

**MINISTRY OF TRANSPORT, CONSTRUCTION AND MARITIME ECONOMY**  
**State Commission for Investigation of Railway Accidents**

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**REPORT No PKBWK/1/2013**  
**(EXCERPT)**

**from the investigation of category A 01 serious accident**  
that occurred on 3 March 2012 at 20:55 on the Sprowa-Starzyny section **on track No 1 at**  
**km 21.250 on line No 64 Kozłów-Konieczpol**  
**in the region of infrastructure manager PKP Polskie Linie Kolejowe S.A.,**  
**Zakład Linii Kolejowych in Kielce**

The report was approved by State Commission for Investigation of Railway Accidents  
Resolution No 1/PKBWK/2013

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**WARSAW, 15 February 2013**

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## REPORT

Prepared as a result of the post-accident proceedings carried out between 20 March 2012 and 20 December 2012 at the headquarters of the State Commission for Investigation of Railway Accidents (PKBWK) at the Ministry of Transport, Construction and Maritime Economy in Warsaw in connection with a category A 01 serious accident i.e. the dispatching of a rail vehicle onto an incorrectly set route and the dispatching of a train onto an occupied mainline track, resulting in a head-on collision of trains: Inter-Regio No 13126 of 'Przewozy Regionalne' Sp. z o.o. Warszawa Wschodnia-Kraków Główny service and TLK No 31101 of PKP Intercity S.A. Przemyśl-Warszawa Wschodnia service, that occurred on 3 March 2012 at 20:55 on the Sprowa-Starzyny section on track No 1 at km 21.250 on railway line No 64, in the region of infrastructure manager PKP Polskie Linie Kolejowe S.A. Zakład Linii Kolejowych in Kielce, by a PKBWK accident investigation team.

## 1. SUMMARY OF THE PROCEEDINGS

### 1.1. Decision to initiate proceedings regarding a serious accident, the composition of the commission and a description of the course of proceedings

The accident investigation team took over proceedings from the railway accident investigation team. Proceedings regarding the occurrence were commenced by the railway accident investigation team headed by Mr Jan Jakubczyk, traffic inspector of PKP PLK S.A. Zakład Linii Kolejowych in Kielce, which was appointed by decision of the Director of PKP PLK S.A. Zakład Linii Kolejowych in Kielce No IZESc-732-07/2012 of 5 March 2012.

A 'Protocol of the Examination of the Serious Rail Accident Site' in relation to the accident was prepared between 3 March 2012 and 16 March 2012 by the divisional railway accident investigation team led by Mr Tadeusz Ryś, Chairman of PKBWK composed of:

1. Tadeusz Ryś – Chairman of PKBWK
2. Jan Jakubczyk – IZKR1
3. Andrzej Wojtachnio – IZKD
4. Zdzisław Obrocki – IZAT
5. Mirosław Gózdź – IZEN
6. Janusz Bąbiński – IZATA2
7. Janusz Muszyński – ISEZ Włoszczowa Północ
8. Krzysztof Krawiec – ISE Sędziszów
9. Ireneusz Ceglarz – PRST Częstochowa PR Katowice – Section Head
10. Marek Kapusta – BZKET – Head of the Rolling Stock Operations Department of Zakład Południowy PKP Intercity

Then, on 20 March 2012, in accordance with the provisions of Section 10(1) and (2) of Ordinance No 59 of the Minister of Infrastructure of 11 December 2008 on the regulations regarding the actions of the State Commission for Investigation of Railway Accidents, in decision No PKBWK-076-89/TR/12 of 20 March 2012 the Chairman of PKBWK – Tadeusz Ryś – appointed a PKBWK accident investigation team operating as part of PKBWK to clarify the causes of the category A 01 serious accident that occurred on 3 March 2012 at 20:55 on track No 1 between Sprowa and signal box Starzyny signal box at km 21.250 on railway line No 64 Kozłów-Konieczpol. The following persons were appointed to the accident investigation team:

Wiesław Sroka - head of the accident investigation team, ad-hoc member of PKBWK, and as members of the accident investigation team:

Andrzej Gniwek – permanent member of PKBWK,

Andrzej Rodzik – ad-hoc member of PKBWK,

Witold Olpiński – ad-hoc member of PKBWK

to continue the investigation procedure.

