KÖZLEKEDÉSBIZTONSÁGI SZERVEZET

TRANSPORTATION SAFETY BUREAU

FINAL REPORT

2006- 0048-5
RAILWAY ACCIDENT

Komárom station
6 August 2006

The sole objective of the technical investigation is to reveal the causes and circumstances of serious railway accidents, accidents and incidents and to initiate the necessary technical measures and make recommendations in order to prevent similar cases in the future. It is not the purpose of this activity to apportion blame or liability.

This present investigation was carried out on the basis of

- Act CLXXXIV of 2005 on the technical investigation of aviation, railway and marine accidents and incidents (hereinafter referred to as Kbvt.),
- In absence of other related regulation of the Kbvt., the Transportation Safety Bureau of Hungary carried out the investigation in accordance with Act CXL of 2004 on the general rules of administrative authority procedure and service,
- MET Decree 7/2006. (II. 27.) on the regulations of the technical investigation of serious railway accidents, railway accidents and incidents.
- The Kbvt. and the MET Decree 7/2006. (II. 27.) jointly serve the compliance with the following EU acts:
  Directive 2004/49/EC of the European Parliament and of the Council of 29 April 2004 on safety on the Community's railways and amending Council Directive 95/18/EC on the licensing of railway undertakings and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification (Railway Safety Directive)
- The competence of the Transportation Safety Bureau of Hungary is based on the Kbvt. until 31st December 2006 and on Government Decree 278/2006 (XII. 23.) from 1st January 2007 respectively.

Under the aforementioned regulations

- The Transportation Safety Bureau of Hungary shall investigate serious railway accidents.
- The Transportation Safety Bureau of Hungary under its discretion can investigate railway accidents and incidents which - in its judgement - would have resulted in serious accidents in other circumstances.
- The technical investigation is independent of any administrative, infringement or criminal procedures.

This present final report

was based on the draft report prepared by the IC and accepted by the Director-General of TSB. The draft report was sent to the relevant parties - defined by law - for reflections. At the same time, the relevant parties and organisations were also informed and invited to the closing discussion of the draft report.

The following organisations were represented at the closing discussion which was held on 8th April 2008:

- National Transport Authority,

- MÁV Zrt. Infrastructure Management - Telecommunication, Heavy current and Signal box Department

The IC has not received any reflections, supplements or opinions different from the findings of the technical investigation.

In the course of the procedure, the IC

- conducted the necessary investigations and took measures in order to fulfil the objectives of the technical investigation within reasonable time:
- examined the site of the occurrence, the railway infrastructure, the railway vehicles and their accessories, and the damages,
- interviewed the persons in possession of relevant information
- received all relevant information and records.

The parties concerned cooperated in conducting the technical investigation.

Incompatibility did not stand against the members of the IC.

The members of the IC performed their tasks under the control of the Investigation-in-charge.

Persons participating in the technical investigation did not act as experts in other procedures concerning the same case and shall not do so in the future.

Abbreviations

BRKS a.s.	Bratislavská Regionálna Kolájová Spolocnost (Slovakian Railway Undertaking)
MET	Ministry of Economy and Transport
(GKM)	(Gazdasági és Közlekedési Minisztérium)
Kbvt.	Act CLXXXIV of 2005 on the technical investigation of aviation, rail and marine accidents and incidents
TSB	Transportation Safety Bureau of Hungary
MÁV ZRt.	Magyar Államvasutak Zártkörűen működő Részvénytársaság (Hungarian State Railways Plc.)
IC	Investigating Committee
RST (VBO)	Area Railway Safety Department of Safety Board - MÁV ZRt. (MÁV ZRt. Biztonsági Igazgatóság illetékes Területi Vasútbiztonsági Osztálya)

Summary

Reports and notifications

The head of traffic operations control of MÁV Zrt. reported the event to the TSB duty services at 06 hours 40 minutes on 6th August 2006.

