because the inspector was not aware of that train. At 20:20 hrs, after the departure of that train Wrocław Gł. – Kraków Gł. train 63130 was dispatched onto the same track.

When on the move, the p-way gang railcar crew noticed trespassers on the track that the ZRM22 train was occupying. The trespassers escaped when the train was approaching. With that in mind, the driver of the p-way gang railcar stopped the vehicle which formed train ZRM22 at km 22.857. The crew of the p-way gang railcar abandoned the vehicle.

The stationary p-way gang railcar was hit by passenger train 63130 at 20:25 hrs. As the result of the impact, the p-way gang railcar was pushed to km 22.620 and stopped. Both the p-way gang railcar and the passenger train derailed and were damaged. At the moment of impact, train 63130 was travelling at 74 km/h.

The proper signalling of the vehicles was difficult to establish because of the extent of damage of both vehicles.

b) event description based on the following data:

- **railwaymen or subcontractors that took part in the event, as well as other individuals and witnesses**
- driver of train MPPJr 63130 Przewozy Regionalne Sp. z o.o. Śląski Zakład Przewozów Regionalnych in Katowice, driving licence No. 037555 issued by the Śląski Zakład Przewozów Regionalnych in Katowice on 31 December 2008;
- train guard of train MPPJr 63130 Przewozy Regionalne Sp. z o.o. Małopolski Zakład Przewozów Regionalnych in Kraków, authorisation No. 146/6 issued by 'PKP Przewozy Regionalne' Ltd. Małopolski Zakład Przewozów Regionalnych in Kraków on 6 June 2006;
- ticket collector of train MPPJr 63130 Przewozy Regionalne Sp. z o.o. Małopolski Zakład Przewozów Regionalnych in Kraków;
- ZRM22 train permanent way trolley driver Artur of PKP PLK S.A. Zakład Linii Kolejowych in Tarnowskie Góry, Sekcja Eksploatacji Gliwice, driving licence No. 002462 issued by Zakład Linii Kolejowych in Gliwice on 25 February 2005;
- ZRM22 permanent way trolley second driver of PKP PLK S.A. Zakład Linii Kolejowych in Tarnowskie Góry, Sekcja Eksploatacji Gliwice, driving licence No. 002502 issued by Zakład Linii Kolejowych in Gliwice 29 January 2009;
- track supervisor of PKP PLK S.A. Zakład Linii Kolejowych Tarnowskie Góry, Sekcja Eksploatacji Gliwice, authorisation to perform duties of a track supervisor No. 03/08 issued by PKP PLK S.A. Zakład Linii Kolejowych in Gliwice on 8 February 2008;
- PKP PLK S.A. Zakład Linii Kolejowych Tarnowskie Góry worker, Sekcja Eksploatacji Gliwice;
- senior fitter PKP PLK S.A. Zakład Linii Kolejowych in Tarnowskie Góry, Sekcja Eksploatacji Gliwice;
- fitter PKP PLK S.A. Zakład Linii Kolejowych in Tarnowskie Góry, Sekcja Eksploatacji Gliwice;
- station inspector of the GIC master signalbox in Gliwice of PKP PLK S.A. Zakład Linii Kolejowych Tarnowskie Góry, Sekcja Eksploatacji Gliwice, authorisation to perform duties No. 81 issued by Zakład Linii Kolejowych in Gliwice 15 April 2005;
- signaller of the GIC master signalbox in Gliwice of PKP PLK S.A. Zakład Linii Kolejowych Tarnowskie Góry, Sekcja Eksploatacji Gliwice, authorisation to perform duties No. 06/07 issued by Zakład Linii Kolejowych in Gliwice 4 May 2007;
- station inspector of the ZZ master signalbox in Zabrze of PKP PLK S.A. Zakład Linii Kolejowych Tarnowskie Góry, Sekcja Eksploatacji Gliwice, authorisation to

perform duties No. 47/05 issued by Zakład Linii Kolejowych in Gliwice 15 April 2005.

- **trains and their setting, load (with particular emphasis on hazardous goods), rail vehicles taking part in the accident**

At km 22.620 the first one in the direction of traffic was Gliwice – Ruda Chebzie train ZRM22 consisting of MS-W01-4222 permanent way trolley and a trailer. The trailer was first in the driving direction. The p-way gang railcar derailed with its second wheelset onto the right-hand side. The other wheelset and both wheelsets of the trailer remained on track. The trailer rammed into the p-way gang railcar.

Overall weight 28 [t], braking weight 80%, actual braking weight 22.4 [t].

Property of Zakład Linii Kolejowych in Tarnowskie Góry.

33 metres behind the ZRM22 vehicle was the first car of train MPPJr 63130 consisting of EN57-1172 with the smashed front Ra cab, derailed to the right-hand side with the first wheelset of the first bogie. 20 m behind EN57-1172 was EN71-007 with a ripped off coupling, upright on the track.

Wrocław – Kraków train MPPJr 63130 consisting of EN57-1172 and EN71-007 EMUs owned by Małopolski Zakład Przewozów Regionalnych in Kraków, train ROPJr 63130 of 151.8 m length, weight 336 tonnes, actual breaking weight 342 tonnes, required breaking weight 297 tonnes (83%).

- **Railway infrastructure and signalling system, in particular types of permanent way, turnouts, signalling equipment**
 - **traffic control devices:**

The GIC master signalbox in Gliwice equipped with VES-type electric equipment with colour light signalling end electric point machine type JEA-29, EEA-4, Gliwice – Zabrze section is equipped with an Eac-type automatic bi-directional block system on tracks 1 and 2 with isolated sections type OTL-2-ZLB-Eac – year of construction 1993. The it252, it240 and it230 block track occupation repeaters are mounted on the GIC and Zz-2 signalboxes. Tracks located at the platforms and point 41 are provided with axle-counting devices. The remaining tracks and points are not equipped with block release circuits.

‘GIC’ master signalbox:

illuminated diagram – track occupation repeaters: section it 2a, it 254, it 240 are represented by white bulbs, constant lights; it 230 – red bulb, constant light; it 212 – white bulb, constant light. The Eac block control panel for track 2 for Gliwice – Zabrze section set for departure towards Zabrze, a white arrow is alight. The emergency direction change button – sealed. The emergency direction change counter – sealed.

Relay station I – locked and sealed, key to the relay station – on the keyboard, sealed.

In situ:

Automatic block devices track 2 Gliwice – Zabrze section, block signal 254 flashes a green constant light, block signal 240 flashes an orange constant light, block signal 230 flashes a red constant light, signal 212 flashes with a blinking orange light, Zabrze N 1/2 home signal indicates entry to the station with two

orange lights. Track mounted Automatic Train Stop (SHP) electro-magnets are placed 200 [m] in front of each of the colour light signals mentioned.

- permanent way:

track 2, standard, S-49 type, on DR/IIB/S wooden sleepers, breakstone. Last major relay performed in 1985 – performed by DOM Katowice, good condition. At km 22.757-22.904 curve of R:4720m radius, straight line at km 22.904 – 22.957. Broken fishplates in the right-hand side rail as a result of the accident in the direction of traffic and lateral distortion of the track on non-isolated rail-joint at km 22.834. Both fishplates broken on the inside hole. On the cross-section of the crack, an old crack is evident from the inside part of the fishplate towards the hole and a new crack of the second part of the fishplate. Sleepers damaged at a distance of 220 m.

On the it230, it240 isolated rail joint impedance bond cables are permanently connected, isolated rail joints located across each other, with no dislocation detected. Underneath the derailed vehicles, all the way to the it230/it240 rail joint semaphore impedance bond, these rail joints are not provided with insulated return joints.

• radio and telephone communication devices used

On train radio communication on channel 5, no speech registration, radio devices equipped with radio-stop system.

Announcement and operating wire communication – correct functioning.

• works performed on the accident site or in its vicinity

- temporary speed restriction at km 23.925-23.825 to 30km/h due to the A1 motorway construction,
- permanent speed restriction at km 23.200-23.500 to 70 km/h due to the short transition curve.

• initiation of the post-accident procedures and their subsequent stages

The accident was reported by the train passengers who called an ambulance. At the same time the train guard of train 63130 reported the incident to the dispatcher of Przewozy Regionalne spółka z o.o. Śląski Zakład Przewozów Regionalnych in Katowice. At 20:35 hrs Mr ..., the dispatcher of Śląski Zakład Przewozów Regionalnych in Katowice informed the line dispatcher of the PKP PLK S.A. Katowice branch.

The Zabrze station inspector has passed the information about the accident that he received from the police at approx. 20:35 hrs on to the dispatcher of Zakład Linii Kolejowych in Tarnowskie Góry.

A train guard of the 63130 train walked the length of the train to check if any passengers have been injured.

• initiation of rescue action by the rescue teams and the Police, succeeding stages of the rescue action

On May 16 2010 at 20:50 hrs the police arrived in the accident site. At 21:20 hrs two ambulances and a Railway Police patrol arrived. The passengers injured along with the EMU driver, the train guard and the ticket collector were taken to hospitals in

Gliwice, Zabrze and Ruda Śląska. The policemen from the Zabrze police station secured the accident site until the arrival of the representative of Zabrze Regional Prosecution Office who became acquainted with the situation and the course of events upon his arrival onto the site.

At 23:00 hrs a wreck train was requested from the Zakład Linii Kolejowych in Tarnowskie Góry. The wreck train arrived onto the site at 1:20 hrs on 17 May 2010.

At 23:20 hrs on 16 May 2010 a substitute EMU EN57-691 was provided on the down line of the Gliwice – Maciejów Płn. section, it was used by the passengers (approx. 150 people) to continue their journey. The train departed towards Gliwice and at 23:40 hrs on 16 May 2010 it departed from Gliwice station as a 63130 train for Kraków Główny.

At 5:25 hrs on 17 May 2010 EN71-07 EMU it departed unassisted towards Gliwice. After re-railing of the EN57-1172 EMU at 7:13 hrs on 17 May 2010, the unit was towed to Gliwice. The MS-W01-4222 railbus and trailer were re-railed and taken to Gliwice at 12.30 hrs on 17 May 2010.

Running line 2 on the Gliwice – Zabrze section was closed from 20:30 hrs on 16 May 2010 until 21:06 on 17 May 2010.

As a result of the accident, 9 trains were delayed for a total of 384 minutes.

c) fatalities, serious injured, injured and losses, including:

- **passengers, railwaymen including subcontractors, level crossing users, individuals unauthorised to be on the railway terrain and others**

As a result of the accident, three injured individuals were taken to the Municipal Hospital in Ruda Śląska:

- the train guard
- the EMU driver
- a female passenger
- confirmed by the hospital with document No. SMRS/DMO/1141/6076/2010 of 5 August 2010.
- Two people injured were taken to the Municipal Hospital in Zabrze:
- a male passenger
- a female passenger
- confirmed by the hospital by document No. NZOZSM/DO/024/395/6109/2010 of 20 July 2010.
- Two injured people were taken to the Municipal Hospital in Gliwice:
- a female passenger
- ticket collector
- confirmed by the hospital by document No. 1710/2010 of 9 June 2010.
- Four of the injured were treated on the spot.
- The Regional Emergency Ambulance Service in Katowice by document No. L.dz. WPR/LL15284/10 of 24 May 2010 and L.dz. WPR/LL17114/10 of 9 June refused to provide personal data of the eleven people injured in the accident. Only patients' numbers were provided.

- **loads, luggage and operational losses**

Luggage secured by the passengers. Train movements were limited to the down line on the Gliwice – Zabrze section.