Prior members of the railway accident investigation team composed of:

1. Jan Jakubczyk – PKP PLK S.A. ZLK Kielce,
2. Andrzej Wojtachnio – PKP PLK S.A. ZLK Kielce,
3. Zdzisław Obrocki – PKP PLK S.A. ZLK Kielce,
4. Ireneusz Ceglarz – 'Przewozy Regionalne' Sp. z o.o., Śląski Zakład Katowice,
5. Marek Kapusta – PKP Intercity S.A., Zakład Południowy Kraków,

established in item 8(5) of the 'Protocol of the examination of the serious accident site' of 16 March 2012, were obliged by the Chairman of PKBWK, in accordance with Article 28(h)(2)(3) of the *Rail Transport Act* of 28 March 2003 to cooperate with the accident investigation team pursuant to a written request addressed to their employers, and in due course to the Chairman of the PKBWK, in accordance with Article 28(h)(2)(3) of the *Rail Transport Act* of 28 March 2012 by decision No PKBWK-076-9/TR/12 of 22 March 2012 changed the makeup of the persons required to cooperate with the accident investigation team, appointing Mr Grzegorz Knapik from 'Przewozy Regionalne' Sp. z o.o. Śląski Zakład in Katowice to replace Mr Ireneusz Ceglarz from the same company.

## **I.2. Short description of the occurrence, location and time that the accident occurred and the effects thereof**

Location of the occurrence: line No 64 Kozłów-Konieczpol track No 1 on the Sprowa-Starzyny section.

On 3 March 2012 at Starzyny signal box at 20:00 the night shift was commenced by train dispatcher A.N. and at Sprowa signal box by train dispatcher J.S.

At 20:06 train No 13132 passed Starzyny signal box on route from semaphore C onto track No 2 on the Sprowa-Starzyny section, past turnouts Nos 3 and 4 in the minus position, maintaining and displaying them in the minus position.

At 20:14 train No 31523 passed Starzyny signal box on track No 1 Sprowa-Starzyny from Sprowa signal box on the track running from semaphore B onto the Psary-Starzyny mainline track through turnout No 4 in the plus position, maintaining and displaying control over the position of turnouts 3/4.

While the route from Psary station in the direction of Sprowa signal box on track No 2 on the Sprowa-Starzyny section was being prepared for train No 13126 at Starzyny signal box, at approximately 20:35 during the change of positions of turnouts No 3 and 4 there was a loss of signal of the control of the minus position.

At 20:40 train No 13127 left Psary station and stopped under semaphore C at Starzyny signal box. In the meantime, train dispatcher A.N. – according to his statement – checked the position of turnouts Nos 3 and 4 on the ground to prepare the departure of the train onto track No 2 on the Sprowa-Starzyny section. He took four switch lock keys for the locks installed on the turnouts (3+, 3-, 4+, 4-) with him, however, he did not take the crank for manually adjusting the switches. Despite a lack of control over the positions of switches Nos 3 and 4, he did not secure them to the ground using the switch locks and returned with the keys to the control room.

Train dispatcher A.N. informed the driver of train No 13127, who had stopped at entry semaphore C, about driving on a substitute signal, and at 20:46 he displayed the substitute signal on semaphore C due to a lack of control over the position of the switches at turnouts Nos 3 and 4.

In the meantime, at Sprowa signal box at 20:46 a permission signal was displayed on semaphore A from track No 2 on the Kozłów-Sprowa section for travelling on track No 1 on the Sprowa-Starzyny section for train No 31101. At Starzyny signal box at 20:48 train No 13126 left on track No 1 in the opposite direction to the main direction on the Sprowa-Starzyny section through turnout No 4, turnouts Nos 3 and 4 were showing a breakage signal while train No 13126 was driving onto turnout No 4, after which mainline track No 1 showed as occupied, signalled at both signal boxes by the relevant repeater signals. The permission signal on semaphore A at Sprowa signal box was turned off, due to it being occupied. While train dispatcher A.N. was forwarding information about the departure of train No 13126 from Starzyny, dispatcher J.S. informed him about turning off semaphore A for train No 31101, and train dispatcher A.N. at the same time used the **dPo2S** button, which made the block signal arrows on track No 2 light up in red at Sprowa and Starzyny signal boxes, informing about the train being dispatched from Starzyny onto mainline track No 2. After semaphore A was turned off, the driver of train No 31101 established radio communications with the Sprowa train dispatcher, who informed him about the need to drive on the substitute signal and requested that the moment of it being given be reported.

At 20:49:47 the train dispatcher at Sprowa signal box displayed the substitute signal with the W24 indicator (**NSz** command) on semaphore A.

