

Investigation Report of a Railway Accident



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Drážní inspekce
The Rail Safety Inspection
Office

INVESTIGATION REPORT OF A RAILWAY ACCIDENT

Fire on the traction unit of train R 766 while underway between Přovany railway station and Vranov u Stříbra railway station on the Pilsen hl. n. to Cheb open railway line

Wednesday, 30 July 2008

INVESTIGATION REPORT OF RAILWAY ACCIDENT

Fire in rolling stock of fast train No 766 underway between Přovany and Vranov u Stříbra stations

Wednesday, 30 July 2008

Ref. No.: 6-08/2469-ÚI4

Investigation Report of a Railway Accident

SUMMARY

Grade: accident
Date and time: 30 July 2008, 22:29 (20:29 GMT)
Occurrence type: fire in rolling stock of fast train No 766

Description: fire in fast train No 766 (locomotive + first carriage) while underway

Type of train: fast train No 766

Location: open line between Přovany and Vranov u Stříbra stations, km 374.100

Parties: České dráhy, a. s. (RU)
Správa železniční dopravní cesty, s. o. (IM)

Consequences: no fatality no injury
total cost CZK 7,326,528.40

Direct cause: rolling stock (locomotive) / on train equipment / equipment failure

Underlying cause: maintenance planning and organisation

Root cause: organisation of work / safety policy

Recommendations: Addressed to České dráhy, a. s.:

1) In the interests of railway safety it is recommended to make maintenance organisation rules compliant with valid national legislation and rolling stock manufacturers' recommendations.

2) It is recommended to take measures preventing managers from ordering staff to break the rules.
Addressed to The National Safety Authority (Drážní úřad):

3) It is recommended to check whether the railway undertaking meets safety requirements each time it reports any change to parameters which are relevant to the safety certification process.

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1 SUMMARY

Grade: accident

Date and time: 30 July 2008, 22:29 (20:29 GMT)

Description: fire of fast train No 766 (locomotive + first carriage) while underway

Location: open line between Přovany and Vranov u Stříbra stations, km 374.100

Parties: Správa železniční dopravní cesty, s. o. (operator of the railway)
České dráhy, a. s. (operator of train R 766)

Consequences: There were no injuries or fatalities

Total cost: CZK 7,326,528.40

Direct cause: A loosened power cable on the intermediate terminal board of the 4th traction motor of the traction unit, which resulted in an arc discharge, and as a consequence of the increased temperature, the ignition of flammable materials near the intermediate terminal board.

Underlying cause: Non-compliance with the provisions of the internal regulation for maintenance organisation, i.e. of regulation ČD V 25

Cause in the safety system: Non-compliance with the conditions stipulated by the Act on Railways for operating railway vehicles, on the basis of which the operator's safety certification was issued

Safety recommendations: Addressed to ČD, a. s.:

Take effective measures comprising of the harmonisation of internal regulations and orders for the organisation of maintenance of railway vehicles with valid legislation (recommendations of the manufacturer of the railway vehicles) in the interests of railway safety;

Stipulate effective measures restricting toleration or ordering staff to breach rules.

Addressed to The National Safety Authority: Adopt special measures comprising the verification of whether the operator meets, in all aspects, the safety requirements for operating railway transport, not only when submitting an application for the issue of operator's safety certification, but also after any eventual subsequent changes to the data the operator submitted when applying for the issue of the safety certification.

2 INFORMATION RELATING TO THE INCIDENT

2.1 Incident

2.1.1 Date, exact time and location of the incident

The incident occurred on 30 July 2008 at 22:29 on the Pilsen hl. n. to Cheb open railway line (line 713B) between the railway stations Pňovany and Vranov u Stříbra, at km 374.100.

2.1.2 Description of the incident and the location of the incident, including the activities of the integrated rescue system and the rescue services

The incident location is found in the Pilsen Regional Operation Centre zone ('ROC'), Pilsen junction railway station zone, on a single-line section of the electrified open Pilsen hl. n. to Cheb line.

While train R 766 was underway, before Pňovany railway station officers of the Czech police who were escorting the train noticed flames coming from the chassis of the traction unit. They reported this to the head guard of the train, who then called, using his mobile telephone, the dispatcher of the Pilsen – Cheb line with remote-controlled safety equipment ('RCSE'). Using a TRS radio system, the RCSE dispatcher instructed the engine driver to immediately stop the train due to a fire in the traction unit. After the train stopped at km 374.100 the driver, in cooperation with the head guard and the police officers, commenced extinguishing the fire; they were however unable to localise it. The fire gradually spread to the first wagon behind the traction unit. For safety reasons around 20 passengers were transferred to the last wagon.

At the incident location elements of the integrated rescue system ('IRS') – the Pilsen Region Fire Rescue Service – Stříbro and Nýřany stations, Fire Rescue Service of the Railway Infrastructure Administration, state organisation ('SŽDC, s. o.') Pilsen, the Pňovany Voluntary Fire Brigade and the Czech police district department of the town of Touškov. No ambulances were put into action.

2.1.3 Decision to commence an investigation into the causes and circumstances of the incident, the composition of the team of experts and the method of investigating the causes and circumstances of the incident

The incident was reported by the Rail Safety Inspection Office to the Prague Central Reporting Office ('PCRO') by an employee of the operator, ČD, a. s., on 31 July at 00:51. At 00:52 a PCRO employee, on the basis of the reported facts, decided to initiate a call-out to the location and the commencement of an investigation into the causes and circumstances of the origin of the incident. To the incident located was sent a senior inspector from The Rail Safety Inspection Office of the Pilsen Territorial Inspectorate. On behalf of the operator, ČD, a. s., and the railway operator SŽDC, s. o., on the basis of the Contract for Cooperation in the Investigation of Railway Incidents and Fatal and Serious Injuries at Work of 30 June 2008, the senior inspector of the Pilsen Regional Railway Safety Inspectorate - the authorised professionally competent person - was authorised to investigate the causes and circumstances of the incident.

The actual investigation into the causes and circumstances of the incident was carried out pursuant to Section 53 letter b) of Act No 266/1994 Coll., on Railways, as amended ('Act No 266/1994 Coll.') and Section 11 and Section 12 of Regulation No 376/2006 Coll., on the management system for rail operation safety and rail transport safety, and on procedures in the event of the occurrence of accidents and incidents in rail systems ('Regulation No 376/2006 Coll.')

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2.2 Circumstances of the incident

2.2.1 Employees of the infrastructure manager and the operator involved, persons in contractual relationships and other participants and witnesses

Employees of the infrastructure manager and the operator involved:

- driver of train R 766, employee of ČD, a. s., Railway Vehicle Depot ('RVD') Pilsen, Pilsen Operational Unit ('OU');
- head guard of train R 766, employee of ČD, a. s., Passenger Transport Train Escort – Karlovy Vary Regional Train Escort Centre, Home Station Cheb;
- person controlling rail transport ('the dispatcher') at Pňovany railway station, junction railway station Pilsen, employee of ČD, a. s., which on the basis of THE CONTRACT FOR RAILWAY OPERATION concluded between SŽDC, s. o. and ČD, a. s. on 30. 06. 2008, with effect from 01. 07. 2008, operates, for the operator SŽDC, s. o., the railway equipment, organises railway transport and manages railway traffic;
- RCSE dispatcher, employee of operator ČD, a. s., which on the basis of THE CONTRACT FOR RAILWAY OPERATION concluded between SŽDC, s. o. and ČD, a. s. on 30. 06. 2008, with effect from 01. 07. 2008, operates, for the operator SŽDC, s. o., the railway equipment, organises railway transport and manages railway traffic.