- Railway vehicles, infrastructure, environment

EN57-1172

‘Ra’ wagon:

The following were detected in the Ra drivers’ cab:

- primary brake handle in end position – emergency braking,
- power notch controller set at ‘0’,
- reverser key set at ‘0’ position,
- speedometer torn out of its normal position, lies between the drivers’ seat and the right-hand side cab wall in the driving direction. It indicates the speed of 93 km/h. During the inspection the committee detected lack of a part of the speedometer tape regarding the work of the EMU. The tape was delivered by the driver during the hearing on 17 May 2010 at 10.20 hrs.
- the transceiver notch on the control panel was set at ‘on’.
- the switch-off button on the transceiver manipulator set on ‘off’, channel notch set on ‘4’ position, the radio-stop button not used, sealed.
- The Automatic Train Stop (SHP) electric and compressed-air sealed.
- No power supply (no lights) in the driver’s cab.
- Drivers’ seat turned left at about 30 degrees. The horizontal surface of the seat covered with broken glass in about 75-80% with clear lack of glass on the left corner of the seat.
- damaged Ra driving cab, control panel moved towards the centre of the car, 3 front windscreens smashed, 1 side window smashed, staff-only compartment sliding door window smashed, damaged Scharfenberg coupling, two front lights and the top light damaged, two fenders disconnected, two front cab steps bent, bent bogie rail fender fastening, dented bodywork above buffer beam, buffer beam damaged, destination board damaged, RT9 speedometer damaged, brake shoe holder guide bar on the first bogie bent, damaged brake pipe, deformed floor in the staff compartment and in passenger compartments, longitudinal frame girder bent upwards, first vestibule – passage door between the vestibule, the staff-only compartment and the passenger compartment, second vestibule – broken screws and a fallen passage door cover, door blocked, deformed front wall panel between the Ra driving car and the powered car, passage door blocked, upper masking angle bar lying on the floor.

‘Rb’ wagon:

Blocked sliding doors in the space between the staff-only compartment of the driving car Rb, front Scharfenberg coupling coupled to the broken-off part of the EN71-07 coupling, with signs of crushing.

Damage costs are estimated at: PLN 591250.00, driving car and powered car to be written off.

EN71–07:

Scharfenberg coupling on the Ra cab side displaced, keyboard wiring torn away.

Estimated repair costs: PLN 22 000.00

Permanent-way gang railcar type MSW-01 No. 4222:

- Vehicle bodywork: A and B cabs damaged, construction buckled, side panel angles bent, doors torn away and bent, front windscreens and side windows smashed, A and B cabs visibly seriously dent inside, driver control panels damaged and displaced, seats bent and displaced, heating and forced ventilation systems damaged, cab interiors destroyed, clothing cabinets damaged, tool box bent, fitters' table torn off its fixing and bent.
- Vehicle underframe: vehicle frame bent and buckled, A and B cabs pressed inside, coupling and buffing gear ripped and destroyed, wheelset drive gear damaged, wheelset truck frames buckled and bent inside, running gear suspension torn and damaged, shock absorbers torn, springs buckled beyond norms, air-brake system destroyed, air reservoirs bent both on ends and the barrel, horn guides damaged.
- Vehicle external equipment: lights, horns, wipers, steps and handrails, mirrors – destroyed, bent, broken.
- Power transmission system: Diesel engine with accessories, gear-box, reversing gear – damaged, moved inside, drive shafts twisted, bent.
- Electrical system: destroyed – electrical wiring torn and cut, 380V and 220V socket damaged, communication equipment, 4 batteries 170Ah destroyed.

Estimated costs: PLN 680 000.00.

PPW-01 p-way gang railcar trailer:

- Bodywork: side panels buckled, destroyed; floor bent and damaged, two winches damaged and buckled, frame bent, fixing and head lines broken, winch lighting destroyed, steel 3mx1m tool box destroyed and bent.
- Underframe: undercarriage frame bent, buckled and indented; coupling and buffing gear ripped, bent, wheelset truck frames buckled; air-brake gear damaged, 24V and 380V systems destroyed, tool-boxes fixed underneath the frame destroyed – bent.

Estimated costs: PLN 220 000.00.

Permanent-way gang railcar portable equipment:

- 'Lifton' hydraulic tools set, 1 set, destroyed;
- ENDRESS 380V generator destroyed;
- internal combustion power bolt tightener ZM-2SH with WJ3B bogie destroyed;
- table drill Frem M-13 destroyed;
- table grinder 220V/150 destroyed;
- electric welder type EW-210 destroyed;
- universal gauge rule destroyed;
- oxygen and acetylene cylinders destroyed;
- oxygen and acetylene valves, torch, hoses destroyed;
- battery rectifier type Boh-24/100 destroyed;
- portable (tripod) lights destroyed;
- 2 dry powder extinguishers 4kg damaged;
- As a result of the damages lack of: Pb95 petrol – 62l; drilling oil – 11l.

Estimated costs: PLN 250 000.00

Work carried out on the permanent way:

- 30 wooden sleepers and track mechanically tamped. 30kmph speed restriction at km 22.650 - 22.850 introduced until completion of the remaining works.

Other permanent-way works:

- 341 single sleepers to be replaced;
- replacement of 6 damaged wooden sleepers placed underneath S49 rail joints;
- adding 40 tonnes of breakstone.
- mechanical track tamping at km 22.600 - 22.950

Estimated costs of repairing permanent-way damage: PLN 197 081.43 gross.

Costs of wreck train operation: PLN 35 391.00

Estimated losses:

Przewozy Regionalne spółka z o.o. Małopolski Zakład Przewozów Regionalnych in Kraków – overall estimated losses amount to: PLN 613 250.00

Przewozy Regionalne spółka z o.o. Śląski Zakład Przewozów Regionalnych in Katowice – overall estimated losses amount to: PLN 2 995.59

PKP PLK S.A. Zakład Linii Kolejowych in Tarnowskie Góry – overall estimated losses amount to: PLN 1 376 472.43

d) External conditions, including weather and other circumstances that may have influenced the accident

Time of day: night, heavy clouds, rainfall, temperature +10°C; visibility: good, other circumstances – windscreen wipers on.

Description:

a) of the rail traffic safety management system with respect to the kind of accident and the applicable procedures, including:

- **organisation and manner of issuance and performance of commands**

The railway operation management system and the control of the operation on the Gliwice – Zabrze section are performed by means of Eac-type automatic bi-directional block system equipped with OTL-2-ZLB-Eac-type isolated sections, SHP Automatic Train Stop devices, on-train radio communication with radio-stop system and operational wire communication between train-announcing blocks.

Dispatching of trains on the down line of the Gliwice – Zabrze section was performed based on permitting semaphore signals.

Train operations were performed according to the regulations included in the instructions and contained in the Technical Rulebook of Gliwice station with operational train traffic control devices.

On 16 May 2010 in the ZLK dispatcher's IZDD(R217) logbook of Zakład Linii Kolejowych in Tarnowskie Góry at 17.55 hrs the dispatcher made an entry about the underpass in Ruda Chebzie being flooded.

In the permanent way rapid defect removal team logbook the track supervisor confirmed the instruction for the team to depart to Ruda Chebzie on 16 May 2010. Entry confirming readiness by the station inspector at 19:30 hrs (column 4); departure from the home station at 20:15 hrs (column 5); arrival onto the site of the failure 22:18 hrs (column 6). The time of arrival to the site in Ruda Chebzie included in table

6 may be incorrect according to the track supervisor, he claims that he might have written 22:28 due to stress, as he thinks that 20:28 should be correct. Under column 11 'short description of the defect and the progress of the rescue action' he wrote departure from depot to Chebzie station, column 13 'crew change' the entry was '16 May 2010, 19.00 hrs, reported on duty with gear by (signature illegible)'.

Based on the Gliwice R-146 operation register, the p-way gang railcar with trailer was shunted from the p-way depot onto track 6 on the station, governed by the Gliwice GIC signalbox, after the departure of train 83102 which had left Gliwice at 20:06 hrs. At 20:09 hrs train 46 left Gliwice station towards Zabrze on track 5. At 20:13 hrs train ZXM22 consisting of p-way gang railcar and trailer was given an 'all clear' signal on track 6 of Gliwice station, the trailer was pushed by the railcar in the Ruda Chebzie direction.

At 20:18 hrs, 9 minutes later than the timetabled arrival, train 63130 entered onto track 6 of Gliwice station, with a timetabled stop of 1 min. As planned, drivers changed on this train. The engine driver was finishing his shift, and driver ... was beginning his. At 20:20 hrs, train 63130 was given the S10 'all clear' signal (constant lower orange light, constant upper green light – 'continue with speed not exceeding 40 km/h and then with the highest speed permitted') on the G6 home signal, and departed on the 2 running line 2 in the primary direction.

The drivers' description of the change-over procedure confirmed that the driver removed the speedometer tape after the train stopped at Gliwice and finished his shift, which was confirmed by an entry in the vehicle's logbook, and verbally informed the driver taking over from him about the technical condition of the EMU. The driver inserted a speedometer tape and radioed the GIC traffic inspector, which has not been confirmed by the traffic inspector. The verification of correct communications performance was marked in the logbook, and then he entered the EMU number into his job sheet. He also confirmed the presence of the brake test chart and the 'O' written order for train 63130, and read it.

- **requirements with respect to requirements and their enforcement (working time, work competence, health requirements)**

- driver of train MPPJr 63130 Przewozy Regionalne spółka z o.o. Śląski Zakład Przewozów Regionalnych in Katowice, driving licence No. 037555 issued by Śląski Zakład Przewozów Regionalnych in Katowice issued on 31 December 2008. Periodic examination on 12 February 2008, last periodical instruction 25 January 2010. One of the topics of the periodical instructions with respect to operation and maintenance issues included the proceedings of the drivers when driving a train on semi-automatic and automatic three-aspect and four-aspect block – these topics were covered by a driver instructor. Last periodical examination 31 August 2009 – valid, last ride over the Gliwice – Zabrze section 11 May 2010 The accident occurred in the 1st hour of work;
- train guard of train MPPJr 63130 Przewozy Regionalne spółka z o.o. Małopolski Zakład Przewozów Regionalnych in Kraków, authorisation for the performance of activities No. 146/6 issued by 'PKP Przewozy Regionalne' Sp. z o.o. Małopolski Zakład Przewozów Regionalnych in Kraków on 6 June 2006, periodical examination 3 March 2010, last routine test 24 March 2009 – valid. Last ride over the Gliwice – Zabrze section 19 March 2010. The accident occurred in the 7th hour of work;

- ticket collector of train MPPJr 63130 Przewozy Regionalne Sp. z o.o. Małopolski Zakład Przewozów Regionalnych in Kraków, periodical examination 4 March 2010, last routine test 30 March 2009 – valid. The accident occurred in the 7th hour of work;
- senior traffic inspector of the GIC master signalbox in Gliwice of PKP PLK S.A. Zakład Linii Kolejowych in Tarnowskie Góry, authorisation for the performance of activities No. 81 issued by PKP PLK S.A. Zakład Linii Kolejowych in Gliwice, Sekcja Eksploatacji Gliwice on 15 April 2005, periodical examination 2 October 2006, routine test – valid 26 November 2009, authorisation on the GIC master signalbox 29 June 2007. The accident occurred in the 2nd hour of work;
- senior traffic inspector of Zabrze station of PKP PLK S.A. Zakład Linii Kolejowych in Tarnowskie Góry, authorisation for the performance of activities No. 47/05 issued by PKP PLK S.A. Zakład Linii Kolejowych in Gliwice, Sekcja Eksploatacji Gliwice on 15 April 15.04.2005, periodical examination 12.10.2006 October, authorisation on the 'Zz' signalbox 27.02.2002. The accident occurred in the 2nd hour of work;
- Gliwice station signalman of PKP PLK S.A. Zakład Linii Kolejowych in Tarnowskie Góry, authorisation for the performance of activities No. 06/07 issued by PKP PLK S.A. Zakład Linii Kolejowych in Gliwice, Sekcja Eksploatacji Gliwice on 4 May 2007, qualification examination 5 April 2007, authorisation on the 'GIC' signalbox 25 April 2009. The accident occurred in the 2nd hour of work, permanent way trolley driver ZRM-22 of PKP PLK S.A. Zakład Linii Kolejowych in Tarnowskie Góry, Sekcja Eksploatacji Gliwice, driving licence No. 002462 issued by Zakład Linii Kolejowych in Gliwice 25 February 2005. Periodic examination 19 February 2010, last routine test 19 February 2009 – valid, last ride over the Gliwice – Zabrze section 12 May 2010. The accident occurred in the 2nd hour of work;
- track supervisor employer of Zakład Linii Kolejowych in Tarnowskie Góry, authorisation for the performance of track supervisor duties No. 03/08 issued by 'PKP PLK S.A. Zakład Linii Kolejowych in Gliwice issued on 8 February 2008, Sekcja Eksploatacji Gliwice. Periodic examination 6 December 2007, last routine test on 5 December 2008 – valid. No authorisation for performing works train supervisor duties. The accident occurred in the 2nd hour of work.