The on duty personnel of TSB reported the event to TSB's head of department on duty at 06 hours 42 minutes on 6th August 2006.

The Director-General of TSB appointed the following Investigating Committee (hereinafter referred to as IC) on 6th August 2006 to investigate the accident:

Investigator-in-charge:	Zita Béleczki	
Field investigator technician:	Márton Kovács Dr.	
Member of IC:	Gábor Szeremeta	(substituting György Kulcsár)

Due to the relocation of György Kulcsár, the Director-General of TSB appointed Gabor Szeremeta as a member of the IC on 1st August 2007.

Time of the accident

6th August 2006, 05 hours 55 minutes (LT)

Legal basis of the investigation:	Article 19 (2) c. of Directive 2004/49/EC 7.§ (1) b) of Act CLXXXIV of 2005
Type of railway system:	National
Type of main occurrence:	Railway accident
Character:	Derailment
Type of secondary occurrent:	n. a.
Type of movement:	Freight train
Location category:	Station (marshalling yard) / Switch

Injuries to persons:

	Fatal	*Serious*	*Minor*	*None*
Passengers				☒
Railway staff				☒
LC users				☒
Trespassers				☒
Others				☒

Infrastructure manager:	MÁV Zrt.
Railway undertaking:	BRKS a.s. (Slovakian Railway Undertaking)

Location of the accident
No.1 main line Budapest – Hegyeshalom
Komárom marshalling yard, switch No. 428

Competent investigating authority (according to the location of the accident)
Transportation Safety Bureau