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At 20:52:04 train No 31101 departed on track No 1 in the main direction on the Sprowa-Starzyny section. At approximately 20:55 there was a head-on collision of both trains on track No 1 at km 21.250.

As a result of the collision, 16 people died at the scene, including five rail operator employees, and 61 people were seriously injured.

The railway rolling stock and train wagons were damaged, including the total destruction of two locomotives and four passenger coaches, and damage to seven passenger coaches from both trains. Also damaged were elements of rail infrastructure (superstructure, contact network) at the site of the occurrence.

### **I.3. Description of the direct cause of the serious accident and intermediate causes established in proceedings**

Causes of the occurrence:

c) Direct cause:

- the Starzyny signal box train dispatcher dispatching train No 13127/6 on a substitute signal onto mainline track No 1SS in the opposite direction to the main direction instead of onto track No 2SS on an incorrectly set up and unsecured route, and the Sprowa signal

box train dispatcher dispatching train No 31101 on a substitute signal onto occupied mainline track No 1SS.

c) Primary cause:

- the Starzyny signal box train dispatcher failing to comply with the provisions of the internal rules regarding procedure in the event of an inability to properly change the coupled turnouts Nos 3 and 4 electrically from the control panel to the minus position (diverging track), resulting in a loss of control of their position while attempting to prepare the route for train No 13127/6 at Starzyny signal box.

c) Indirect causes:

- train No 13126 departing from Starzyny signal box and continuing its journey along track No 1SS on the Sprowa-Starzyny section in the opposite direction to the main direction on an **Sz** signal without indicator W24, not authorising such travel,
- train No 31101 departing from Sprowa signal box and continuing its journey along track No 1SS on the Sprowa-Starzyny section in the main direction on an **Sz** signal with indicator W24, not authorising such travel,
- incorrect execution of tasks by the Starzyny train dispatcher, comprising:
  - improper checking and failure to locally secure turnouts Nos 3 and 4 on the ground in a situation where there was a lack of control over the positions of the switches,
  - giving permission for train No 13127/6 to proceed (by displaying a substitute signal) when there was a lack of control, and without locally securing the switches,
  - failure to react to a breakage signal for turnouts Nos 3 and 4 when train No 13126 was passing through – tracking the occupancy status of remaining sections,
  - failure to properly observe the passing of the train in the switch circuit with and without the use of **railway traffic control** devices,
  - incorrect confirmation of the departure of train No 13126 onto mainline track No 2SS to Sprowa signal box using **semiautomatic line block** devices, contrary to the actual situation,
- incorrect execution of tasks by the Sprowa train dispatcher, comprising:
  - incorrect interpretation of the information concerning the unexpected occupancy of mainline track No 1SS, which caused the permission signal on the semaphore to turn off, while mainline track No 2SS was unoccupied,
  - failure to react to mainline track No 2SS not displaying as occupied after the information 'train on route' displayed, which was illustrated by the red colour of the block signal arrow from Starzyny signal box on this track,
  - failure to apply the provisions of internal rules involving ignoring warnings while executing special instructions – issuing a substitute signal for train No 31101 – without verifying their validity,
  - failure to use the 'Alarm' function in the radio system and failure to take other immediate actions when there was doubt as to the correctness of the dispatch of train No 13126 from Starzyny signal box,