- **internal emergency and periodical control procedures and their outcome**

The train 63130 driver and train crew went through a satisfactory number of emergency controls and control – training rides by the supervisors and instructors and they took part in the periodical instructions. The last control – training ride with the driver was performed by Janusz Słomian, a driver instructor on 11 April 2010.

The employees of the emergency rapid defect removal team and the GIC master signalbox of the Gliwice station were subject to a relevant number of emergency, night, day and random controls. The employees connected with the incident took part in the periodical instructions. (PLK employees)

- **duties with respect to cooperation within different organisational units taking part in the incident**

The conversations that were connected with the accident were reconstructed based on the statements of the employees who took part in the accident. The Gliwice

station train communication transceiver as well as the EN57-1172 and the p-way gang railcar ZRM-22 were in working order.

b) the interviews performed, including the personal data protection act:

- **railway employees, including subcontractors**

The following individuals were heard:

- the senior driver of train 63130, who explained that he took over the EMUs in the Gliwice station platforms, then he checked the performance of the transceiver on channel 5 with GIC traffic inspector. He was doing that during the train stopover time which lasted for 2 minutes. Having received an order to proceed from the train guard, he departed with the permitting signal: lower light constant orange and upper constant green. He performed a brake test approximately at the height of the middle of the EMU stabling group. The next semaphore that he passed, the automatic block semaphore, indicated a green light. The next automatic block semaphore showed an orange light signal. As described by Mr ..., he stopped at km 22.200, as the track was blocked by a permanent way trolley that he eventually hit leaving a curve, as there was no way of seeing the trolley earlier. When asked if the constant orange light indicated on the automatic block semaphore was for the track that his train was on, the driver answered that the orange light was displayed on the automatic block semaphore to the right-hand side of the track, and when he was behind the viaduct he noticed a p-way trolley on his track at about 200m, lit properly (train-end signals), stopped beyond a semaphore. Apart from the end signals he didn't see the red light on the semaphore. When asked what he saw when on the viaduct, he answered that it was an orange light. When asked if it was possible to describe how far behind the signal the trolley was, he answered 'not far away'. When asked if he recalled seeing the indications of other tracks' semaphores, he declared that he was observing the line that he was on and didn't see the indications of any other signals. When asked later what he saw when he pushed the dead man's SHP button before the automatic block semaphore 230 (behind which the accident happened), the driver answered that he saw a semaphore displaying an orange signal, and that was all that he saw.

The driver claims that the Automatic Train Stop (SHP) devices on the section from Gliwice to the incident spot worked properly, and he was able to operate them without delay after the appearance of the colour light indicator and before the application of the audible signal.

The driver then explained that he then applied the emergency brake, and the disconnection of the two units was caused by the more rapid application of brakes on the other EMU. After the impact, when he regained consciousness the train was still moving, and he was standing upright in the middle of the cab and does not recall the moment of moving from his seat to the centre of the cab. In the course of the accident, the driver suffered head and leg injuries.

He informed the master, Mr ... and locomotive crew dispatcher in Tarnowskie Góry about the accident using his mobile phone. It was not possible to inform the GIC signalbox due to the damaged portable on-train radio as a result of the impact.

The driver explains that when driving train 63130 he was in the cab, sat on the driver's side seat and did not perform any other activities; he was observing the route, pressing the Automatic Train Stop and dead man's buttons.

female senior traffic inspector of the GIC master signalbox in Gliwice, who explained that at approx. 20:00-20:10 hrs the p-way train reported on the on-train transceiver the departure to Ruda Chebzie. She ordered the senior signalman to shunt the p-way train onto track 6. After reporting on the phone the need to depart with the p-way train to Ruda Chebzie to the line dispatcher of the Katowice branch, she received permission to run the train in the ZXM22 path. After signalling and reporting readiness for departure, the p-way train left in the direction of Ruda Chebzie. After the departure of the ZXM22 train, she observed its progress on the diagram until it had left the first block and entered the second. During that time, she received information on train 63130 from the Szobiszowice junction. She directed that train onto track 6 and then allowed it to go towards Zabrze having displayed the 'all clear' signal on the home signal, and after the departure of the train she observed the display until it left the first block and entered another. At this point, she arranged the required shunting procedures with the signalman, looked at the illuminated diagram and noticed that the penultimate block was occupied. She was certain that it was occupied by train 63130 as the remaining sections were flashing a white light. From the clarification of the traffic inspector, it turned out that she did not pass to the ZXM22 train the information of the dispatching of train 63130 onto the down line of the Gliwice – Zabrze section behind the permanent way train, and she also did not receive any information from the ZXM-22 train about it stopping on the running line. After some time, the block (line) dispatcher informed Ms ... that train 63130 had crashed into the permanent way train. Having received that information, she tried to contact both the 63130 train and the p-way train on the radio. Bearing in mind that she was unable to contact that train after closing the down line, the traffic inspector dictated the 'S' written order to the platform traffic inspector for train 48, which included an instruction to drive carefully on the up line and to stop by the site of the event to find out what had happened. The driver of train 48 informed the traffic inspector on the transceiver that people from train 63130 were walking on the track.

- the master traffic inspector of the Zabrze Zz master signalbox, who explained that on 16 May 2010 after 20:00 hrs he received the confirmation of departure of the ZRM22 works train from Gliwice to Ruda Chebzie. He prepared the road for the train, which meant setting the home and distant signals. The next information that he received was that of the departure of train 63130. Because of the prolonged journey time of train ZRM22, he tried to contact the train, but to no avail. After that he received a telephone call from the police station in Gliwice asking about the accident involving a passenger train. Because he had no prior information on that accident, he tried to contact train 63130 on the transceiver on channels 5 and 2. This also had no effect. In the meantime, the line dispatcher from Katowice called him with the instruction to close the track due to an accident. As described by the Zz signalbox inspector, he was informed about the accident at 21:03 hrs. When asked if he had heard GIC being called by the trains that were involved in the collision, he said that he did not hear the GIC signalbox being requested on any of the available channels by the trains that were involved in the accident.
- the Gliwice GIC master signalbox signalman, who explained that he directed the emergency p-way trolley from track 45 onto track 6, as requested by the master

traffic inspector of the GIC signalbox, and prepared the road towards Zabrze station. The signaller confirmed that he heard the conversation of the traffic inspector with the trolley driver before he departed Gliwice. The signaller states that he did not hear any of the attempts to contact the GIC signalbox by the trolley driver during the departure of the trolley. He was not also called by the trolley when it was on the move, and did not hear the communication requested by train 63130 when stationary in Gliwice.

- the MPPJr 63130 train guard explained that engine drivers changed over during the stop in the station. The driver ... started his work. The train guard could not recall whether the driver checked the correct operation of the on-train radio transceiver communication. According to the clarification by the guard, the day was cloudy with intermittent rain. At 20:19 hrs the train departed, having first given the Rp14 'right of way' signal. When on the move, the driver's cab and the staff-only compartment were not illuminated, and the door to the driver's cab were open. The visibility in the staff-only compartment allowed him to prepare the paperwork. When the train was on the move, the guard was not maintaining conversation with the driver as he was performing his duties and therefore had no visual contact with the driver and could tell nothing of his activities. The guard did not notice the driver to be leaving his seat or performing activities other than driving the train. He could see nothing wrong in the driver's behaviour. The driver was not wearing glasses when driving the train. According to the guard, the speed of the train was also acceptable. At the moment of the impact, the guard vaguely remembers that he wanted to stand up from his seat by the staff-only compartment door, but he hit his head, and temporarily lost consciousness. When he regained consciousness, he noticed that the driver was standing next to the cab door with his head bleeding, and informed him that they had hit a permanent way trolley. He informed the dispatcher's office in Katowice about the incident. Both the driver's and guard's transceivers were damaged. At that point, two young passengers entered into the compartment informing them that they had already called an ambulance. One of the passengers helped to provide first aid to the driver. He later went through the length of the train to find out if there were any people injured, four passengers having been found to be injured, and a ticket collector reported injuries of her left leg. Railwaymen wearing high-visibility vests informed him that there were no people injured among the permanent way trolley crew.
- the driver of the permanent way trolley forming the ZRM-22 train, who explained that after performing an inspection check on the vehicle, he declared fitness for departure to the track supervisor. He informed him that they were going towards RCB. On leaving the depot, he reported on the transceiver on channel 5 to the GIC. He received the timetable during the shunting procedure. Before leaving Gliwice, he did not collect the written order 'O' and did not report the readiness for departure, because he received the plan on the transceiver. According to him, receiving a plan and a semaphore signal entitled him to depart. Bearing that in mind, having seen the indication of the distant semaphore, they left towards RCB. From Gliwice to the speed restriction (30km) he drove with speeds not exceeding 50 km/h, and after he passed the restriction 45-50 m/h. The driver determined those speeds on the basis of the speedometer indications. When on the move in the first cab, he was sitting to the left of the

driver, and somebody was standing behind him, but he could not say who it was. En route, he noticed trespassers by the track. Having asked the track supervisor 'are we continuing or are we stopping', he gave a warning signal and started to brake slowly. During the complementary hearing, he also explained that he stopped the trolley on the running line under the instruction of Mr ... , who was then acting as a train guard. He stopped behind the automatic block semaphore sb1230, which was displaying a green light when they passed it. After they stopped, the track supervisor and his people left the trolley in order to check what the trespassers were doing by the track. The driver of the permanent way trolley was trying to contact the GIC signalbox using the transceiver to inform about their unplanned stop. As he did not receive an answer, he tried again. As he did not receive any answer once again, he decided to let the trolley inform the track supervisor about that fact, as he wanted him to report the fact of them stopping using his mobile phone. The driver also did not manage to contact the traffic inspectors of the Zz, GIA and Mpn signalboxes. When he was leaving the permanent way trolley, he saw a train approaching on the viaduct, and he did not even have time to think about using the radio-stop button; he only shouted to inform the rest of the team about the approaching train and escaped towards the forest, i.e. to the right side of the track, in the direction of traffic. Mr ... escaped in the same direction. After more than a quarter of an hour, and after he had recovered, he came back to the trolley. After several minutes he returned to the team.

The driver of the ZRM22 train also provided the following clarification:

1. After the permanent way train stopped on the running line, it did not change its position.
2. From the moment when the p-way gang railcar stopped until the EMUs crashed into it, about 2 to 4 minutes passed, its crew was on the track in front of the trailer.
3. No fishplates were being changed or rails unloaded on the running line, the rail unloading cranes were properly secured before the departure of the trolley. The driver was not aware of the screws missing from the track and had no knowledge if permanent way works were to be carried out on the Gliwice – Zabrze section.
4. The GIC traffic inspector did not inform him that the work train was followed by a passenger train.
5. Before setting off, the permanent way trolley was equipped with its logbook, roadworthiness certificates for the p-way trolley and the trailer, repair logbook and the 'O', 'N' and 'S' orders. All that was placed in one folder in a rucksack that he took with him after the accident and left in the drivers' room.