Other persons involved:

- officers of the Czech police escorting train R 766.

2.2.2 Trains and their composition, including the registration numbers of the individual railway vehicles

The base railway station for train R 766 was, due to a line closure, the Prague-Smíchov railway station and the destination railway station was Cheb. The train was composed of a 242.264-0 traction unit from RVD Pilsen and 8 passenger wagons (wagon series and reg. No B 51 54 20-41 754-2, wagon series and reg. No B 51 54 20-41 786-4, wagon series and reg. No B 51 54 20-41 698-1, wagon series and reg. No B 51 54 20-41 676-7, wagon series and reg. No B 51 54 20-41 788-0, wagon series and reg. No Ds 50 54 95-40 039-0, wagon series and reg. No Bdbmsee 50 54 82-70 041-4 and wagon series and reg. No A 51 54 19-41 092-0). The train was 216 metres in length, had 36 axles, an operating weight of 358 tonnes, a total weight of 442 tonnes, required braking percentage 78% and actual braking percentage 117%.

ČD, a. s. is the owner of all the railway vehicles.

2.2.3 Description of the part of the track and of the safety system (i.e. in particular the condition of the tracks, points, signal boxes, signalling devices and the train safety equipment)

Pňovany railway station is located at km 372.150 of the electrified Pilsen hl. n. to Cheb line. In the Pňovany railway station – Vranov u Stříbra railway station section there is an overhead line powered with a single-phase alternating 25 kV/50 Hz current.

The station is equipped with ESA 11 category 3 safety equipment ('SSE') with a unified operational centre ('UOC') with the possibility of remote operation from the RCSE Pilsen service office. On 28.11. 2007, the Prague National Safety Authority issued for the SSE a 'Compliance Certificate' under ref. No PZ 2270/07-E.49, valid for an indefinite period of time. The last regular inspection of the SSE was carried out on 25. 07. 2008 with the result: 'Equipment tested, in order – complies with standard condition'.

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At the time of the incident the dispatcher at Pňovany railway station controlled the SSE at Vranov u Stříbra railway station. The centrally controlled points and derailling stops are switched using electric three-phase motors. The safety equipment was designed for a speed of 160 km/h on the main rails. Points with a through speed of over 120 km/h are supplemented by position sensors to verify their position and check for any approach from the wrong direction. In the Pňovany railway station zone, track circuit 275Hz type KOA-1 and a Frauscher axle counter are used to check whether line sections are free or occupied and for the interaction of railway vehicles with the safety equipment.

The single-line section between Pňovany railway station and Vranov u Stříbra railway station is equipped with category 3 track safety equipment ('TSE') – automatic block bidirectional three-position type ABE-1, with transfers of train control codes in both directions, with a 75 Hz coding frequency, with full blocking condition set when a train enters the line. KOA-1 track circuits are used for checking whether a line is free. The two-track section between Kozolupy railway station and Pňovany railway station is equipped with category 3 TSE – automatic block bidirectional three-position type ABE-1, with transfers of train control codes in both directions, with a 75 Hz coding frequency, with full blocking condition set when a train enters the line. KOA-1 track circuits are used for checking whether a line is free.

2.2.4 Use of means of communication

In connection with this incident the following means of communication were used:

- a mobile telephone, used by the head guard on train R 766 to alert the RCSE dispatcher regarding the fire on the traction unit;
- a TRS radio system located at the RCSE operations office, operating on frequency 467.875 MHz, used by the RCSE dispatcher to communicate with the driver of train R 766.
- vehicle radio system TRS type Locomotive Set VS47, located on traction unit 242.264-0, working on the frequency 467.875 MHz, used by the driver of train R 766 to communicate with the RCSE dispatcher.

2.2.5 Work carried out at the incident location and in its vicinity

There was no work being carried out either at the incident location or in its vicinity.

2.2.6 Activation of the railway incident plan and the sequence of events

The railway incident plan was activated pursuant to Regulation No 376/2006 Coll. RCSE Dispatcher Pilsen proceeded pursuant to internal regulation ČD D 17 Regulation for incident reporting and investigating, PART TWO REPORTING INCIDENTS, Chapter I 'Reporting obligation' Article 42 and 46. The incident was reported pursuant to the REPORTING PLAN to the ROC Pilsen head dispatcher, who subsequently reported the incident to the Regional Railway Transport Safety Inspectorate ('RRTSI') Pilsen. The RRTSI Pilsen head inspector, authorised professionally competent person in the sense of Section 9 Regulation No 376/2006 Coll., reported the incident to The Rail Safety Inspection Office PCRO on 31. 07. 2008 at 00:51.

2.2.7 Activation of the integrated rescue system plan, police, and medical rescue service, and the sequence of events

The IRS plan was activated at the same time as the incident was reported by the authorised professionally competent person in the sense of Regulation No 376/2006 Coll. The Pilsen Region Fire Rescue Service – Stříbro and Nýřany station, Fire Rescue Service SŽDC, s. o., Pilsen, the Pňovany Voluntary Fire Brigade and the Czech police district department of the town of Touškov all operated at the incident location. The medical rescue service was not put into action.

2.3 Fatalities, injuries and property damage

2.3.1 Passengers and third parties, employees of the infrastructure manager and the operator, including persons in contractual relationships

The incident did not have any impact on the health of employees of the infrastructure manager and the operator, or any other persons.

2.3.2 Transported items, luggage, and other property

There was no damage to transported items, luggage or other property.

2.3.3 Railway vehicles, parts of the railway infrastructure, and the environment

The commission inspection carried out on 06. 08. 2008 at RVD Pilsen discovered the following extent of the damage:

- to the 242.264-0 traction unit

- completely burned out driver cabin No 2, including the dividing wall;
- cabling and other parts of the whole engine room affected by heat;
- defective roof-mounted lightning arrester;
- burned out intermediate terminal board of the 4th traction motor ("TM") including the cabling to the TM;
- cracked supporting insulator of the 2nd accumulator;
- burnt paint on the brackets of the 2nd accumulator;
- damaged piping for the lubrication flange for the 4th axle;
- 4th TM affected by heat;
- burned sleeve of the 4th TM;
- heated connection of the intermediate terminal board of the 4th TM.

- to wagon B 51 54 20-41 754-2

- half the interior of the wagon was completely destroyed by the fire, while the remainder was irreparably damaged by the heat and smoke. In view of the extent of the damage, this wagon will no longer be operated. The final total of the damage will be stipulated on the basis of an assessment by an expert witness.

The damage calculated by the infrastructure manager and operator:

- to the traction unit CZK 6,828,000
- to the wagon CZK 426,808.40 (net book value)
- to the infrastructure equipment CZK 71,720
- there was no damage to the environment.

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- total material damage CZK7,326,528.40

2.4 External circumstances

2.4.1 Weather conditions and geographical data

The incident occurred during the night, +25 °C, clear skies, no wind.