- insufficient supervision of the operation of block posts, train teams and the process of modernisation and the state of maintenance of infrastructure, including, in particular:
    - the management of the Operation Section (ISE) of Włoszczowa allowing train dispatcher A.N. to work, and this train dispatcher commencing work without him confirming he was aware of the changes to the Technical Regulations of Starzyny signal box following the alteration of *railway traffic control* devices,
    - irregularities as regards training and authorisation of train dispatchers at Sprowa signal box and Starzyny signal box following the alteration of *railway traffic control* devices,
    - outdated and incorrect records in technical regulations at signal boxes,
    - leaving the wrong device showing switch turnout power to be flowing in the control panel of Starzyny signal box when changing these drivers during modernisation,
  - the following entities deliberately concealing the fact that train No 35103 had been dispatched in the wrong direction on 2 March 2012 by train dispatcher A.N. of Starzyny signal box:
    - line dispatcher T.B. PKP PLK S.A. – Railway Traffic Management Centre – Branch Office in Lublin,
    - train dispatcher A.G. of Koniecpol station,
    - train dispatcher J.S. of Sprowa signal box,
    - train team of train No 35103.
- c) Systemic causes:
- the limited effectiveness of internal checks in the areas of operation and maintenance, not carried out in accordance with accepted principles and the organisational structure of a unit (Railway Operator) that results from those principles; namely the practice of allocating checks to a management representative from the same entity as that being inspected and who was also generally responsible for operating results,
  - imprecise and restrictive rules as regards the use of substitute signals, including:
    - conditions for displaying a substitute signal, making use of this signal too easy when managing traffic – the Regulation on general conditions for railway traffic management and signalling and the resulting provisions of Instruction Ir-1 enable easy use of *Sz*, resulting in this signal being frequently used,
    - detailed rules allowing the use of substitute signals in signal boxes without approach semaphores and the validity period of such permits – lack of appropriate regulations in this regard in the Technical Guidelines for the Construction of *Railway Traffic Control* devices (WTB-E10),
  - insufficient frequency and number of hours of training for employees of infrastructure managers and rail carriers in positions directly related to train movements and train driving (e.g. three times a year, 16 hours total at PKP Intercity S.A., two times a year eight hours each at Przewozy Regionalne Sp. z o.o., once a year eight hours at PKP PLK S.A. with no requests for additional training for employees in supervisory and control positions), caused by a lack of legislation imposing minimum requirements in this regard.

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- c) Irregularities found during the investigation that were not directly related to the occurrence:
- lack of supervision and control during operation in terms of the work of train dispatchers and employees of infrastructure maintenance services, consisting of, in particular:
    - lack of reaction to repeated faults entered in books E 1758,
    - lack of analyses of conversation recordings using various means of operational communications.
  - entries in notebooks Nos 209 and 217 of the official timetable (RJ) 2011/2012 regarding the symbols used in automatic and semiautomatic line block devices and compliance with the rules of departure onto a route in the opposite direction to the main direction of travel on individual routes covered by these timetables, not corresponding to the actual situation on 3 March 2012,
  - mistakes made by train dispatcher A.N. of Starzyny signal box on 2 March 2012, i.e. on the day preceding the category A 01 serious accident on the Sprowa-Starzyny section due to his not being competent to carry out the duties of this position, consisting of, in particular:
    - incorrect recording of train numbers in traffic management journals,
    - ignoring warnings of train dispatchers from neighbouring boxes regarding mistakes in passing on train numbers,
    - incorrect logging of train arrival and departure times,
    - lack of knowledge of train timetables on the signal box operated,
    - lack of knowledge of proper and safe backing up of a train from a route,
    - dispatching train No 35103 to Koniecpol station without permission,
    - incorrect keeping of documentation, namely confirming a train's travel and documenting the dispatching of train No 35102 from Starzyny to Psary and the dispatching of this train from Starzyny to Koniecpol at the same time,
    - incorrect keeping of documentation R-146 regarding the time of train No 35103 entering the Starzyny-Koniecpol section by train dispatcher A.N. of Starzyny signal box and train dispatcher A.G. from Koniecpol station,

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- failure of train dispatchers at Sprowa signal box to log in and log out on the day of the occurrence,
- improper signalling of time-related speed limits on the Knapówka-Psary section on 3 March 2012 at the site of work being carried out,
- irregularities in the receipt of written instructions given via radio,



- lack of a W28 indicator, which was not set after completion of modernisation works at the exit of Kozłów station on line No 64 Kozłów-Konieczpol,
- irregularities as regards the state of *railway traffic control* devices (push-in fuses for damaged and incorrectly repaired light circuits, lack of maintenance of relays) at Starzyny signal box, also left in this state after reconstruction,
- operation of railway traffic control devices without restrictions at Sprowa signal box without obtaining certification from the UTK for type compliance of these devices,
- lack of regulation regarding the rules and frequency of ongoing testing of the Radiostop system by service personnel, as required by Instructions Ir-5 and Ie-14,
- imprecise traffic regulations (in particular Ir-1) regarding the area of responsibility and responsibility of the train manager regarding the state of rail traffic safety, including observation of signalling indications when the train manager is not in the traction vehicle cab,
- incorrect ergonomics of the Kozłów station train dispatcher's position consisting in leaving the block control panel and additionally equipping this position with an excessive number of monitors showing the state of various parts of the infrastructure, including the traffic situation at Sprowa signal box (without the Kozłów train dispatcher being required to observe it as per regulations),
- insufficient preparation of some basic-level employees of the infrastructure manager and rail carriers, in particular as regards ongoing maintenance work and after modernisation of rail infrastructure devices, arising first and foremost from a lack of personnel education opportunities in the system of sector-related secondary and professional education, resulting in employment of personnel who are not predisposed to work in positions related to train traffic safety and the operation of modern equipment.