When asked 'Did you cover the back of train after the train had stopped?', he answered that 'The railbus was properly signalled according to the signalling instruction, and the conditions for covering the train were met'.

- the second driver of the permanent way trolley, train ZRM22, who explained that at 19:56 hrs the track supervisor received an instruction from the dispatcher to set off to Ruda Chebzie in order to pump out water from a flooded tunnel. After the preparations, they left towards GIC. The driver reported to GIC that he was ready to depart towards Chebzie. He was granted permission from GIC according to the departure plan. After shunting and approaching the Katowice direction

semaphore, they were given a clear road, indicated by two orange lights on the semaphore. The 'O' written order was not collected. They left and continued with speeds not exceeding 40 km/h, Mr ... stood behind the back of the driver, next to the cabinet in the front cab, in the direction of traffic, Mr ... stood next to him in the cab, and temporarily the track supervisor. After passing the viaduct in Sośnica, the driver noticed two trespassers on the track and asked the track supervisor for permission to stop. The track supervisor agreed, after they started braking and came closer to the trespassers, and they started running towards Maciejów. Mr ... went to the back of the permanent way trolley, put his clothes on and went outside. When he was leaving the trolley, he heard the driver trying to contact the GIC signalbox. He had to put more clothes on, as it was drizzling and was cold. He got off on the left-hand side, in the direction of traffic (tracks to Bytom) and saw no trespassers. All the remaining members of the p-way gang apart from the driver were in front of the trailer, making sure that the trespassers did not do something to the track. None of the p-way gang were chasing the trespassers, as they were not in their field of view after they stopped the trolley. When Mr ... was in front of the permanent way trolley trailer, after about 3 minutes he noticed the trolley driver leaving the trolley on the right-hand side. When the driver walked towards the front of their train and was at about half the length of the trailer, he shouted 'I guess there is a train running towards us.', and as soon as he made sure that it was actually the case he shouted at us in blunt words to get off the tracks. After being told to run, two of the crew escaped to the right (the driver and one of the workers), and he himself and probably all the others escaped in the direction of the up line embankment of the Zabrze – Gliwice section. The track supervisor Who was at the left-hand side of the trailer in the direction of traffic displayed a 'stop' signal. When he was on the embankment he noticed the approaching train. It seemed strange to him that the train was not slowing down at all and was not giving any signals. Mr ... thought that there was no light in the cab of the EMU, yet at the same time the train was properly signalled. Shortly after that, the train crashed into the p-way trolley, pushing it for about 200m. After the impact, he went down the embankment towards the train and then went towards the trolley alongside the train. After Mr ... reached the trolley, its engine was still on, and after some time he saw flames underneath the vehicle that soon disappeared though and the engine stopped. Using his mobile phone, the track supervisor informed his superiors about the accident.

When asked additional questions, Mr ... explained:

1. The permanent way trolley was stopped on the basis of an instruction issued by the track supervisor, who went on inspecting the track in front of the trolley, accompanied by three workers as soon as they stopped.
2. The permanent way trolley was not backed up on the running line.
3. He knew nothing of the fishplates being changed at km 22.800 on the down line (track 2) and of the lack of fishplate bolts in the place where the trolley had stopped.

When asked:

1. 'What was the indication of semaphore 230, after which the accident occurred?',
he answered: 'Green'.
2. 'Please specify if you could see trespassers on the running line, and if so at which point and where would they be?',

he answered: 'I saw two people escaping onto the embankment towards Maciejów Północny.'

- the track supervisor Mr Y who was on board train ZRM-22. Mr Y explained that he received an instruction from the dispatcher at 19:40 hrs to attend to a situation in Ruda Chebzie, in order to pump out water from a flooded tunnel underneath the track. The track supervisor did not report the train setting to the GIC traffic inspector. In the permanent way railbus, the first cab in the direction of traffic was occupied by: the driver behind the control panel, he was standing in the middle and ... sitting at the table. In the second cab, in the direction of traffic, to the left sat ... facing the direction of traffic, and ... with his back in the direction of traffic, and there was also ... present, but he could not say exactly in which place. They were on their way to Ruda Chebzie and moving at 30 km/h (according to him, not based on the speedometer readings), at good visibility, with no rain, when underneath the girder bridge he, the driver and Mr Y noticed two thieves on the down line (track 2) at km 22.800 about 300 m in front of their vehicle, and that is why the track supervisor instructed them to stop the trolley, and at the same time instructed the driver to inform GIC about them stopping. The permanent way trolley driver gave a warning signal, and the trolley stopped about 40 m behind a semaphore which was indicating a green light when they passed it. On the track supervisor's instruction, all the workers except the driver got off the trolley, as there were thieves on the track. The track supervisor heard the permanent way trolley driver calling the GIC signalbox. After he got off the vehicle, the track supervisor saw the disappearing people, so he and Mr ... chased the thieves for about 60 m, but the thieves escaped towards the detached houses in Maciejów Północny, and it all lasted for about 2-3 minutes. On the way back, they wanted to check what was going on, but he was not able to say if the track was damaged. In the meantime, the permanent way trolley driver kept trying to contact the GIC signalbox. The GIC signalbox did not answer. After about 3-4 minutes of them staying there, the trolley driver noticed an approaching train and warned them from the steps of the trolley. When he was warned, the track supervisor was about 5 m in front of the trailer and was not able to describe the distance between the p-way railbus and the approaching train. The track supervisor told them to run, so they escaped onto the embankment, and he himself ran towards the approaching train, trying to stop it with the 'Stop' signal given by hand. The emergency trolley was lit. Then the train crashed into the emergency trolley. The train did not slow down and it was not giving a warning signal. As a result, the trolley was pushed for 300 m. After the crash, he tried to find his people and make sure they were all right. After about 30 minutes, he asked the ticket inspector if all the people were all right.

When asked additional questions, the track supervisor explained:

1. The ZXM22 train left Gliwice without the 'O' written order as it was not necessary, because they were assigned the train number.
2. The trolley stopped on the running line was properly covered by the required signalling lights.
3. He was aware that by instructing the p-way crew to stop the trolley and to walk onto the running line, he had posed a direct threat to their lives.
4. The front of the train stopped exactly 4 m in front of the rail joint at km 22.850 because 'It so happened'.

5. He has no knowledge of the exchange of the broken fishplates in the right rail and about the parts of two broken fishplates lying in between the track at that spot at km 22.800 and has got nothing to do with it, and said that the spanner lying not far away from the place where the fishplates were replaced is not one that is part of the p-way gang railcar equipment.
 6. After noticing the trespassers, he did not telephone the police.
- the fitter who was travelling on the ZRM-22 train, who explained that on 16 May 2010, when he signed up for work, he was instructed to go to Chebzie to pump out water. They left the depot, the supervisor reported the movement to the traffic inspector and they moved on. Beyond GIA, there were 3 people walking about next to the semaphore in the place where there was a cabinet and cables on the track. They ran away when they saw them. The supervisor told the driver to stop so that they could see what they were doing there. They stopped at about 40 m beyond the semaphore. Visibility was good and it was not raining. When he was leaving the trolley, he heard the driver trying to contact the traffic inspector. They left the trolley in order to see what the trespassers were doing on the track, and nobody tried to catch them, because after the vehicle stopped the people ran away to the left. All of them went to the front of the trailer, where they saw dismantled bolts, but there was nothing they could do about it because the trolley driver who was between the trolley and the trailer on the right shouted that there was a passenger train coming towards them. They escaped with the driver into a ditch to the right, in the direction of traffic. The passenger train hit the trolley. After the accident, he went onto the embankment and went towards the trolley. After he arrived at the trolley, the police came.
- When asked additional questions, Mr ... explained:
1. The bolt that he was shown by the controller was a fishplate bolt and had been cut with a torch.
 2. Under normal circumstances, when they need to replace p-way material on the track and could not unscrew the bolts, they would heat them up and if that was still no good they would cut them with a torch and collect the material in a bucket and take it with them on the trolley.

When asked:

1. 'Did you go to the place where the trespassers, cabinet and cables were?', he answered: 'Yes, all of us did, except the driver.'
 2. 'What did you see in the place where you saw the trespassers?' he answered: 'The cables were all right, there were no faults on the track'
 3. 'Where there any faults on the part of the track that you inspected?', he answered: 'There were one or two bolts missing on the rail joint'
 4. 'Did the track supervisor inspect the missing bolts on the rail joint?', he answered: 'Yes'.
- the senior fitter, who was travelling on the ZRM-22 train, who explained that on 16 May they were ordered to go to Chebzie. When on the move Mr ... was sat in cab A (second in the direction of traffic), ... sat opposite, ... stood behind the driver, and the track supervisor was walking around the trolley, talking on the transceiver. At some point, the track supervisor noticed 3 trespassers on the track and ordered the trolley to be stopped. When they were stopping, it was raining a

bit. Mr ... claims, that they were ordered by the track supervisor to chase the trespassers for about 100-150 m in the Zabrze direction, but they got away. They went to check whether they had dismantled anything, and he noticed 2 fishplate bolts in the right rail. When he was standing there with his coworkers in the middle of the track in front of the trailer, the driver shouted 'run, there's a train running towards us'. That is why they took no further measures. They all ran away, and he escaped onto the tracks leading to Maciejów. Then the trolley was hit by the train. For the additional questions, the answers of Mr ... are as follows:

1. The bolt that he was shown by the controller was a fishplate bolt, and it had been cut with a torch.
2. He does not remember who was chasing the trespassers with him.
3. He did not know if the track supervisor saw the missing bolts in the track, and did not remember who else apart from him saw the missing bolts in the right rail in the track.
4. There was no work planned to be carried out on track 2 on the Gliwice – Zabrze section.
5. The permanent way trolley was not backed up on the running line when on the way to Chebzie.
6. 'Did you hear the trolley driver report to the traffic supervisor about the permanent way trolley stopover?'
He answered: 'The driver was saying something on the radio, and I don't know if he reported that.'
1. 'At which point did you notice the two missing bolts?'
He answered: 'Somebody said there were two bolts missing.'
2. 'Did the track supervisor walk to that joint with missing bolts with you?'
He answered: 'All of us went to the joint with missing bolts with the track supervisor.'

- fitter, who was on board train ZRM-22, explained that on 16 May 2010 at 19:00 hrs he came to work, and checked the cylinders to see if they were full and in good working order. At about 20:00 hrs they left the depot for Chebzie, and it was raining when they were going there. The trolley stopped on the running line at the instruction of the track supervisor, as he saw thieves on the running line. Answering the additional questions, Mr ... specified that when he was in the back cab of the trolley he saw the thieves personally at about 100 m in front of the moving trolley, but he could not specify the exact location, because he had no route knowledge. He was responsible for buildings' maintenance and therefore was not a member of a trolley crew very often. After the trolley had stopped, the track supervisor got off, and he followed shortly after to see what the others were doing on the track. When he was leaving the trolley, he did not hear the driver calling the traffic inspector. The railwaymen were wearing hi-visibility vests. The thieves escaped to the right, in the direction of traffic. When he walked in the direction of Gliwice to the place where they saw the thieves, he saw along with the track supervisor that the bolt nuts were unscrewed, but he did not see the fishplates to be broken, and he was not able to say how many bolts were unscrewed, whether there were 2, 3 or 4 fishplate bolts. That was all that he managed to notice, because the trolley driver who was in front of the trolley from the Gliwice direction and from the incoming train shouted that they should run away, because a train was going to crash into their trolley. He, the track supervisor and another railwayman escaped to the left, looking in the direction of

traffic. He heard a rumble, and he knew that the EMU had derailed. When he came closer, he noticed that the trolley had derailed.