3 RECORD OF STATEMENTS SUBMITTED

3.1 Summary of statements submitted (subject to identity protection)

3.1.1 Employees of the infrastructure manager and the operator, including persons in contractual relationships

- In the 'Employee Record' statement, the driver of train R 766 stated apart from other things that: 'After Pňovany railway station the RCSE dispatcher called via the TRS saying that he had been informed by the head guard by mobile telephone that there were flames coming from the rear of the chassis. I immediately stopped the train and saw small flames coming from the centre of the rear chassis. I used the fire extinguisher from the locomotive, while the head guard brought fire extinguishers from the wagons, but they were not enough to localise the fire. I used the TRS to tell the RCSE dispatcher to call the HZS. I also requested that the traction current be switched off. The fire subsequently spread to the 1st wagon, and so the head guard moved the passengers into the wagons behind it...'
- In the 'Employee Record' statement, the head guard of train R 766 stated apart from other things that: '... while travelling towards railway station Pňovany, officers of the Czech police who were escorting the train notified me that they had seen flames coming from the chassis of the traction engine. I reported this situation to the RCSE dispatcher Pilsen, who then informed the driver, who then stopped the train after Pňovany railway station... Together with the police officers we collected all the fire extinguishers and attempted to put out the fire. I then notified the Stříbro station dispatcher by telephone of this situation. The flames spread through the locomotive. Later the traction current was switched off. We transferred around 20 passengers to the last wagon, which was at a safe distance...'
- In the 'Employee Record' statement the Pňovany railway station dispatcher stated apart from other things that: '... Until fast train R 766 passed through, the shift had been completely uneventful. For the pass-through of this train I set the route along the 2nd station track. The fast train did go through on that track and still nothing gave any hint of anything unusual, nor was I notified about anything out of the ordinary by anybody... It was only after the train passed through Pňovany that I was informed by telephone by the RCSE dispatcher, that R 766 had stopped due to the notification of a fire on the traction engine between Pňovany station and the Sulislav stop. The dispatcher also informed me that the fire service and the investigation bodies had already been informed...'

3.1.2 Other persons

No explanations were required from any other people.

3.2 Safety assurance system

3.2.1 General organisation and the manner of issuing and executing instructions

The general organisation and the method of issuing and executing orders during track operation and railway transport in connection with the incident is stipulated in technological procedures, which are stipulated through internal regulations of the infrastructure manager and operator, which include:

- internal regulation ČD V 25 'REGULATION FOR THE ORGANISATION OF MAINTENANCE OF ELECTRIC AND MOTOR TRACTION ENGINES, PASSENGER, INTERMEDIATE, TRAILER AND CONTROL VEHICLES' ('internal regulation ČD V 25'), where in Article 5 it is stated:
'The purpose of maintenance of railway vehicles is to ensure safety and reliability during their operation; maintenance of railway vehicles is therefore of a preventive character. Within the framework of such maintenance, the condition of the individual parts is checked and in the

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event preventive maintenance has not been not successful in preventing faults in the individual parts of the of railway vehicles, such faults are rectified. Maintenance is split into preventive maintenance, which is composed of the following degrees:

- operational treatment;
- periodic inspections;
- periodic repairs;
- planned repairs;
-

- internal regulation ČD V 25, where in Article 15 it is stated:
 'The labelling and naming of inspections and repairs is stated in Table 1.'

Table 1:

Name	Label				
	E Electric traction unit		MIN Motorised traction unit		P Passenger, trailer and controlling wagons
	locomotives	units and wagons	locomotives	units and wagons	
Operational treatment	O	O	O	O	O
Periodic inspections					
- minor	MIN	MIN	MIN	MIN	MIN
- major	MAJ	MAJ	MAJ	MAJ	MAJ
Periodic repairs					
- calibration	CAL	CAL	CAL	CAL	CAL
- main	MAIN	MAIN	MAIN	MAIN	MAIN
- general	-	GEN	-	GEN	GEN
Planned repairs	P	P	P	P	P
Unplanned repairs	U	U	U	U	U
Unplanned service repairs	MR	MR	MR	MR	MR
Changes to approved state	CAS	CAS	CAS	CAS	CAS

- internal regulation ČD V 25, where in Article 16 it is stated:
 'Mileage standards for railway vehicles to undergo operational treatment, periodical inspections and periodic repairs are given in Annex 1.'
- internal regulation ČD V 25, where in Annex 1 it is stated:
 'Mileage standards for sending railway vehicles for operational treatment, periodical inspections and periodic repairs.'

Traction unit series	E O	EMIN	EMAJ	E CAL	E MAIN	E GEN
230, 240, 242	2.5 4.5	71 62	180	550	1100	---

The presented values are in 1000 locomotive kilometres (lokkm). The lower value indicates the lower and the upper value indicates the upper limit for the stipulated range of km travelled.

- internal regulation ČD V 25, where in Article 20 it is stated:
 'The upper limits for kilometre and time figures given in Annex 1 are binding for the performance of operational treatment and MIN periodical inspections. Recommended figures

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are given for the performance of MAJ periodical inspections and for the performance of periodical repairs...'

- internal regulation ČD V 25, where in Article 22 it is stated:
'When deciding on requirements for sending railway vehicles for periodical repairs in the next period it is always necessary to base the decision on the actual technical condition of the of railway vehicles and the expected technical condition of the of railway vehicles at the envisaged time they will be sent. On the basis of this, the RVD will decide whether to require that the railway vehicles will be sent for periodical repairs of the relevant degree, or whether the performance of periodical repairs of a lesser degree will be required (e.g. CAL instead of MAIN), or whether instead of a periodical repair a MAJ periodical inspection will be performed and on how many km or what period of time the periodical repair will be postponed until the MAJ periodical inspection. The given procedure can be combined or repeated according to the actual technical condition of the of railway vehicles'.
- 'MAINTENANCE REGULATION 'A' and 'B' FOR ELECTRIC ALTERNATING CURRENT LOCOMOTIVES SERIES S 499 (S 499 0 231 – 256)' ('Maintenance Regulation') issued by the manufacturer Škoda Pilsen, where in Subgroup 8.5 Cabling and Accessories, 8.5.2. Circuit cabling VN and MH it is stated:
 - Examine and check the cable feeds to the traction motors under the locomotive (check the deflexion of the cables, the sealing of the cables in the terminal boards of the traction motors, intermediate terminal boards in the floor of the locomotive and in infed jacketed tubes located on the chassis).
 - Tighten the current-carrying connections, especially the connections of the working and protection earths and the connections in the terminal boards of the traction motors and the intermediate terminal boards.
'
- Maintenance Regulation, issued by the manufacturer Škoda Pilsen, when in the Overview of Control Inspections are given the norms for mileage travelled for sending a traction unit for the individual inspections and repairs:

Minor periodical inspection	MIN	17 000 – 22 000 km
Major periodical inspection	MAJ	119 000 – 154 000 km
Medium reduced repair (pursuant to regulation ČD V25 periodical calibration ECAL repair)	MR	238 000 – 308 000 km
Medium repair (pursuant to regulation ČD V25 main periodical repair EMAIN)	MED	476 000 – 616 000 km
General repair	GEN	1 904 000 – 2 464 000 km

3.2.2 Requirements regarding employees of the infrastructure manager and the operator and their enforcement

The health-related competency of the employees of the infrastructure manager and operator is assessed pursuant to Regulation No 101/1995 Coll., Issuing the Rules for the Health and Professional Competence in the Operation of a Railway and Railway Transport, as amended (hereinafter only Regulation No 101/1995 Coll.).