#### **I.4. Specification of factors that influenced the occurrence of the accident**

The factors described in subsection I.3 regarding direct, intermediate and systemic causes of the accident and a lack of implementation and audit, at Zakład Linii Kolejowych (IZ) PKP PLK S.A. in Kielce of relevant procedures for the Safety Management System applicable at this rail infrastructure manager.

#### **I.5. Main recommendations and the recipients of these recommendations**

##### **I.5.a) Recommendations of the railway accident investigation team**

- 2) Removal from duties of train dispatchers A.N. and J.S., employees of Zakład Linii Kolejowych Kielce, until the circumstances of the occurrence have been clarified.
- 2) Introduction of telephone announcing of trains on routes adjacent to Sprowa signal box until the causes of the occurrence have been determined.

### **I.5.b) Recommendations of the State Commission for Investigation of Railway Accidents**

#### Interim recommendations of the Chairman of the PKBWK of 14 March 2012

By way of letter No PKBWK-076-83/RL/R/12 of 14 March 2012 addressed to the Office of Rail Transportation PKBWK recommended that infrastructure managers and rail carriers implement the following measures under the supervision of the UTK:

- 5) to make changes to the internal regulations of PKP PLK S.A. (in particular Instruction Ie-1) and other relevant internal regulations of other infrastructure managers, introducing an obligation to illuminate the head of a train or other rail vehicle with a Pc2 signal (two white lights and one red light), when it is travelling on a mainline track in the opposite direction to the main direction, irrespective of the type of block system used,
- 5) infrastructure managers are to undertake measures, in consultation with the President of the Office of Rail Transportation, to develop an indicator set up on the border of the dispatching signal box and section next to the track, which would notify that the rail vehicle departing from that signal box departed on the mainline track towards the next signal box in the opposite direction to the main direction and may continue its journey only based on a signal on a semaphore with a 'W-24' indicator or 'N' order displayed,
- 5) regular synchronisation with real time: internal time systems in conversation recorders, computer systems and other time-recording devices; the synchronisation periods should be agreed upon with the President of the Office of Rail Transportation,
- 5) conducting an extraordinary inspection of devices recording events and conversations on mobile announcing devices and radio communications as regards the continuity of their operation,
- 5) verification of the technical regulations of stations and other block signal boxes with an analysis of the responsibilities of the employees at these signal boxes in the event a situation not described in the provisions occurs (abnormal situations) in particular during the operation of new types of devices not covered in the Managers' internal regulations.

#### Recommendations of the PKBWK accident investigation team

The PKBWK accident investigation team recommends the implementation of the following measures:

- 19) Starting with upcoming training for train teams and train dispatchers, including in such training, in particular, the rules for issuing **Sz** and travelling on **Sz** in connection with displaying a W24 indicator and others affecting traffic management methods. These rules should be taken into account and better defined when the internal regulations of PKP PLK S.A. are updated.

The training should also discuss issues regarding receipt of written instructions via radio communication and the conduct of traction teams after a radio communication channel is changed.

- 19) For training of train dispatchers on simulators (if positions are equipped with computer devices) the rules of conduct if **railway traffic control** devices fail should be covered. Training, especially regarding failures, should be repeated periodically.

- 19) PKP PLK S.A. should carry out checks as regards the correctness of data given to rail carriers, and whether it is up-to-date or not regarding descriptions of infrastructure, and these data should be included in Internal Timetable notebooks.

- 19) For design and implementation of structural changes to turnouts, to include their effects on the dimensions of switch and control housings, so as to avoid shorting the electrical circuits of turnout occupancy checks as a result of any introduced changes. The housing dimensions are to also be amended in turnouts that are already encased, if such shorting is possible.

- 19) The UTK should analyse previously released permits for assembly and operation of signals from **Sz** at signal boxes without approach semaphores in terms of the validity of their continued use.

- 19) It is essential always to comply with updated technical regulations and other documents regarding positions at block signal boxes after assembly or modernisation of new **railway traffic control** devices.

- 19) PKP PLK S.A. should inspect the method of authorisations being carried out and records in documentation and authorisation regarding the execution of duties in a given position. If there are any discrepancies with the provisions of Instruction Ia-5, training and authorisations should be carried out again.