When asked additional questions, Mr ... explained:

1. The permanent way trolley was not backed up on the running line.
2. The first one to walk towards the spot of the missing fishplate bolts' nuts was the track supervisor.
3. They were not cutting the bolts with a torch in the place they stopped.
4. The incoming train was not giving any signals with its horn and it seemed as if nobody was there in its cab.
5. When they spotted the nuts to be unscrewed from the bolts, they did not take any actions, and there was no talk of any.
6. There was no work planned to be carried out on track 2 on the Gliwice – Zabrze section, and there was no talk of any.

When asked:

1. 'Could you refer to the explanations given by your co-workers who claimed that when the trolley stopped they stood in front of the trolley?', he answered: 'I don't agree.'
2. 'Bearing in mind that you were sitting in the trolley with your back to the direction of travel, would you remember where were you sitting and where the track supervisor was?'. He answered: 'In front of the cab.'

- the senior driver who was driving the 63130 train from Wrocław to Gliwice. Mr ... explained that when he was driving the train and was entering Gliwice Łabędy he checked the transceiver communication on channel 5, and it worked properly. After he stopped the train in Gliwice on the Bytom track of platform 2, when he opened the door he noticed his relief driver and started to perform his end-of-shift activities. He took the speedometer tape away and made an appropriate entry in the vehicle's logbook, and passed on orally the information about the condition of the vehicles of train 63130 'to the relief driver, who was already in the cab when he was taking the speedometer tape out', and the rolling stock was in good working order. He saw the relief driver inserting a new speedometer tape. After he completed these activities, he went out onto the platform where he looked at the distant signal, which was displaying two constant lights: lower orange and upper green. Mr ... did not remember whether Mr ... tested the radio communication, and during the handover procedure the transceiver was set to channel 5. Mr ... declared that there was nothing suspicious in the relief driver's behaviour, and at the same time he declared that the brakes worked properly on the Wrocław – Gliwice section and he felt that the second EMU of the train (EN71-07) braked more efficiently. When the relief driver took over the train, it was raining heavily and the front wipers in the Ra cab on the EN57-1172 EMU worked properly. According to Mr ..., the weather conditions on the Gliwice Łabędy – Gliwice sections allowed for the train to be operated with a timetable speed.
- the driver of train 46, which was the last train on the Gliwice – Zabrze section before the passage of train ZRM-22, who explained that on 16 May 2010 the automatic block on the Gliwice – Zabrze section worked correctly and he did not record any interference in the train ride, and the ride was smooth. According to Mr ..., the visibility was good but he could not remember if it was raining. When driving the train on the running line, he did not notice any trespassers or railwaymen next to the tracks.

- the driver of train 39, Mr ..., who was driving his train on the up line (track 1) of the Gliwice – Zabrze section, who explained that the departure from Zabrze towards Gliwice on 16 May 2010 took place at 20:20hrs. When on the Zabrze – Gliwice section, the weather was rainy, which impeded visibility, and he heard no conversations on channel 5 and saw no trespassers. Mr Karolczyk also did not see the permanent way trolley parked on track 2 and permanent way workers working on the track, and also no EMU train.
- the senior electric locomotive / EMU driver, who was acting as locomotive crew dispatcher PRSM4 in Tarnowskie Góry explained that on 16 May 2010 he summoned driver ..., who reported for duty No. 266/7. The driver stayed in the dispatcher's room for 30 minutes before starting his duty. He used this time to make corrections to the timetables, permanent working tables, and he updated himself on the newly issued regulations. The works documentation of the driver was complete and valid before he took over the job. He would discuss with the driver both railway and private matters. In a direct conversation with the driver, he was able to confirm that the psycho-physical condition of the driver did not seem out of the ordinary, and therefore he was not breathalysed. When in the dispatcher's office, the driver did not expose any signs of distress and did not report any circumstances that would prevent him from performing his duties on that day. Afterwards, he collected his job sheet No. 505/05, and took a passenger train to Gliwice.
- the ISE Gliwice deputy road and construction manager, with respect to the replacement of fishplates at km 22.800 after the described accident. The manager explained that on 17 May 2010 at approx. 06:00 hrs he went to the accident site and instructed the permanent way workers to replace fishplates on the rail joint in order to ensure the safe passage of trains. Six-hole fishplates were used. After the arrival of the manager, the fractured fishplates were lying in four pieces next to the left rail. When asked if he had been informed earlier about the fractured or broken fishplates in track 2, the answer was: 'Yes, I have'. On the more detailed question of whether he had received a report on the fractured or broken fishplates at km 22.800, he answered: 'No, I did not'.
When asked: 'If you knew about the fractured fishplates in track 2, when did you learn about these?' He answered: 'I don't remember when'. The manager could not say who removed the fractured four-hole fishplates. The track workers who were fitting the six-hole fishplates were not equipped with welding gear. With respect to the procedure for the removal of track faults and its documentation, the manager explained that the faults reported orally by the track supervisor or the line inspection worker were passed on by him to the emergency train in order for the faults to be attended to. The repair of the detected faults was coordinated with the PLK dispatcher. The manager was not able to specify whether the track supervisor, who acted as the head of the maintenance train, was in possession of the necessary approvals allowing him to perform these duties. At the hearing on 9 July 2010, the manager had not been able to describe the place where the emergency trolley written order sheets had been found. When asked: 'have the broken fishplates from the site been retained', Mr ... explained that 'a couple of days after the accident the fishplates were still there, but now they are not', also adding that he thought 'that when the committee was inspecting the equipment

after the accident they were inspecting the fishplates as well, and that is why the fishplates had not been retained’.

On 15 July 2010, the deputy track manager Mr ... provided reports to the ISE Gliwice employees hearing that he prepared himself, which state:

- the ISE Gliwice senior fitter questioned with respect to the extent of works carried out on 17 May 2010, related to the provision of repairs to the track damaged in the course of the accident of 16 May 2010, explained that he got off the permanent way trolley bound for Zabrze with Mr As instructed by the manager, they started replacing the cracked fishplates in the right-hand side rail. The first of the fishplates to be fitted was taken from the trailer of the damaged p-way train, and the second picked up from the trackbed (as it would have fallen off the trailer due to the impact), and they started replacing the fishplates. They unbolted the fishplates, took the fishplates off and placed them on sleepers and replaced these with six-hole fishplates. When asked ‘How many holes did the fishplates that you replaced have?’ He answered: ‘I don’t remember’.
- the ISE Gliwice senior fitter questioned with respect to the extent of works carried out on 17 May 2010 May, related to the provision of repairs to the track damaged in the course of the accident of 16 May 2010, explained that he got off the permanent way trolley bound for Zabrze with Mr As instructed by the manager, they started replacing the cracked fishplates in the right-hand side rail. The first of the fishplates to be fitted was taken from the trailer of the damaged p-way train, and the second picked up from the trackbed (as it would have fallen off the trailer due to the impact), and they started replacing the fishplates. They unbolted the fishplates, took the fishplates off and placed them on sleepers and replaced these with six-hole fishplates.
- the track supervisor, who said that he had not replaced any of the fishplates at km 22.800, and knows nothing about it.
- - **witnesses**

No such hearing required.

c) the technical condition of railway structures and equipment and rolling stock, including:

- **signalling, traffic control and safety systems, including automatic data recording**

‘GIC’ master signalbox:

illuminated diagram; section it 2a, it 254, it 240 – flashes with white lamps, constant light; it 230 – red lamp flashes, constant light; it 212 – white lamp flashes, constant light. The Eac block control panel for track 2 for the Gliwice – Zabrze section set for departure towards Zabrze, a white arrow is alight. The emergency direction change button – sealed. The emergency direction change counter – sealed. Relay station I – locked and sealed, key to the relay station – on the key board, sealed.

The detailed description of the GIC signalbox in Gliwice, the Zz-2 signalbox in Zabrze as well as automatic block containers No. 211/212 and 229/230 are included in the accident report.

In situ:

Automatic block devices track 2 Gliwice – Zabrze section, block signal 254 glows with a green constant light, block signal 240 flashes an orange constant light, block signal 230 flashes a red constant light, signal 212 flashes a blinking orange light, Zabrze N 1/2 home signal indicates entry to the station with two orange lights. Track mounted Automatic Train Stop (SHP) electro-magnets are placed 200 [m] in front of each of the colour light signals mentioned.

Internal devices (relay room, generator room, etc.):
relay rooms sealed, seals remain intact.

Measuring and testing performed on track 2 of the GIC – Zz-2 section with Eac-type automatic block (sections 254, 240, 230).

The measuring and testing procedures were performed between 17-20 and on 26 May 2010 by the employees of the diagnostic department No.1 and workers from the automatics laboratory in the presence of the internal railway committee members.

- I. The Automatic Train Stop devices in front of the 254, 240 and 230 semaphores worked properly, the electrical and fitting parameters of those Automatic Train Stop electro-magnets were found to be within the limits.
- II. The visibility required for the automatic block signals for line 137 on the GIC - Zz-2 section on track 2 at the current maximum speed of 100 km/h should not be less than 250 m.

The actual visibility from the driver's seat of an EN57 EMU (right-hand side seat):

- a) semaphore 254 visible constantly from a distance of 400 m,
 - b) semaphore 240 visible constantly from a distance of 400 m,
 - c) semaphore 230 visible constantly from a distance of 295 m,
 - d) the electrical characteristics of semaphore 230 red lamp are correct
- III. The signals displayed on the block semaphores are compliant with the Ie-1 instruction and the applicable operational situation.

After the analysis of the measuring and testing records, it can be stated that the performance of the Eac-type automatic block system with OTL-2-ZLB-Eac-type sections on track 2 of the GIC – Zz-2 section is compliant with the design requirements and the technical and operational documentation.

On the basis of the above-mentioned findings, the improper functioning of the automatic block system has been ruled out as one of the causes of the accident, even in case of the permanent way trolley becoming non-isolated when stationary on the it230 track section, with the it212 section unoccupied and 212 semaphore bulbs in correct order – in that case, the signal displayed by the semaphore would change from the 'stop' signal (red light signal – S1) to a 'clear' signal (green light – signal S2). This excludes the version recorded during the hearing of the 63130 train driver, who mentioned the light to be orange on the semaphore.

The diagnostic testing of the automatic block devices was confirmed with report No. IZATA1-54/27/2010 of 10 March 2010 that confirmed the correct operation of the automatic block devices on the Gliwice – Zabrze section.

The latest control report of a structure maintenance No. IZATA1-54/100/2009 of 21 November 2009.

On 4 June 2010 at 20:17 hrs an on-site test was performed using EN57-1307 with speeds replicating those registered by the speedometers of train 63130 on 16 May 2010.

Having left Gliwice on track 2 of the Gliwice – Zabrze section, an Automatic Train Stop device test was performed in front of the automatic block semaphore 240. After the train had passed over the track electro-magnet placed 200 m before the automatic block semaphore 240, the Automatic Train Stop acknowledgment button was not pressed. In that time, the train managed to cover 100 m, and with another 100 m left to automatic block semaphore 240, the train started to brake automatically. After the Automatic Train Stop acknowledgment button had been pressed, the automatic braking process was discontinued.

This made the passing of the Automatic Train Stop semaphore 240 impossible before the pressing of the acknowledgment button by the 63130 train driver.

Continuing the site inspection, the visibility check of automatic block semaphore 230 was performed. A girder flyover is located 200 m before automatic block semaphore 230. Before the flyover, the track curves to the left, in the direction of traffic, with the curve radius R: 615m.