The requirements for the professional competency of people participating in the operation of railways and railway transport including the method of their enforcement are stipulated pursuant to Section 35 paragraph 1 letter b) of Act No 266/1994 Coll., internal regulation of the infrastructure manager 'SŽDC Zam1 (provisional) Regulation on the Professional Competency of Employees of the Railway Infrastructure Administration, State Organisation' and the internal regulation of the operator 'ČD Ok 2 TRAINING AND TESTING REGULATIONS OF CZECH RAILWAYS, a. s.', as amended.

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According to the materials of the infrastructure manager and operator, at the time of the incident all the employees involved had valid health certification and were professionally competent to perform their jobs.

One condition for competency to drive a railway vehicle is stipulated by Section 45 of Act No 266/1994 Coll. The driver holds a valid 'Certificate of Competency to Drive a Railway Vehicle', ref. No 502337, issued by The National Safety Authority Prague on 31. 07. 2007, for traction units type E1, E2 and E3 on open lines.

3.2.3 Internal safety inspection procedure and its results

Before the incident the following periodical inspections and repairs were performed on the 242.264-0 traction unit, in the sense of Annex 1 of the internal regulation ČD V 25:

Minor periodical inspection (EMIN) – mileage standard 17 000 – 26 000 km. Performed on the 242.264-0 traction unit before the incident on 30. 04. 2008 after 44 325 km. From the last periodical minor inspection performed on 30. 04. 2008 to the incident the traction unit travelled 25 030 km. Major periodical inspection (EMAJ) – mileage standard 180 000 km. Performed on the 242.264-0 traction unit before the incident on 14. 10. 2002 after travelling 260 560 km. Periodical repair calibration (ECAL) – mileage standard 550 000 km. Performed on the 242.264-0 traction unit before the incident on 06. 09. 1999 after travelling 508 757 km. From the last periodical calibration repair performed on 06. 09. 1999 until the incident the traction unit travelled 758 057 km.

Main periodical repair (EMAIN) – mileage standard 1 100 000 km. Performed on the 242.264-0 traction unit before the incident in December 1987 after travelling 858 710 km. From the last major periodical repair performed in December 1987 to the incident the traction unit travelled 1 836 364 km.

3.2.4 Interfaces between the various participants and parts of the railway infrastructure

The interface between the various participants and parts of the railway infrastructure is stipulated pursuant to Act No 266/1994 Coll. as follows:

- The owner of the Pilsen hl. n. to Cheb open railway line is Správa železniční dopravní cesty, s. o., registered offices Prague 1, Nové Město, Dlážděná 1003/7, postcode 110 00;
- The operator of the railway is Správa železniční dopravní cesty, s. o., on the basis of authorisation issued by The National Safety Authority Prague on 29. 5. 2008 under ref. No 3-4277/07-DÚ/Le (ref. No ÚP/2008/9002);
- The operator is České dráhy, a. s. on the basis of the licence granted by The National Safety Authority Prague on 21. 5. 1996 under ref. No 1-157/96-DÚ-Bp (ref. No L/1996/5000).

3.3 Legal and other regulations

3.3.1 Relevant Community and open legal regulations

The relevant Community legal regulation is Directive of the European Parliament and of the Council 2004/49/EC of 29.04.2004 (Railway Safety Directive).

National legal regulations:

- Act No 266/1994 Coll., on Railways, as amended;
- Regulation No 100/1995 Coll., Specifying the Conditions for the Operation, Construction and Production of Specific Technical Devices, and their Specification (Code of Specific Technical Devices), as amended;

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- Regulation No 177/1995 Coll., through which the Building and Technical Regulations for Railways are issued, as amended;
- Regulation No 101/1995 Coll., Issuing the Rules for the Health and Professional Competence in the Operation of a Railway and Railway Transport, as amended;
- Regulation No 173/1995 Coll., Issuing the Railway transport Rules, as amended;
- Regulation No 376/2006 Coll., on the Management System for the Rail Operation Safety and Rail Transport Safety, and on Procedures in the Event of the Rise of Accidents and Incidents in Rail Systems;
- Act No 262/2006 Coll., the Labour Code, as amended by Act No 362/2007 Coll.

3.3.2 Other regulations, e.g. operating rules, work rules, maintenance guidelines, applicable technical norms and other internal regulations

- internal regulation SŽDC (ČD) D1 REGULATION FOR THE USE OF WARNINGS DURING THE ORGANISATION AND OPERATION OF RAILWAY TRANSPORT;
- internal regulation SŽDC (ČD) D2 REGULATION FOR THE ORGANISATION AND OPERATION OF RAILWAY TRANSPORT;
- internal regulation ČD D 17 REGULATION for reporting and investigating incidents;
- internal regulation ČD Ok 2 TRAINING AND TESTING REGULATIONS OF CZECH RAILWAYS, a. s.;
- internal regulation ČD V 25 REGULATION FOR THE ORGANISATION OF MAINTENANCE OF ELECTRIC AND MOTORISED TRACTION VEHICLES, PASSENGER, INTERMEDIATE, TRAILER AND CONTROL VEHICLES;
- 'MAINTENANCE REGULATION 'A' and 'B' FOR ELECTRIC ALTERNATING CURRENT LOCOMOTIVES SERIES S 499' issued by the manufacturer Škoda Pilsen;
- internal regulation SŽDC Zam1 (provisional) Regulation on the professional competency of employees of The Railway Infrastructure Administration, State Organisation;
- internal regulation SŽDC (ČD) Z1 REGULATION FOR THE OPERATION of Station and Line SAFETY EQUIPMENT;
- Supplementary provisions of regulation ČD Z1 Regulation for the operation of station and line safety equipment at Pňovany railway station and in the Kozolupy – Pňovany line section, in the Pňovany – Vranov line section;
- IMPLEMENTING ORDER FOR LINES WITH REMOTE CONTROLLED SAFETY EQUIPMENT (IO) FOR THE LINE Pilsen - Jižní předměstí (exclusive) – Stříbro (exclusive).

3.4 Operation of railway vehicles and technical equipment

3.4.1 Control, signalling and safety systems, including automatic data recording equipment

The Pilsen hl. n. to Cheb line is a line with remotely operated safety equipment. The RCSE organises the railway transport in the controlled area via SSE and the connected TSE, remotely controlled by the RCSE dispatcher from the RCSE service office ('RCSE SO'). RCSE instructions are sent via

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telecommunications equipment from RCSE SO to all controlled elements and element groups of the safety equipment in the controlled area and the readings from this equipment back to RCSE SO. The RCSE Control Office ('RCSE CO') is located in Pilsen. At the CO of the RCSE dispatcher there are telephones (with specific calling numbers) and connections via these are recorded using REDAT type recording equipment. RCSE SO is equipped with:

- unified operating control section office with AŽD RCSE 1 safety equipment;
- operating office with safety equipment graphical/technological upgrade (electronic transportation documentation), which allows the automatic recording of the completed train transport traffic diagrams;
- TRS radio system;
- IP TouchCall equipment terminal, in which is integrated a telephone connection in the service network and direct telephone connections to selected offices in the controlled area, connected with radio systems in the controlled area (apart from the track radio system) and control of the station PA systems in the controlled area.