- 19) It is necessary to introduce a rule regarding mandatory authorisations for positions if there has been a modernisation or replacement of *railway traffic control* devices.
- 19) The Ie instruction set should be amended to include general principles of operation of computer *railway traffic control* devices.
- 19) Instruction Ie-104 and other internal documents, including instructions for operation of line blocks, should be changed so that the description '*train on the track*' pictured as a red arrow be replaced with the description '*set block direction used*' with a comment that the display of this image does not actually mean that a mainline track is occupied by a train.
- 19) In the provisions of the ordinance of 18 July 2005 on *the general conditions for managing railway traffic and signalling devices* (Journal of Laws of 2005 No 172, item 1444, as amended) and the resulting Ir-1 instruction the provisions regarding the method of conduct and responsibilities of a train manager as regards rail traffic safety when a train manager is not present in the cab or a traction vehicle should be clarified.
- 19) Section 63(4) of Instruction Ir-1 on train traffic management should be amended to include an additional subsection instructing that a train should be stopped, reading as follows: '*a train was directed onto the right track, with indicator W24 displayed*', and Section 57(4) of this instruction should be amended to include an additional point, e.g. 7(a) reading as follows: '*permission to continue journey of a stopped train directed onto the right track, when its front passed a semaphore with indicator W24 displayed*'.
- 19) Verification is required of the number of internal inspections regarding:
- a) the obligation of periodic (as specified in internal regulations) playback of conversations carried out using communications and radio communications,
  - b) the correctness of provisions of operation and maintenance documentation kept at block signal boxes, including in traffic management journals, in particular as regards currency and clarity,
  - c) the types and frequency of repeated faults of *railway traffic control* devices and the accuracy of descriptions and their signs, causes and the scope of repair activities carried out.

- 19) In accordance with the requirements of Section 19(7) of instruction Ie-5, the internal regulations should be better defined regarding the rules of ongoing testing of the Radiostop system by service personnel, as required by item 4 of this paragraph, in accordance with the documentation of individual radio-communications device types.
- 19) Analyse the internal regulations of infrastructure managers and rail carriers as regards the frequency and duration of training of personnel employed in positions directly related to rail traffic safety and personnel driving rail vehicles. The minimum frequency of such training should not be less than three times a year, with a total number of hours of this training depending on the position held.
- 19) In Section 105(6) of the ordinance of 18 July 2005 on the general conditions for managing railway traffic and signalling devices (Journal of Laws of 2005 No 172, item 1444, as amended) and the resulting provisions of instruction Ie-1, a provision should be made regarding the ditch lights of trains and rail vehicles on a closed track:
- 'For trains or other rail vehicles travelling in the main direction on a closed track of a two-track railway line, at night, the Pc 1 signal should be used to mark the front of the train and a Pc 2 signal for its back, and if the train is driving in the opposite direction to the main direction on a closed track of a two-track railway line, the front of the train should display the Pc 2 signal and the back the Pc 1 signal, not changing the ditch lights while stopping on a route.'*
- 19) In the provisions of the ordinance of 18 July 2005 on the general conditions for managing railway traffic and signalling devices (Journal of Laws of 2005 No 172, item 1444, as amended) and the resulting provisions of instruction Ir-1, a provision should be introduced regarding a significant reduction in the use of *Sz* and a tightening of the procedures regarding its use each time.
- 19) In the provisions of the ordinance of 18 July 2005 on the general conditions for managing railway traffic and signalling devices (Journal of Laws of 2005 No 172, item 1444, as amended) and the resulting provisions of instruction Ie-1, provisions should be introduced clearly specifying which indicators apply despite the issue of a substitute signal.
- 19) In the *Technical Guidelines for railway traffic control device construction* (WTB-E10), detailed rules should be introduced regarding the use of substitute signals at signal boxes without exit semaphores, and the duration of such permits

should be determined, and such a permit should apply only in the case of frequent mainline track closures, e.g. during periods of intensive construction and renovation work.

The recipients of all recommendations are rail market operators, over which the President of the Office of Rail Transportation exercises statutory supervision. In accordance with Section 28(1)(4) and (8) of the Rail Transport Act of 28 March 2003 (consolidated text Journal of Laws of 2007 No 16, item 94), these recommendations are given to the President of the Office of Rail Transportation and stakeholders. Individual entities should implement the recommendations that are contained in this Report by the accident investigation team and approved by a PKBWK resolution.