On the basis of a film recorded during the cab ride, the committee concluded the following:

1. At a distance of approx. 500 m from automatic block semaphore 230, the signals displayed on automatic block semaphore 230 and the ToB forewarning signal connected with the B home signal for the Maciejów Północny junction, located to the left of track 2 to Zabrze and not serving that track are not visible;
2. then, within one second:
 - a) the signal displayed on the automatic block semaphore 230 is visible with the ToB forewarning signal invisible;
 - b) after a while, the automatic block semaphore 230 becomes invisible, with the ToB forewarning signal still invisible.
3. After another while, the ToB forewarning signal becomes visible for three seconds, displaying one constant orange light.
4. After that time, in the same moment, the girder of the bridge obscures the ToB forewarning signal at the same time automatic block semaphore 230 became visible from behind the bridge girder.
5. After another second, the ToB forewarning signal becomes visible from behind the girder and is visible along with automatic block semaphore 230 for another three seconds, after which the automatic block semaphore 230 becomes again obscured by the girder.
6. Being before the girder flyover automatic block, semaphore 230 and the ToB forewarning signal are constantly visible.
7. The EN57-1307 was stopped by means of an emergency brake application after 70 km/h was attained (i.e. a speed reached by train 63130 in that particular place) after pressing the Automatic Train Stop acknowledgment button after passing over a track-mounted Automatic Train Stop electro-magnet placed before the automatic block semaphore 230. As a result of the emergency brake application, the cab of the EN57-1307 EMU stopped 3 m beyond the original location.

Summing up the site inspection, it is stated that:

1. In adverse weather conditions (dusk and rain) on that particular stretch, the driver could be mistaken and read the indication of the ToB forewarning signal

as that of the automatic block semaphore 230. The required visibility of the automatic block semaphore 230 of 250 m has been retained.

2. In case of a correct reaction of the driver of the 63130 train, the train should stop before the obstruction or hit it with minimal speed if the driver had pressed the Automatic Train Stop acknowledgment button, additionally seeing the tail lamps of the stationary train.

- **of the track on the 100 m stretch before the site of the accident, all the way to the site of the accident, in the direction of traffic**

Track 2 measurements of line 137, Zabrze – Gliwice section performed on 17 May 2010. Track condition – good.

- **of the remaining railway infrastructure**

Permanent way.

Track 2, standard, S-49 type, on DR/IIB/S wooden sleepers, breakstone.

Last major relay performed in 1985 – performed by DOM Katowice.

At km 22.757-22.904 curve of R:4720m radius, straight line at km 22.904 – 22.957. The last control and measurement report No. IZDKN1-500/583/2009 of 18 December 2009. Measurement performed by an EM-120 trolley on 14 December 2009.

- As a result of the accident and the effect of the two derailed wheelsets, the following were damaged:
 - 371 single wooden sleepers,
 - 6 rail joint supporting wooden sleepers,
 - buckling of rails on the rail joint at km 22.834.

From 17 May 2010, a 30 km/h speed restriction was introduced at km 22.650 - 22.850 until completion of the track repair works. Current condition of track – satisfactory.

- Overheat catenary and support poles have not been damaged.

- **communication equipment**

Communication equipment in working order. The entries in the 'Communication equipment defect logbook' of the GIC signalbox show that on 30 April 2010 the on-train channel 5 Koliber transceiver was replaced with a Radmor EM 3036 not equipped with speech recording devices.

Before the accident, the mobile transceivers installed on both the EN57-1172 and the p-way railbus were in good working order.

- **rail vehicles, including the automatic data registration entries**

- EN57-1172 of PR Kraków, EMU-type 5B6B5B built in 1977 works No.706 produced by PAFWAG Wrocław, rail vehicle working order certificate No. PBU4-808/2008 of 17 June 2008 issued for a mileage of 400 000 km valid until 16 May 2011. Mileage since last servicing until the accident – 333 800 km. Speedometer type RT9 No. 22872. Speedometer measuring tape – 120 km/h. Speedometer tape range – 120 km/h.

Last periodical inspection PU2 12 May 2010 performed by Małopolski Zakład Przewozów Regionalnych in Kraków, maintenance department in Sucha Beskidzka.

Last control inspection PU2 12.05.2010 May 03:00 hrs performed by Małopolski Zakład Przewozów Regionalnych in Kraków, maintenance department in Sucha Beskidzka. Time of operation since the last control overhaul amounted to 42 hours. The details on the speedometer tape show:

- 1) The speedometer tape entry begun from registering an approx. 1.5 min. stop from 20:18 to 20:19.5 hrs in Gliwice.
- 2) At 20:19.5 hrs, the drive was turned on and speed rose to approx. 40 km/h, after which the drive was switched off.
- 3) After approx. 200 m, a passage over a track mounted Automatic Train Stop electro-magnet was recorded, the EMU being driven from the Ra car cab and the application of the Automatic Train Stop acknowledgment button and the active dead man's vigilance button (semaphore GIC) V=35km/h.
- 4) At 20:20 hrs, the turning on of the drive was recorded with speed increasing to approx. 60 km/h at a distance of approx. 300 m, after which the drive was switched off.
- 5) At 20:20.5 hrs, an increase in the pressure in the brake cylinder was recorded with speed limited to approx. 15 km/h, then a short application of the drive and the increase of speed to approx. 30 km/h, then the journey was continued with the drive switched off and speed declining to about 22 km/h at a distance of approx. 400 m.
- 6) At 20:20.5 hrs, another record shows the application of the Automatic Train Stop and the dead man's vigilance switch in the Ra car cab (application of the dead man vigilance device).
- 7) At 20:21 hrs, the turning on of the drive was recorded with speed increasing to approx. 78 km/h at a distance of approx. 1300 m.
- 8) After approx. 20:21.5 hrs, a passage over a track mounted Automatic Train Stop electro-magnet was recorded, and the application of the Automatic Train Stop acknowledgment and active dead man's vigilance switch (automatic block semaphore 254) V=60km/h.
- 9) At 20:22.5 hrs, the drive was turned off and speed decreased to approx. 20 km/h at a distance of 600 m.
- 10) At 20:23 hrs, a passage over a track mounted Automatic Train Stop electro-magnet was recorded, and the application of the Automatic Train Stop acknowledgment and active dead man's vigilance switch (automatic block semaphore 240) V=55km/h.
- 11) At 20:23.5 hrs, the drive was turned on and speed rose to approx. 74 km/h, at a distance of approx. 900 m.
- 12) At 20:24.5 hrs, a passage over a track mounted Automatic Train Stop electro-magnet was recorded, and the application of the Automatic Train Stop acknowledgment and active dead man's vigilance button in the Ra car cab (automatic block semaphore 230) V=70km/h.
- 13) 200 m after the passage of the Automatic Train Stop electro-magnet, the switching off of the drive was recorded, and then the recording was discontinued at a speed of 74 km/h (caused most probably by the opening of the speedometer and the falling out of a tape roll).

On the basis of the tape description above, the committee stated that when passing over the track mounted Automatic Train Stop electro-magnet before the automatic block semaphore 240 a delayed application of the Automatic Train Stop acknowledgment button had been recorded. A correct application of the Automatic Train Stop acknowledgment button before the automatic block semaphore 230

when passing over the track-mounted Automatic Train Stop electro-magnet with traction motors on and the speed increasing from 70 km/h was registered by the Automatic Train Stop electro-magnet before automatic block semaphore 230 to 74 km/h when crashing onto the p-way gang railcar. From the moment of passing over the Automatic Train Stop electro-magnet placed before the automatic block semaphore 230 until the impact, the train continued for approx. 200 m more and there was no brake application recorded.

The speedometer tape of EN71-07 confirms the parameters registered on the tape of EN57-1172 until the records were discontinued. The data not registered because of the speedometer being disconnected have been registered on the EN71-07 speedometer tape. After approx. 250 m from the track-mounted Automatic Train Stop device before automatic block semaphore 230, the disconnection of the drive and the increased pressure in the brake cylinder were registered. After covering 300 m with approx. 75 km/h, the speed falls rapidly to $V = 0$ km/h.

- EN71-07 of PR Kraków, EMU type 5B6B6B5B built in 1976 works No. 7 manufactured by PAFAWAG Wrocław, rail vehicle working order certificate No. PBU4/6-14/2009 of 31 March 2009 issued for the mileage of 400 000 km valid until 31 March 2014. Mileage since last servicing until the accident – 122636 km. Type RT9 speedometer No. 36334. Speedometer measuring tape – 120 km/h. Speedometer tape range – 120 km/h.

Last periodical inspection PU2 5 May 2010 performed by Małopolski Zakład Przewozów Regionalnych in Kraków, maintenance department in Sucha Beskidzka. Last control inspection 12 May 2010 04.00 hrs performed by Małopolski Zakład Przewozów Regionalnych in Kraków, PRTE Kraków Płaszów.

- Permanent-way gang railcar.

Railcar working order certificate No. IRK7-10/2005/023/2008, issued on 11 April 2008 valid until 10 April 2011 for the mileage of 9000 hours of operation counted from 6350 hours of operation. Current mileage 8258 hours of operation.

Railcar type approval No. T/2003/0063.

Working order certificate (for the motorised trolley trailer) PP-W-01 No. IRK 7-10/2005/032/2007 issued on 3 September 2007 valid until 3 September 2010.

Gross weight 22.4 [t], braking weight 80%, actual braking weight 28 [t].

d) rail operating documentation, including:

- **actions taken by railway employees with respect to traffic and signalling control**

In Zakład Linii Kolejowych in Tarnowskie Góry dispatcher's logbook, the charts are not filled in according to the headings, no written entry confirming the ordering of the emergency trolley to Ruda Chebzie station. The questioning of the track supervisor proves that the order was issued orally by the ZLK dispatcher at 19:40 hrs.

The train route printout of the SEPE system prepared on 16 May 2010 shows that the line dispatcher of the Katowice branch issued the train a ZRM22 type symbol for the Gliwice – Ruda Chebzie direction, while in the R-146 operation register of the GIC signalbox in the Zabrze direction the train was recorded as ZXM22. The above-mentioned printout confirms that the departure of the ZRM22 train confirms

the correctness of the R-146 operation register for the ZXM22 train – 20:13 hrs. The same SEPE system printout includes details of the passage through Zabrze station at 20:22 hrs and arrival to Ruda Chebzie at 20:30 hrs. Train timings entered into the GIC signalbox R-146 operation register are incomplete (no full departure timings). According to paragraph 33 of the Technical rulebook for Gliwice station from 5 December 2007, the interval for a freight train to be followed by a train train cannot be shorter than:

- before a stopping passenger train – 14 min.
- before a non-stop passenger train – 18 min.

Notes regarding train ZRM22:

- No brake test sheet.
- No 'O' written order issued on 16 May 2010 for the ZRM22 train.
- The committee was not provided with the blank written orders from the p-way gang railcar.

The driver did not enter the time of taking over the train in the EN57-1172 logbook. The entry confirming the radio communication check performed by the driver is legible in its first part, but smudgy in the second part, which may suggest that the entry was only completed after the accident. According to the driver's explanations 2 minutes are not enough to perform all the activities connected with taking over a vehicle. The timetabled stop-over time for the 63130 train in Gliwice was 1 min. During the site inspection, the time needed for the section of speedometer tape to be taken out and the preparation of the speedometer for further operation was measured and came out to be 47 seconds. On top of that, a certain amount of time is required for the drivers to perform the activities determined in section 15, paragraphs 1 and 2 of the Pt-2 instruction.

The driver's work chart was lost during the accident, and therefore a copy had been issued.

The braking sheet for the 63130 train is noncompliant with regulation of the Minister of Transport No. 63 of 2 November 2006 with respect to the documents which should be present on a rail vehicle.

- **exchange of oral messages connected with the accident, along with the documentation of the records**

The communication process was performed by means of individual, telephone or radio conversations in the way described in the explanations. The entries in the 'Communication equipment defect logbook' of the GIC signalbox show, that on 30 April 2010 the on-train channel 5 Koliber transceiver was replaced with a Radmor EM 3036, not equipped with speech-recording devices.