The whole controlled area is equipped with the line part of the train control system.

3.4.2 Railway parts

The condition of the railway superstructure and the safety equipment had no connection with the incident.

3.4.3 Means of communication

The controlled area is equipped with a track radio system – a radio-dispatcher network ('RDN') with REDAT recording equipment, which is the basic connection between the RCSE dispatcher and the driver. In the whole controlled area channel group No 63 is used. At the OP of the RCSE dispatcher there is a base dispatcher radio system. At the offices of the emergency dispatchers at all railway stations there are base dispatcher radio systems. In the event it is impossible to establish connection by radio, a connection must be ensured between the RCSE dispatcher and the drivers throughout the controlled area using an alternative radio connection (a portable radio system cooperating with TRS with automatic channel group frequency selection) or an alternative telephone connection (by mobile telephone). The telephone and radio communication of the RCSE dispatcher via telephone, via the IP TouchCall terminal and via the base radio system TRS are recorded using the recording equipment.

3.4.4 Railway vehicles, including automatic data recording equipment

The passenger wagon series and reg. No B 51 54 20-41 754-2 is a four-axle second-class wagon with ten compartments for passengers and a side corridor. Wagons series B, code 249 are equipped with remote control and blocking of entrance doors and are designed for operation under the RIC regime, year of manufacture 1983, serial number 1983/141, manufacturer VEB Waggonbau Bautzen. The wagon has a chassis type Görlitz Va and is equipped with an automatic DAKO air brake with brake blocks. The wagon heating features hot air with steam and an electric air heater with automatic air temperature regulation and manual regulation in the passenger compartments. Ventilation is ensured through roof ventilation and via the heating system when it is not in heating mode. The electricity source is a three-phase generator on the flange of the bearing chamber of the axle bearing. When the wagon is stationary an accumulator battery provides the electricity source. The main lighting is via fluorescent tubes, while the emergency and night lighting uses bulbs. The wagon is equipped with main and feeding brake pipes, longitudinal steam pipes, longitudinal electrical high current wiring and a UIC cable. The last regular technical inspection of the wagon was carried out on 05. 03. 2008 at RVD Pilsen, OU Cheb.

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The 242.264-0 traction unit is an alternating current box-type bogie locomotive with two end cabins for the personnel and an internal engine room. The box is made of welded steel plates. The driver's cabin is accessible from both sides. The traction unit has the Bo'Bo' layout, meaning that it has two twin-axle chassis. All the wheel sets are driven by their own TM. The TMs are six-pole, constructed taking into account the rippled current power supply. They have a third-party ventilation system designed to prevent water, snow and coarse dust entering the motors. The TMs are protected from overloading via an overcurrent relay. The TMs are split into three revolution groups and are suspended on the frame of the chassis. All the cables and belts of the power circuits and wires of the control circuits and auxiliary circuits are copper. The high-current and low-current wiring is separated. In the locations where the cables branch there is an intermediate terminal board for connecting the power cables for the TMs. The intermediate terminal board made up of four terminals, a wooden backing and lid and four CBAU 240/800 V cables. The connections between the terminals and the wires are performed through soldering (silver solder).

The 242.264-0 traction unit was manufactured in 1981, serial number 7610, manufacturer ŠKODA Pilsen. Its technical/safety test was carried out on 13. 11. 1981 on the Brno – Břeclav line. The traction unit has in the sense of Section 43 of Act No 266/1994 Coll. a valid 'Compliance Certificate' issued by The National Safety Authority Prague on 07. 06. 2000 under ref. No PZ 6965/00-V.02. The last regular technical inspection of the traction unit was carried out within the scope of Annex 6 of Regulation No 173/1995 Coll. on 14. 07. 2008 with the result 'The vehicle complies with the conditions for operation on railways', the next to last technical inspection was carried out on 14. 01. 2008.

The electrical equipment of 242.264-0 traction unit has a valid 'Compliance Certificate', ref. No PZ 0895/97- E.29, dated 05. 06. 1997, the last regular revision was carried out on 20. 04. 2004, the next to last regular revision was carried out on 19. 10. 1999.

The 242.264-0 traction unit is in the sense of Annex 3, part II, paragraph 5 of Regulation No 173/1995 Coll. equipped with recording equipment, a Hassler & Bern recording speedometer, with mechanical data recording that can measure speeds from 0 to 150 km/h.

An evaluation of the data recorded by the recording speedometer located in the driver's cabin of the traction unit shows that:

- train R 766 passed through Pňovany railway station at km 372. 180 at 22:28 at a speed of 50 km/h;
- the speed of the train in the subsequent 1 550 m was between 49 and 50 km/h with a subsequent reduction in speed until it came to a complete stop at 22:29 at km 374.100;
- the speed limit of 100 km/h was not exceeded at the incident location;
- the train safety system was switched on for the whole journey and regularly operated by the driver.

3.5 Operating system documentation

3.5.1 Measures taken by employees of the infrastructure manager and operator relating to signalling control and transport safety

The signalling control and transport safety had no impact on the occurrence of the incident.

3.5.2 Exchange of verbal reports in connection with the incident, including records from the recording equipment

The Exchange of verbal reports by employees of the infrastructure manager in connection with the incident led to the localisation of the incident, the report of the origin of the incident, the IRS being

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called and the adoption of alternative measures in view of the incidents that arose in the subsequent operation of the railway and railway transport. The communication between the employees of the infrastructure manager and operator present at the origin of the incident was at the location of the incident both direct/verbal (driver + head guard), and also via communication devices (head guard + RCSE dispatcher and RCSE dispatcher + driver).

The first demonstrable report in connection with the incident can be considered the report of flames coming from the rear of the traction unit by the head guard of train R 766 to the RCSE dispatcher Pilsen via mobile telephone at 22:29. Communication between the head guard, dispatcher and the driver was documented through the REDAT recording equipment located at RCSE SO Pilsen.

3.5.3 Measures taken to protect and secure the incident location

The measures taken to protect and secure the incident location were - until the arrival of the IRS units and the authorised professionally competent person of the infrastructure manager and railway transport - performed by the driver in cooperation with the head guard and the officers of the Czech police escorting the train.

3.6 Working, health and operating conditions

3.6.1 Working hours of the employees of the infrastructure manager and the operator who were involved in the incident

- the driver of train R 766 began his shift on 30. 07. 2008 at 11:26;
- the head guard of train R 766 began his shift on 30. 07. 2008 at 14:28;
- the Přovany railway station dispatcher began his shift on 30. 07. 2008 at 19:00;
- the RCSE dispatcher began his shift on 30. 07. 2008 at 18:00.

All the employees had rested prior to their shift pursuant to Section 90 of Act No 262/2006 Coll., the Labour Code, as amended by Act No 362/2007 Coll.

3.6.2 Health conditions and personal situations that had an impact on the incident, including physical or mental stress

Employees of the infrastructure manager and operator are subject to regular medical inspections pursuant to the provisions of Regulation No 101/1995 Coll. No health condition or personal situation that could have an impact on the origin of the incident, including physical or mental stress, was found.