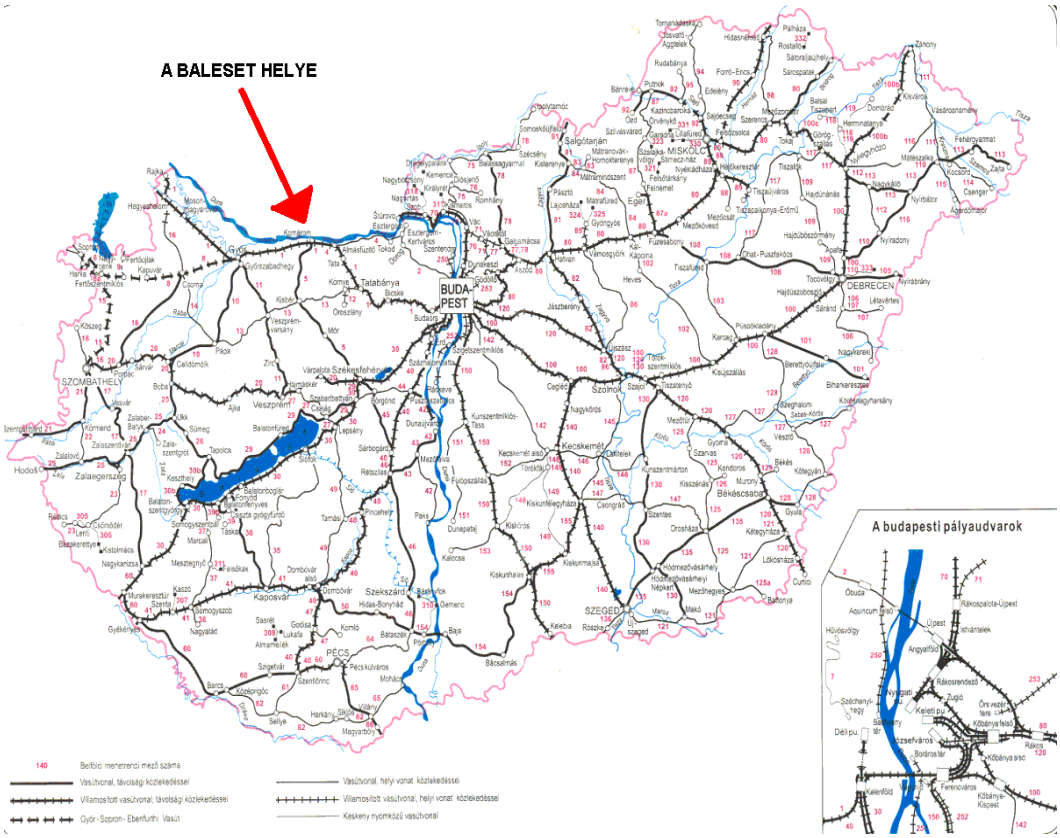

Figure 1: Komárom marshalling yard

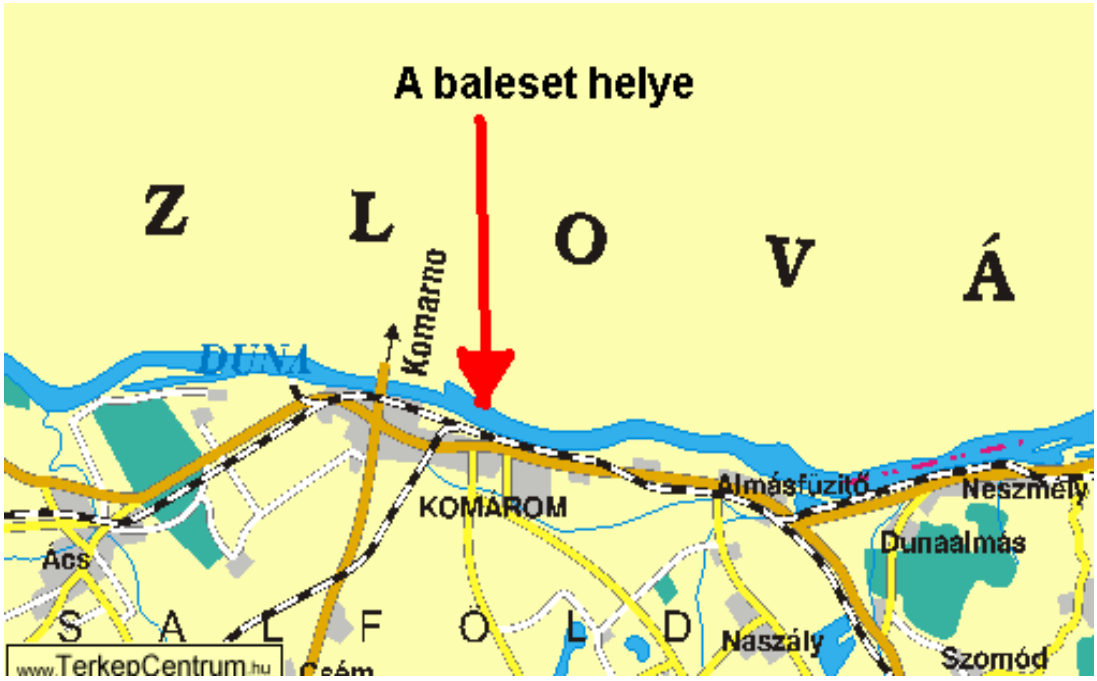

Figure 2: Location of the accident

1. Factual information

1.1. Course of the event

Train no. 45552 of BRKS a. s. railway undertaking was signalled out from platform no. XVI at Komárom marshalling yard in the direction of Komarno. At 05 hours 55 minutes, the first freight car derailed with 4 shafts and the second freight car with 2 shafts at the common crossing of switch no. 428.

No one was injured in the course of the accident. The rail track was slightly damaged. Neither the locomotive nor the surface elements of the safety installation suffered damage.

The investigation established that the accident was caused by a scotch block left under the first pair of wheels of the first freight car.