- **measures taken in order to protect the accident site**

Until the arrival of the ZLK railway committee, the site was protected by the Railway Police.

e) work organisation with respect to the incident, including:

- **working time of the railwaymen involved in the accident**

The accident took place during the time compliant with the regulations after correct recreation time. The amount of time required in the regulation had not been exceeded.

- the MPPJr 63130 train driver. The accident occurred in the 1st hour of work;
- the MPPJr 63130 train guard. The accident occurred in the 7th hour of work;
- the MPPJr 63130 train ticket inspector. The accident occurred in the 7th hour of work;
- senior traffic inspector of the GIC master signalbox in Gliwice. The accident occurred in the 2nd hour of work;
- senior station inspector of the Zabrze station. The accident occurred in the 2nd hour of work;
- the GIC master signalbox signalman, The accident occurred in the 2nd hour of work;
- the driver of the permanent way trolley in train ZRM – 22 Artur. The accident occurred in the 2nd hour of work;
- the ZRM – 22 permanent way trolley secondman Marek . The accident occurred in the 2nd hour of work;
- track supervisor. The accident occurred in the 2nd hour of work.

- **psychophysical condition of the railwaymen who had influence of the accident that occurred**

The outcome of the breath tests of the railwaymen who were connected with the accident, the EMU driver and the permanent way trolley driver performed by the police from Zabrze – outcome 0.00‰.

On 17 June 2010 at 9:10 hrs the track supervisor was breathalysed – outcome 0.00‰.

- **environment and ergonomic conditions of the railwaymen workplaces who were involved in the accident**

The environment and ergonomic conditions were not the cause of the accident. Both the testimony of the drivers and the logbook entries confirm that the windscreen wipers on the EN57-1172 Ra car cab were in good working order before the accident.

- **adherence to the health and safety regulations**

There was no breach of health and safety regulations.

- Analysis and findings:

a) reference to earlier accidents that took place in similar circumstances

There had not been any similar accidents in the IZ Tarnowskie Góry PR Katowice area before.

b) the committee's establishments with respect to the detailed course of events of the accident based on the factual circumstances mentioned in points 1 and 2

On 16 May 2010, in the ZLK dispatcher's IZDD(R217) register of Zakład Linii Kolejowych in Tarnowskie Góry at 17.55 hrs the dispatcher made an entry about the underpass in Ruda Chebzie being flooded. In the register, the charts are not filled in according to the heading, with no written entry confirming the ordering of the emergency trolley to the Ruda Chebzie station. The questioning of the track supervisor proves that the order was issued orally by the ZLK dispatcher at 19:40 hrs.

The train route printout of the SEPE system prepared on 16 May 2010 shows that the line dispatcher of the Katowice branch issued the train a ZRM22 type symbol for the Gliwice – Ruda Chebzie direction, while in the R-146 operation register of the GIC signalbox in the Zabrze direction the train was recorded as ZXM22. In accordance with the guidelines, section 81 paragraph 6 of the Ir-1(R-1) instruction 'Instruction on the train operations' states that support vehicles are described by the type of vehicle with added descriptions such as 'trolley' or 'motorised trolley', and when moving between at least three stations a two-digit number is assigned, and should the movement be of a vehicle with a trailer, the words 'with trailer' should be added.

In the permanent way defect rapid removal team logbook, on that day the track supervisor entered leaving the home station at 20:15 hrs and the arrival to the site of the failure in Ruda Chebzie station at 22:28 hrs, which is inconsistent with the state of affairs, as the ZRM22 train never made it to Ruda Chebzie station.

After preparation of the p-way gang railcar for the departure to the place of a defect, it was shunted from the p-way depot onto track 6 on the station, governed by the Gliwice GIC signalbox, after the departure of train 83102, which had left Gliwice at 20:06 hrs.

At 20:09 hrs, train 46 left Gliwice station towards Zabrze on track 5. The automatic block on the Gliwice – Zabrze section functioned properly when the train was on the running line, and the driver has felt no interference in the running of the train. Visibility was good. When driving the train on the running line, the driver did not notice any trespassers next to the tracks. Train 46 entered Zabrze station at 20:18 hrs and left at 20:19 hrs.

At that moment, at 20:13 hrs, train ZRM22 consisting of a p-way gang railcar and a trailer placed in front of the railcar in the direction of traffic departed Gliwice from track 6 onto track 2 without reporting what the train consisted of to the traffic inspector and without receiving the required computer printout of the 'O' order, on the basis of the 'clear' signal displayed by the G6 semaphore. When on the way to Ruda Chebzie, the p-way gang railcar was stopped at approx. 20:20 hrs on the instruction of the track supervisor, who did not have the authority of a train guard. The end of the train was located at km 22.857 i.e. 48 m behind the automatic block semaphore 230. According to the clarifications provided by the crew of the p-way gang railcar, the vehicle was stopped after trespassers were spotted by the track, and in order to find out whether these individuals were stealing permanent-way material.

The track supervisor explained:

- when the vehicle was on the move, he saw two trespassers 300 m in front of the railcar, and told the driver of the railcar to stop the vehicle;

- after he left the vehicle he saw the figures running into the distance and chased them for about 60 m towards Maciejów for about 2-3 minutes.

Mr ... explained:

- when on the move, the track supervisor spotted three trespassers;
- after they stopped as instructed by the track supervisor, they ran for about 100-150 m towards Zabrze.

Mr ... explained:

- some people were wandering about behind the GIA signalbox, then ran away when they saw us;
- after we stopped, nobody tried to run or catch them, because after the vehicle stopped the people ran away to the left.

Mr ... explained:

- standing by the driver, when we approached the trespassers they started to run away towards Maciejów Północny;
- none of the p-way gang were chasing the trespassers.

Mr ... explained:

- when in the back cab he saw the trespassers himself at about 100 m away before the approaching trolley, he didn't mention the trespassers to be chased by p-way gang members after the trolley stopped.

Mr ... explained:

- when the trolley was on the move he spotted trespassers by the track, he didn't remember whether the trespassers had been chased by p-way gang members after the trolley stopped.

After the p-way gang railcar stopped at km 22.857, four metres before the non-insulated rail joint, the p-way gang railcar members stated the following about the damaged joint:

Track supervisor :

- he was not able to say whether the track was damaged;

Mr ...:

- two fishplate bolts were missing in the right rail;

Mr ...:

- saw the displaced bolts with everybody else around him;

Mr ...:

- knows nothing about the missing fishplate bolts;

Mr ...:

- when next to the track supervisor, he saw the nuts to be unscrewed from the bolts, but he cannot give the number of the bolts removed.

The driver of the p-way trolley claims that he tried to communicate with the GIC traffic inspector after the ZRM22 train was stopped on the running line, and this is confirmed by all members of the p-way railcar crew, apart from Mr This has not been confirmed by the GIC and Zz inspectors. The committee states that after the ZRM22 train stopped on the running line its driver did not contact the GIC traffic inspector and did not pass the information on the train being stopped on the running line, which prevented the GIC traffic inspector from informing the driver of train 63130 about that fact. The permanent way trolley driver did not try to give information about the ZRM22 train standing on the Gliwice –Zabrze running line by means of the nearest traffic posts (MPn, GIA, Zz). The driver of the p-way gang railcar did not activate the 'A1' 'alarm' signal, and the trolley was signalled with the 'Pc5' tail marker lights – two red lights.

On 15 May 2010, train 63130 was directed back to service after a brake from 4 May 2010.

On 16 May 2010, the master traffic inspector of the GIC signalbox did not know the contents of the message about the restoration of train 63130, but she knew about the train to be running from the SEPE(SWDR) computer system.

At 20:16 hrs, the ancillary traffic inspector received the confirmation of the departure of train 63130 from the Szobiszowice junction, which entered the station platform track 6 in Gliwice, at 20:18 hrs, 9 minutes later than the timetabled arrival. The timetabled stop for the train was 1 minute. As planned, drivers changed on this train. The engine driver was finishing his shift, and driver ... was beginning his.

After stopping the train on the platform of Gliwice station, the driver removed the speedometer tape and finished his shift, which was confirmed by an entry in the vehicle's logbook, and verbally informed the driver taking over from him about the technical condition of the EMU. The driver inserted a speedometer tape and radioed the GIC traffic inspector, which has not been confirmed by the traffic inspector. The checking of the transceiver performance was entered into the logbook. The entry confirming the radio communication check performed by the driver is legible in its first part, but smudgy in the second part, which may suggest that the entry was only completed after the accident. Because the original driver job sheet disappeared during the accident the committee cannot confirm whether the driver had entered the necessary details into his job sheet.

The driver also confirmed the presence of the brake test chart and the 'O' written order for train 63130, and read it. At 20:20 hrs, train 63130 departed Gliwice after the Rp14 signal was given on the transceiver by the train guard (Rp13 should be given) and for the S10 'all clear' signal (constant lower orange light, constant upper green light – 'continue with speed not exceeding 40 km/h and then with the highest speed permitted') on the G6 home signal, and departed on the 2 running line in the primary direction.

More or less at the same time, the ZRM22 train stopped three block sections away, at km 22.857; behind automatic block semaphore 230.

After train 63130 had reached the speed 60 km/h, the driver performed a brake test, which reduced the speed to 15 km/h. Then the traction motors were applied and the speed rose to 30 km/h. When passing the location marked with 'lower pantographs' signs, the speed was again reduced to 22 km/h.

At 20:21 hrs, traction motors were applied and the speed rose to approx. 78 km/h.

At 20:21.5 hrs a passage over a track-mounted Automatic Train Stop electro-magnet was recorded with a speed of 60 km/h, and the application of the Automatic Train Stop acknowledgment and active dead man's vigilance button (automatic block semaphore 254 displays S2 signal – one constant green light). At 20:22.5 hrs, the registered speed fell to approx. 20 km/h due to the passage over a section with a temporary 30 km/h speed restriction. When the speed was being reduced at 20:23 hrs, the EMU passed over a track-mounted Automatic Train Stop electro-magnet at 55 km/h, and the late application of the Automatic Train Stop acknowledgment and active dead man's vigilance shift (automatic block semaphore 240 displays S5 signal – one constant orange light, i.e. that the next semaphore displays S1 signal (one red light) stop) was recorded. The late application of the Automatic Train Stop and active dead man's vigilance button may signify that the driver was not concentrating properly when driving. At 20:23.5 hrs, the speed rose with power applied, despite the fact that the previous semaphore (automatic block

240) informed the driver that he was approaching an automatic block semaphore which could display an S1 'stop' signal (one red light).

At a distance of 500 m to the flyover, when the train was traversing a curve in front of the automatic block semaphore 230, two colour light signals were visible interchangeably (the ToB forewarning signal [one constant orange light] located to the right of track 2 and directing onto the Maciejów Północny junction and the automatic block semaphore 230 [one constant red light] located to the right of track 2 in the Zabrze direction), which was caused by the signals being obscured by the girder of the flyover, the axis of which is located at km 23.126. The required constant visibility for the automatic block semaphore 230 set at 250 m was retained. At 20:24.5 hrs the driver immediately pressed the Automatic Train Stop acknowledgment and active dead man's device button driving at 70 km/h with his traction motors on over a track-mounted Automatic Train Stop electro-magnet located 200 m before the automatic block semaphore 230 which was displaying an S1 'stop' signal, and at the same time not reacting to the indication of the semaphore and the visible tail lamps of a train. After the train had passed the electro-magnet, the drive had not been discontinued, emergency braking not applied and the speed rose to 74 km/h, and with that speed the train 63130 passed the automatic block semaphore 230 displaying the S1 'stop' signal, as a result of which the train crashed into the p-way gang railcar parked 48 m beyond the automatic block semaphore 230. As a result of the collision, the p-way gang railcar derailed with its fourth wheelset in the direction of traffic onto the right, at the same time derailing the first axle of the EN57-1172 front bogie, with the two vehicles moving this way to km 22.620, i.e. a distance of 237 m. After the crash, the rescue operation was initiated. The Ambulance, Police and Railway Police were all informed.