3.6.3 Arrangement of the equipment of the control station or the vehicle that had an impact on its control and use

The arrangement of the equipment of the control station or the vehicle had no link to the origin of the incident, and for this reason was not assessed.

3.7 Previous incidents of a similar nature

Upon request by The Rail Safety Inspection Office dated 30. 10. 2008, ref. No 4-233/2008/DI, the railway operator SŽDC, s. o., via the Fire Rescue Service in document ref. No 2810/08-HZS/ dated 14. 11. 2008, submitted an overview of fires in series 242 traction units for a period of 5 years: From 2004 to 2008 (14. 11. 2008) there were 29 fires on series 242 traction units.

2004 – 5 fires (none of which started in the TM terminal board)

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2005 – 5 fires (none of which started in the TM terminal board)

2006 – 8 fires (of which 1 started in the low-current cabling of the TM terminal board)

2007 – 5 fires (none of which started in the TM terminal board)

2008 – 6 fires (none of which started in the TM terminal board)

4 ANALYSIS AND CONCLUSIONS

4.1 Final description of the incident

4.1.1 Final description of the incident, on the basis of the facts established in Section 3

The incident occurred on 30 July 2008 at 22:29 on the Pilsen hl. n. to Cheb open railway line (line 713B) between the railway stations Pňovany and Vranov u Stříbra, at km 374.100. The incident location is found in the Pilsen Regional Operation Centre zone (hereinafter only ROC), Pilsen junction railway station zone, on a single-line section of the electrified open Pilsen hl. n. to Cheb line. While train R 766 was underway, before Pňovany railway station officers of the Czech police who were escorting the train noticed flames coming from the chassis of the traction unit. They reported this to the head guard of the train, who then called, using his mobile telephone, the dispatcher of the Pilsen – Cheb line with remote-controlled safety equipment ('RCSE'). Using a TRS radio system, the RCSE dispatcher instructed the engine driver to immediately stop the train due to a fire in the traction unit. After the train stopped at km 374.100 the driver, in cooperation with the head guard and the police officers, commenced extinguishing the fire; they were however unable to localise it. The fire gradually spread to the first wagon behind the traction unit. For safety reasons around 20 passengers were transferred to the last wagon. The commission inspection performed on 06. 08. 2008 at RVD Pilsen found that the source of the fire was the space under the locomotive body on the left side due to the burned-out 2nd driver cabin. This space showed signs of damage by flames. This space is the location of the intermediate terminal board for the 4th TM, made up of four terminals, a wooden backing and lid and four cables. The connections between the terminals and the wires are performed through soldering (silver solder). After the terminal board was disassembled it was found that a TM power cable had come loose and this had resulted in the origin of an electric arc discharge between the cable and the terminal. An electric arc discharge can produce temperatures of up to 4 000 °C. This temperature was sufficient to ignite dirt and flammable components in the traction unit.

The Rail Safety Inspection Office is not an inspection body for investigating the origin of fires or fire protection in general, therefore it agrees with this expert evaluation and will base its future actions on it.

During the incident there was no harm caused to any of the persons involved or any damage to the environment. There was damage to the traction unit, the first wagon connected behind the traction unit and infrastructure equipment.

4.2 Analysis

4.2.1 Assessment of the facts established in Section 3 and conclusions as to the cause of the incident and the work of the rescue services

Maintenance Regulation issued by the manufacturer Škoda Pilsen stipulates a standard mileage for the performance of a MIN minor periodical inspection as 17 000 – 22 000 km, for the performance of a major MAJ periodical inspection as 119 000 – 154 000 km, for the performance of medium reduced repair MR (pursuant to internal regulation ČD V 25 periodical calibration ECAL repair) 238 000 – 308 000 km, for the performance of medium repair S (an ECAL periodical calibration repair pursuant to internal regulation ČD V 25) as 476 000 – 616 000 km and for the performance of a GEN general repair as 1 904 000 – 2 464 000 km. The actual technical procedure of the operator contained in internal regulation ČD V 25 in Annex 1 stipulates a standard mileage for an EMIN periodical inspection as 17 000 – 26 000 km, for an EMAJ periodical inspection as 180 000 km, for an ECAL periodical repair as 550 000 km, for an EMAN periodical repair as 1 100 000 km and for an EG periodical repair no standard mileage has been stipulated.

Upon request by The Rail Safety Inspection Office dated 20. 10. 2008, ref. No 4-219/2008/DI, the operator in document ref. No 2174/2008-O 12/2 dated 07. 11. 2008, stated:

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‘The obligation to comply with the mileage figures for carrying out periodical maintenance for vehicles stipulated by the vehicle manufacturer forms part of the stipulation of the Technical Specifications for Interoperability (TSI) for conventional vehicles, which have not yet become valid. Until such time, the necessity to comply with the mileage figures stipulated by the vehicle manufacturer for periodical maintenance is not enforced through legislation. For this reason the Operator, on 01. 10. 2000, on the basis of its experience with the operation and maintenance of vehicles of this series within its competency, stipulated mileage figures for its performance through Annex 1 of internal regulation ČD V25.’

The unified technological procedures of the operator contained in internal regulation ČD V 25 in Annex 1 stipulated the mileage standard for EMIN periodical inspection as 17 000 – 26 000 km.

Measure of the director of the Railway Vehicle Department ‘Measure of the director of the Railway Vehicle Department relating to Annex 1 of regulation ČD V25’, ref. No 05-12/2-2845 dated 21. 10. 2005, increased the standard mileage figures for sending railway vehicles for a safety inspection, operational treatment and periodical inspections. For traction unit series 242 the mileage standard until an EMIN periodical inspection was increased to 38 000 – 42 000 km.

Measure of the director of the Railway Vehicle Department ‘Performance of Bp, O and MIN inspections on selected series of traction vehicles’, ref. No 05-12/2-3492, dated 15. 12. 2005, permits within the competency of managers in their RVD to decide in justified cases on a change to the upper mileage limit for Bp, O and MIN inspections by a factor of up to 1.5. This decision does not release the RVD from its responsibility for the technical condition of the vehicles. The manager of RVD Pilsen, with validity from 15. 01. 2006, through Order No 004/2006 pursuant to measure ref. No 05.12/2-3492 dated 15. 12. 2005 stipulated the upper mileage limit until O and MIN inspections for selected series of traction units different to the mileage figures stipulated through measure ref. No 05-12/2-2845 dated 21. 10. 2005, while this measure does not release RVD Pilsen from its responsibility for the technical condition of the vehicles with modified mileage figures pursuant to this Order. For traction unit series 242 the mileage standard until the EMIN periodical inspection was changed to 26 000 – 42 000 km.

The unified technological procedures of the operator contained in internal regulation ČD V 25 in Annex 1 stipulated the mileage standard for EMAJ periodical inspection as 180 000 km.