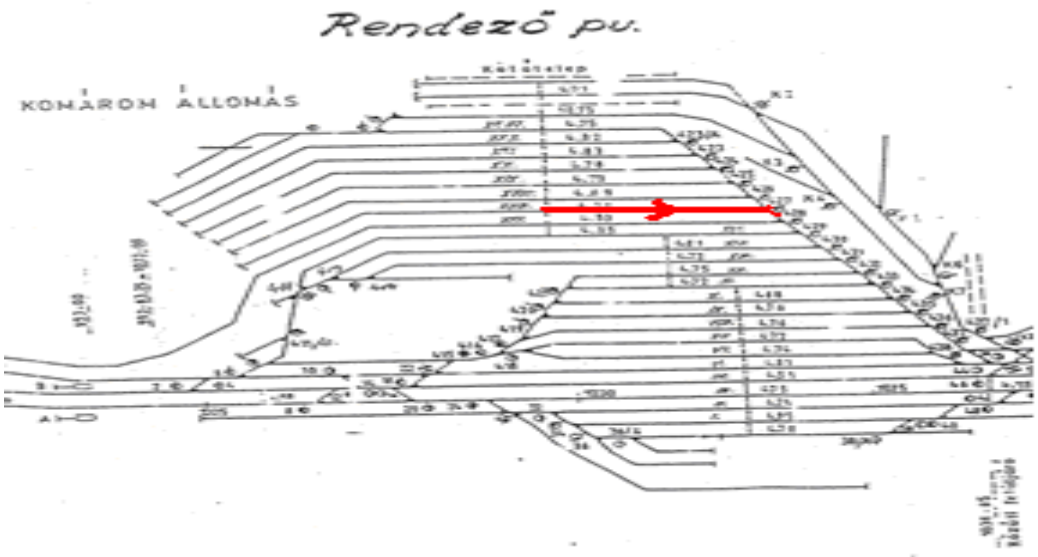

Figure 3: Lay-out of Komárom station

Figure 4: The endpoint side of the switching zone of Komárom marshalling yard

Figure 5: Location of the accident (switches 427, 428)

1.2. Injuries to persons

There were no injuries.

1.3. Damage to railway vehicles

- The electric locomotive (registration number: **BRKS a. s. 230 041-6**) was not damaged.

Figure 6: electric locomotive of train no. 45552

- **Sequenced cars**
  31 54 596 19864 Easu car derailed with 2 shafts and
  81 54 597 89716 Eas car derailed with 4 shafts and both were slightly damaged.

Figure 7: Derailed freight cars

1.4. Damage to infrastructure

- The surface elements of the safety installation were not damaged.
- The track was slightly damaged.

The IC did not receive any information about further damage by the completion of the investigation.

Based on the information received from the RST, the estimated amount of damages is 1,000,000 HUF.

The IC did not receive any information on the final amount of the damages by the completion of the draft report.

The environment did not suffer damage. The train did not transport dangerous goods.

1.5. Personnel information

Engine driver of train no. 45552

Gender:	male
Age:	unknown
Qualification:	electric engine driver
Job title at the time of the accident:	engine driver
Medical certificate valid:	07. 09. 2006.

Other personnel involved

– Second personnel on the locomotive on duty

Gender:	male
Age:	unknown
Qualification:	unknown
Job title at the time of the accident:	unknown
Medical certificate valid:	07. 07. 2007

The IC did not receive the requested information on the personnel of BRKS a. s. by the completion of this draft report.

– Movements inspector

Gender:	male
Age:	25 years
Job title at the time of the accident:	movements inspector
Place of work:	Komárom Station Management Office
Entering into service at MÁV Zrt.:	13. 09. 2005.

1.6. Train information

Train number	45552
Train type	freight train
Registration number of locomotive	230 041- 6
Owner of locomotive	BRKS s.a.
Owner of freight	Czech Railways
Number of freight cars	25
Length of train	375 metres
Tonnage	554 t
Prescribed braked weight percentage	64
Actual braked weight percentage	105

1.7. Meteorological information

At the time of the accident, the weather was calm and rainy. The temperature was approximately 15^{O}C. The visibility was good with normal daylight conditions.

As the meteorological conditions had no influence on the accident, a detailed description is not necessary.