The committee established that:

1. After pressing the acknowledgment button when passing over the track-mounted Automatic Train Stop electro-magnet placed before automatic block semaphore 230, the driver was not paying enough attention in observing the road in front of the train, i.e. he misread the indication of automatic block semaphore 230 that was displaying the S1 'stop'; he also did not react properly to seeing red lights (tail lamps) of the permanent way railcar.
2. When approaching automatic block semaphore 240, the driver did not act in due diligence, and in consequence passed the automatic block semaphore 230 which was displaying the S1 'stop' signal. As a result of passing automatic block semaphore 230 displaying the 'stop' signal, the EN57 crashed into a p-way gang railcar which was parked beyond automatic block semaphore 230.
3. During the site inspection which took place on 4 June 2010, making use of the EN57-1307, the EMU was stopped by means of an emergency brake application after 70 km/h had been attained (i.e. a speed reached by train 63130 in that particular place) after pressing the Automatic Train Stop acknowledgment and active dead man's device button. As a result of the emergency brake application, the cab of the EN57-1307 EMU stopped at the site of the impact. The site inspection proved, that even if the driver was not paying proper attention to driving the train, if he had reacted properly to the signal marking the passage over a track-mounted Automatic Train Stop electro-magnet located before automatic block semaphore 230 the extent of the damage would have been limited or the collision between train 63130 and the p-way gang railcar would not have taken place.

4. After the analysis of the outcome of the verification and measurements of the automatic block devices ruled out the incorrect functioning of the automatic block devices as one of the reasons behind the accident, even if the trolley parked on the it230 section with an unoccupied section it212 became non-insulated and with working bulbs on the 212 automatic block semaphore, the signal displayed on the automatic block semaphore 230 would change from a stop signal (red light – S1) to an ‘all clear’ signal (green light – S2 signal) and on the previous automatic block semaphore 240 from a ‘clear’ signal (orange light – S5 signal to a green light – S2 signal).
This excludes the version received while hearing of the driver of train 63130, who claimed that automatic block semaphore 230 displayed an orange light signal.
5. Bearing in mind the different versions provided by the p-way gang railcar track workers with respect to the defect in the rail joint, the committee stated that the defect caused by the removal of fishplate bolts actually took place, but it was not possible to determine who was responsible for it and at which point the damage took place.
6. Bearing in mind the mostly coherent versions of the railwaymen, the committee assumed, that most probably trespassers were there on the track most probably trying to steal railway track material. However it did not believe the version presented by Mr ..., who claimed that he had seen the trespassers, however he had held a place in the trolley from which it would not have been possible to observe the track in the direction of travel.
7. The committee states that the presence of the trespassers on the running line was not enough to justify the stopping of the ZRM22 train for approx. 5 minutes without this fact being mentioned to the traffic inspector. From the explanations of the p-way gang railcar workers, it seems that after the railcar sounded its horn and stopped the trespasser ran away. The railwaymen were unable to inform the committee whether the trespassers were stealing anything or tampering with the permanent way or whether they had posed a danger for the continued move of the vehicle by not moving away from the track.

Summing up the above-mentioned details of the accident that have been established, it has to be said that the accident was caused by failure to adhere to the regulations that are in force on PKP PLK S.A. and in Przewozy Regionalne TOC, as well as by railwaymen not paying enough attention when performing their duties, i.e.:

1. The driver should have:
 - been carefully observing the signals displayed on the colour light semaphores and strictly followed their indications, as well as paying attention to the train that he was driving, as specified in the Instruction for the EMU and Locomotive Drivers (Instrukcja dla Maszynisty Pojazdów Trakcyjnych), Instruction 2, section 12, paragraph 2, subparagraphs 1 and 4, which he failed to do;
 - been observing the signals while driving the trains, and from the 240 automatic block semaphore, which was displaying the S5 signal (one orange light) indicating that the next automatic block semaphore 230 displayed the S1 ‘stop’ signal (red light), the driver should have regulated the speed in such a way that he could stop his train before the next signal displaying the ‘stop’ signal, as specified in Instruction Ie-1, section 3, paragraph 13, subparagraphs 1 and 5, which he failed to do;

- been observing the signals and indicators, and acted according to their indications, and observed whether there had been any obstacles on the track that was to be used by the train, as specified in Instruction Ir-1, section 63, paragraph 1, subparagraphs 3a and 3b, that he failed to do;
- stopped train 63130 before the automatic block semaphore 230 displaying the 'stop' signal. He may have continued if no other train or obstacle could have been seen from the train on the block section in front of him, and after giving a horn signal he should have continued carefully with speeds not exceeding 20 km/h and to regulate it in such a way to be able to stop the train in case of any obstacle seen as specified in Instruction Ir-1, section 63, paragraph 10. He continued despite seeing an obstacle on the track in front of him and an S1 'stop' signal displayed by the automatic block semaphore 230.

2. The permanent way trolley driver should have:

- been strictly adhering to the timetable agreed with the traffic inspector, and should have not stopped on the running line without the permission of the inspector, as specified in Instruction Ir-1, section 81, paragraph 9. Instruction Ir-1, section 81, paragraph 11 leads in consequence to the need for the permanent way trolley driver to adhere to the rules regarding the driving of a support vehicle under train rules described in Instruction Ir-1, section 63, paragraph 19, to which the driver did not adhere.
- contacted the signalbox immediately after the trolley stopped on the automatic block behind semaphore 230, according to the directions of Instruction Ir-1, section 63, paragraph 19, that he failed to do.

3. The track supervisor

- instructed the driver to stop the ZRM22 train without the authority of the maintenance train guard, which is against the Regulation of the Minister of Infrastructure listing the posts connected directly with the safety of rail operations;
- should have informed the traffic inspector immediately after the train had stopped, providing the reasons for the train to stop on the running line as specified in Instruction Ir-1, section 63, paragraph 19, that he failed to do.

4. The ZRM22 train was operated without the maintenance train guard, which is in breach of Instruction Ir-1, section 15, paragraph 7. The permanent way defect rapid removal team rulebook does not provide for such a job.

c) establishing of the causes of the accident

Direct cause of the accident:

Train 63130 not stopping before automatic block semaphore 230 displaying the S1 'stop' signal and crashing into the ZRM22 train (p-way gang railcar and trailer) that was parked 48 m behind the semaphore.

Original cause of the accident:

Wrong assessment of the situation by the track supervisor, which lead to the ZRM22 train stopping at km 22.857 on the 230 block of the automatic block of the Gliwice – Zabrze section, 48 m behind the automatic block semaphore 230 which was covering it, at the same time without informing the traffic inspector immediately.

Indirect cause of the accident:

- inadequate level of route observation by the driver while in charge of the 63130 train between the Automatic Train Stop electro-magnet before automatic block semaphore 240 and automatic block semaphore 230;
- incorrect driver's reaction to the indications of the automatic block semaphores 240 and 230;
- in adverse weather conditions (dusk and rain), the driver took the indication of the ToB forewarning signal as that of the automatic block semaphore 230.

d) establishing the accident category according to Annex 6 to the Regulation:

B04 - failure to stop a rail vehicle before a 'stop' signal or in a place where it should be stopped, or starting up a rail vehicle without the necessary authority.

e) other irregularities revealed during the proceedings that are not connected with the preventive outcomes with respect to the accident:

- The braking sheet for train 63130 is noncompliant with the regulation of the Minister of Transport No. 63 of 2 November 2006 with respect to the documents which should be present on a powered rail vehicle.
- Zakład Linii Kolejowych in Tarnowskie Góry shall develop point No. 33 of Gliwice Station Technical Rulebook with respect to the departure of maintenance trains on a 'clear' signal displayed on a semaphore, and shall delimit if this point deals with the train operations with automatic block devices functioning correctly.
- Insufficient time for a correct crew-changing process if the drivers are to change ('hand to hand').
- No entries in the IZ Tarnowskie Góry dispatcher's register concerning the order for departure for support vehicles and special rolling stock.
- No documentation (R-138) of the order of departure and train number issued by the line dispatcher of the Katowice branch.
- No written 'O' order requested by the master traffic inspector of the GIC signalbox for train ZRM22.
- Charts 5 and 7 of the R-146 operation logbook are not filled in according to Instruction Ir-1, section 36.
- ISE Gliwice did not provide the written order charts that were on the p-way gang railcar on the day of the incident.
- The p-way gang railcar driver departed on the ZRM22 train without collecting the 'O' written order.

- The driver of the p-way gang railcar exceeded the maximum speed allowed when going with trailer first of 40 km/h (Instruction Ir-1, section 82, paragraph 2, paragraph 5b).
- The EMU driver should have departed Gliwice with train 63130 on the Rp13 signal (train ... ready for departure) given by the train guard, but departed on the Rp14 signal (Passenger train departure), which was inconsistent with Instruction le-1, section 13, paragraph 1, subparagraph 3 and Instruction Ir-1, section 61, paragraph 1;
- The train 63130 train guard had given an incorrect signal Rp14 (Passenger train departure) for the train to depart Gliwice station. He should have given the Rp13 signal (train ... ready for departure), as this was inconsistent with the specification of Instruction le-1, section 13, paragraph 1, subparagraph 3 and Instruction Ir-1, section 61, paragraph 1.
- Zakład Linii Kolejowych in Tarnowskie Góry shall restore a transceiver conversation recorder on the GIC signalbox.

- Precautionary measures to be applied:

The committee required the EMU driver, the track supervisor and the permanent way trolley driver to be doing other jobs than they had been doing so far.

With respect to the other employees of ZLK Tarnowskie Góry, Śląski Zakład Przewozów Regionalnych in Katowice and Małopolski Zakład Przewozów Regionalnych in Kraków, the decisions will be made by the respective managers after the provision of the end report outcome.

- Recommendations and preventive conclusions in order to avoid such accidents in the future or limit their effects

1. The committee considers that the time that was earmarked for the crew change-over was inadequate, and therefore Przewozy Regionalne sp. z o.o. shall devise the required crew change-over time for a given type of vehicle according to the rules, regulations and instructions, and will suitably adjust the timetable.
2. Śląski Zakład Przewozów Regionalnych in Katowice will prepare an information newsletter about the accident.
3. Śląski Zakład Przewozów Regionalnych in Katowice and Małopolski Zakład Przewozów Regionalnych in Kraków shall describe all the aspects of the accident during the next periodical instruction for train crews on the basis of the newsletter prepared.
4. Zakład Linii Kolejowych in Tarnowskie Góry will regulate the regulations of support vehicle and auxiliary internal rolling stock operations compliant with Instruction Ir1 (R-1).
5. Due to the proximity of the ToB forewarning signal referring to the B semaphore of the Maciejów Północny junction and the automatic block semaphore 230 by track 2 of the Gliwice – Zabrze section, Zakład Linii Kolejowych in Tarnowskie Góry shall consider moving the ToB forewarning signal to automatic block semaphore 230, meeting the conditions included in the WTBE-10 instruction.
6. Zakład Linii Kolejowych in Tarnowskie Góry shall regulate the documenting of departure ordering for support vehicles and auxiliary rolling stock issued by the ZLK dispatcher.
7. Zakład Linii Kolejowych in Tarnowskie Góry shall bring the permanent way rapid defect removal team rulebooks up to date.
8. Zakład Linii Kolejowych in Tarnowskie Góry will ensure that at the next periodical instruction for the following posts:

- permanent way trolley driver,
 - maintenance train guard,
 - track supervisor,
 - station inspector
- all details of the accident will be discussed, based on the prepared newsletter.

Signatures of the committee:

1.
(signature and date)

2.
(signature and date)

3.
(signature and date)

4.
(signature and date)

5.
(signature and date)

6.
(signature and date)

7.
(signature and date)

8.
(signature and date)

9.
(signature and date)

For conformity with the original: Rafał Leśniowski