By measure of the director of the Railway Vehicle Department ‘Performance of major periodical inspections on traction units in 2005’, ref. No 3391/04-O12/2-Ca dated 17. 12. 2004, the performance of major periodical inspections was stopped in 2005. Measure of the deputy general manager of ČD for sales and operations ‘Implementing measure for regulation ČD V25 for 2005’, ref. No 1044/2005-12/4-Ro dated 06. 01. 2005, states that experience from operation has shown that on some series of traction units periodical maintenance was performed unnecessarily often or needlessly thoroughly. In addition, in it the deputy general manager of ČD for sales and operations further specifies the listed measure ref. No 3391/04- O12/2-Ca in such a way that type ‘MAJ’ periodical inspections will not be performed in 2005 on traction units and passenger, intermediate and independent control wagons. The only exceptions to this are vehicles that are still within the manufacturer warranty period, where it is necessary to maintain the maintenance rules stipulated by the vehicle manufacturer (Article 26 of the internal regulation ČD V 25).

The individual technological procedures of the operator contained in internal regulation ČD V 25 in Annex 1 stipulate the standard mileage for EMAN periodical repair as 1 100 000 km. This was performed on 242.264-0 traction unit before the incident in December 1987 after travelling 858 710 km. The traction unit, from the time of the last main periodical repair performed in December 1987 until the incident, travelled 1 836 364 km. In 2001 RVD Pilsen, pursuant to Article 22 of the internal regulation ČD V 25, requested that the 242.264-0 traction unit be sent for EMAN periodical repair for 2002 (on 31. 07. 2001 the traction unit had a mileage of 1 245 360 km). This request from the operator was not accepted by the Railway Vehicle Department.

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In 2004 RVD Pilsen, pursuant to Article 22 of the internal regulation ČD V 25, repeated its request that the 242.264-0 traction unit be sent for EMAIN periodical repair for 2005 (on 31. 08. 2004 the traction unit had a mileage of 1 452 377 km). This request from the operator was again not accepted by the Railway Vehicle Department.

Upon request by The Rail Safety Inspection Office dated 20. 10. 2008, ref. No 4-219/2008/DI, the operator stated in document ref. No 2174/2008-O 12/2 dated 07. 11. 2008:

‘In 2003 and 2005 RVD Pilsen requested, pursuant to Article 22 of regulation ČD V25, for the locomotive 242.264-0 to be sent for periodical repair. The 242 series locomotives were at that time managed by two separate RVDs, namely RVD Pilsen and RVD Brno. After a summary of all the requests for sending railway vehicles for higher grade periodical repair, performed at the Railway Vehicle Department of the ČD headquarters, and a subsequent discussion between O 12 representatives with representatives of RVD, the series 242 locomotives whose further operation without performed repairs was in contradiction to Section 34, paragraph 1 letter a) of Regulation No 173/1995 Coll. were sent for periodical repair. The repair of locomotive 242.264-0 was postponed on the basis of its actual technical condition pursuant to all the provisions of Article 20 and 22 of regulation ČD V25 and Section 34, paragraph 1 letter a) of Regulation No 173/1995 Coll. An overview of the numbers of traction units 20 for higher grade periodical repair in the individual years is given in the following table...’

The former Federal Transport Ministry, by letter of the director of the Locomotive Management Department ‘Reconstruction of feeds for TMs of electric locomotives series S 489.0 – reconstruction No 7024’, ref. No 13 308/77-12 dated 31. 05. 1977, ordered the reconstruction (removal) of the intermediate TM terminal board of electric locomotives series 230 (S 489.0). The stated reason was: ‘The terminal board TM on electric locomotives series S 489.0 is frequently the cause of changes to the insulation state of the cabling. This cause is composed of the contamination of the terminal board with dust as well as metal filings, which results in the failure of the terminal board and thus the inability of the locomotive...’

Further, the former head office of Czechoslovakian State Railways by letter of the director of the Locomotive Management Department ‘Extended reconstruction ref. No 7024’, ref. No 60.329/89-12/2-Ro dated 30. 10. 1989, extended this order to also include electric locomotives series 240 and 242. The reason stated was: ‘Through measure of the former FMD 012 ref. No 13.308/77-12 reconstruction 7024 was ordered for electric locomotives series 230 (S 489.0), composed of the removal of the intermediate TM terminal board. The reasons for the issuing of this reconstruction included the frequent fires on the intermediate TM terminal board. The same problems apparently also occur as a result of the aging of the tin solder – they now appear as well in electric locomotives series 240 and 242. We are therefore extending the validity of reconstruction ref. No 7024 to include electric locomotives series 240 and 242... We request that the reconstruction be carried out during the periodical repairs in ŽOS, or at the locomotive depots when appropriate’.

Subsequently the former Regional Head Office of Czechoslovakian State Railways by letter of the head of Locomotive Management Services ‘Reconstruction No 7024 – extension of reconstruction’, ref. No.

6773/89-12 dated 01. 12. 1989, imposed instructions in connection with the reconstruction, apart from other things: ‘... to perform the reconstruction in locomotive depots always after damage to the terminal board by fire and also according to the capacity and material possibilities of the locomotive depots’.

RVD Pilsen operates a total of 52 series 242 traction units, on 46 of which the approved change of approved state No 7024 – removal of the intermediate terminal board traction units - has been performed. On the remaining 6 traction units, including traction unit 242.264-0 damaged by fire, the approved change of approved state was not performed.

Upon request by The Rail Safety Inspection Office dated 20. 10. 2008, ref. No 4-219/2008/DI, the operator stated in document ref. No 2174/2008-O 12/2, dated 07. 11. 2008: ‘The fire risk of railway vehicles is assessed every six months and measures are adopted according to need. The change in

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approved state No 7024 composed of the removal of the intermediate terminal board of the traction motor is always performed during periodical repair at the external operator, or at the subsidiary DPOV, a. s. Locomotive 242.264-0 had its last ECAL periodical repair performed between 6. 9. 1999 and 5. 11. 1999. In view of the fact that this repair was carried out at RVD Pilsen, the change in approved state No 7024 was not performed on the vehicle. At the current time we are verifying the documentation of the performed change and state on vehicles for the purpose of adopting subsequent measures leading to a maximum speeding up of the implementation of the reconstruction on the remaining vehicles.'

The maintenance regulation issued by manufacturer Škoda Pilsen, in Subgroup 8.5 Cabling and Accessories, 8.5.2. VN and MH circuit cabling states:

‘- Examine and control the cable feeds to the traction motors under the locomotive (control the deflexion of the cables, the sealing of the cables at the terminal boards of the traction motors, the intermediate terminal boards in the locomotive chassis and in the infeed jacketed pipes located on the chassis).

- Tighten the current-carrying connections, especially the connection of the working and protection earth and the connection in the terminal boards of the traction motors and the intermediate terminal boards...’

All the indicated activities should be performed pursuant to the Maintenance Regulation of the manufacturer within the framework of a MIN inspection (minor periodical inspection), within the framework of a MAJ inspection (major periodical inspection), within the framework of an MR inspection (medium reduced repair – pursuant to internal regulation ČD V 25 an ECAL calibration repair), within the framework of a MED inspection (medium repair – pursuant to internal regulation ČD V 25 an EMAIN main repair) and within the framework of a GEN inspection (general repair).