1.8. Description of rail track and safety installation

The structure of the rail track was of 48 kg per linear metre rail fitted on reinforced-concrete sleepers in ballast chips. The target speed for the line is 40 km/h. The permitted speed of the reception sidings was 40m/h at the time of the accident. The permitted speed in the ladder of the switching zone was 10 km/h.

Track irregularities did not have an effect on the accident.

VES type electrodynamic signal box operates at Komárom station.
Due to its construction, the device does not have an built-in system for registering operations. Platforms I – VII of Komárom marshalling yard have their own exit light signal, while platforms VIII - XXIII receive signals from the so called “VrCs” exit signal. The switches at the start point and endpoint of the ladder which directs trains to platforms VIII – XXIII are all hand-operated on-site switches. When switching over a train, the switches of the start point of the ladder are controlled and checked by the movements inspector of post VIII, while the switches of the endpoint of the ladder are controlled and checked by the movements inspector of post X. There is no structural dependency between the hand-operated switches of the ladder and the common signals. The tracks – whether they are clear or occupied – are visually checked and their occupation is registered in the track occupation log.

The safety installations of Komárom station had no effect on the accident, therefore their detailed description is not necessary.

1.9. Communications

Communications equipment had no effect on the accident, therefore their detailed description is not necessary.

Telecommunication
The telecommunications equipment worked adequately at the time of the accident. There was no entry in the error logs regarding deficiencies.

1.10. Station information

Characteristics of the station had no effect on the accident, therefore their detailed description is not necessary.

1.11. Data recorders of trains

The electric locomotive (registration number **230 041-6)** of **BRKS a. s.** is equipped with an electromechanical “TELOC” system, „562A 109” type, data registering device (manufacturing number 84647, made in Czechoslovakia) which worked normally at the time of the accident. The measuring limit of the recording tachometer is 150 km/h, and the measuring limit of the strip chart recorder inside the tachometer is 120 km/h. The time, the speed and the recordings on the electromechanical strip chart recorder are clearly visible and can be evaluated.

During the investigation, the IC used the photograph taken of the original recordings.

1.12. Tests and research

There was no need to conduct tests and research for reaching the conclusion.

1.13. Organisational and management information

The IC did not receive any information on the previous service, the given rest time and the start of the actual service of the engine driver of freight train 45552 and of the second personnel on the locomotive.

According to the representative of BRKS a.s., the engine driver and the second personnel knew the line in question well and they were aware of the instructions required for their tasks established by MÁV Zrt.

For economical reasons, the movements inspector of post X of Komárom marshalling yard was not on duty. Therefore the movements inspector of post VIII – besides his duty at the start point of Komárom marshalling yard – also had to signal out the trains at the endpoint of the marshalling yard.

1.14. Additional information

Figure 8: The scotch block left under the first freight car causing the accident.

2. Analysis

The investigation proved that the Slovakian locomotive of train no. 45552 arrived at platform II at 04 hours 45 minutes. Then at approximately 05 hours 10 minutes, it changed tracks from platform II to platform XVI via track V (which is in the switching zone of post VIII). On platform XVI, a 25-car-train had already been prepared to be attached to the locomotive. The movements inspector at post VIII followed the locomotive along his own switching zone then going back to his post, he started to prepare for handing over his duties. He checked the occupation of the tracks and compared them with the entries in the track occupation log as well as checking the items in the inventory.

The personnel of BRKS a. s. attached the locomotive to the handed over train, carried out the technical inspection of the cars and the brake test. The second personnel on the locomotive stated on the site that he had attached the locomotive to the train and carried out the inspection. He went along the train on its right side. He put the device indicating the end of the train onto the last car, and then he went back to the locomotive on the other (left) side of the train. Meanwhile, he carried out the technical inspection and the necessary brake test, however, he did not notice the scotch block. At 05 hours 40 minutes, it was reported to the chief movements inspector that the train was ready to depart.

According to the statements, at 05 hours 40 minutes the chief movements inspector gave the instruction to the movements inspector of post VIII to signal out train 45552 on platform XVI. This task should have been carried out by the personnel of post X, but there was no one on duty there. The movements inspector of post VIII acknowledged this instruction but it was not registered in the log.