The operator performs, within the framework of an EMIN periodical inspection, a tightening of the connections on the intermediate terminal boards and also a visual check of the deflexion of cables and their sealing on the intermediate TM terminal boards. The last EMIN inspection for the traction unit before the incident was performed on 30. 04. 2008. General checks of the soldering and the attachment of the cable lugs is only performed by the operator during periodical ECAL repairs or higher. The last ECAL repair performed on the traction unit before the incident was on 06. 09. 1999 and the last EMAIN repair in December 1987. The Rail Safety Inspection Office, as the expert body for investigating the causes and circumstances of the origin of incidents on railways, on the basis of the analysis of the discovered facts pursuant to point 3 of this report and their comparison with the reference facts stipulated by Act No 266/1994 Coll., technical regulations and the provisions of the internal regulations of the operator given above, agreed with the expert statement of the commission dated 06. 08. 2008, including the expert statement from the Pilsen Region Fire Rescue Service dated 15. 08. 2008 (The Rail Safety Inspection Office is not an expert body for investigating the causes of fires), that the cause of this incident was the gradual loosening of the power cable of the 4th TM in the intermediate terminal board, located under the locomotive body, which resulted in the origin of an arc discharge and the fire.

A general control of the soldering and the attachment of the cable lugs is only performed during periodical ECAL repairs or higher. RVD Pilsen requested that the traction unit be sent for a main periodical repair in 2001 and again in 2004. However, this request was not accepted by the Railway Vehicle Department. The last ECAL repair before the incident was performed between 06. 09. and 05. 11. 1999, the last EMAIN repair in December 1987. From the last ECAL repair until the origin of the incident the traction unit in question travelled 758 057 km. This means that since the last periodical calibration repair, the operator operated this traction unit for 9 years without a general check of the soldering and the attachment of the cable lugs, in spite of the fact that there was an existing order in relation to traction units of this series for the gradual reconstruction/removal of the intermediate terminal board in question as early as in the calendar year 1989. In spite of the fact that the operator, pursuant to the provisions of Section 35 paragraph 1 letter c) of Act No 266/1994 Coll.,

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issued, on the date of commencement of its operation of railway transport, an internal regulation on the organisational performance of maintenance of railway vehicles and also, to the relevant railway administration authority – The National Safety Authority – demonstrated in its application for operator safety certification (Section 34h paragraph 3 letter d) of Act No 266/1994 Coll.), that it had issued internal regulations for the operation of railway transport, on the operation of railway vehicles and on the operation of specified technical equipment, it did not comply with their provisions as it did not respect the wording of Article 22 of the internal regulation ČD V 25, i.e., that ‘when making a decision on requests for sending railway vehicles for periodical repair in the following period it is always necessary to take into account the actual technical condition of the railway vehicles’. The operator did not accept the request from RVD Pilsen nor did it in any other objective method verify the actual technical condition of the traction unit in question.

On the basis of the results of the investigation we can also state that the fundamental and systemic causes leading up to the immediate cause – the fire – lie both in the unsuitably designed regulatory framework for the maintenance of the traction unit, as well as in the tolerated and even ordered breaches of compliance with it. The origin of the incident in question and the results of the investigation have shown that the operator operated a railway vehicle that, as regards its construction and technical condition, did not comply with the safety requirements for railway transport, the operating personnel, transported people and things and whose technical compliance was demonstrated through accordance with the approved type. The fact that the condition of the railway vehicle – the 242.264-0 traction unit in question – was not in compliance with the safety requirements for railway transport was known by the operator for a long period of time.

At the location of the incident, elements of the integrated rescue system (‘IRS’) – Pilsen Region Fire Rescue Service – stations Stříbro and Nýřany, Fire Rescue Service SŽDC, s. o., Pilsen, Přovany Voluntary Fire Brigade and the Czech police district department of the town of Touškov were all put into operation. No medical rescue service was put into operation.

4.3 Conclusions

4.3.1 Immediate causes of the incident, including factors that contributed thereto and that were related to the actions of the persons involved or to the condition of the railway vehicles or technical equipment

The immediate cause of the incident was a loose power cable on the intermediate terminal board of the 4th traction motor of the traction unit, which resulted in the origin of an arc discharge and, through the increased temperature thus produced, the ignition of flammable materials around the intermediate terminal board.

4.3.2 Underlying causes related to qualifications, procedures and maintenance

The underlying cause of the incident related to the qualifications, procedures and maintenance was non-compliance with the provisions of the internal regulation for the organisation of maintenance, i.e. of regulation ČD V 25.

4.3.3 Causes resulting from the regulatory framework and use of the safety system

The cause resulting from the regulatory framework is its unsuitable design; in the use of the safety assurance system and then non-compliance with the conditions stipulated by Act No 266/1994 Coll., on Railways, as amended, for the operation of railway vehicles on the basis of which the operator's safety certification was issued.

4.4 Additional findings

4.4.1 Shortcomings and omissions established during the investigation into the causes and circumstances of the incident, but which are not significant for the conclusions as to causes

No shortcomings and omissions, but which are not significant for the conclusions as to causes, were established by the Railway Inspection during the investigation into the causes and circumstances of the incident.

5 MEASURES ADOPTED

5.1 List of measures that have been adopted as a consequence of the incident

Measures relating to the incident in question have been adopted by the operator ČD, a. s. and are listed in the 'Assessment of causes and circumstances of the origin of an incident – Accident', ref. No 70503/08-O18-RRTSI-5 dated 12. 09. 2008. These are the following measures:

1. All the employees of RVD Pilsen involved in the operation of traction railway vehicles series 242 will be demonstrably informed of the causes and circumstances of the origin of the incident by 30. 09. 2008.
2. RVD Pilsen will carry out visual inspections of the intermediate terminal boards of electric locomotives for which the approved change in the approved state ('ZSS') No 7024 has not yet been performed with a deadline of 31. 10. 2008.
3. On the basis of the measure from the head of repairs at RVD Pilsen, detailed inspections will be carried out of the intermediate terminal boards until the performance of the modification pursuant to the approved ZSS. Calibration will be performed during periodical EMIN inspections until the performance of the modification pursuant to the approved ZSS No 7024.

RVD Pilsen will be responsible for compliance with all the adopted measures.

Investigation Report of a Railway Accident

6 SAFETY RECOMMENDATIONS

The Rail Safety Inspection Office, as the materially competent administrative authority pursuant to the provisions of Section 53b paragraph 5 of Act No 266/1994 Coll., on Railways, as amended, on the basis of the results of the investigation into the causes and circumstances of the origin of the incident recommends:

that ČD, a. s., as the operator:

- adopts effective measures comprising the harmonisation of internal regulations and orders for the organisation of the maintenance of railway vehicles with valid legislation (and the recommendations of the manufacturers of the railway vehicles) in the interests of the safe operation of railway transport;
- stipulates effective measures restricting the toleration or ordering of breaches of the regulatory framework.

that The National Safety Authority, as the safety and regulatory body for the operation of railways and railway transport:

- adopts a special measure comprised of the verification of whether the operator fulfils, in all aspects, the safety conditions for the operation of railway transport not only when submitting its request for the issuing of operator's safety certification, but also after any eventual subsequent changes to the information that it submitted with its request for the issuing of operator's safety certification.

Pilsen, 18 December 2008

Ing. Klára Majdlová
Senior Inspector at the Pilsen Territorial
Inspectorate

Ing. Petr Mencl
Director of the Pilsen Territorial
Inspectorate

7 ATTACHMENTS



Photo 1: View of the traction unit after the fire



Photo 2: View of the wagon after the fire