The movements inspector - walking along the right side of the train – checked whether there is any foreign object under the train. However, he did not check the first five cars behind the locomotive. Before signalling out the train, he checked the screw coupling and the air-brake hose between the locomotive and the first car. As he did not notice anything unusual, he signalled out the train.

The signalled out train 45552 departed from platform XVI and accelerated approximately to 15 km/h. The left front wheel of the first car pushed the scotch block in front of itself until the common crossing of switch no. 428 where the scotch block got stuck. As a result, the first freight car derailed with two shafts and the second freight car with four shafts. The scotch block flew off the rail due to the arising forces.

Having noticed the derailment, the engine driver stopped the train. In consequence of the derailment, train 45552 blocked platforms XVI-XXII from the traffic.

3. Conclusions

3.1. Immediate cause

The immediate cause of the accident was that during the coupling and the inspection of the train it was not noticed that the scotch block had been left under the left front wheel of the first freight car.

3.1.1. Other findings

In the course of the investigation, the IC found - independent from the accident - that point 26 of Station Regulations is not in accordance with 5.1 and 5.2 of F.2. Traffic Regulations. Station Regulations of Komárom prescribes the use of a certain type of scotch block to secure the trains from braking away. On the contrary, F.2. Traffic Regulations permits the use of a different type (and shape) of scotch block.

3.2 Rules and regulations

- Under the current regulations, and according to 7.4 of Traffic Regulations, the scotch block must be removed immediately after the coupling of standing cars.
- Station Regulations of Komárom prescribes the tasks and responsibilities of the movements inspectors, with consideration to local circumstances.
- The 'Local Accession Agreement of Komárom and Komarno for penetrating services' contains the tasks and responsibilities of BRKS a.s. personnel.

Both the personnel of MÁV Zrt. and BRKS a. s. private railway undertaking passed the required examinations concerning their tasks and responsibilities under the regulations.

4. Safety recommendations

4.1. Immediate preventive actions

Suggesting an immediate preventive action, TSB issued the following safety recommendation to MÁV Zrt. on 16th August 2006:

BA2006-048-5_1: TSB recommends the introduction of an instrument or sign which makes the scotch block clearly visible from a distance.

4.1.1. Measures taken

This safety recommendation has not been implemented.

4.1.2. Observations and opinions

BA2006-0048-5-01: According to the views of MÁV Zrt. – expressed in writing – the shape, colour and application of the scotch blocks are adequately and unambiguously regulated.

At the closing discussion the participants agreed that the current regulations were adequate but only in that case if they can be enforced and if the condition and visibility of the applied devices/equipment continuously comply with the regulations.

Nevertheless, the coat of paint on the scotch blocks wears off and become dirty very quickly during the constant usage which makes it difficult to notice them and therefore may lead to similar occurrences.

Having regard to the fact that the new Traffic Regulations - came into force on 6th April 2008 – prescribe the application of scotch blocks in a significantly wider range, a decision should be made on whether it is possible to maintain the condition (better visibility) of scotch blocks prescribed in the current regulation. If it is not possible, a new sign or indication should be applied which would make it easier to notice scotch blocks. (For examples for this solution, see 7.1.6 and 9.12 of No F.1. Signs Regulation).

4.2. Further safety recommendations

Based on the evaluations of the investigation, TSB issues the following safety recommendation:

BA2006-048-5_2: The IC recommends that point 26. of Station Regulations of Komárom should be revised.

See 3.1.1 for the reasons for this safety recommendation.

4.2.1. Measures taken, observations and opinions

BA2006-0048-5-02: MÁV Zrt. has arranged for the implementation of this safety recommendation.

Budapest, 4th July 2008

Zita Béleczki
Investigator-in-charge

Márton Kovács Dr.
Field investigator technician

Gábor Szeremeta
Member of IC